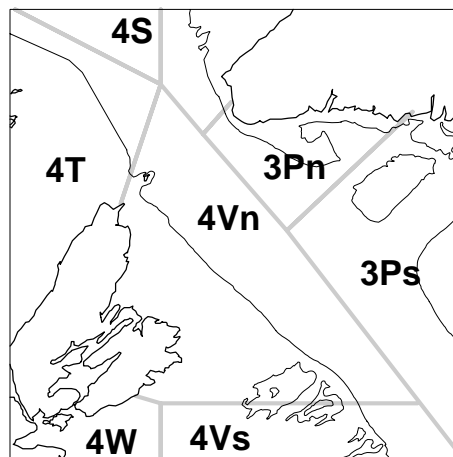




**SYDNEY BIGHT COD**



**Background**

The 4Vn region is known to represent a mixing ground between the small resident 4Vn cod stock, the large 4T cod stock to the west and the large 4VsW cod stock to the east. In addition, 4T cod overwinter along the shelf edge from Sydney Bight as far as Banquereau Bank region, leaving the Gulf in the late autumn and returning in the spring. During this period the catch of cod in 4Vn comprises both Gulf and resident cod, although the 4T cod make up the bulk, being a much larger stock. Thus, unknown quantities of 4Vn cod are caught during the overwintering period. Mixing of Gulf of St. Lawrence (4T) cod with the resident stock and inability to apportion landings according to stock has complicated the assessment and management of the 4Vn stock.

**The Fishery**

Landings (thousands of tonnes)

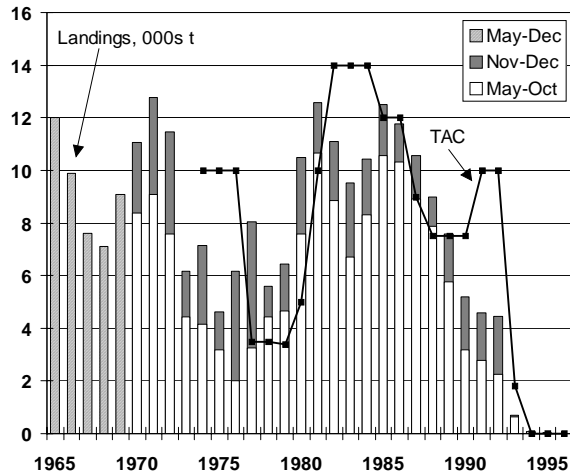
Year	70-79 Avg.	80-89 Avg.	1991	1992	1993	1994	1995
TAC	6.7	10.5	10.0	10.0	1.8	*	*
Landings <sup>1</sup>	5.1	8.6	2.8	2.3	0.7	<0.1	<0.1
Landings <sup>2</sup>	7.1	10.6	4.6	4.5	0.7	<0.1	<0.1

\* - by-catch only  
1 - May-October only  
2 - May-December only

Before extended jurisdiction in 1977, the cod fishery in 4Vn was traditionally a summer inshore longline fishery which exploited the banks south of the Laurentian Channel. During these years, large foreign trawlers fished along the Laurentian Channel edge in deeper water mainly during the winter months. These trawlers were targeting mainly Gulf of St. Lawrence cod which overwinter in the Sydney Bight area, whereas, the fixed gear fishery was prosecuted on the 4Vn resident stock. After the 200 mile limit was declared and foreign boats were denied access to this area, an inshore dragger fleet developed. Cod **landings** in North Atlantic Fisheries Organization (NAFO) Subdivision 4Vn have declined sharply during recent years. Throughout most of the 1980s, catch quotas restrained the fishery, but after 1990 the catch was substantially less than the TAC. In September 1993, the cod fishery was closed and this moratorium is still in effect. In the few years prior to the closure, vessels using mobile gear generally managed to maintain a catch close to their allocation, whereas the longline fleet fared less well.

**Available from:** Maritimes Regional Advisory Process, Department of Fisheries and Oceans, P.O. Box 1006, Stn. B105, Dartmouth, N.S., Canada B2Y 4A2. Telephone: 902-426-8487. E-mail: d\_geddes@bionet.bio.dfo.ca

Furthermore, the dragger fleet which had traditionally caught most of its catch between May and October began to transfer its activities toward the latter part of the year to exploit migrant cod. The effect was to maintain the overall catch for 4Vn even as the abundance of resident fish fell.



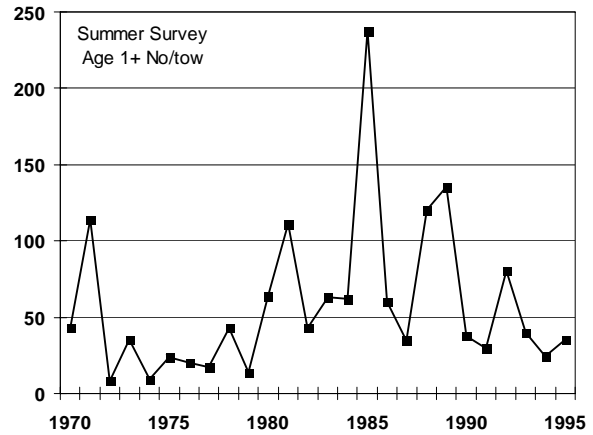
Information on the overwintering migration of Gulf of St. Lawrence (4T) cod into the Sydney Bight area was reviewed in the spring of 1994. From patterns of commercial fleet movements and results of tagging studies it was clear that many 4T cod had departed the Gulf by mid November. Therefore it was decided to modify the 4Vn management unit by redefining the assessment period from May to December, to May to October, inclusive.

Less than 50 tonnes of cod landings were reported in 1995. These were taken as by-catch from redfish and flounder fisheries.

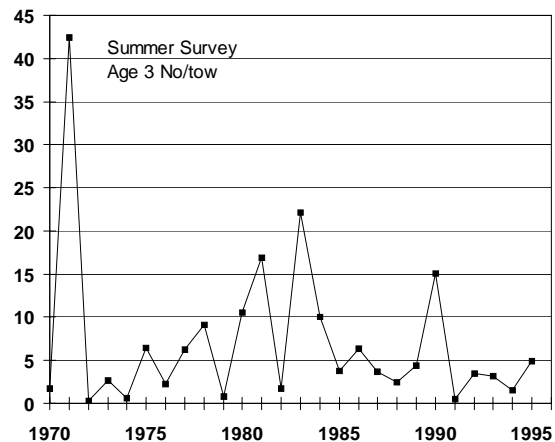
**Resource Status**

Interpretation of the **July survey** data from 4Vn with its high variability has always been difficult due to small sample size and periodic incursions of other stocks into the area.

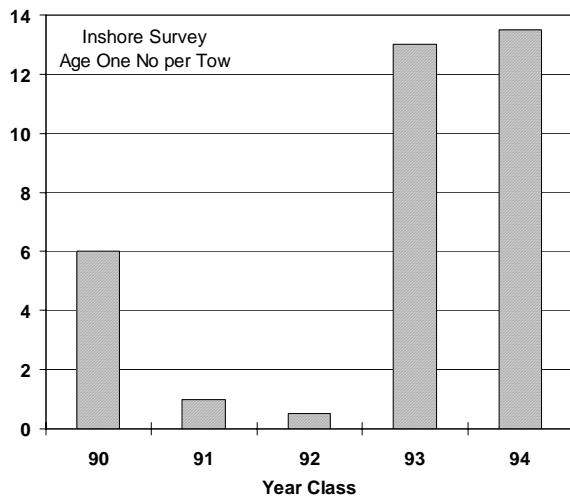
Nevertheless, the general trend of the survey index does seem to reflect the abundance of cod. Although the index was slightly higher in 1995 than in 1994, it is still at a very low level.



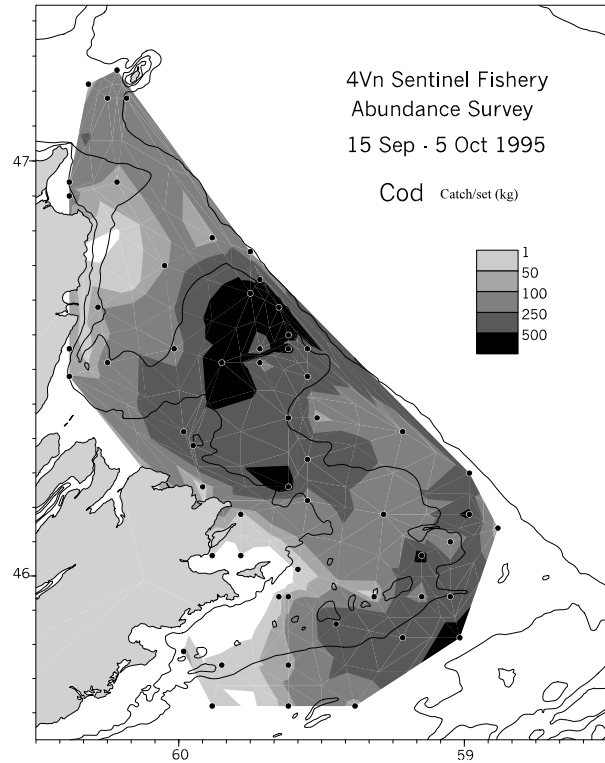
No cod were taken in the deepest stratum (>183 m); about 100 per tow in the mid-depth stratum (91 to 183 m) and about 9 per tow in the shallow stratum (<91 m). Most of the catch was taken in two sets, 278 and 165 fish, respectively. The 1990, 1991 and 1992 **year-classes** made up the bulk of the catch with 5 yr-olds being slightly more abundant than adjacent year-classes. This stock continues to suffer from low levels of recruitment; the last good year-class seen in previous assessments was 1987.



DFO has also conducted an **inshore survey** in western Sydney Bight for the past five years. A cod nursery area was located in the southwest corner of the Bight, in the Bird Islands region. In the past two years, the number of one year-old cod (average length 12 cm) was at least twice the level of the previous three years. However, it is still too early to determine if the catches in this area reflect overall recruitment to the stock.



Initiated in 1994, a **4Vn sentinel survey** conducted by commercial longliners follows a stratified random design similar to that used by the July groundfish survey. Three surveys have now been completed; September 1994, and July and September 1995. The geographic distribution of cod caught in all three surveys was similar. However, although the catch rates in September of 1994 and 1995 were virtually identical (110.1 and 108.3 kg/1000 hooks, respectively), the catch rate during July 1995 (22.8 kg/1000 hooks) was much lower. This appears to be a seasonal effect. Longline fishermen have found that July catch rates have historically been lower than in other months.



Besides cod, the dominant species in sentinel catches were skate, plaice and dogfish. Together, plaice and skate comprised 2.3 and 2.8 tonnes of the catch in July and September, respectively. About a tonne of dogfish were taken in September, whereas in July this species formed the greatest proportion of the total catch at 21.2 tonnes. The fishing industry has noted that high concentrations of dogfish can interfere with the catch rate of cod.

A comparison of the July 1995 sentinel survey and the July trawl survey demonstrated that cod were caught in the same areas, but none of the areas identified as being of low abundance by the sentinel survey were sampled by the Needler. Therefore, the degree of correspondence between the two surveys could not be properly assessed. Cod taken by the sentinel survey were significantly larger than those caught by the trawl survey; this is due to gear selectivity. The research trawl is fitted with a small mesh

liner so is capable of capturing very small cod; whereas, the size of hook used in the commercial longline fishery take few small fish. Fishermen indicate that cod <35 cm (14 in) are rarely taken with #12 hooks which are used for the survey.

DFO Science has extended its **4T survey** into 4Vn during September in the past two years. The distribution of cod seen by these surveys largely mirrors that as seen by the surveys mentioned previously. However, the catch rate of cod in 1995 decreased compared to the previous year.

The major sources of **uncertainty** in this assessment include the degree of mixing with cod from adjacent management areas, difficulties linking sentinel survey and research vessel surveys due to differences in spatial coverage, and the possible impacts of dogfish on commercial and sentinel fishery catch rates. Notwithstanding these uncertainties, the stock is at a low level.

### ***Outlook***

The short-term future of this stock remains bleak; not one survey index shows any convincing sign of an increase. The inshore survey cannot yet be validated and the absence of incoming year-classes of any note in the July trawl survey is the major concern. Little change is expected in the status of this stock until there is clear evidence of a substantial improvement in recruitment

### ***For More Information***

#### Contact:

Timothy C. Lambert  
Marine Fish Division  
Bedford Institute of Oceanography  
P.O. Box 1006, Dartmouth  
Nova Scotia, B2Y 4A2

TEL: (902) 426-3872  
FAX: (902) 426-1506  
E-mail: t\_lambert@bionet.bio.dfo.ca

### ***References***

- Campana, S., P. Fanning, M. Fowler, K. Frank, R. Halliday, T. Lambert, R. Mohn, S. Wilson, and W. Stobo. 1995. Report of the 4Vn cod working group on the scientific value of a 4Vn cod (May-Oct) stock assessment. DFO Atl. Fish. Res. Doc. 95/16: 110p.
- Lambert, T.C. 1993. The timing of the winter migration of 4T cod into 4Vn. DFO Atl. Fish. Res. Doc. 93/25.
- Lambert, T.C., and S. Wilson. 1995. Update of the status of 4Vn cod: 1994. DFO Atl. Fish. Res. Doc. 95/27.
- Lambert, T.C., and S. Wilson. 1996. Update of the status of 4Vn cod: 1995. DFO Atl. Fish. Res. Doc. 96/66.