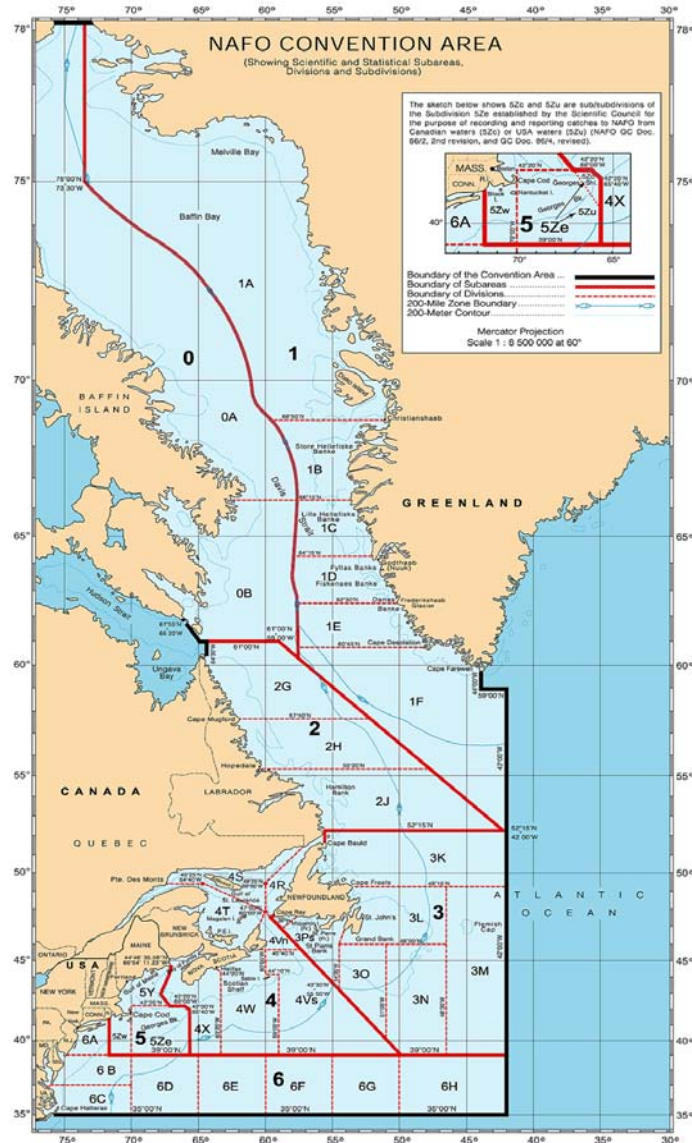


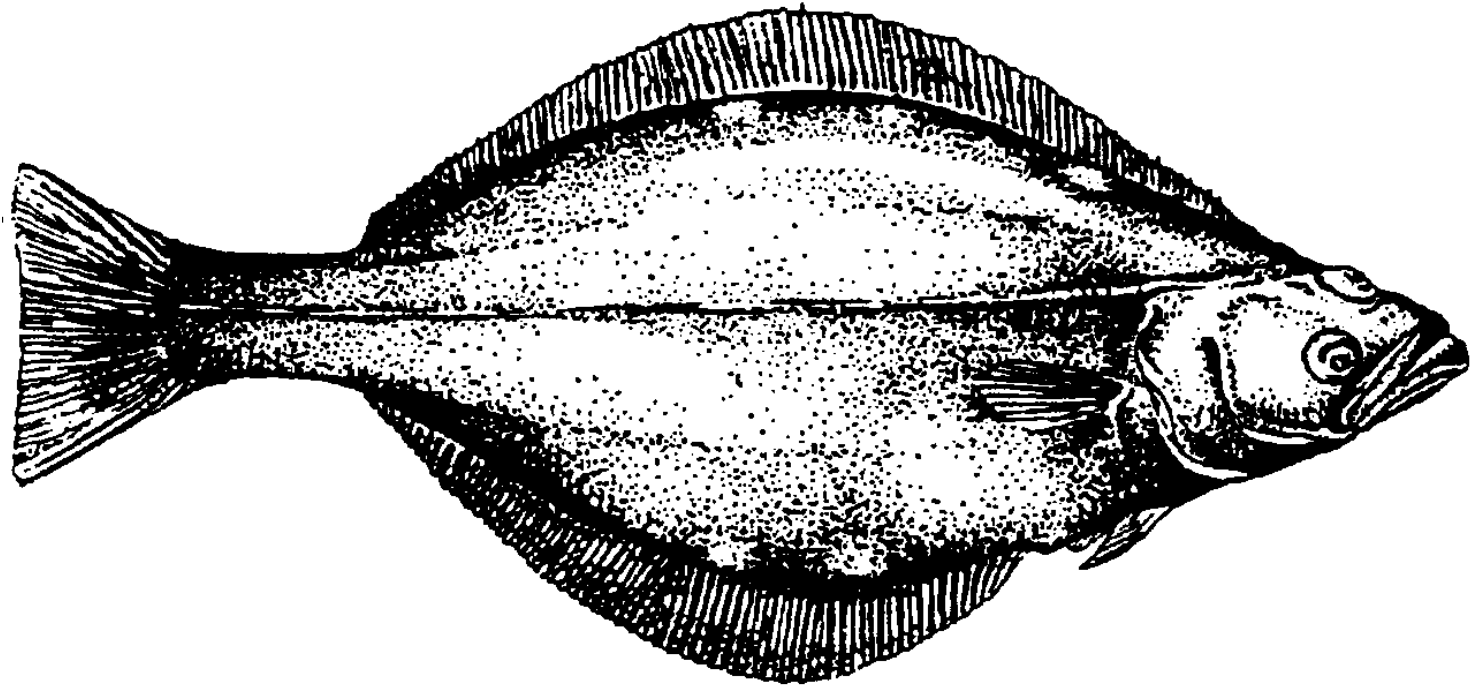


Map Showing NAFO Management Units





Greenland halibut in Canadian and NAFO Waters



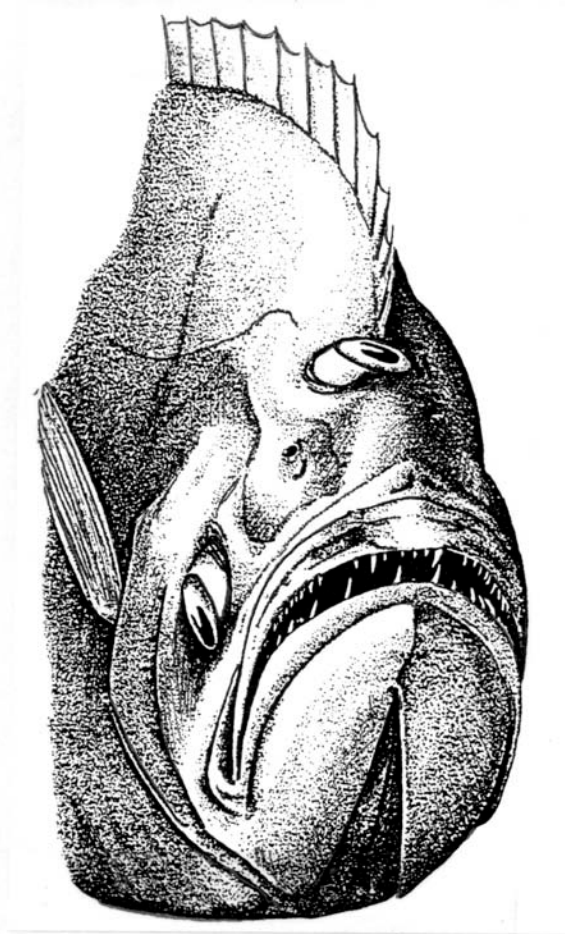
Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canada



Greenland halibut in Canadian and NAFO Waters



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canada



Greenland halibut in Canadian and NAFO Waters

Unique biological characteristics

- dark coloration on both sides compared to almost all other flatfish species
- left eye not fully migrated giving it an unusually wide range of peripheral vision
- elongated shape and muscle arrangement are characteristics of a powerful swimmer (often observed at the surface of the ocean)
- physiology indicates it can control its gravitational position when swimming either vertically or horizontally





Greenland halibut in Canadian and NAFO Waters

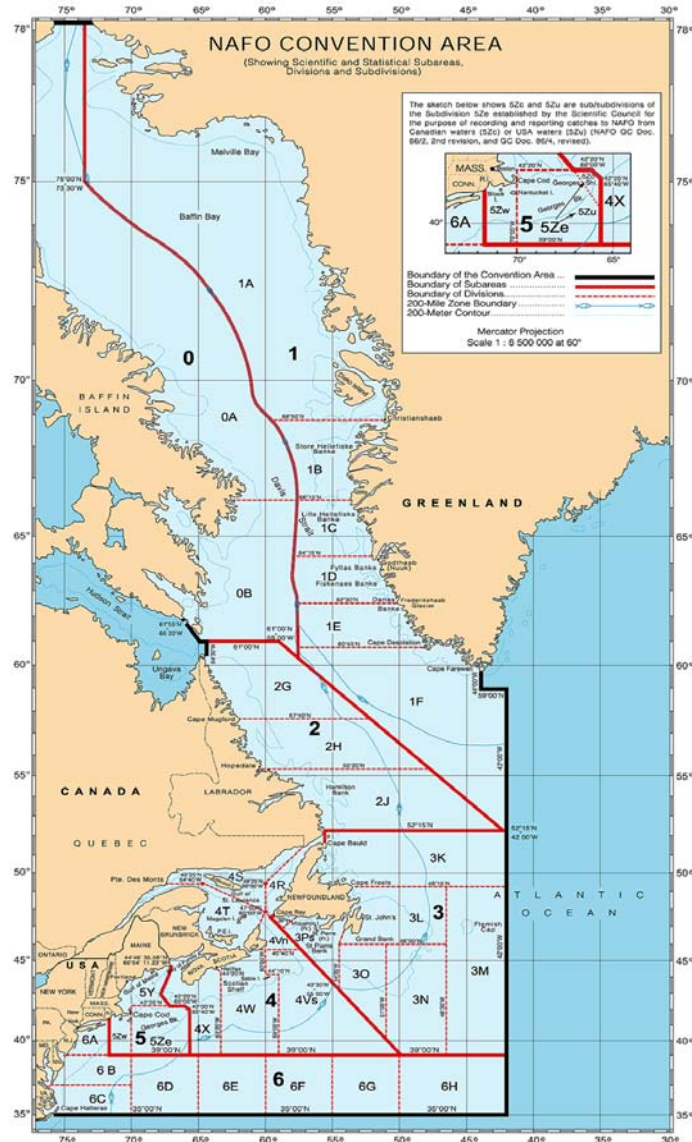
Stocks

- Although considered to be a single stock complex in the NW Atlantic it is managed by the following units:
 - NAFO Div. 4RST – Gulf of St. Lawrence – domestic fishery only
 - NAFO Subdiv. 3Ps – small stock component and domestic fishery only
 - NAFO Subarea 2 & Div. 3KLMNO – most heavily fished and widely studied – large international fishery (*only this one addressed in detail here*)
 - NAFO Div. 0A, 1A (offshore) and 1B – bilateral fishery (Canada & Greenland)
 - NAFO Div. 0B, 1C-F – bilateral fishery (Canada & Greenland)
 - NAFO Div. 1A (inshore) Greenland fishery only



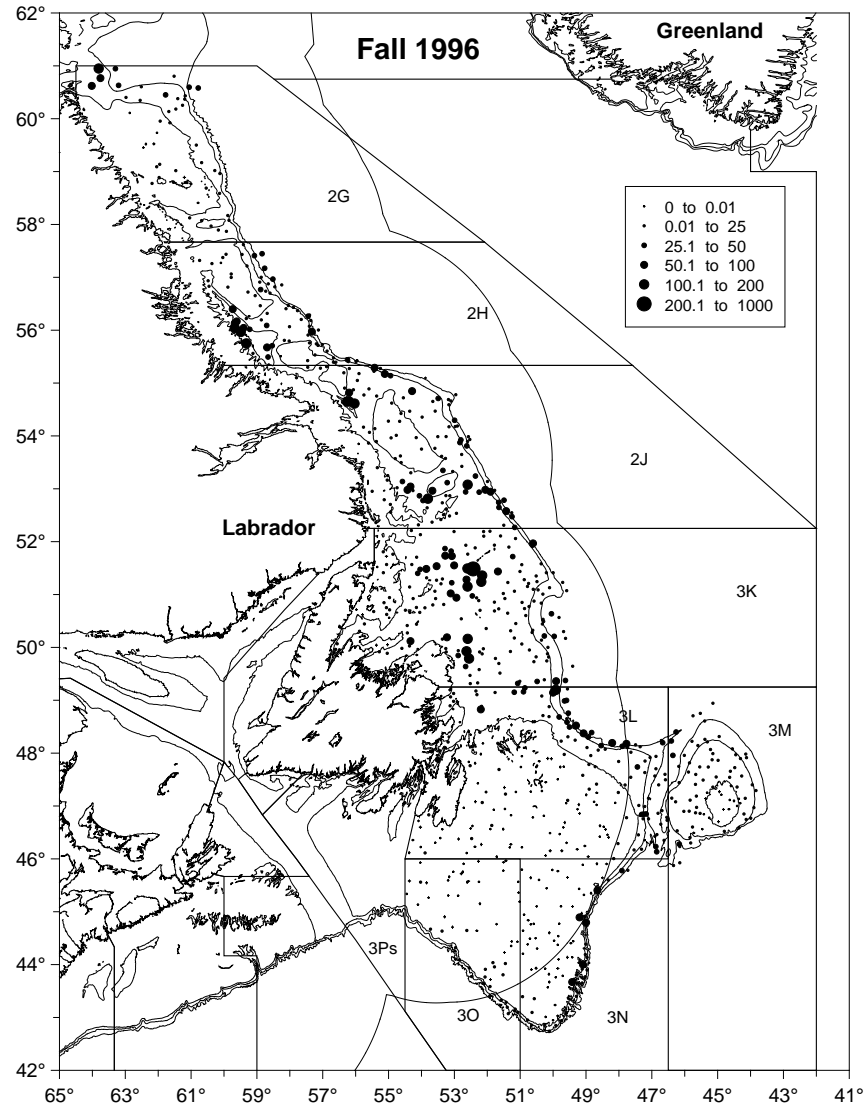


Map Showing NAFO Management Units



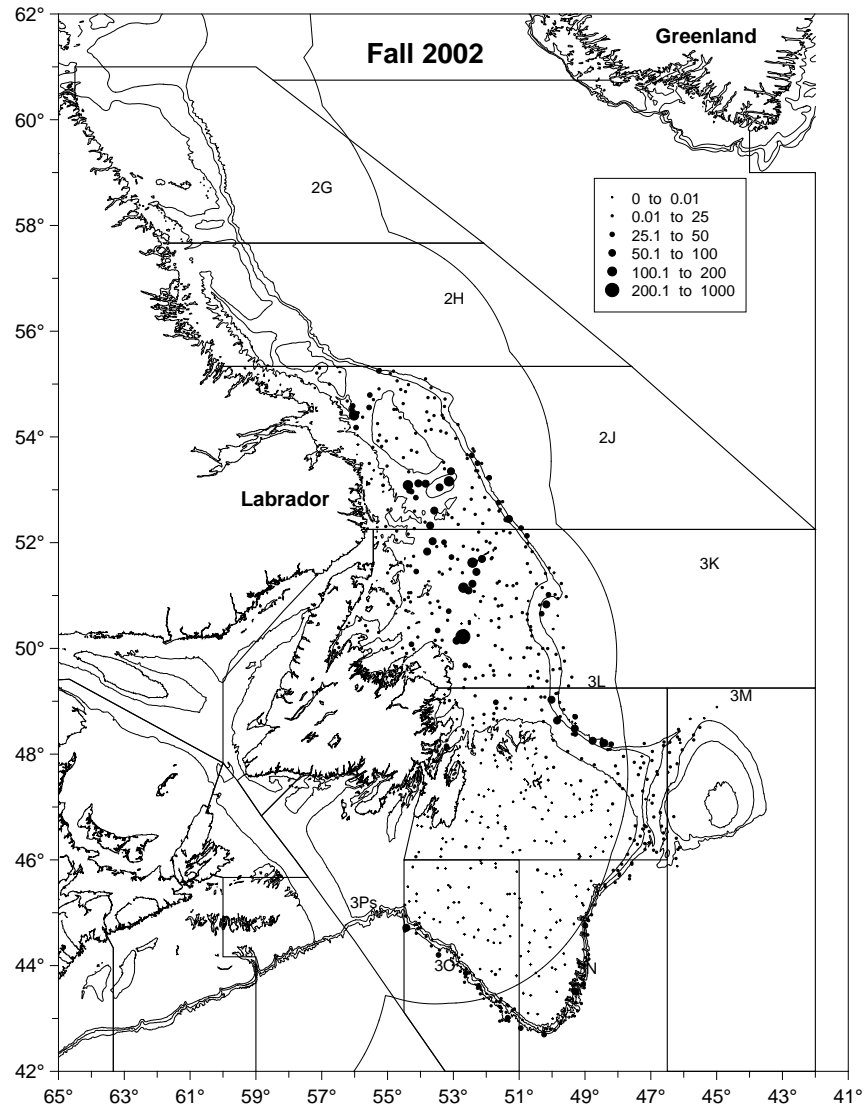


Greenland halibut in Canadian and NAFO Waters





Greenland halibut in Canadian and NAFO Waters

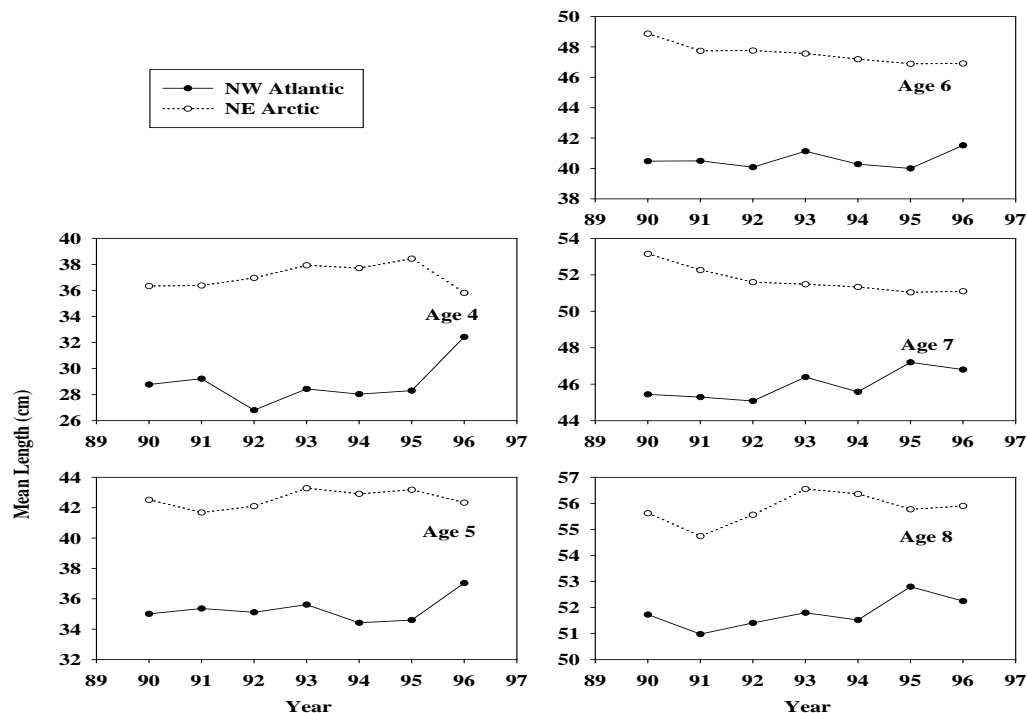




Greenland halibut in Canadian and NAFO Waters

Biology – Growth

- Little change in mean size at age over time but substantial difference in between NW Atlantic vs NE Arctic





Greenland halibut in Canadian and NAFO Waters

Biology – *Maturity*

- No trend in maturity rates (M_{50}) at age over time but occurring at much older ages than in any other area of the North Atlantic

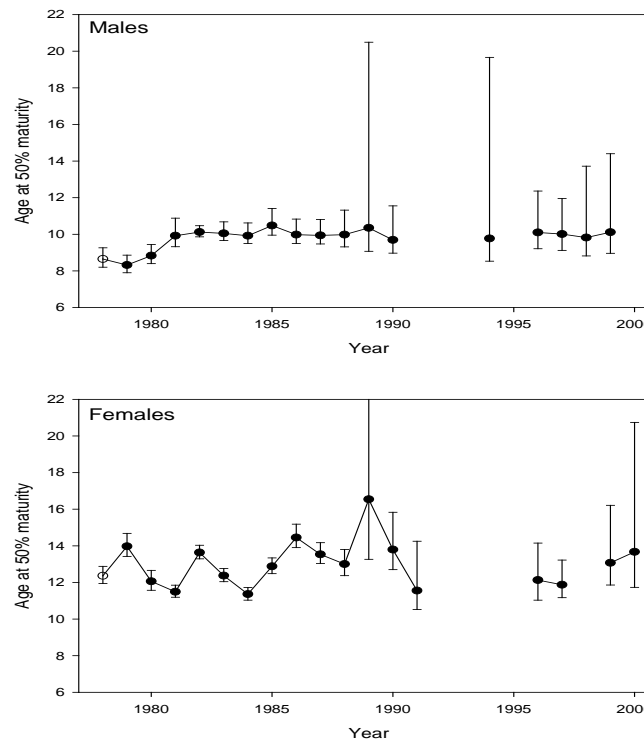


Figure 2. Age at 50% maturity (+ 95% fiducial limits) for male and female Greenland halibut in NAFO Divs. 2J3K from 1978 to 2000. Data are from Canadian fall surveys.





Greenland halibut in Canadian and NAFO Waters

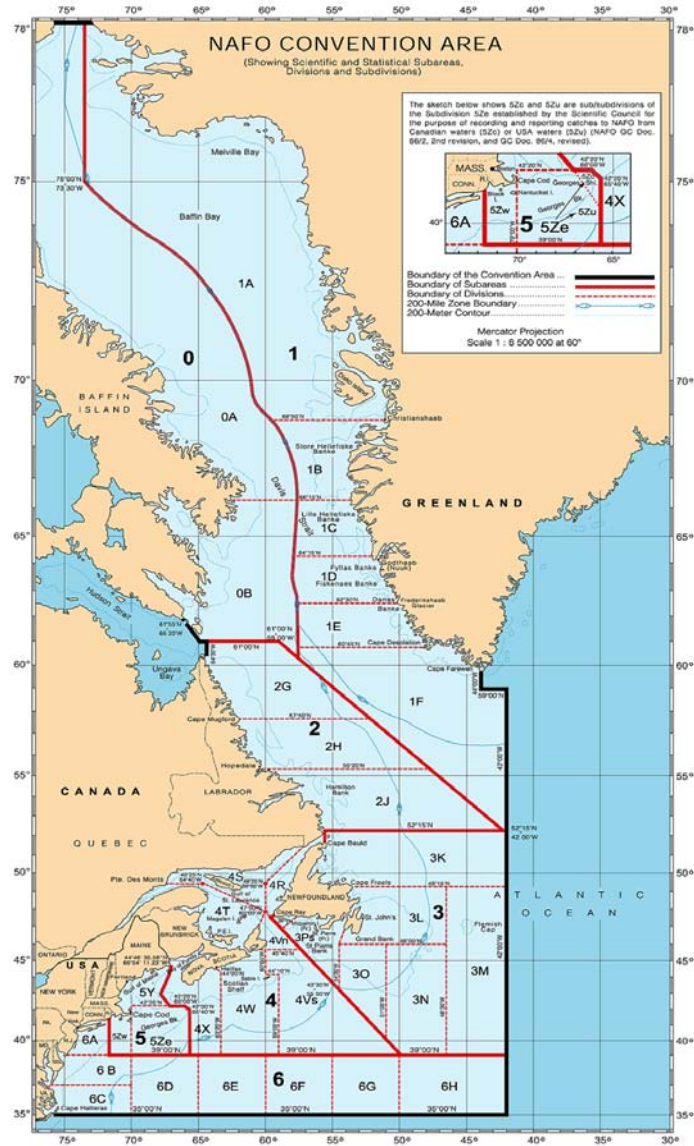
Biology – *Spawning*

- Most spawning believed to occur in the deep waters (600-1000 m) of Davis Strait (Div. 0B) during wintertime
- Research in recent years indicate that spawning has been observed also along the deep slopes of Subareas 2 & 3 as far south as Flemish Cap (Div. 3M)
- Spawning times in Subareas 2 & 3 very erratic for this population, being observed at various times of the year but not consistent from year to year
- Some evidence indicates that Greenland halibut may not spawn every year creating substantial difficulty in establishing time series of SSB





Map Showing NAFO Management Units





Greenland halibut in Canadian and NAFO Waters

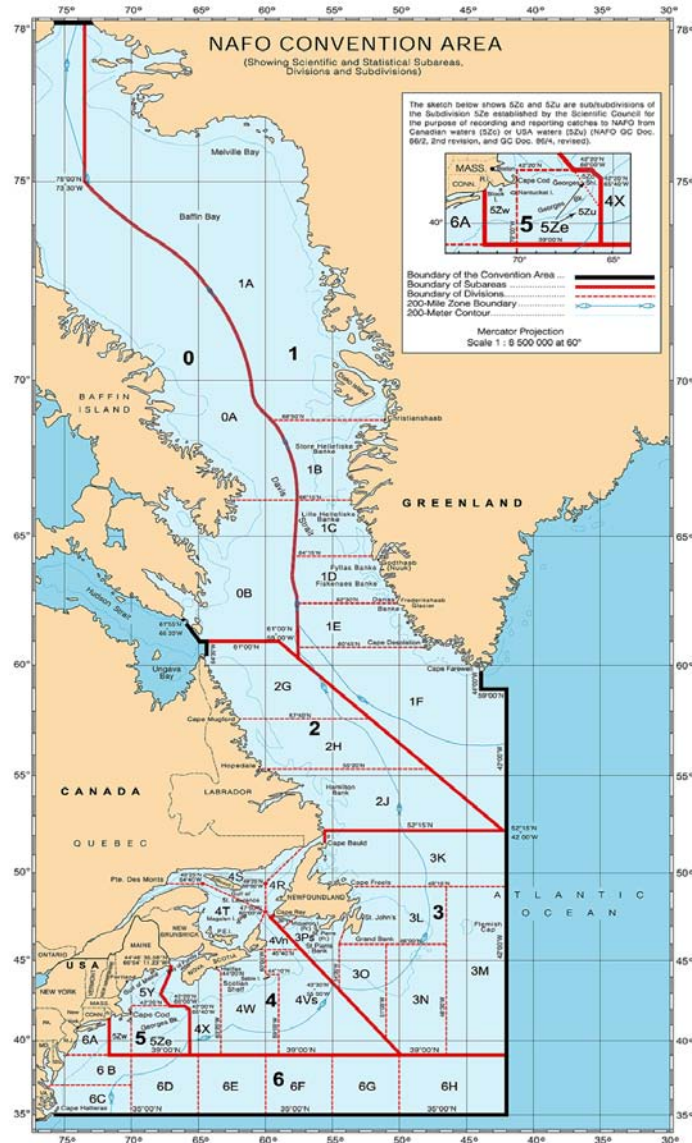
Fishery – *Development*

- The fishery began in earnest in the 1960's in deep Newfoundland inshore bays in Div. 3KL with the development of synthetic gillnets
- Large non-Canadian trawlers (mainly the USSR, Poland and GDR) entered the fishery in the 1970's fishing the slope areas largely as by-catches in the roundnose grenadier fishery
- With the introduction of the 200-mile limit in 1977, most non-Canadian effort was phased out of the Canadian zone
- A large non-Canadian fishery developed in the NAFO Regulatory Area (NRA) of Div. 3LM by 1990 primarily by EU-Spain and EU-Portugal with considerable catches also taken by Russia and Japan
- The fishery in the NRA has comprised the largest component of the SA2 & Div. 3KLMNO since then





Map Showing NAFO Management Units



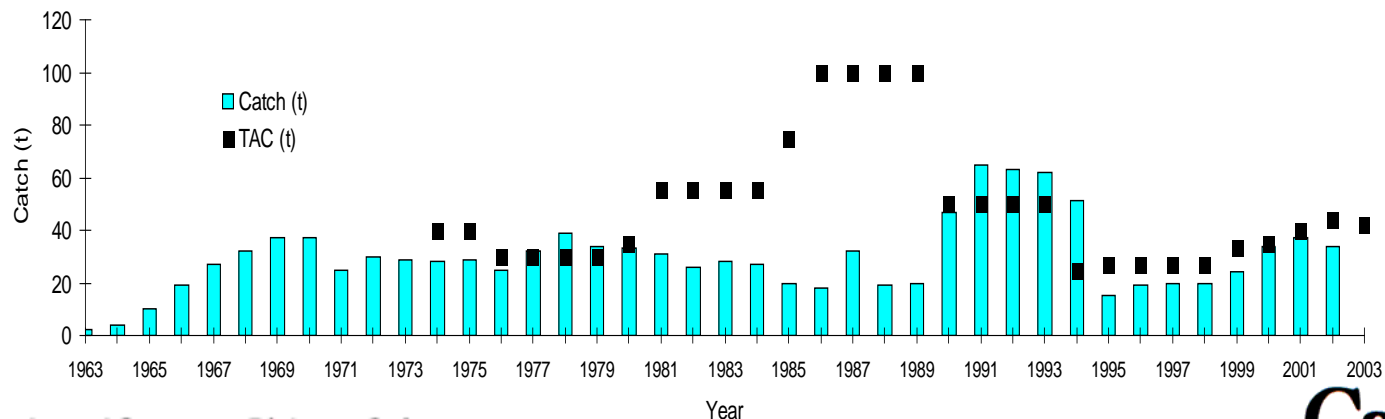


Greenland halibut in Canadian and NAFO Waters

Fishery – *Catches and TAC's*

- Catches averaged about 30 000 t during the 1970's then declined in the 1980's
- In the early 1990's catches increased to over 60 000 t
- In 1995 catches declined to 15 000 t in 1995 following the infamous “turbot war” but have increased since to 36 000 – 38000 t by 2000-02
- TAC's set autonomously by Canada to 1994 and NAFO Fisheries Commission since then

Greenland halibut TAC and catches (t) for NAFO Subarea2 & Div. 3KLMNO.

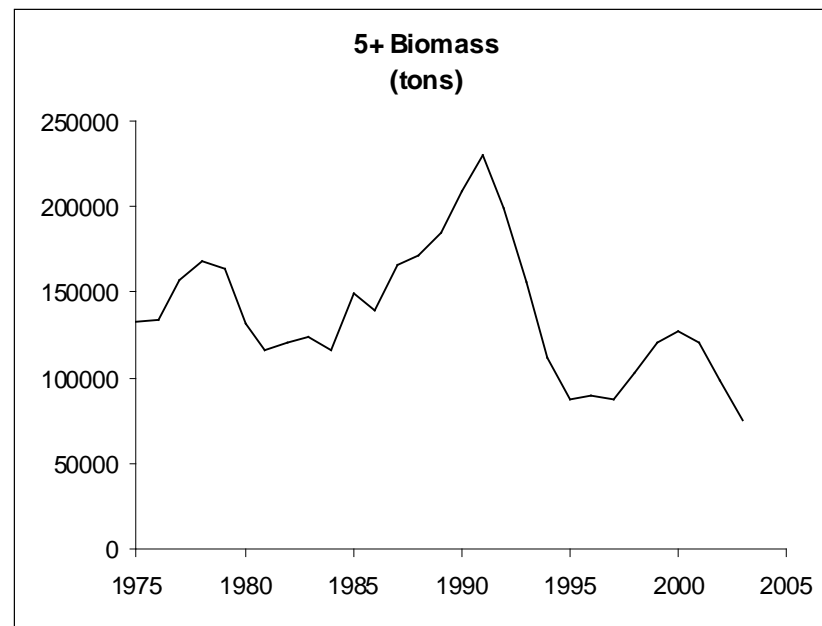




Greenland halibut in Canadian and NAFO Waters

Assessment – *Fishable Biomass (Ages 5+)*

- The assessment of this stock is undertaken by the NAFO Scientific Council on an annual basis
- Based on an analytical assessment in June 2003, the fishable stock has declined in recent years and by 2003 is the lowest observed

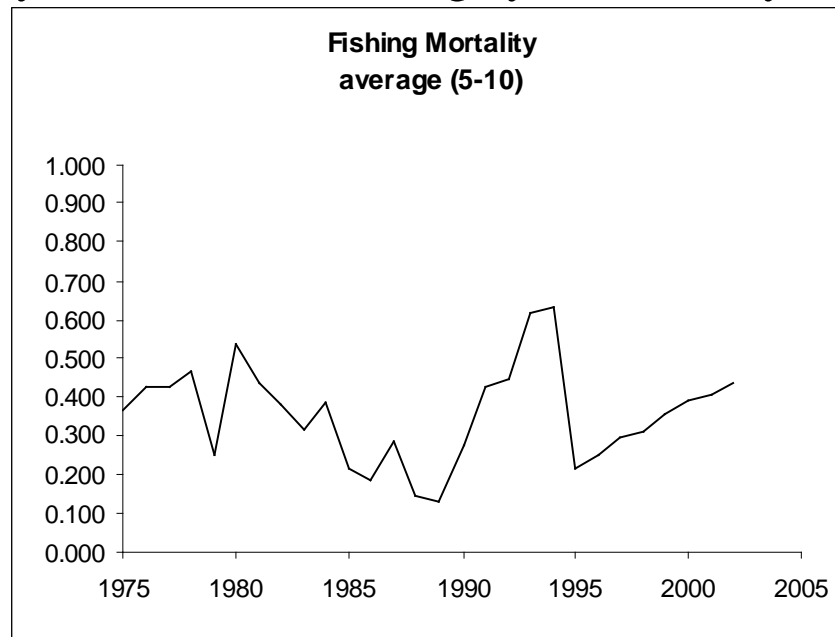




Greenland halibut in Canadian and NAFO Waters

Assessment – *Fishing mortality (Ages 5-10)*

- Fishing mortality peaked in the early 1990's then declined substantially in 1995 as the NAFO SC introduced its first TAC well below recent catches
- Fishing mortality has been increasing systematically since then

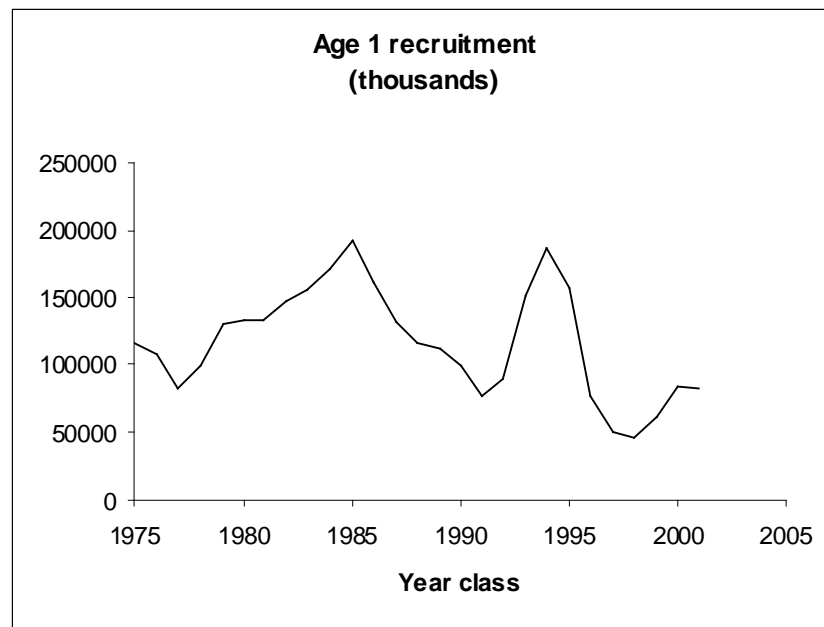




Greenland halibut in Canadian and NAFO Waters

Assessment – *Recruitment (Age 1)*

- The fishery in recent years has been comprised primarily of the above average 1993-95 year-classes
- Subsequent year-classes are well below average and these are the ones which will comprise the fishery over the next several years





Greenland halibut in Canadian and NAFO Waters

Management

- Managed by annual quotas split between the coastal state (Canada) and various member states of the NAFO Fisheries Commission
- All non-Canadian catches are taken in the NRA
- Management approach based on advice from ICNAF since 1974 and NAFO from 1979
- Within Canadian waters the minimum mesh size is 145 mm for both otter trawl and gillnets and, in addition, for gillnets fishing depths > 400 fathoms the minimum mesh size is 190 mm
- Minimum mesh size in the NRA is 130 mm with no depth restrictions
- Within Canadian waters the minimum fish size is 45 cm whereas the minimum fish size in the NRA is 30 cm

