

## 14 Demersal elasmobranchs in the Norwegian Sea

### 14.1 Ecoregion and stock boundaries

The Norwegian Sea connects with the Northeast Atlantic Ocean to the southwest, the Icelandic Waters ecoregion and Greenland Sea to the west along the edge to the shallower Iceland Sea between the Faroe Islands, and northwards to Jan Mayen. To the south it borders the shallower North Sea along the 62°N parallel between Norway and the Faroe Islands, and to the northeast with the shallower Barents Sea (ICES 2019). It comprises ICES Divisions 2.a-b.

The occurrence of chondrichthyan species in the Norwegian Sea ecoregion was reviewed by Lynghammar *et al.* (2013). In coastal areas, thorny skate *Amblyraja radiata* is the most abundant skate species (Williams *et al.*, 2008). While more abundant in the north, this species is common at all latitudes along the Norwegian coast.

Other species that have been confirmed in the coastal area are thornback ray *Raja clavata*, common skate complex (most likely flapper skate *Dipturus intermedius* (Lynghammar *et al.*, 2014; C. Junge, pers. obs.)), sailray *Rajella lintea*, Norwegian skate *Dipturus nidarosiensis*, sandy ray *Leucoraja circularis*, shagreen ray *Leucoraja fullonica*, round skate *Rajella fyllae*, arctic skate *Amblyraja hyperborea* and spinytail skate *Bathyraja spinicauda*. Long-nose skate *Dipturus oxyrinchus* is distributed mainly along the southern section of the coastline, south of latitude 65°N. Records of blond ray *R. brachyura* and spotted ray *R. montagui* need to be confirmed by voucher specimens, although they are present in catch statistics (Lynghammar *et al.*, 2014).

In deeper areas of the Norwegian Sea, *A. radiata* and *A. hyperborea* are the two most abundant species, but *B. spinicauda* and *R. fyllae* also occur regularly, particularly north of 70°N (Skjaeraasen and Bergstad, 2001; Vollen, 2009 WD).

Sharks in the Norwegian Sea ecoregion include spurdog *Squalus acanthias* (Section 2), velvet belly lanternshark *Etmopterus spinax* (Section 5), porbeagle *Lamna nasus* (Section 6), basking shark *Cetorhinus maximus* (Section 7), Greenland shark *Somniosus microcephalus* (Section 24), black-mouth catshark *Galeus melastomus*, and lesser-spotted dogfish *Scyliorhinus canicula* (Section 25). One chimaera, the rabbitfish *Chimaera monstrosa*, is also found in the Norwegian Sea.

Stock boundaries of skates and rays in the Norwegian Sea are not known, neither are the potential movements of species between the coastal and offshore areas. Further investigations are necessary to determine potential migrations or interactions of elasmobranch populations within this ecoregion and adjacent areas.

### 14.2 The fishery

#### 14.2.1 History of the fishery

There are no fisheries targeting skates or sharks in the Norwegian Sea, though they are caught in various demersal fisheries targeting teleost species. All skate species in the ecoregion may be taken as bycatch, with only larger individuals thought to be landed (see Section 14.3).

#### 14.2.2 The fishery in 2021

No new information.

### 14.2.3 ICES advice applicable

ICES does not provide advice for the skate stocks in this ecoregion, although some stocks of North Sea skates may extend into the southern parts of the Norwegian Sea.

### 14.2.4 Management applicable

There are no TACs for any of the skate stocks in this ecoregion.

Norway has a general ban on discarding. Since 2010, all dead or dying skates in the catches should be landed, whereas live specimens can be discarded.

## 14.3 Catch data

### 14.3.1 Landings

Landings data for skates are provided for the years 1973–2021 (Table 14.1). For ICES Subarea 2, landings data are limited and, for skates, aggregated across all species. This Subarea covers all of the Norwegian Sea ecoregion, but also includes the most westerly parts of the Barents Sea ecoregion (Section 13).

Overall landings throughout time have been low, ca. 200–330 t per year for all fishing countries, with moderate fluctuations. The peak in the late 1980s resulted from Russian fisheries landing over 1900 t of skates in 1987, subsequently dropping to low levels two years later. This peak was a consequence of an experimental fishery, when skate bycatch was landed, whereas normally they are discarded (Dolgov, pers. comm.). Russia and Norway are the main countries landing skates from the Norwegian Sea and Figure 14.1 shows their landings from 1973 to 2021.

Landings data (usually not discriminated at species level) since 2010 have been provided by Norway (2010–2021), France (2010–2013), Germany (2010, 2013–2020), the UK (2010–2011, 2013, 2015–2016, 2021), Spain (2010, 2012–2014), the Netherlands (2015), and Denmark (2021). Russian landings have not been available since 2010.

Based on data from the Norwegian Reference fleets, and the expert judgement detailed in Albert *et al.* (2016 WD), Norwegian landings by species and species groups from ICES Subarea 2 were estimated (Table 14.2). The main species landed tend to be larger specimens of *Dipturus oxyrinchus*, *Bathyraja spinicauda* and *Raja clavata*.

### 14.3.2 Discard data

Based on interviews of the Norwegian Reference Fleet and landing sites, the expected discards of skates vary extensively between species and is assumed to be almost 100% for specimens <50 cm TL. For *Rajella fyllae* and *Amblyraja radiata*, nearly all specimens are probably discarded, whereas the discarding of *Raja clavata* by the coastal fleet is expected to be negligible (Albert *et al.*, 2016 WD).

### 14.3.3 Quality of catch data

Catch data are not species disaggregated.

Recent data on skate catch and landings in the Norwegian Sea are almost exclusively from Norway, and species information from the Norwegian Reference Fleet (Table 14.2) may be indicative of the species composition of total catch and landings. The estimation of total skate catches and

landings by species relied on some strong assumptions, e.g., that data from the Coastal and Oceanic Reference Fleets operating in the Norwegian Sea are representative of vessels below and above 21 m, respectively. Also, that the relative species composition of skate catches in either of these two reference fleets has been stable over the last ten years. These assumptions were made due to limited data availability.

Even after allocating skate landings to species based on data from the Reference Fleet, the generic “Skates and rays” category still accounted for about 30% of the total skate landings. A further reduction of this proportion should, however, be achievable in the future. Work on improving species identification by arranging workshops for reference fleet crew and education during visits at sea is ongoing.

As mentioned here since 2016, in addition, the splitting by species should also be validated by independent surveys. The best way to do this is probably to include skates on the list of species sampled from selected landing ports. Skates are mostly landed as wings in Norway, which can make conventional species identification more difficult (although skate identification could be confirmed with genetic barcoding). Programmes for market sampling of skate landings could usefully be undertaken.

#### **14.3.4 Discard survival**

No data is available to WGEF for the fisheries in this ecoregion.

### **14.4 Commercial catch composition**

#### **14.4.1 Species and size composition**

In 2009, Russian landings of skates were taken as bycatch during the longline and trawl demersal fisheries at depths ranging from 50–900 m deep in February–November. The main skate caught was *A. radiata*, with *A. fyllae*, *A. hyperborean*, and *B. spinicauda* found in minor quantities (Vinnichenko *et al.*, 2010 WD).

*A. radiata* (27–58 cm  $L_T$ ) were recorded in the commercial bottom-trawl catches, comprising mostly males of 41–55 cm and females of 36–50 cm (Figure 14.2a). The proportion of small individuals was lower than in the Barents Sea. The mean length of females (43.7 cm) was smaller than that of males (45.0 cm). Males were slightly more abundant in catches (sex ratio of 1.1:1).

Vinnichenko *et al.* (2010 WD) presented data on *A. radiata* compiled from samples taken by scientific observers on commercial fishing vessels, the Russian survey, and the joint Russian–Norwegian surveys. These are presented in Section 14.6.

#### **14.4.2 Quality of the data**

Information on the species composition of commercial catches is required.

Data from the Norwegian Reference Fleet demonstrated that elasmobranch catches in ICES Sub-area 2 were dominated by *A. radiata* and *R. clavata* (Table 14.2; Vollen, 2010 WD), although misidentification problems may exist.

For vessels in the Oceanic Reference Fleet, elasmobranch bycatch differed between bottom trawl, bottom gillnet and longline. Whereas *A. radiata* made up the bulk of trawl and longline catches (55% and 79% by numbers, respectively), *R. clavata* dominated in gillnet catches (82%). This was probably influenced by the dominance of trawl and longline vessels further north, and more southerly fishing grounds for gillnetters, but potential misidentifications issues should also be

investigated. Catches of *A. radiata* were higher in Subarea 2 than in Subarea 1 for trawl catches (61 kg per 100 trawl hours for Subarea 2; 43 kg per 100 trawl hours for Subarea 1), but lower for longline catches (119 kg per 10 000 hooks vs. 135 kg per 10 000 hooks, respectively).

Data from the Coastal Reference Fleet indicated that the common skate complex (most likely misidentified) and unidentified skates dominated the landed catches in this area (39% and 33% by weight, respectively). Discards were dominated by unidentified skates (32% by weight). As opposed to the Oceanic Reference Fleet, *A. radiata* was only sporadically recorded in this area.

## 14.5 Commercial catch and effort data

Limited data available (but see above).

## 14.6 Fishery-independent surveys

### 14.6.1 Russian bottom trawl survey (RU-BTr-Q4)

Vinnichenko *et al.* (2010 WD) reported that catches from the 2009 survey were dominated by *A. radiata* (10–56 cm L<sub>T</sub>; Figure 14.2b). In the size distribution, different size/age classes were distinct. The mean length of males (37.7 cm) and females (37.4 cm) were similar, and males predominated slightly (sex ratio = 1.05:1).

*A. hyperborea* (17–91 cm L<sub>T</sub>) were recorded in the catches (Figure 14.2d; specimens > 131 cm were not considered here as they are thought to be typing errors or species misidentifications). The mean length of males (65.1 cm) and females (65.8 cm) were similar, and mostly males were caught (sex ratio = 5:1).

### 14.6.2 Norwegian coastal survey (NOcoast-Aco-4Q)

The distribution and diversity of elasmobranchs in northern Norwegian coastal areas, based on survey data from 1992–2005, were summarized by Williams *et al.* (2008). The southern portion of the coastal area studied was incorporated within the Norwegian Sea ecoregion, and the Barents Sea was defined as the border between Norwegian Directorate of Fisheries Statistical Areas 04 and 05 (<https://portal.fiskeridir.no/portal/apps/webappviewer/index.html?id=ea6c536f760548fe9f56e6edcc4825d8>).

Thirteen skate species and four species of shark were recorded from the coastal region (Table 14.3). Regularly occurring skates were *A. radiata*, *A. hyperborea*, common skate complex (most likely *Dipturus intermedius* (Junge/Lynghammar, pers. comm)), *D. nidarosiensis*, *D. oxyrinchus*, *Raja clavata*, *Rajella fyllae* and *L. fullonica*. Occasional or single observations were made of *B. spinicauda*, *R. lintea* and *L. circularis* (also *R. montagui*, *R. brachyura* were nominally recorded, but see Section 14.6.5). Four species of shark were identified: *E. spinax*, *G. melastomus* and *S. acanthias*, as well as one specimen of *S. microcephalus*.

*A. radiata* appeared to fluctuate in both biomass and numbers, but the stock had an increasing trend in 2008–2016 (Knutson *et al.*, 2017 WD). *D. oxyrinchus* also fluctuated in biomass, but only slightly in numbers, indicating variance in size composition of the survey catch between years. However, the overall trends in biomass and numbers were positive. The estimates of biomass and abundance of *R. fyllae* were stable over the time-series (2003–2016) (Knutson *et al.*, 2017 WD).

Although no clear shifts in abundance over time were detected for any species, more robust assessment is necessary to better identify temporal trends in abundances.

### 14.6.3 Deep stations from multiple Norwegian surveys (NO-GH-Btr-Q3 and others)

Vollen (2009 WD) reported on elasmobranch catches from 3185 deep trawl hauls (400–1400 m) along the continental slope (62–81°N) from the Barents Sea to the Skagerrak. Data were combined from multiple deep-water surveys during the period 2003–2009. Data from the Skagerrak are excluded in this section, whereas parts of the Barents Sea ecoregion are included. Overall, nine species (six skates and three sharks) were recorded. *A. radiata* and *A. hyperborea* were the dominant species north of 62°N (ICES Subarea 2), whereas *E. spinax* was most numerous in the Norwegian Deep (Division 3.a). *B. spinicauda* and *R. fyllae* also occurred frequently in the catches in all areas. Reports of *R. clavata* were considered to be misidentifications of other species. Results were reported in more detail in ICES (2009).

### 14.6.4 Joint Russian-Norwegian survey (BS-NoRu-Q1 (BTr), Eco-NoRu-Q3 (Aco)/Eco-NoRu-Q3 (Btr))

Two joint Russian–Norwegian surveys are conducted in the Barents Sea: one during February (BS-NoRu-Q1 (BTr)) in the southern Barents Sea northwards to the latitude of Bear Island, and another in August–September (Eco-NoRu-Q3 (Aco)/Eco-NoRu-Q3 (Btr)) covering much of the Barents Sea, including waters near Spitsbergen and Franz Josef Land. The Norwegian part of the February survey started in 1981, but data on elasmobranchs are missing for some years. The August–September survey started in 2003. All skates are recorded during these surveys, and data on length distributions as well as some biological data (on board Russian vessels) are collected. As a result of initial problems with species identification, species-specific data should only be used from the years 2006–2007 onwards (for Norwegian data). Analyses of data from these surveys are not complete, but some data from the 2009 surveys are presented in Vinnichenko *et al.* (2010 WD).

*A. radiata* was the dominant species in the August–September survey. The length range was 5–61 cm total length (TL), with most specimens in the range 33–37 cm (Figure 14.2c; Vinnichenko *et al.*, 2010 WD).

Vinnichenko *et al.* (2010 WD) also presented data on *A. radiata* compiled for samples collected by scientific observers on commercial fishing vessels, the Russian survey, and the joint Russian–Norwegian surveys. Males prevailed in these samples (1.7:1). Most males and females (over 70%) were immature, the rest were in developing stages or were mature. Unlike in the Barents Sea, no individuals at the active stage were reported in the area. The main prey (by weight) were crustaceans (spider crab *Hyas* spp.: 33%; northern shrimp *Pandalus borealis*: 14%; amphipods: 6%), fish (capelin *Mallotus villosus*: 14%; Atlantic hookear sculpin *Artediellus atlanticus*: 12%; unidentified fish remains: 6%) and polychaete worms.

### 14.6.5 Quality of survey data

The difficulties associated with identifying skate species are a concern when considering the validity of the data used for any assessment. Identification problems between *A. radiata* and *R. clavata* were highlighted by Williams (2007) and summarized in ICES (2007). Despite sampling since 2007, Lynghammar *et al.* (2014) did not catch any specimens of common blue skate *Dipturus batis*, *R. brachyura* or *R. montagui* in the Norwegian Sea: giving more credence to suspected misidentifications in earlier years. Indeed, a record of *R. montagui* from central Norway was known from a museum specimen, but Lynghammar *et al.* (2014) identified it as *R. clavata*. *D. intermedius*

may occur in small numbers in the Norwegian Sea. There were also no contemporary records of *L. fullonica*, though this species was reported in historical accounts.

To achieve a better quality of survey data, it is important to improve the identification practices and use appropriate identification literature. Ongoing work to improve sampling at the Institute of Marine Research includes workshops to educate staff as well as improved guides and keys used for species identification, including a new simplified guide for commercial longliners since January 2021. A workshop series in 2019 established the basis for an updated complete identification guide that is to be used for surveys and by the reference fleet.

## 14.7 Life-history information

Some length data are available for *A. radiata* and *A. hyperborea* (Vinnichenko *et al.*, 2010 WD; ICES, 2010). Some biological information is also available in the literature (e.g., Berestovskii, 1994). Sampling of elasmobranch egg-cases was included in Norwegian trawl surveys from mid-2009 until 2020 (from 2021: egg cases are still recorded but only sampled when caught in large numbers per station), which may provide future information on nursery grounds.

## 14.8 Exploratory assessment models

Due to limited data availability, no exploratory assessments have been conducted. Analyses of survey trends may allow evaluation of the status of more frequently caught species, although species identification issues need to be addressed first.

## 14.9 Stock assessment

No assessments have been conducted.

## 14.10 Quality of assessments

No assessments have been conducted.

## 14.11 Reference points

No reference points have been proposed for any of these skate stocks.

## 14.12 Conservation considerations

The International Union for Conservation of Nature and Natural Resources (IUCN Red List of Threatened species (IUCN, 2017)) listings for species occurring in this area include (assessment year in parentheses):

- “Critically endangered”: common skate complex (2006; Europe: 2015) – this complex comprises *Dipturus batis* and *Dipturus intermedius*, but their status has not been assessed on a species level yet
- “Endangered”: *L. circularis* (2014)
- “Vulnerable”: *L. fullonica* (2014)
- “Near threatened”: *B. spinicauda* (2006), *D. nidarosiensis* (2014), *D. oxyrinchus* (2014) and *R. clavata* (2005; Europe: 2014)

Demersal elasmobranchs listed on the Norwegian Red List (Nedreaas *et al.*, 2015), excluding species assessed as “Least concern”, is only the common skate complex (“Critically endangered”).

### 14.13 Management considerations

There are no TACs for any of the skates in this ecoregion. The demersal elasmobranch fauna of the Norwegian Sea comprises several species that also occur in the Barents Sea (Section 13) and/or the North Sea (Section 15). Further investigations are required and could offer valuable information for the management of these neighbouring ecoregions.

### 14.14 References

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**Table 14.1. Demersal elasmobranchs in the Norwegian Sea. Total landings (t) of skates from ICES Subarea 2 (and Division 2.a and 2.b) from 1973–2021. “n.a.” = no data available, “.” = means zero catch, “+” = < 0.5 tonnes. Countries with only occasional catches are not included by country in the landings table: Denmark (1994, 2021), Belgium (1 tonne 1975), Sweden (+ in 1975), Netherlands (1979, 2015), Iceland (2001, 2011), Estonia (2002, 2005), and Ireland (2007, 2009). Species included are: *A. radiata*, *D. licha*, *D. pastinaca*, *D. spp.*, *L. circularis*, *L. fullonica*, *L. naevus*, *M. aquila*, *R. brachyura*, *R. clavata*, *R. montagui*, *R. alba*, *T. marmorata*, Rajiformes (indet).**

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Faroe Islands	.	.	.	5	2	1	1	.	.	.	.	.	.	4
France	.	.	1	68	61	18	2	1	12	109	2	6	5	11
Germany	+	1	52	12	59	114	84	85	53	7	2	112	124	102
Norway	201	158	89	34	99	82	126	191	137	110	96	150	104	133
Portugal	.	.	.	34	39	.	.	.	.	.	.	.	.	.
USSR/Russ. Fed.	.	.	.	.	.	302	99	39	.	.	.	537	261	1633
Spain	.	.	.	.	.	.	.	.	.	.	28	.	17	5
UK – E, W & NI	65	18	14	20	90	10	6	2	+	+	.	5	1	2
UK – Scotland	2	1	.	+	1	+	.	.	.	.	.	.	+	+
Other	.	.	1	.	.	.	2	.	.	.	.	.	.	.
Total	268	178	157	173	351	527	320	318	202	226	128	810	512	1890
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Faroe Islands	.	15	.	42	.	2	.	.	.	.	.	.	.	.
France	21	42	8	56	11	15	9	7	8	6	8	5	.	5
Germany	95	76	32	52	.	+	.	.	.	.	.	.	.	2
Norway	214	112	148	216	235	135	286	151	239	198	169	214	239	244
Portugal	.	.	.	.	.	.	22	11	.	10	28	46	10	6
USSR/Russ. Fed.	1921	1647	867	208	n.a.	181	112	257	n.a.	n.a.	77	139	247	400
Spain	.	9	.	.	.	.	.	.	3	.	3	15	6	.
UK - E, W & NI	4	.	2	1	+	1	+	+	1	4	.	+	1	+
UK – Scotland	2	+	+	+	+	+	+	.	+	+	+	+	1	1
Other	.	.	.	.	.	.	.	+	.	.	.	.	.	.
Total	2257	1902	1057	575	246	334	429	426	251	218	285	419	504	658

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Faroe Islands	.	.	2	12	15	13	9	13	4	3	n.a.	.	n.a.	n.a.
France	4	7	2	7	9	7	2	5	3	5	1	1	+	+
Germany	.	2	2	7	1	.	.	.	+	1	.	.	1	2
Norway	233	118	111	142	133	146	189	259	258	250	198	121	147	105
Portugal	3	.	8	2	1	14	13	2	.	.	.	.	.	.
USSR/Russ. Fed.	113	38	6	50	20	16	20	.	8	2	n.a.	n.a.	n.a.	n.a.
Spain	7	11	32	.	1	.	.	.	.	+	.	+	1	+
UK - E, W & NI*		.	.	.	2	4	1	1	+	+	+	.	1	.
UK – Scotland*	1	3	3	.	.	.	.	.	.	.	.	.	.	.
Other	4	5	.	.	.	.	1	.	+	.	.	.	.	.
Total	365	184	166	220	182	200	235	280	273	261	199	122	150	108
	2015	2016	2017	2018	2019	2020	2021							
Faroe Islands	.	.	.	.	.	.	.							
France	.	.	.	.	.	.	.							
Germany	2	1	1	6	+	.	.							
Norway	112	198	111	213	275	328	180							
Portugal	.	.	.	.	.	.	.							
USSR/ Russ. Fed.	.	.	.	.	.	.	.							
Spain	.	.	.	.	.	.	.							
UK (com- bined)*	2	+	.	.	.	.	+							
Other	+	.	.	.	.	.	+							
Total	115	200	112	219	276	328	180							

**Table 14.2. Demersal elasmobranchs in the Norwegian Sea. Estimated Norwegian landings (tonnes) of skates and rays by species in ICES Subarea 2. Source: Albert *et al.* (2016 WD).**

	2012	2013	2014	2015
<i>Amblyraja hyperborea</i>	9	11	7	10
<i>Bathyraja spinicauda</i>	23	28	19	23
Common skate complex (most likely <i>Dipturus intermedius</i> )	7	9	7	7
<i>Dipturus oxyrinchus</i>	23	28	23	20
<i>Leucoraja circularis</i>	2	2	2	2
<i>Leucoraja fullonica</i>	1	1	1	1
<i>Raja clavata</i>	14	17	14	12
<i>Rajella lintea</i>	6	7	5	6
Rajidae indet.	36	43	27	32
Total	121	146	104	112

**Table 14.3. Catch data (number of individuals per species) for the Norwegian Sea ecoregion from the Annual Autumn Bottom-trawl Surveys of the North Norwegian Coast, from 1992 to 2005. Adapted from Williams *et al.* (2007 WD).**

Species	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total catch	Total % of positive samples	Catch rate (No. per survey)
<i>Amblyraja radiata</i>	7	44	23	15	8	41	9	16	9	6	10	10	19	9	226	11%	17.4
<i>Bathyraja spinicauda</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0%	0.1
<i>Rajella fyllae</i>	0	4	0	0	0	1	0	0	0	0	5	6	4	0	20	1%	1.5
<i>Raja clavata</i>	0	4	15	1	0	2	3	6	0	0	0	0	2	0	33	2%	2.5
Common skate complex (most likely <i>Dipturus intermedius</i> )	0	2	0	1	3	7	7	1	1	1	1	0	0	0	24	1%	1.8
<i>Leucoraja fullonica</i>	0	0	0	0	0	0	0	4	3	9	3	0	0	1	20	1%	1.5
<i>Leucoraja circularis</i>	0	0	0	0	0	0	0	0	1	0	1	9	5	7	23	1%	1.8
<i>Raja montagui</i> *	0	0	0	0	0	0	0	2	1	0	1	0	1	0	5	<1%	0.4
<i>Dipturus oxyrinchus</i>	0	0	54	3	2	30	2	0	0	1	2	6	4	2	106	5%	8.2
<i>Dipturus nidarosiensis</i>	0	0	0	0	1	1	0	0	0	3	1	0	1	0	7	<1%	0.5
<i>Amblyraja hyperborea</i>	0	0	1	0	0	0	0	0	0	0	4	0	1	0	6	<1%	0.5
<i>Raja brachyura</i> *	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	<1%	0.3
<i>Rajella lintea</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	<1%	0.1
<i>Galeus melastomus</i>	0	24	1883	1197	105	1269	189	480	258	812	1196	275	640	48	8376	24%	644.3
<i>Etmopterus spinax</i>	0	829	8453	473	1061	2733	584	3881	1485	1401	2417	785	2305	1369	27 776	33%	2136.6
<i>Squalus acanthias</i>	0	21	51	26	20	5	106	168	12	68	43	21	104	17	662	8%	50.9
<i>Somniosus microcephalus</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	<1%	0.1
Number of samples	17	163	106	77	74	96	78	81	76	56	78	65	77	63			

\*Probably misidentifications, the occurrence of the species in the area has not been confirmed (see Section 14.6.5).

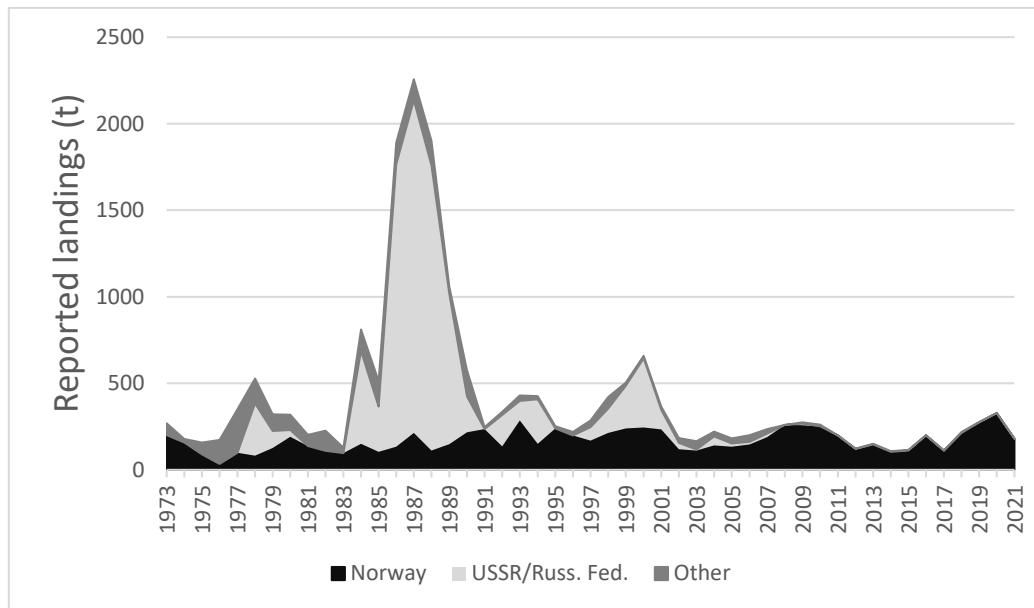


Figure 14.1. Demersal elasmobranchs in the Norwegian Sea. Total landings (t) of skates from ICES Subarea 2 (1973–2021).

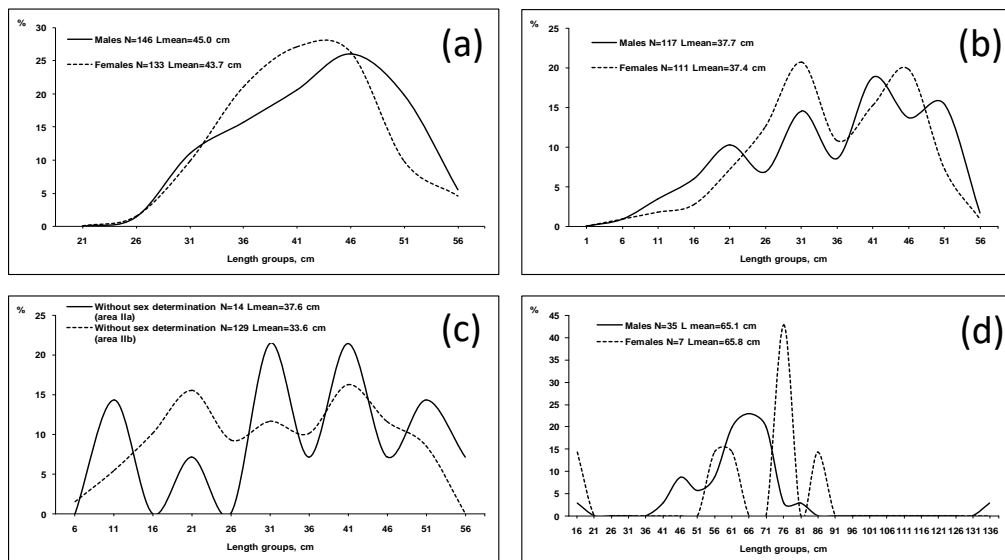


Figure 14.2. Demersal elasmobranchs in the Norwegian Sea showing the length composition of *A. radiata* in (a) commercial bottom-trawl catches in the Norwegian Sea in 2009, (b) Russian demersal survey (October–December 2009) and (c) the Norwegian Sea based on data from the joint Russian–Norwegian ecosystem survey (August–September 2009); and (d) length composition of *A. hyperborea* in the Norwegian Sea (Division 2.b) from the Russian demersal survey (October–December 2009). Specimens exceeding 131 cm are probably typing errors or misidentifications. Source: Vinnichenko *et al.* (2010 WD).