



# Map Showing NAFO Management Units





# Cod in Canadian and NAFO Waters

## 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)





# Cod in Canadian and NAFO Waters

## 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





## Cod in Canadian and NAFO Waters

### 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)





## Cod in Canadian and NAFO Waters

### 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





## Cod in Canadian and NAFO Waters

### 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





## Cod in Canadian and NAFO Waters

### 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





## Cod in Canadian and NAFO Waters

### 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







## Cod in Canadian and NAFO Waters

### 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





## Cod in Canadian and NAFO Waters

### 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





## Cod in Canadian and NAFO Waters

### 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





## Cod in Canadian and NAFO Waters

### 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

