

## 13 Stocks and Fisheries outside ICES ECO-REGIONS: the Tusk (*Brosme brosme*) Fishery in Canadian waters

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### 13.1 The fisheries

Tusk (*Brosme brosme*), or cusk as they are called in Canada, are caught by a number of gear types in Atlantic Canada however there is no directed fishery. Although considered a deep-water species, commercial catches are mostly from waters of less than 500m in depth due to the distribution of effort. The majority of landings are reported from the cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) longline fishery (Table 13.1) in Northwest Atlantic Fisheries Organization (NAFO) divisions 4X and 5Z (Figure 13.1). Catches by otter trawlers are low due to the behaviour of tusk and their preference for rocky or hard bottom, which is avoided by this sector. Tusk landings in the groundfish fisheries have been reported since the 1960s but the quality of the data in earlier years is questionable and the resolution is low. Prior to 1999 there was no catch limit on tusk and it has been suggested that other species, such as cod, were landed as tusk when quotas were exceeded. Tusk were also landed in combination with white hake (*Urophycis tenuis*) and pollock (*Pollachius virens*) as 'shack'. The proportion of shack landings that were tusk cannot be determined.

Prior to 1999, tusk caught in the lobster (*Homarus americanus*) fishery could be landed in unlimited quantities. Unfortunately, reporting at that time was minimal thus there are no historical estimates of tusk landed although anecdotal reports suggest catches off southwestern Nova Scotia may have been substantial. Currently tusk caught in the invertebrate fisheries cannot be legally landed. These discards, which are unlikely to survive when returned to the water, are not reported. The data collection phase of a science project to estimate these discards has just been completed.

### 13.2 Landings trends

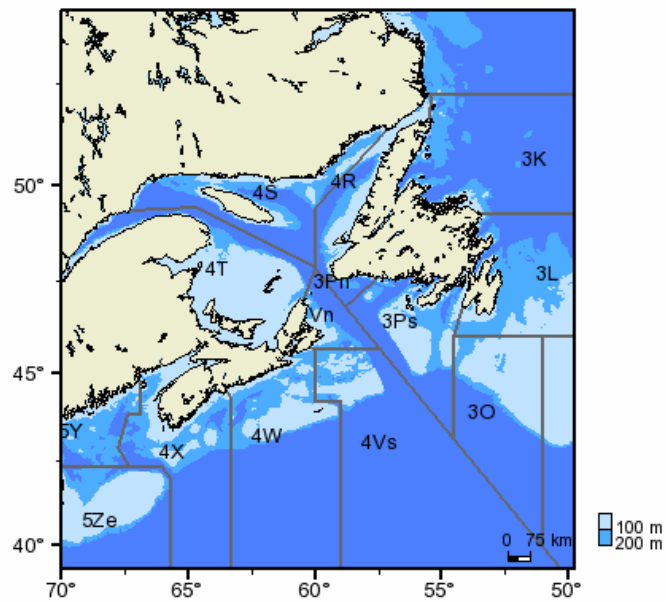
Tusk landings in Atlantic Canada have decreased and have been at an historical low since 1994. The CPUE of tusk in the 4X groundfish longline fishery declined in the early 1990s. The current catch rates are at around 40% of the historical level, though misreporting of other species as tusk may have exaggerated this trend. The decline appears to have stopped. The proportion of 5-minute square units in 4X in which tusk landings were reported and the proportion of trips that report tusk were used as indices of area occupied. These indices suggested that there has been little change in the proportion of the 4X area occupied by tusk since 1991 or in the proportion of 4X longline trips with tusk since 1977, and that tusk are still caught throughout the traditionally fished area despite the decline in landings and CPUE. However, there are anecdotal reports from members of the fishing industry that tusk are no longer a significant proportion of the catch in some locations where, in the past, they were abundant.

### 13.3 Management measures

Tusk in Canadian waters are managed as a single stock. They can only be legally landed in the groundfish fisheries. A by-catch cap of 1000t for fixed gear in NAFO divisions 4VWX was first implemented in 1999. In 2003 this cap was reduced to 750t for 4VWX5Z, where it has remained since. There are no minimum size limits. Cusk are currently being considered for legal protection under Canada's Species at Risk Act but there is some debate over their status.

**Table 13.1. Reported landings (metric tonnes) of tusk by gear type from NAFO divisions 4VWX5Z**

	Bottom				Total
	Longline	Trawl	Gillnet	Other	
1986	1657	34	21	287	2000
1987	3386	95	118	137	3736
1988	2666	74	41	51	2832
1989	3044	45	77	127	3294
1990	3210	42	52	143	3447
1991	4028	73	40	151	4293
1992	4693	46	93	196	5028
1993	2693	55	57	77	2882
1994	1427	56	49	42	1574
1995	1828	40	25	38	1931
1996	1293	17	27	31	1368
1997	1688	25	23	34	1770
1998	1508	56	21	15	1600
1999	976	35	16	5	1032
2000	1020	28	16	9	1073
2001	1397	37	16	5	1454
2002	1218	35	13	3	1270
2003	1037	27	13	4	1080
2004	873	31	7	2	878
2005	859	22	6	2	887
2006	804	17	5	4	830



**Figure 13.1. NAFO divisions from which tusk are landed**

## **14 Impact of Area Closures**

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No more data than those used to substantiate ACFM/ACE response to the NEAFC request on the impact of area closures (ICES advice 2006, book 9, p. 17) could be used by the WG (see Section 15).

Progress on this issue is closely linked to advances in identifying and mapping out deep-water fisheries (see Section 16).

## 15 NEAFC Request concerning the quality of VMS, Catch and Effort Data

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### 15.1 Background

For several years, WGDEEP has repeatedly stressed that a number of tasks requested by ICES clients could not be fulfilled satisfactorily due to a lack of fine-scale data on the spatial distribution of fishing effort. Such data are held by national and international bodies responsible for fisheries management, but these have until recently not been made accessible to ICES.

In the course of 2006, after WGDEEP06 had met, the NEAFC submitted a set of raw VMS data (2001-2005) to ICES, with copies to the chairs of WGDEEP and WGDEC. These data were evaluated by CEFAS and IFREMER, which produced a WD (WD3). This document provided the main scientific background supporting the ACFM/ACE response to the NEAFC request on the impact of area closures (ICES advice 2006, book 9, p. 17).

The WG commended the decision of NEAFC to provide VMS data to ICES. However, the WG also noted a number of limitations in the current data format and structure, which would need to be addressed, to respond more adequately to requests such as those listed in Sections 14, 16 and 17 (Section 15.2).

A link between catch and VMS data at some appropriate spatial and temporal scale is also a requirement to identify and map out deep-sea fisheries (Section 16). Catch data may be derived from log-books or other sources (e.g. EU observers program etc.). With regards to that requirement, members of WGDEEP and WGDEC visited NEAFC in April 2007, with the objective to evaluate whether catch data were available for all contracting parties and, should that be the case, to assess the feasibility of linking those catch data with VMS records. This assessment is presented in Section 15.3.

### 15.2 Quality of VMS data

First, in the year with the most complete data (2005), more than half of the records did not specify the type of gear used. Therefore, it was not possible to identify the type of activity exerted by vessels for which gear information was not documented. These vessels could target deep-sea species, but they could just as well target other species. It would be highly desirable that in the future, gear information be comprehensively recorded in the VMS data files provided to ICES. This links in particular to the issue of identifying and mapping deep-sea fisheries, which is discussed in Section 16.

Second, the frequency of VMS records ranged from 1 to 2 hours. Preliminary studies indicate that this frequency of recording and reporting might not be unreasonable for trawlers, when the haul duration exceeds that interval, which is generally the case in deep-sea fisheries (Mills et al., 2007). However, a higher frequency of recording would be desirable for monitoring fishing activities in relation to protected areas. There is also some evidence that a 1-2 hour frequency does not allow to identify fishing operations and calculate fishing effort at a satisfactory precision, for vessels using passive gear (WD2). In this WD, a recording frequency of 10-15 minutes was recommended.

Third, anecdotal evidence indicate that there may be an element of mis-reporting in the transmission of VMS data (e.g. by interrupting the signal), which would need to be scrutinised more closely.

Fourth, the NEAFC VMS records covered international waters but not waters under national jurisdiction. It would be desirable that bodies responsible for holding VMS data in national waters grant ICES access to this information.

### **15.3 Linking catch data with VMS records**

Weekly catch data by vessel and by species were made available to ICES by the NEAFC Secretariat. The type of licence (deep-sea fishing or others) attributed to each vessel was also documented. It was concluded that these information would be valuable, and could potentially be linked with VMS data records, at some aggregation level.

However, one major issue appeared to be that data were not recorded consistently, so linking effort and catches through an automated procedure is not straightforward. It is feasible to do this, but would take a substantial amount of time. Given the CD-ROM with NEAFC data was only received shortly before the WGDEEP meeting, it has not been possible to link effort positions, as derived from VMS records, with catches.

The WG was of the opinion that an appropriate exchange format of VMS data and catch information be defined, under the auspices of a dedicated ICES SG, to facilitate the use of these data by ICES and WGDEEP in particular.

### **15.4 Recommendations**

In order to make a better use of VMS data, the WG recommends that a dedicated SG be set up by ICES around the development of methods based on VMS data (SGVMS). This SG should include WGDEEP members, but also experts from other assessment WGs. WGDEEP suggested the following terms of reference

#### **SG on the development of methods based on VMS data (SGVMS)**

- a) To review existing information based on VMS records available to ICES, including the status, extent, quality, accessibility and restrictions applying to these data.
- b) To define a standard format for collating data derived from VMS records. This will include defining an appropriate unit for the time elapsed between consecutive records
- c) To review existing methods and possibly develop new methods to separate out fishing positions from plain travelling. These methods should apply to vessels using both active and passive gears.
- d) To review existing methods and possibly to develop methods and to identify suitable formats to link fishing effort as derived from VMS data with catches, vessel and gear characteristics, and fishing depth.