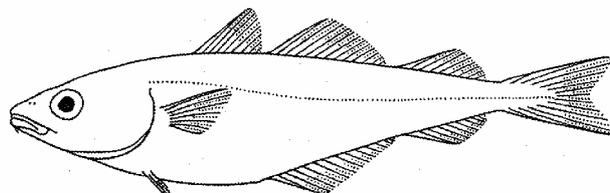




Saithe

*Pollachius virens*  
Family Gadidae

Max size: 130 cm  
Max age: 25 years



### Introduction

*Taxonomy:* Saithe *Pollachius virens* (Linnaeus, 1758) (Order: Gadiformes, Family: Gadidae) belongs to the gadoid family or cod-like fishes. The genus *Pollachius* is represented by two species: saithe *P. virens* and pollack *P. pollachius* [1].

common names			
<i>Danish</i>	Sej	<i>Icelandic</i>	Ufsi
<i>Dutch</i>	Zwarte koolvis	<i>Latvian</i>	Saida
<i>English</i>	Saithe	<i>Norwegian</i>	Sei
<i>Estonian</i>	Süsikas	<i>Polish</i>	Czarniak
<i>Faroese</i>	Upsi	<i>Portuguese</i>	Juliana / Escamudo
<i>Finnish</i>	Seiti	<i>Russian</i>	Сайда
<i>French</i>	Lieu noir	<i>Spanish</i>	Carbonero
<i>German</i>	Seelachs	<i>Swedish</i>	Gråsej

*General:* Saithe (or coalfish) is a semi-pelagic North Atlantic species that occupies the deeper waters over the shelf edge and beyond and, although frequently taken in bottom trawls may form dense layers in midwater. However, juveniles occupy inshore habitats and recruit to the exploitable stock at an age of 2-3 years old. Owing to this separation between adults and juveniles, discards in targeted saithe fisheries are generally low. Saithe is an important commercial species in many European countries.

*Minimum Landing Size:* 35 cm in the North Sea (EU waters), 32 cm in Norwegian waters, and 30 cm in the Skagerrak and Kattegat.

### Distribution

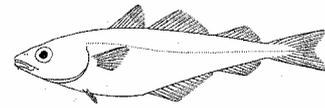
*Biogeographical distribution:* Saithe is a boreal species distributed in the western Atlantic from North Carolina to southwest Greenland, and in the eastern Atlantic from the Bay of Biscay to Iceland, Spitzbergen and the Barents Sea.

The bathymetric distribution of saithe is very broad, living in shoals in both offshore and inshore areas depending on size and age, and occurring in midwater, close to the bottom and even near the surface. Adults sometimes display extensive diel vertical migrations and may be found hundreds of metres above the bottom during night time, as well as close to the bottom, down at depths of more than 300 m during day time [2].



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*Spatial distribution in North Sea:* The distribution of saithe in the area covered by ICES-FishMap highlights their concentration in the northern part of the North Sea and in the Skagerrak and Kattegat, along the shelf edge. Young saithe (< 30 cm) are most abundant in the more coastal waters near Shetland and in the Kattegat, where they congregate in sea lochs and escape representative sampling, while larger saithe (≥30 cm) are more widely distributed between these two regions, with a clear zone of high abundance along the edge of the Norwegian Deep (Fig. 1). Tagging experiments have shown that young saithe gradually leave their coastal nurseries during the spring [3] to join the offshore component of the stock [4].

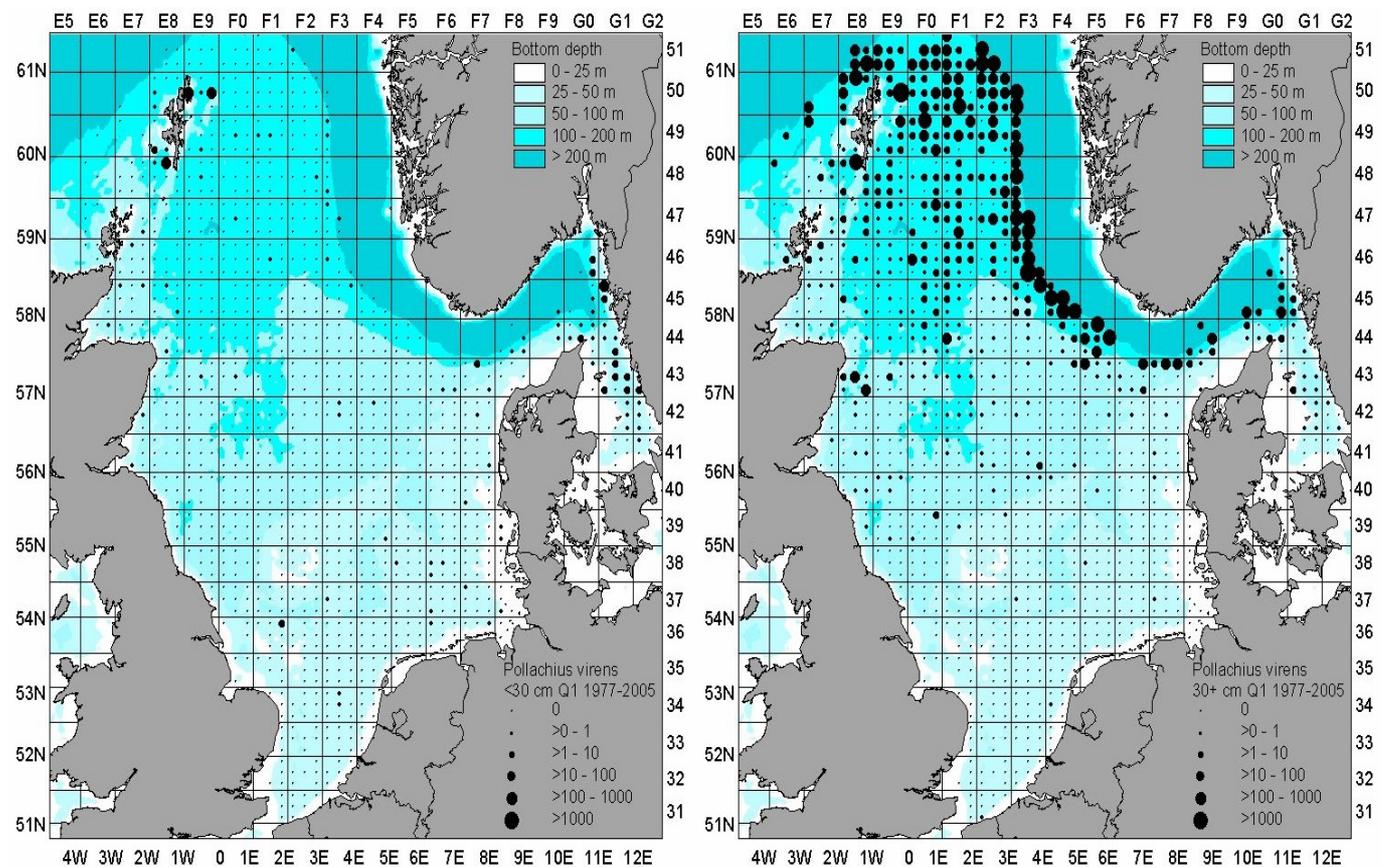


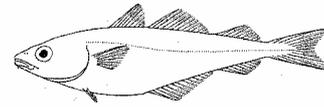
Figure 1. Average annual catch rate (number per hour fishing) for saithe in the quarter 1 IBTS survey, 1977-2005.

*Habitat characteristics:* O-group saithe are found pelagically in the open northern North Sea, from where they move to sea lochs along the Scottish and Scandinavian coastline. Not infrequently they spread out to reach the outer harbours in the South. They remain there close to the shore during the first three years of life, while performing limited migrations. Overall, habitat characteristics are wide ranging depending on life history stage.



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### Life history

*Age, growth rates, length-weight relationship:* Males and females have similar growth rates during the first 6 years of life (Fig. 2), although females become ultimately slightly larger than males. The majority has reached maturity at age 6 (Fig. 3).

The average relationship over all seasons between gutted weight (GW) and total length (L) for saithe in the North East Atlantic is estimated to be [5]:  $GW=0.0238*L^{2.7374}$ .

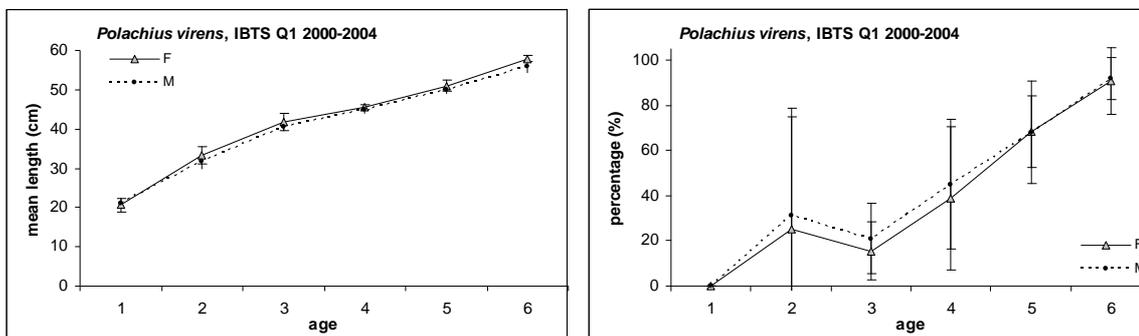


Figure 2. Mean length (left panel) and percentage mature with standard errors (right panel) per age group in the North Sea and Skagerrak/Kattegat in February 2000-2004, based on IBTS-data.

*Reproduction:* Spawning takes place from January (in the southern part of the distribution area) to May (further north), and generally occurs along the edge of the continental shelf [6]. A 75 cm long female produces on average 2.9 million eggs during a spawning season, equivalent to 750 eggs per gram body weight [7].

*Migrations:* Little is known about migrations of North Sea saithe, but older tagging experiments have shown recaptures over considerable areas, indicating at least some exchange between the Norwegian coast, Faroer and Iceland [6]. Being a semi-pelagic species that is not bound to a demersal life style, crossing abyssal plains should not be too difficult. IBTS data show that density in the northeastern North Sea is markedly higher during summer than during winter, suggesting dispersal during the feeding season (Fig. 3).



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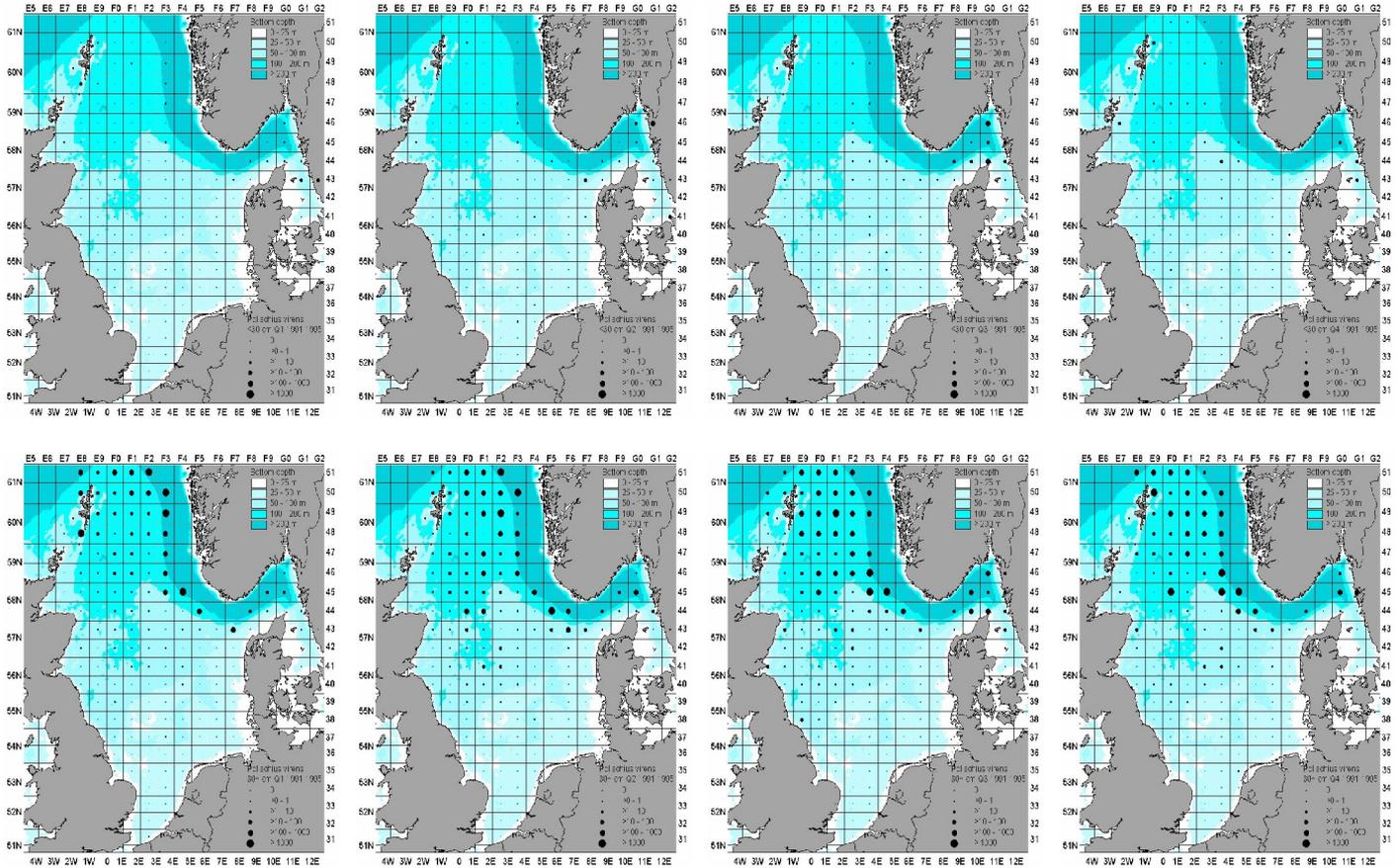
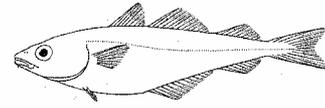


Figure 3. Average quarterly catch rate (number per hour fishing) for juvenile (<20cm, above) and adult (≥20cm, below) saithe in the IBTS survey, 1991-1995.

**Food habits:** Young saithe in inshore waters feed on planktonic organisms, including copepods and euphausiids, but they are able to change to a benthic diet when suitable planktonic prey is scarce. Small saithe may also feed on larval and juvenile fish, including herring, cod, and sandeel [3]. Adults feed almost entirely on pelagic and demersal fish, such as herring, Norway pout, haddock and sandeel, though euphausiids and other invertebrates are also consumed [8,9].

**Predation:** Juveniles may occasionally be eaten by larger gadoids and other demersal fishes. Furthermore, predation by seals in inshore areas has been mentioned as a threat to the saithe stock in Norwegian waters [10].

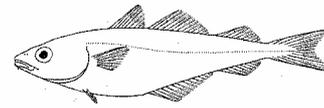
### Population structure

**Length composition:** The Skagerrak/Kattegat area is a habitat for two age groups, as indicated by the two peaks in the length-frequency distribution (Fig. 4). The first peak at a length of 20 cm represents 1-group fish, the second is composed of the saithe of 2 years and older. In contrast, 1-group is largely missing in the North Sea, while the 2-group reveals a distinct peak in the length composition.



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**Landings:** The landings in the North Sea area have declined since the mid 1970s, when annual landings were over 300,000 t, to less than 150,000 t in subsequent years (Figure 5). After a slight recovery during the mid-1980s, landings have decreased again and have since remained at approximately of 100 000 t per year [12].

**Status of the stocks:** ICES has classified the saithe stock in the North Sea as having full reproductive capacity and as being harvested sustainably. After exceeding the limit reference point ( $F_{lim}$ ) of 41% in the 1970s and 1980s, fishing mortality has declined since 1986, and is estimated to be well below  $F_{lim}$ . The spawning stock biomass dropped below the limit reference point ( $B_{lim}$ ) of 106 000 t in the early 1980s, but has recovered since in response to the reduction in fishing mortality [12].

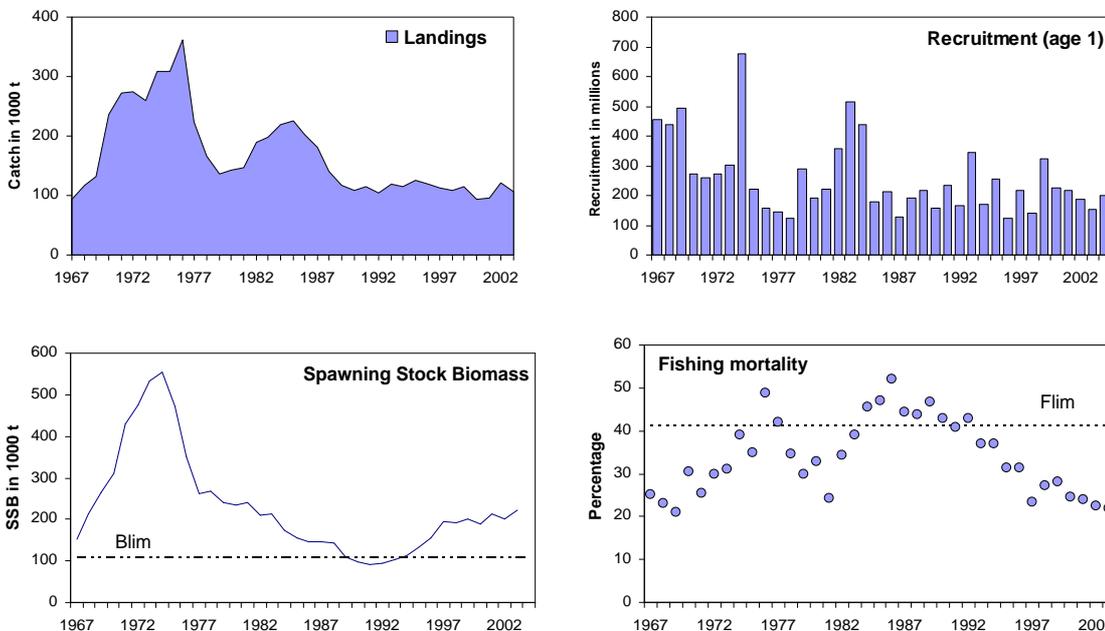


Figure 5. Time series of landings ('000 t), recruitment (in millions of one-year-old fish), spawning stock biomass ('000 t) and fishing mortality (percentage per year of ages 3-6) of saithe in the North Sea, West of Scotland and Skagerrak [12].

**Protection and management:** To meet the objective of sustainable saithe fisheries and greater potential yield, the EU and Norway have agreed on a precautionary approach. The stock is managed by annual TACs (total allowable catch) and technical measures such as minimum mesh size for several types of fishing gear [12].

### Exploitation

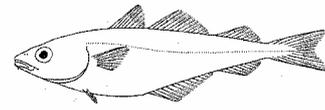
**Main metiers targeting the stock:** Saithe is a highly valued species for human consumption. A directed fishery exists along the shelf edge, which is mainly executed by Norwegian, German and French offshore trawlers [11]. Because of the separation between juveniles and marketable fish, discards are generally low.

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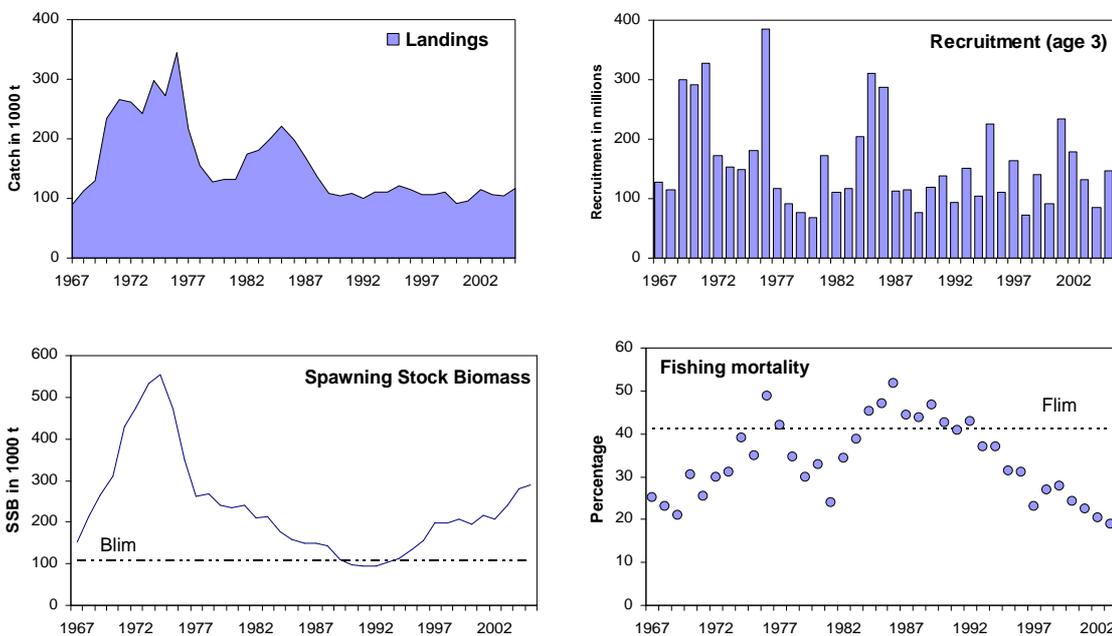
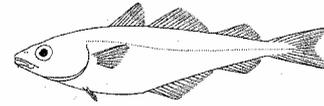


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