

13 Sprat in the Celtic Seas (subareas 6 and 7)

Most sprat fisheries in the Celtic Seas area are sporadic and occur in different places at different times. Separate fisheries have taken place in the Minch, and the Firth of Clyde (6.aN); in Donegal Bay (6.aS); Galway Bay and in the Shannon Estuary (7.b); in various bays in 7.j; in 7.aS; in the Irish Sea and in the English Channel (7.d–e). A map of these areas is provided in Figure 13.1.

The stock structure of sprat populations in this ecoregion is not clear. In 2014, HAWG presented an update of the available data on these sprat populations, in a single chapter. However, HAWG does not necessarily advocate that 6 and 7 constitutes a management unit for sprat, and further work is required to resolve the problem.

13.1 The Fishery

13.1.1 ICES advice applicable for 2019 and 2020

ICES analyzed data for sprat in the Celtic Sea and West of Scotland. Currently there is no TAC for sprat in this area, and it is not clear whether there should be one or several management units. ICES stated that there is insufficient information to evaluate the status of sprat in this area. Therefore, based on precautionary consideration, ICES advised that catches should not be allowed to increase in 2019. The TAC for the English Channel (7.d and e) is the only one in place for sprat in this area.

13.1.2 Landings

The total sprat landings, by ICES Subdivision (where available) are provided in tables 13.1.1–13.1.8 and in figures 13.2.1–13.2.8.

Division 6.a (West of Scotland and Northwest of Ireland)

Landings have been dominated by UK-Scotland and Ireland (Table 10.1.1). The Scottish fisheries have taken place in both the Minch and in the Firth of Clyde. The Irish fishery has always been in Donegal Bay. Despite the wide separation of these areas, the trends in landings between the two countries are similar, though the UK data have been higher. Irish data may be underestimated, due to difficulties in quantifying the landings from vessels of less than 10 m length.

The Scottish fishery is mainly for human consumption and is typically a winter fishery taking place in November and December, occasionally continuing into January. Landings were high in the early part of the time series peaking with average annual landings of ~ 7000 t in the period 1972 to 1978 (Figure 10.2.1). Landings were low for a period after this until a second peak in the period 1995 to 2000 where landings averaged just around 4600 tonnes annually. In 2005 to 2009 the fishery was virtually absent but has slowly picked up again since 2010. In 2013 landings reached 968 tonnes, lower than in 2012, but then increased again in the last 3 years, until 2176 t in 2016. In 2015 Irish landings were higher than the Scottish ones, with 1300 t, but decreased again to low values in 2016. 2018 landing were only recorded for Ireland and much lower than that of 2017, 1 tonne in total.

Division 7.a

The main historic fishery was by Irish boats, in the 1970s, in the western Irish Sea. This was an industrial fishery and landings were high throughout the 1970s, peaking at over 8000 t in 1978

(figures 13.2.2–3). The fishery came to an end in 1979, due to the closure of the fish meal factory in the area. It is not known what proportion of the catch was made up of juvenile herring, though the fishing grounds were in the known herring nursery areas. In the late 1990s and early 2000s, UK vessels landed up to 500 t per year. In recent years a trial fishery for sprat was carried out by the vessels that fish herring in the area. This was carried out to investigate the feasibility of a clean commercially viable sprat fishery. The results of the trials were inconclusive and plans to conduct further experiments are under discussion.

Irish Landings from 1950–1994 may be from 7.aN or 7.aS. Very high catches in 7.aS were reported in 2012 (Table 13.1.3) with a decrease in 2013 and only 16 t reported in 2014. In 2015 the catches raised again to over 3500 t and dropped again to less than 1000 t in 2016. Despite the high catches registered in some years, those figures should be interpreted with caution because they may be over-estimated. No landings from 7.aN were reported in 2009–2013 or 2018 (Table 13.1.2), however there have been reported landings of 522 t in 2014, 771 t in 2015 and 150 t in 2016 and 2017. With the exception of 2014, the last decade, Irish landings are mainly from 7.aS, predominantly from Waterford Harbour.

Divisions 7.b–c (West of Ireland)

Sporadic fisheries have taken place, mainly in Galway Bay and the Mouth of the Shannon. The highest recorded landings were in 1980 and 1981 during the winter of 1980/1981, when over 5000 t were landed by Irish boats (Table 13.1.4, Figure 13.2.4). This fishery took place in Galway Bay in the winter of 1980/1981 (Department of Fisheries and Forestry, 1982). Since the early 1990s landings fluctuated from very low levels to no more than 700 t per year in 2000. Zero catches were reported for 2016, increasing to above 500 tonnes in the two most recent years. Irish data may be underestimated, due to difficulties in quantifying the landings from vessels of less than 10 m length.

Divisions 7.g–k (Celtic Sea)

Sprat landings in the Celtic Sea from 1985 onwards are WG estimates. In the Celtic Sea, Ireland has dominated landings. Patterns of Irish landings in divisions 7.g and 7.j are similar, though the 7.j landings have been higher. Landings for 7.g and 7.j were aggregated in this report. Landings have increased from low levels in the early 1990s, with catches fluctuating between 0 t in 1993 and just under 4200 t in 2005 (Table 13.1.7). The average catches in the last 10 years were equal to 2452 t. Irish data may be underestimated, due to difficulties in quantifying the landings from vessels of less than 10 m length.

Divisions 7.d–e (English Channel)

Please refer to Section 12 (Sprat in subarea 7.de).

13.1.3 Fleets

Most sprat in the Celtic Seas Ecoregion are caught by small pelagic vessels that also target herring, mainly Irish, English and Scottish vessels. In Ireland, many polyvalent vessels target sprat on an opportunistic basis. At other times these boats target demersals and tuna, as well as other small pelagics. Targeted fishing takes place when there are known sprat abundances. However, the availability of herring quota is a confounding factor in the timing of a sprat-targeted fishery around Ireland.

Sprat may also be caught in mixed shoals with herring. The level of discarding is unknown, but based on a limited number of samples available to the working group this is estimated to be less than 1% of the catch.

In the English Channel the primary gear used for sprat is midwater trawl. Within that gear type between two and four vessels under 15 m have actively target sprat and have been responsible for the majority of landings (since 2003 they took on average 96% of the total landings). In the most recent year only three of the vessels have been targeting sprat. Sprat is also caught by drift-net, fixed nets, lines and pots and most of the landings are sold for human consumption.

In Ireland, larger sprats are sold for human consumption whilst smaller ones for fish meal. Other countries mainly land catches for industrial purposes.

13.1.4 Regulations and their effects

There is a TAC for sprat for 7.d–e, English Channel. No other TACs or quotas for sprat exist in this ecoregion. Most sprat catches are taken in small-mesh fisheries for either human consumption or reduction to fish meal and oil. It is not clear whether bycatches of herring in sprat fisheries in Irish and Scottish waters are subtracted from quota.

13.1.5 Changes in fishing technology and fishing patterns

There is insufficient information available.

13.2 Biological Composition of the Catch

13.2.1 Catches in number and weight-at-age

There is no information on catches in number or weight in the catch for sprat in this ecoregion.

13.2.2 Biological sampling from the Scottish Fishery (6a)

Between 1985 and 2002 the fishery was relatively well sampled and length and age data exists for this period with some gaps. Unfortunately, the data is not available electronically at the present time.

Sampling of sprat in 6.a came to an end in 2003 and no information on biological composition of catches exists in the period 2003–2011. Sampling was resumed in 2012 where a total of 8 landings were sampled. The sampling programme has been carried out since and it is anticipated that it will continue in the future.

13.3 Fishery-independent information

Celtic Sea Acoustic Survey

The Irish Celtic Sea Herring Acoustic Survey was used to calculate sprat biomass. Biomass estimates for Celtic Sea Sprat for the period November 1991 to October 2014 are shown in Figure 13.3.1 and Table 13.3.1. However, the survey results prior to 2002 are not comparable with the latter surveys because different survey designs were applied.

Since 2004 the survey has taken place each October in the Celtic Sea. Due to the lack of reliable 38 kHz data in 2010, no sprat abundance is available for this year.

It can be seen that there are large inter-annual variations in sprat abundance. Large sprat schools were notably missing in 2006, and so no biomass could be calculated. The utility of this survey as an index of sprat abundance should be considered carefully (Fallon *et al.*, 2012). Sprat is the second most abundant species observed from survey data. Sprat biomass over the time series up

to 2009 is highly variable, more so than could be accounted for by 'normal' inter survey variability (Figure 13.3.1). Biomass in 2015 is really high, while the value for 2016 dropped down again. This is in part due to the behaviour of sprats in the Celtic Sea which are often seen in the highest numbers after the survey has ended in November/December and again in spring during spawning. The survey is placed to coincide with peak herring abundance and is temporally mismatched with what would be considered sprat peak abundance.

Scottish Acoustic Surveys

A Clyde herring and sprat acoustic survey was carried out in June/July 1985–1990 and then discontinued (Figure 13.3.2 for coverage). Biomass estimates from all years as well as lengths and ages from some years are available from this survey but not presented here.

In 2012 this survey was reinstated as an October/November survey for herring mainly. Full results from these surveys for sprats are not available at the moment. Age and length distribution from the survey in 2012 are in Figure 13.3.3. In 2013 the survey was cancelled due to technical problems but has been continued up to 2018.

Scottish IBTS surveys

The Scottish West Coast IBTS has been carried out in Q1 since 1981 to the present and in Q4 from 1991 onwards (Figure 13.3.2). Although the survey is a ground fish bottom trawl survey it does catch sprat throughout the survey area. The survey provides numbers at length per haul and aggregated age-length keys on a sub area basis. In the period 1981 to 2012 a total of 1434 hauls were completed and approximately half of these caught sprat. Although the survey is still carried out the figure has not been updated in the last five years (2013 to 2018).

Northern Ireland Groundfish Survey

The Agri-Food and Biosciences Institute of Northern Ireland (AFBINI) groundfish survey of ICES Division 7.aN are carried out in March and October at standard stations between 53° 20'N and 54° 45'N (see Stock Annex for more detail on the survey). Sprat is routinely caught in the groundfish surveys however; data were not available at the time of submission of this report.

AFBI Acoustic Survey

The Agri-Food and Biosciences Institute of Northern Ireland (AFBINI) carries out an annual acoustic survey in the Irish Sea each September (see the Stock Annex for a description of the survey). While targeting herring, a sprat biomass is also calculated. The annual calculated biomass from 1998–2014 is shown in Figure 13.3.4 and Table 13.3.2. The biomass is estimated to have peaked in 2002 with 405 000 t and it has declined since then to just under 95 000 t in 2010. Recent estimates suggest an increase with 2014 being the second highest estimate in the time series, followed by a decline in the final year of the survey. Spatial distribution of sprat at the time of the survey is shown in Figure 13.3.5. Further work is required to investigate the utility of this survey for measuring sprat biomass in this area. No further updates were provided to the working group.

PELTIC Acoustic Survey

Please refer to Section 12 (Sprat in divisions 7.d-e).

FSP Acoustic Survey off the western English Channel

Please refer to Section 12 (Sprat in divisions 7.d-e).

IBTS Q1 in the Eastern English Channel

Please refer to Section 12 (Sprat in divisions 7.d-e).

13.4 Mean weight-at-age and maturity at age

No data on mean weight at age or maturity at age in the catch are available.

13.5 Recruitment

The various ground fish and acoustic surveys may provide an index of sprat recruitment in this ecoregion. However further work is required.

13.6 Stock Assessment

An analytical assessment was carried out for sprat in the English Channel at WKSPRAT 2013 and requires further development prior to its acceptance. Currently, the only assessment carried out in the Celtic ecoregion is for sprat in 7.d-e and it is based on a survey index of biomass (Please refer to Section 12 - Sprat in divisions 7.d-e).

13.7 State of the Stock

The state of the sprat stock in the Celtic Seas is currently unknown and the data available are not enough to provide any indication on its status. The only assessment available in the area for this species is for sprat in the English Channel (for that, please refer to Section 12 of this report).

13.8 Short term projections

No projections are presented for this stock.

13.9 Reference Points

No precautionary reference points are defined for sprat populations in the region

13.10 Quality of the Assessment

The stock status is unknown and the Working Group does not have enough information to assess the status of the stock in relation to reference points.

13.11 Management Considerations

Sprat is a short-lived species with large inter-annual fluctuations in stock biomass. The natural inter-annual variability in stock abundance, mainly driven by recruitment variability, is high and does not appear to be strongly influenced by the observed levels of fishing effort.

The sprat has mainly been fished together with herring. The human consumption fishery only takes a minor proportion of the total catch. Within the current management regime, where there is a by-catch ceiling limitation of herring as well as by-catch percentage limits, the sprat fishery is controlled by these factors. Most management areas in this ecoregion do not have a quota for sprat. However, there is a quota in 7.d-e, English Channel, which has not been fully utilized.

13.12 Ecosystem Considerations

In the North Sea Multispecies investigations have demonstrated that sprat is one of the important prey species in the North Sea ecosystem, for both fish and seabirds. At present, there are no data available on the total amount of sprat, and in general of other pelagic species, taken by seabirds in the Celtic Seas Ecoregion.

The Celtic Seas Ecoregion is a feeding ground for several species of large baleen whales (O'Donnell *et al.*, 2004–2009). These whales feed primarily on sprat and herring from September to February.

Table 13.1.1 Sprat in the Celtic Seas Ecoregion. Landings of sprat, 1985–2018, Division 6.a. Irish data may be underestimated, due to difficulties in quantifying the landings from vessels of less than 10 m length. (tonnes)

Country	Denmark	Faeroe Islands	Ireland	Norway	UK Eng+Wales+N.Irl.	UK Scotland	Total
1985	0	0	51	557	0	2946	3554
1986	0	0	348	0	2	520	870
1987	269	0	0	0	0	582	851
1988	364	0	150	0	0	3 864	4 378
1989	0	0	147	0	0	1 146	1 293
1990	0	0	800	0	0	813	1 613
1991	0	0	151	0	0	1 526	1 677
1992	28	0	360	0	0	1 555	1 943
1993	22	0	2 350	0	0	2 230	4 602
1994	0	0	39	0	0	1 491	1 530
1995	241	0	0	0	0	4 124	4 365
1996	0	0	269	0	0	2 350	2 619
1997	0	0	1 596	0	0	5 313	6 909
1998	40	0	94	0	0	3 467	3 601
1999	0	0	2 533	0	310	8 161	11 004
2000	0	0	3 447	0	0	4 238	7 685
2001	0	0	4	0	98	1 294	1 396
2002	0	0	1 333	0	0	2 657	3 990
2003	887	0	1 060	0	0	2 593	4 540
2004	0	0	97	0	0	1 416	1 513
2005	0	252	1 134	0	13	0	1 399
2006	0	0	601	0	0	0	601
2007	0	0	333	0	0	14	347
2008	0	0	892	0	0	0	892
2009	0	0	104	0	0	70	174
2010	0	0	332	0	0	537	869
2011	0	0	468	0	248	507	1 223
2012	0	0	113	0	0	1 688	1 801

Country	Denmark	Faeroe Islands	Ireland	Norway	UK Eng+Wales+N.Irl.	UK Scotland	Total
2013	0	0	487	0	0	968	1 455
2014	0	0	3	0	0	1 540	1 543
2015	0	0	1 305	0	0	1 060	2 365
2016	0	0	431	0	0	2 177	2 608
2017	0	0	604	0	0	1 354	1 958
2018	0	0	1	0	0	0	1

Table 13.1.2 Sprat in the Celtic Seas Ecoregion. Irish landings of sprat, 1985–2018 from Division 7.aN. Irish data may be underestimated, due to difficulties in quantifying the landings from vessels of less than 10 m length. (tonnes)

Country	Ireland	Isle of Man	UK Eng+Wales+N.Irl.	UK Scotland	Total
1985	668	0	20	0	688
1986	1 152	1	6	0	1 159
1987	41	0	0	0	41
1988	0	0	4	6	10
1989	0	0	1	0	1
1990	0	0	0	0	0
1991	0	0	3	0	3
1992	0	0	0	0	0
1993	0	0	0	0	0
1994	0	0	0	0	0
1995	0	0	30	0	30
1996	0	0	0	0	0
1997	0	0	2	0	2
1998	0	0	3	0	3
1999	0	0	146	0	146
2000	0	0	371	0	371
2001	0	0	269	3	272
2002	0	0	306	0	306
2003	0	0	592	0	592

Country	Ireland	Isle of Man	UK Eng+Wales+N.Irl.	UK Scotland	Total
2004	0	0	134	0	134
2005	0	0	591	0	591
2006	0	0	563	0	563
2007	0	0	0	0	0
2008	0	0	2	0	2
2009	0	0	0	0	0
2010	0	0	0	0	0
2011	0	0	0	0	0
2012	0	0	0	0	0
2013	0	0	0	0	0
2014	522	0	0	0	522
2015	792	0	0	0	771
2016	150	0	0	0	150
2017	150	0	0	0	150
2018	0	0	0	0	0

Table 13.1.3 Sprat in the Celtic Seas Ecoregion. Irish landings of sprat, 1985–2018 from Division 7.aS. Irish data may be underestimated, due to difficulties in quantifying the landings from vessels of less than 10 m length. (tonnes)

Country	Ireland
1985	0
1986	0
1987	0
1988	0
1989	0
1990	0
1991	0
1992	0
1993	0
1994	0

1995	0
1996	0
1997	0
1998	7
1999	25
2000	123
2001	7
2002	0
2003	3 103
2004	408
2005	361
2006	114
2007	0
2008	102
2009	0
2010	433
2011	1 535
2012	6 261
2013	2 545
2014	16
2015	3659
2016	935
2017	935
2018	1 117

Table 13.1.4. Sprat in the Celtic Seas Ecoregion. Landings of sprat, 1985–2018, from divisions 7.b–c. Irish data may be underestimated, due to difficulties in quantifying the landings from vessels of less than 10 m length. (tonnes)

Country	Ireland
1985	0
1986	0
1987	100
1988	0
1989	0
1990	400
1991	40
1992	50
1993	3
1994	145
1995	150
1996	21
1997	28
1998	331
1999	5
2000	698
2001	138
2002	11
2003	38
2004	68
2005	260
2006	40
2007	32
2008	1
2009	238
2010	0
2011	0
2012	23

Country	Ireland
2013	237
2014	0
2015	250
2016	0
2017	874
2018	508

Table 13.1.5 Sprat in the Celtic Seas Ecoregion. Landings of sprat, 1985–2018, from divisions 7.d–e. (tonnes)

Country	Denmark	France	Netherlands	UK Eng+Wales+N.Irl.	UK Scotland	Other	Total
1985	0	14	0	3 771	0	0	3 785
1986	15	0	0	1 163	0	0	1 178
1987	250	23	0	2 441	0	0	2 714
1988	2 529	2	1	2 944	0	0	5 476
1989	2 092	10	0	1 520	0	0	3 622
1990	608	79	0	1 562	0	0	2 249
1991	0	0	0	2 567	0	0	2 567
1992	5 389	35	0	1 791	0	0	7 215
1993	0	3	0	1 798	0	0	1 801
1994	3 572	1	0	3 176	40	0	6 789
1995	2 084	0	0	1 516	0	0	3 600
1996	0	2	0	1 789	0	0	1 791
1997	1 245	1	0	1 621	0	0	2 867
1998	3 741	0	0	1 973	0	0	5 714
1999	3 064	0	1	3 558	0	0	6 623
2000	0	1	1	1 693	0	0	1 695
2001	0	0	0	1 349	0	0	1 349
2002	0	0	0	1 196	0	0	1 196
2003	0	2	72	1 368	0	0	1 442
2004	0	6	0	0 836	0	0	842

Country	Denmark	France	Netherlands	UK Eng+Wales+N.Irl.	UK Scotland	Other	Total
2005	0	0	0	1 635	0	0	1 635
2006	0	7	0	1 969	0	0	1 976
2007	0	0	0	2 706	0	0	2 706
2008	0	0	0	3 367	0	0	3 367
2009	0	2	0	2 773	0	0	2 775
2010	0	2	0	4 408	0	0	4 410
2011	0	1	37	3 138	0	0	3 176
2012	6	2	8	4 458	0	0	4 474
2013	0	0	0	3 793	0	0	3 793
2014	45	0	275	3 358	0	0	3 658
2015	0	1	346	2 657	0	0	3 012
2016	185	7	231	2 867	0	49	3 339
2017	0	0	235	2 498	0	0	2 733
2018	474	1	0	1 776	0	0	2 252

Table 13.1.6 Sprat in the Celtic Seas Ecoregion. Landings of sprat, 1985–2018, Division 7.f. (tonnes)

Country	Netherlands	UK Eng+Wales+N.Irl.	Total
1985	273	0	273
1986	0	0	0
1987	0	0	0
1988	0	0	0
1989	0	0	0
1990	0	0	0
1991	0	1	1
1992	0	0	0
1993	0	0	0
1994	0	2	2
1995	0	0	0

Country	Netherlands	UK Eng+Wales+N.Irl.	Total
1996	0	0	0
1997	0	0	0
1998	0	51	51
1999	0	0	0
2000	0	0	0
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	0	0	0
2005	0	0	0
2006	0	0	0
2007	0	2	2
2008	0	0	0
2009	0	1	1
2010	0	7	7
2011	0	1	1
2012	0	2	2
2013	0	2	2
2014	0	1	1
2015	0	0	0
2016	0	1	1
2017	0	0	0
2018	0	0	0

Table 13.1.7 Sprat in the Celtic Seas Ecoregion. Landings of sprat, 1985–2018, divisions 7.g–k. Irish data may be underestimated due to difficulties in quantifying the landings from vessels of less than 10 m length. (tonnes)

Country	Denmark	France	Ireland	Netherlands	Spain	UK Eng+Wales+N.Irl.	Total
1985	0	0	3 245	0	0	0	3 245
1986	538	0	3 032	0	0	2	3 572
1987	0	1	2 089	0	0	0	2 090
1988	0	0	703	1	0	0	704
1989	0	0	1 016	0	0	0	1 016
1990	0	0	125	0	0	0	125
1991	0	0	14	0	0	0	14
1992	0	0	98	0	0	0	98
1993	0	0	0	0	0	0	0
1994	0	0	48	0	0	0	48
1995	250	0	649	0	0	0	899
1996	0	0	3 924	0	0	0	3 924
1997	0	0	461	0	0	6	467
1998	0	0	1 146	0	0	0	1 146
1999	0	0	3 263	0	0	0	3 263
2000	0	0	1 764	0	0	0	1 764
2001	0	0	306	0	0	0	306
2002	0	0	385	0	0	0	385
2003	0	0	747	0	0	0	747
2004	0	0	3 523	0	0	0	3 523
2005	0	0	4 173	0	0	0	4 173
2006	0	0	768	0	0	0	768
2007	0	0	3 380	0	1	0	3 381
2008	0	0	1 358	0	0	0	1 358
2009	0	0	3 431	0	0	0	3 431
2010	0	0	2 436	0	0	0	2 436
2011	0	0	1 767	0	0	12	1 779
2012	0	0	2 632	0	0	0	2 642

Country	Denmark	France	Ireland	Netherlands	Spain	UK Eng+Wales+N.Irl.	Total
2013	0	0	1 648	0	0	0	1 648
2014	0	0	2 311	0	0	0	2 311
2015	0	0	3 322	0	0	0	3 322
2016	0	0	3 248	0	0	0	3 189
2017	0	0	1 755	0	0	0	1 755
2018	10	0	1 955	0	0	0	1 965

Table 13.1.8 Sprat in the Celtic Seas Ecoregion. Landings of sprat, 1985–2018. Total Landings, subareas 6 and 7. Irish data may be underestimated, due to difficulties in quantifying the landings from vessels of less than 10 m length. (tonnes)

Country	Denmark	Faeroe Islands	France	Ireland	Isle of Man	Netherlands	Norway	Spain	UK England & Wales	UK Scotland	Other.	Total
1985	0	0	14	3 964	0	273	557	0	3 791	2 946	0	11 545
1986	553	0	0	4 532	1	0	0	0	1 173	520	0	6 779
1987	519	0	24	2 230	0	0	0	0	2 441	582	0	5 796
1988	2 893	0	2	853	0	2	0	0	2 948	3 870	0	10 568
1989	2 092	0	10	1 163	0	0	0	0	1 521	1 146	0	5 932
1990	608	0	79	1 325	0	0	0	0	1 562	813	0	4 387
1991	0	0	0	205	0	0	0	0	2 571	1 526	0	4 302
1992	5 417	0	35	508	0	0	0	0	1 791	1 555	0	9 306
1993	22	0	3	2 353	0	0	0	0	1 798	2 230	0	6 406
1994	3 572	0	1	232	0	0	0	0	3 178	1 531	0	8 514
1995	2 575	0	0	799	0	0	0	0	1 546	4 124	0	9 044
1996	0	0	2	4 214	0	0	0	0	1 789	2 350	0	8 355
1997	1 245	0	1	2 085	0	0	0	0	1 629	5 313	0	10 273
1998	3 781	0	0	1 578	0	0	0	0	2 027	3 467	0	10 853
1999	3 064	0	0	5 826	0	1	0	0	4 014	8 161	0	21 066
2000	0	0	1	6 032	0	1	0	0	2 064	4 238	0	12 336
2001	0	0	0	455	0	0	0	0	1 716	1 297	0	3 468

2002	0	0	0	1 729	0	0	0	0	1 502	2 657	0	5 888
2003	887	0	2	4 948	0	72	0	0	1 960	2 593	0	10 462
2004	0	0	6	4 096	0	0	0	0	970	1 416	0	6 488
2005	0	252	0	5 928	0	0	0	0	2 239	0	0	8 419
2006	0	0	7	1 523	0	0	0	0	2 532	0	0	4 062
2007	0	0	0	3 745	0	0	0	1	2 708	14	0	6 468
2008	0	0	0	2 353	0	0	0	0	3 369	0	0	5 722
2009	0	0	2	3 773	0	0	0	0	2 774	70	0	6 619
2010	0	0	2	3 200	0	0	0	0	4 415	537	0	8 154
2011	0	0	1	3 770	0	37	0	0	3 399	507.3	0	7 714
2012	6	0	2	9 029	0	8	0	0	4 460	1 688	0	15 193
2013	0	0	0	4 916	0	0	0	0	3 795	968	0	9 680
2014	45	0	0	2 852	0	275	0	0	3 339	1 540	0	8 050
2015	0	0	1	9 328	0	346	0	0	2 657	1 060	0	13 392
2016	185	0	7	4 763	0	231	0	0	2 868	2 177	49	10 280
2017	0	0	0	4 318	0	235	0	0	2 498	1 354	0	8 405
2018	484	0	1	3 580	0	0	0	0	1 776	0	0	5 842

Table 13.3.1. Sprat in the Celtic Seas Ecoregion. Sprat biomass by year in the Celtic Sea (Source: MI Celtic Sea Herring Acoustic Survey, ICES, 2016).

Year	Biomass (t)
Nov/Dec-91	36 880
Jan-92	15 420
Jan-92	5 150
Nov-92	27 320
Jan-93	18 420
Nov-93	95 870
Jan-94	8 035
Nov-95	75 440
2002	20 600
2003	1 395
2004	14 675
2005	29 019
2008	5 493
2009	16 229
2011	31 593
2012	35 100
2013	44 685
2014	33 728
2015	83 779
2016	28 016

Table 13.3.2. Sprat in the Celtic Seas Ecoregion. Annual sprat biomass in ICES Division 7.a (Source: AFBI annual herring acoustic survey).

Sprat & 0-group herring				Sprat
Year	Biomass (t)	CV	% sprat	Biomass (t)
1994	68,600	0.1	95	65,200
1995	348,600	0.13	n/a	n/a
1996	n/a	n/a	n/a	n/a
1997	45,600	0.2	n/a	n/a
1998	228,000	0.11	97	221,300
1999	272,200	0.1	98	265,400
2000	234,700	0.11	94	221,400
2001	299,700	0.08	99	295,100
2002	413,900	0.09	98	405,100
2003	265,900	0.1	95	253,800
2004	281,000	0.07	96	270,200
2005	141,900	0.1	96	136,100
2006	143,200	0.09	87	125,000
2007	204,700	0.09	91	187,200
2008	252,300	0.12	83	209,800
2009	175,200	0.08	78	136,200
2010	107,400	0.1	87	93,700
2011	280,000	0.11	85	238,400
2012	171,200	0.11	95	162,600
2013	255,300	0.09	77	197,500
2014	393,000	0.1	93	367,100
2015	237,000	0.09	84	199,100
2016				236,000
2017				
2018				



Figure 13.1. Sprat in the Celtic Seas Ecoregion. Map showing areas mentioned in the text.

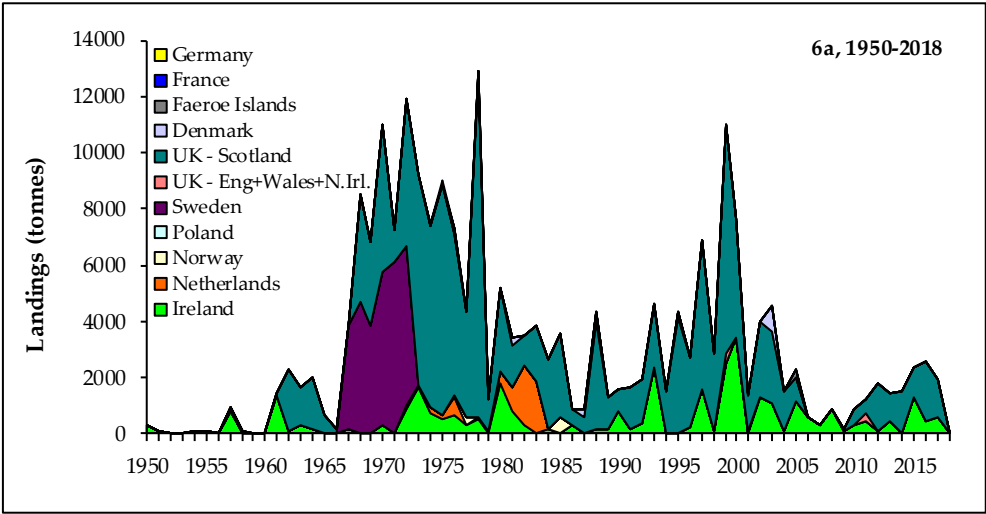


Figure 13.2.1. Sprat in the Celtic Seas Ecoregion. Landings of sprat 1950–2018 ICES Division 6.a.

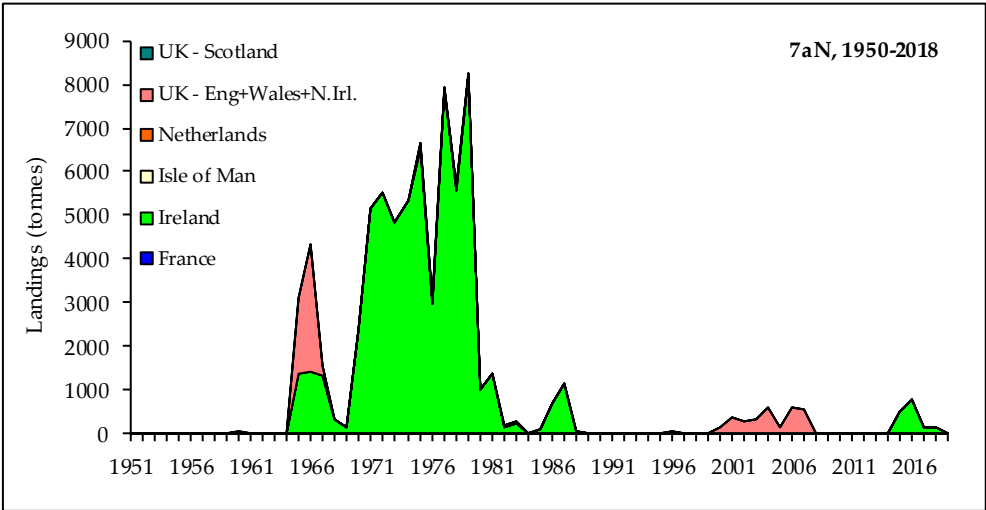


Figure 13.2.2. Sprat in the Celtic Seas Ecoregion. Landings of sprat 1950–2018 ICES Division 7.aN. Note: Irish landings from 1973–1995 may be from 7.aN or 7.aS.

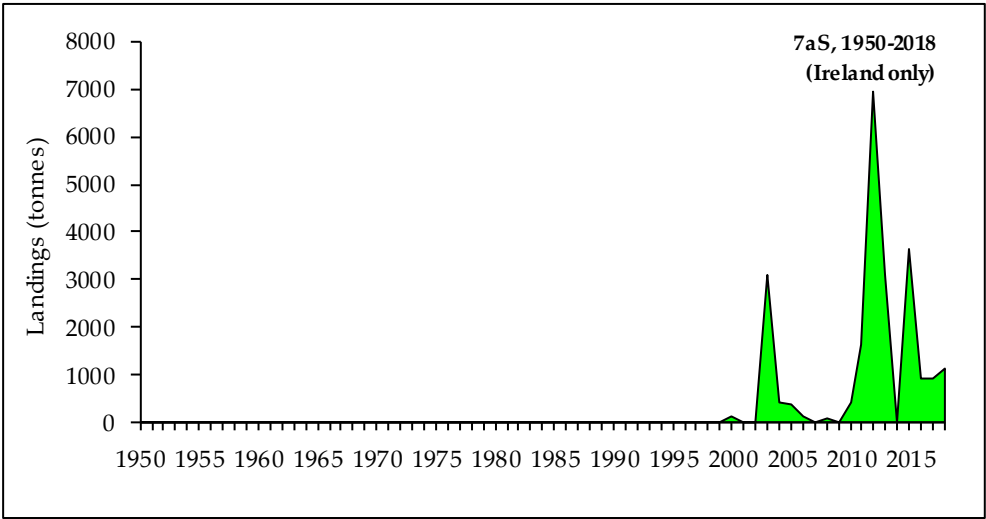


Figure 13.2.3. Sprat in the Celtic Seas Ecoregion. Landings of sprat 1950–2018 ICES Division 7.aS.

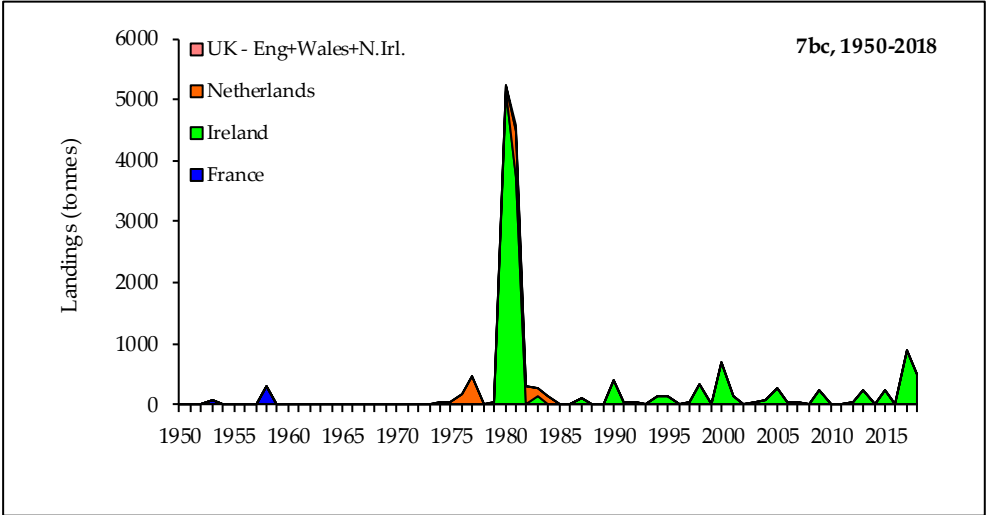


Figure 13.2.4. Sprat in the Celtic Seas Ecoregion. Landings of sprat 1950–2018 ICES divisions 7.b–c.

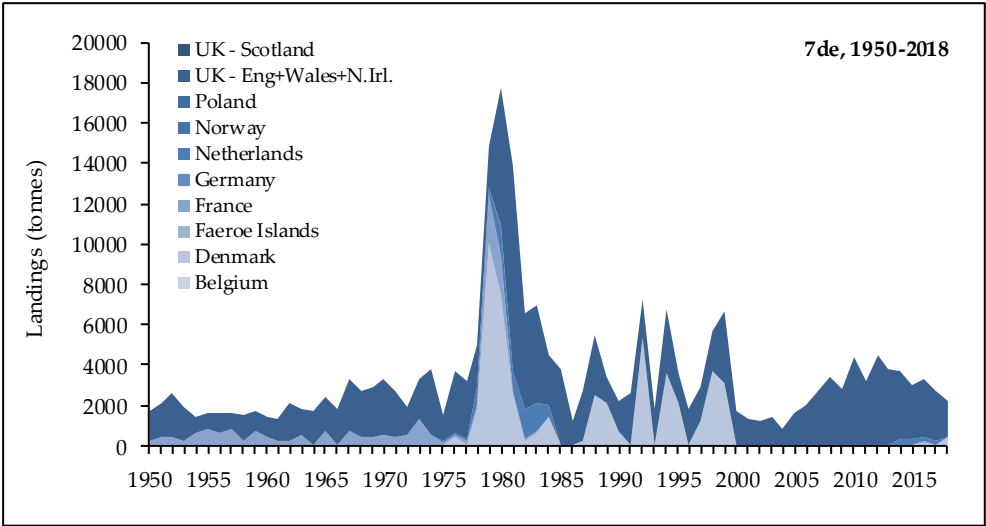


Figure 13.2.5. Sprat in the Celtic Seas Ecoregion. Landings of sprat 1950–2018 ICES divisions 7.d–e.

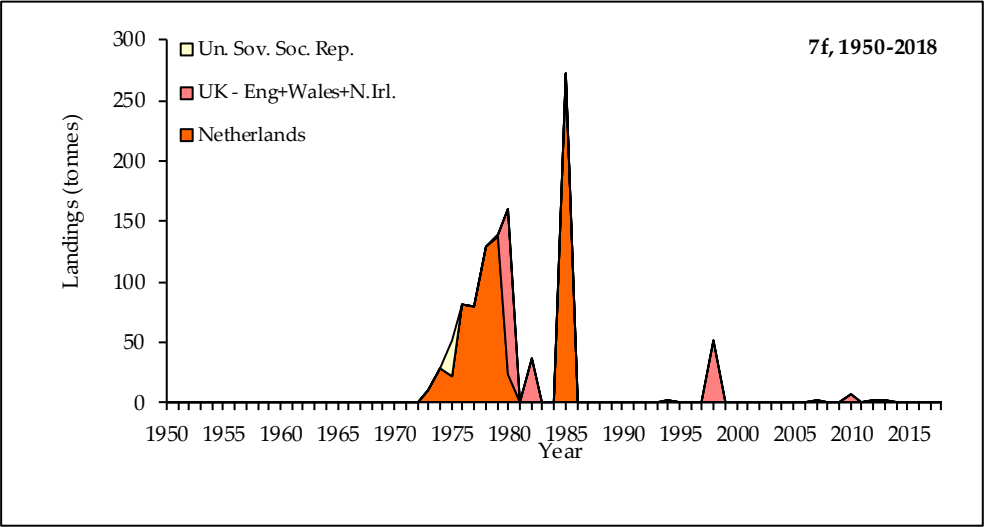


Figure 13.2.6. Sprat in the Celtic Seas Ecoregion. Landings of sprat 1950–2018 ICES Division 7.f.

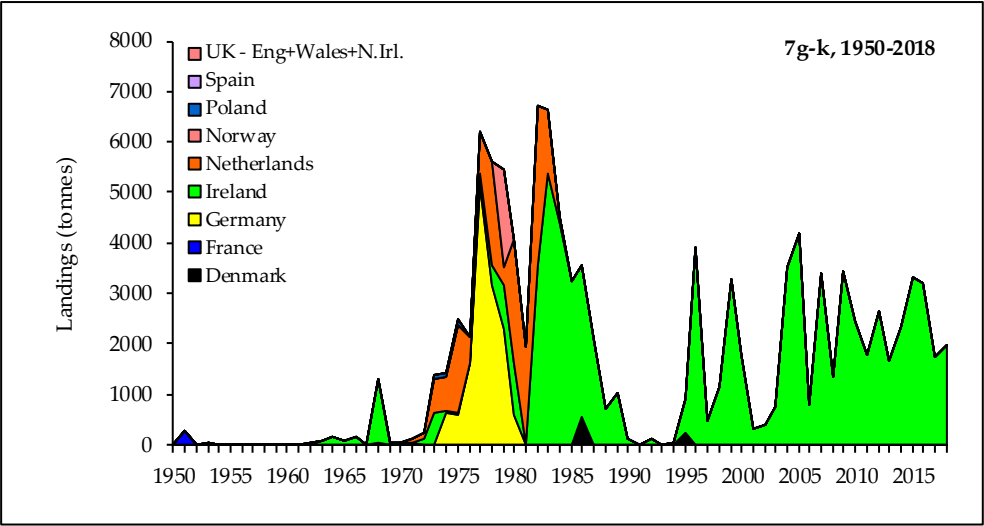


Figure 13.2.7. Sprat in the Celtic Seas Ecoregion. Landings of sprat 1950–2018 ICES divisions 7.g–k.

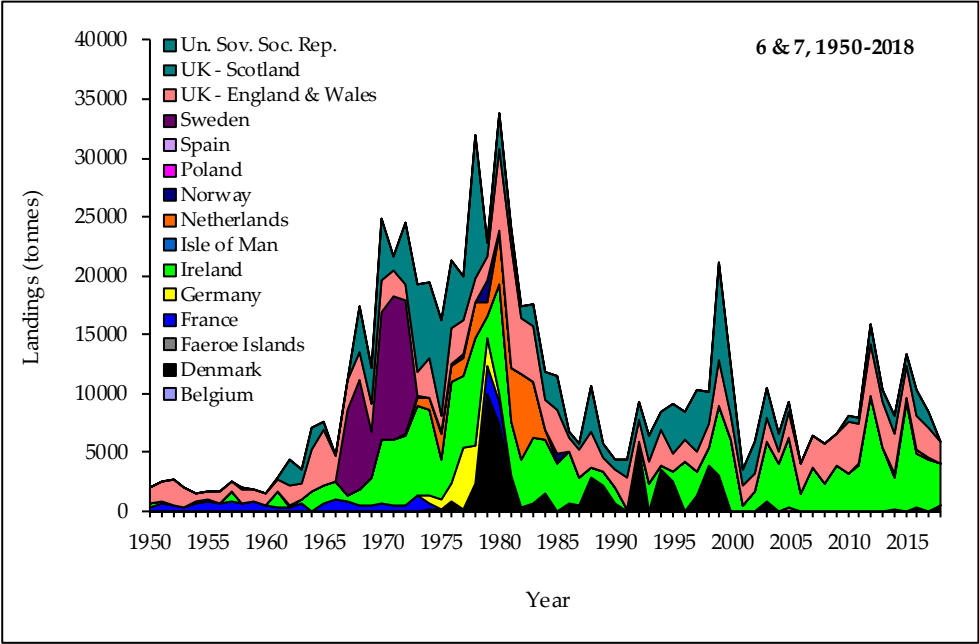


Figure 13.2.8. Sprat in the Celtic Seas Ecoregion. Landings of sprat 1950–2018 ICES subareas 6 and 7 (Celtic Seas Ecoregion).

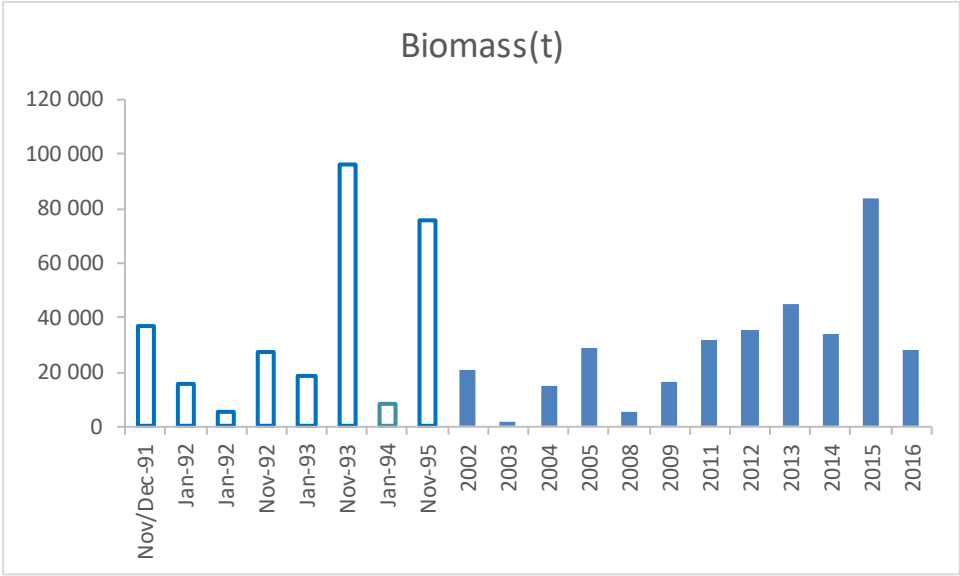


Figure 13.3.1. Sprat in the Celtic Seas Ecoregion. Estimated sprat biomass in the Celtic Sea. (Source: MI Celtic Sea Herring Acoustic Survey). Solid bars correspond to the period where the surveys are considered consistent.

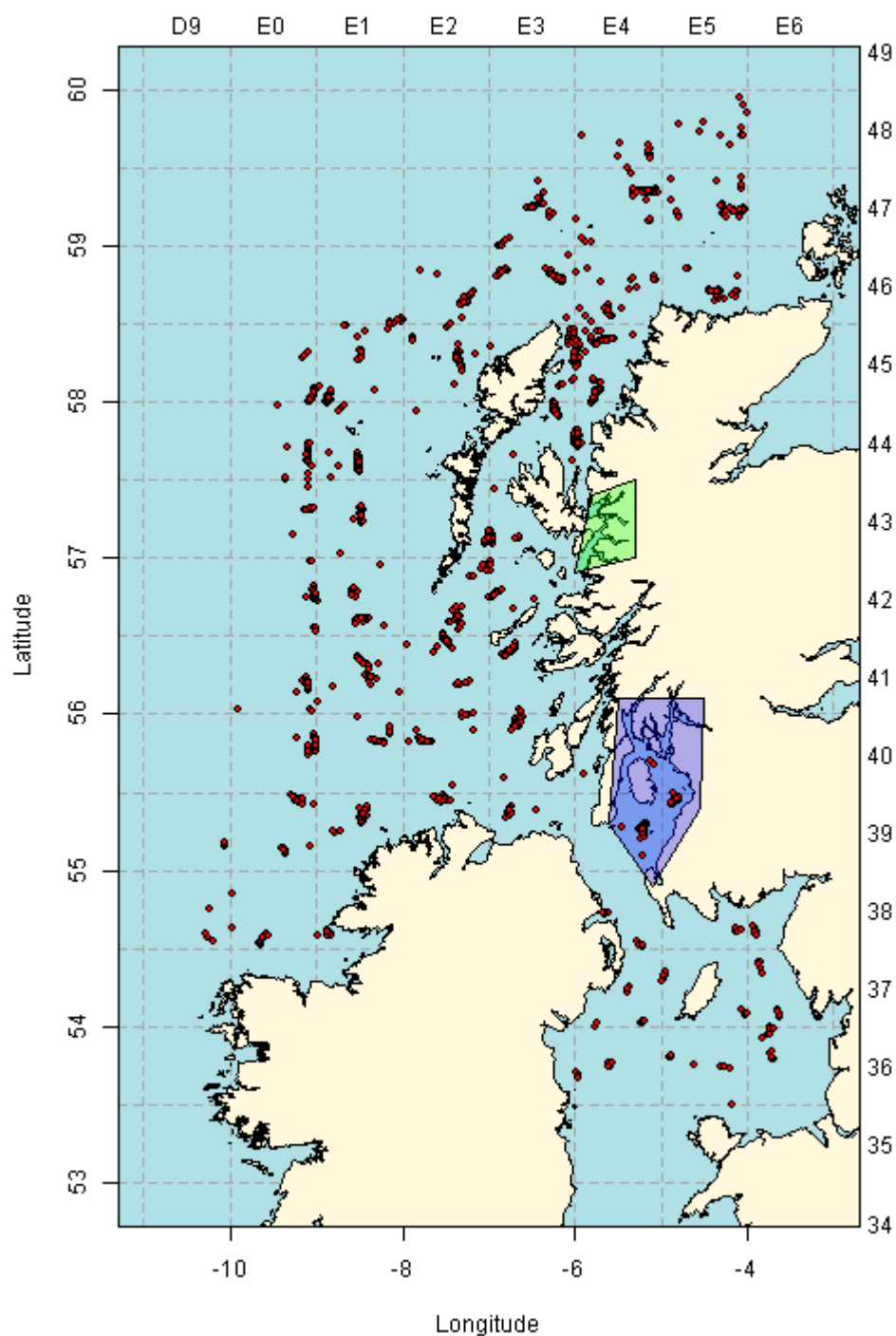


Figure 13.3.2: Extent of Scottish surveys that may provide information about sprat in 6.a. In purple is the extent of the Clyde Herring and Sprat Acoustic Surveys carried out in July between 1985 and 1989 and again in October 2012. In green is the extent of the Sea Lochs Surveys carried out annually in Q1 and Q4 between 2001 and 2005. Red markers indicate all hauls from the Q1 and Q4 Scottish West Coast IBTS between 1985 and 2012.

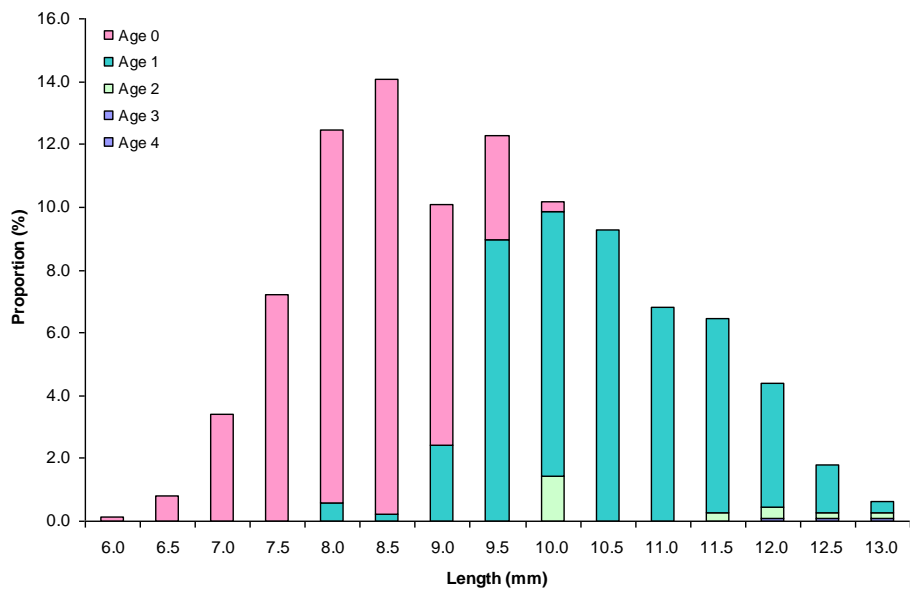


Figure 13.3.3. Length and age of sprat caught in the October 2012 Clyde Herring and Sprat Acoustic Survey. Data from six hauls were combined giving equal weight to the age and length distribution in each haul. 1442 sprat were measured and 182 were aged.

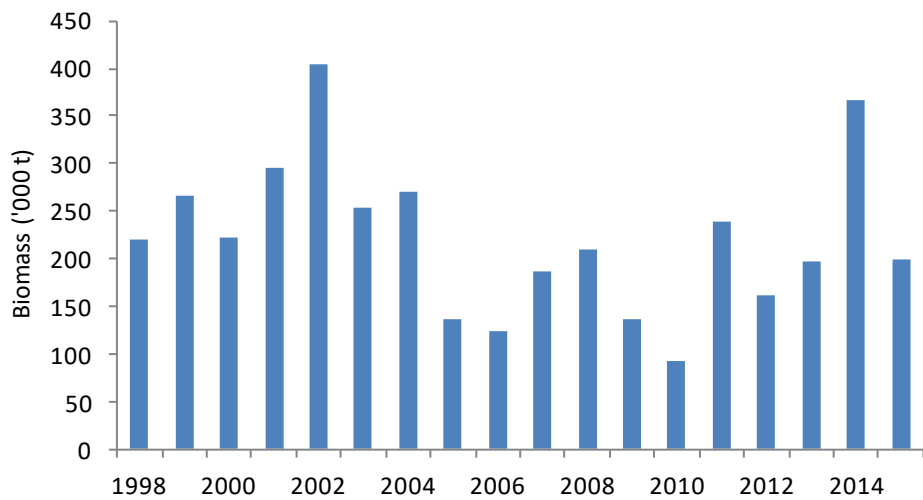


Figure 13.3.4. Sprat in the Celtic Seas Ecoregion. Annual sprat biomass in ICES Division 7.aN.

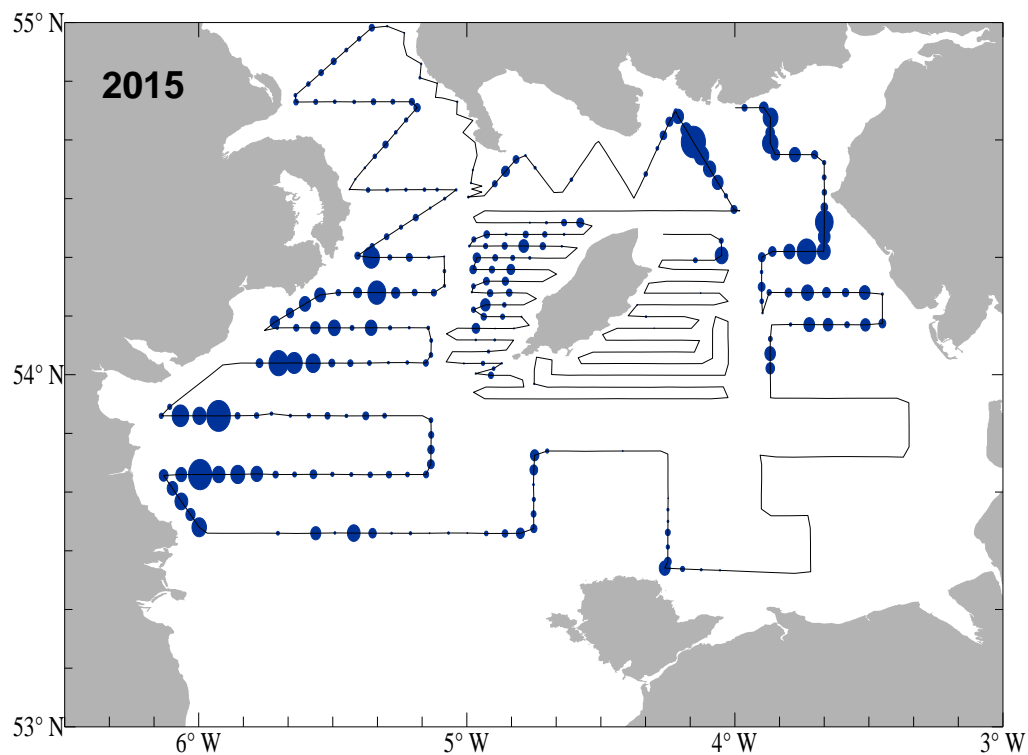


Figure 13.3.5. Sprat in the Celtic Seas Ecoregion. Sprat acoustic densities in ICES Division 7.aN. Size of ellipse is proportional to square root of the fish density (t n.mile^{-2} per 15-minute interval) for the UK (NI). September 2015 acoustic survey (AC(7.aN)). Maximum density was $470 \text{ t n.mile}^{-2}$.