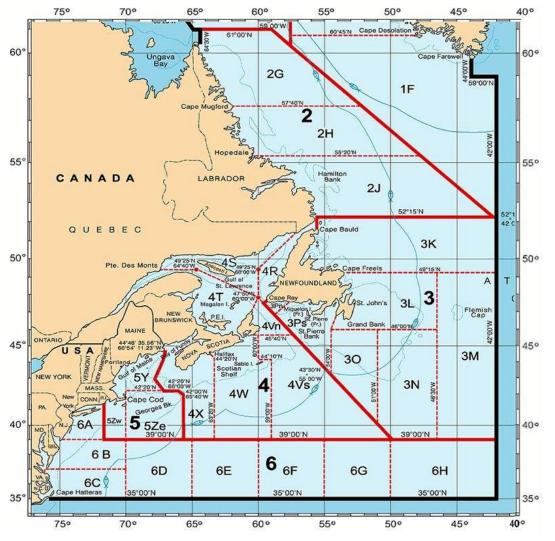
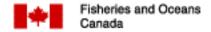


Map Showing NAFO Management Units









Distribution

- Found in the Northwest Atlantic from Greenland to Cape Hatteras
 Stocks
- Are 12 stocks in total with 9 stocks in Canadian and NAFO waters
 - 2GH (northern Labrador)
 - 2J+3KL (northern cod)
 - 3M (Flemish Cap)
 - 3NO (southern Grand Bank)
 - 3Ps (southern Newfoundland)
 - 4RS-3Pn (northern Gulf of St Lawrence)
 - 4TVn (southern Gulf of St Lawrence)
 - 4VsW (Scotian Shelf)
 - 4X (Bay of Fundy)







History of management

- Until the early 1970's the fisheries research administered by the Fisheries Research Board of Canada (FRBC)
- Subsequently taken over by Federal Government Department of Fisheries
- ICNAF (International Commission for the Northwest Atlantic Fisheries) provided management
- Extension of jurisdiction to 200 nm -1977
- NAFO (Northwest Atlantic Fisheries Organization) 3M and 3NO
- CAFSAC (Canadian Atlantic Fisheries Scientific Advisory Council)
- Latter replaced by regional/zonal assessments and FRCC (Fisheries Resource Conservation Council) consults with science and stakeholders and provides advice to Minister of Fisheries and Oceans on TAC's for cod and other groundfish







Management strategies

- Traditionally attempted to fish at F_{max} then $F_{0.1}$
- Controls on by-catch of cod in other fisheries through spatial/temporal closures/gear restrictions (mesh sizes and amounts of gear, Nordmore grates, etc)
- In Canada introduction of dockside monitoring program to monitor landings more carefully (paid for by industry)
- Enforcement through spot checks by fisheries officers on patrol
- Observers on larger offshore vessels (Canadian and NAFO)
- Surveillance over-flights/aerial photography and patrols/boardings of vessels in NAFO Regulatory Area (NRA)





Assessments

- Annual research vessel survey biomass, abundance and catch-rate indices along with age/growth, SSB, condition, etc data
- Inshore sentinel fishery catch-rate index (line-trawl and gill net) for 3Pn4RS, 3Ps and 2J3KL cod
- Science log-book catch rate indices (< 35' vessels) for 3Pn4RS, 3Ps and 2J3KL cod
- Exploitation and stock size estimates from tagging (inshore only) for 3Pn4RS, 3Ps and 2J3KL cod
- Other data sources (pre-recruit surveys, hydro-acoustic estimates) for 3Ps and 2J3KL cod

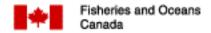




2J+3KL cod ("Northern" cod)

- Cod from this stock grow more slowly compared to those in warmer areas
 - An age 5 cod is presently about 50 cm (about 20 inches) long
- Females mature at about age 5, and age at maturity has declined since the early 1980's
- Feed on a wide variety of food items
 - Capelin has historically been the major prey of adults
- Historically, many northern cod migrated between over-wintering areas offshore and summer feeding areas inshore



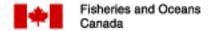




2J+3KL cod ("Northern" cod)

- Supported a commercial fishery since the 16th century
- Prior to 1960 the catches were generally less than 300,000 t
- With higher catches in the late 1960s (max. 800,000 t in 1967), mainly by non-Canadian fleets, the stock declined until the mid-1970s
- After the extension of jurisdiction in 1977, the stock increased until the mid-1980s, but then collapsed in late 1980s and early 1990s
- Moratorium on commercial fishing declared in July 1992
- Small inshore TAC reintroduced in 1998
- Fishery again closed in 2003







3Ps cod

- Cod from this stock grow more rapidly compared to northern cod or those in northern Gulf of St. Lawrence
 - An age 5 cod is presently about 54 cm (about 22 inches) long
- Females mature at about age 5, and age at maturity has declined since the early 1980's
- Feed on a wide variety of food items
 - Capelin has historically been an important prey of adults
 - Sand lance is an important prey item on St. Pierre Bank.
- Some offshore cod migrate from offshore over-wintering areas in to summer inshore feeding areas
- Stock was not in as poor shape as northern cod when moratorium introduced (1993) good growth and survival of two year-classes (1989 and 1990) resulted in good rebuilding of stock







3Ps cod

- Supported a commercial fishery for decades
- During 1960-1970 annual catches generally 60,000 80,000 t
 - Stock heavily exploited by non-Canadian fleets, particularly from Spain
- Fishery declined through the 1970's until extension of jurisdiction in 1977, thereafter landings increased until the mid-1980's
- French catches increased in the offshore throughout the late 1980s and the stock declined until the early-1990s
- Moratorium on commercial fishing declared in August 1993
- Small TAC was reintroduced in 1997 restricted to the inshore and to vessels less than 65 feet in length
- Current TAC 15,000 t

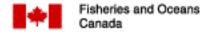




3NO cod

- Cod from this stock grow more rapidly compared to northern cod or those in northern Gulf of St. Lawrence
 - Age 5 cod is presently about 55 cm long
- Females mature at about age 5
 - age at maturity has declined since the early 1980's
- Feed on a wide variety of food items
 - Capelin historically an important prey of adults
 - Sand lance an important prey item in some areas
- Some offshore cod over-winter along the slope edge and migrate onto the shallower Grand Banks and to inshore feeding areas in summer
- Some seasonal mixing between cod from 3O and 3Ps







3NO cod

- Supported a commercial fishery for decades
- During 1950's reported catches were variable ranging from 40,000
 140,000 t
 - Hand-line fisheries on the shallowest areas of the Grand Banks were replaced by large otter trawlers in recent decades.
- Stock was heavily exploited by non-Canadian fleets, particularly from the former USSR and Spain, and catches peaked at 227,000 t in 1967
- Fishery declined steadily thereafter to a low of 15,000 t in 1978
- From 1979 to 1991 reported catches ranged from 20,000 t to 50,000 t
- The stock declined rapidly in the late 1980's and early 1990's
- Moratorium was imposed in 1994







3NO cod

- Stock remains at an extremely low level
- Reported by-catch of cod has increased ten-fold since moratorium imposed
 - currently at levels that are impeding stock recovery
 - Heavy and illegal directed fishing on the "tail" of the Grand Bank in NAFO Regulatory Area

