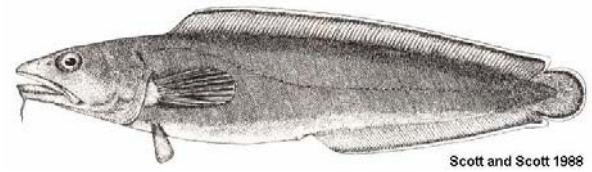


Allowable Harm Assessment for Cusk in Atlantic Canada

Background

Cusk is designated as "threatened" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). They are not currently listed by the Canadian Government under the Species At Risk Act (SARA). To inform decisions related to listing and recovery planning, an Allowable Harm Analysis was prepared and reviewed during a National Advisory Process (NAP) meeting convened October 25-28, 2004.

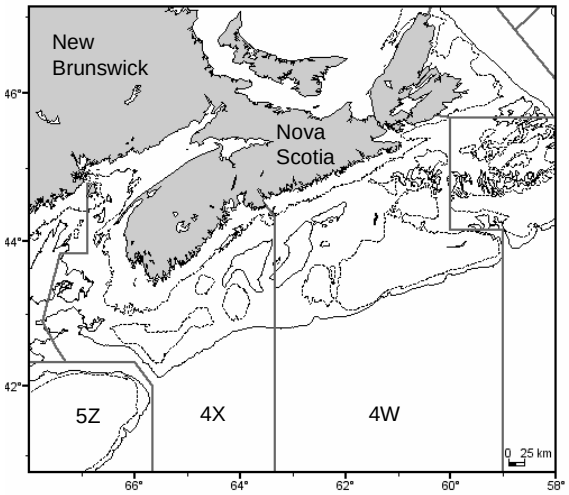
SARA provides that the Minister of Fisheries and Oceans may issue a permit to allow for incidental harm to a listed species if a number of conditions are met. Under section 73(2), authorizations may only be issued if:

a) the activity is scientific research relating to the conservation of the species and conducted by qualified persons;
b) the activity benefits the species or is required to enhance its chance of survival in the wild; or
c) affecting the species is incidental to carrying out the activity.

Section 73(3) establishes that authorizations may be issued only if the competent minister is of the opinion that:

a) all reasonable alternatives to this activity that would reduce the impact on the species have been considered and the best solution had been adopted;
b) all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals; and
c) the activity will not jeopardise the survival and recovery of the species.

The analysis provided herein will allow the Minister of Fisheries and Oceans to determine the basis under which permits are to be issued in Atlantic Canadian waters. It will also provide scientific information to recovery teams, required should cusk be listed. It should be noted that in the context of this status report, "harm" refers to all prohibitions as defined in SARA.



Main area of cusk distribution in Canadian waters

Summary

- Since the mid 1990s cusk abundance has fluctuated without trend. Status relative to historical population sizes is uncertain, although it has experienced a decline. Cusk does not show the usual signs of a greatly depleted stock however there is scope for an increase in abundance.

- Indicators of extent of distribution suggest that cusk are widespread in 4X and 5Z. All indicators suggest that cusk were always infrequent and rarely encountered beyond the Scotian Shelf and Gulf of Maine.

- The main source of human-induced mortality is bycatch in fisheries directed at other species. Based on current information, the rate of mortality caused by all sources of bycatch could continue over the permitting period without jeopardizing recovery.

- Exploitation rate due to bycatch is unknown. The main source of documented bycatch is the groundfish longline fishery for cod and haddock. There is anecdotal information that

bycatch occurs in some invertebrate trap/pot fisheries.

- Recent caps on allowable bycatch are causing industry to actively alter their fishing behaviour to avoid cusk however these caps are being exceeded.

- Because the changes in management intended to reduce catch of cusk are recent, it is too soon to know if current (2003/04) bycatch mortality rates are low enough to allow an increase in biomass. A further reduction in bycatch may be necessary.

Issue

COSEWIC has recommended a designation of 'threatened' for cusk. If this species were given legal protection under SARA, allowable harm permitting would be required in the short term and recovery planning would be required for the long term. Both necessitate scientific input.

Assessment of Issue

The following analyses and information were reviewed during a National Advisory Process (NAP) meeting convened 25-28 October 2004.

Description of the Species

Cusk (*Brosme brosme*) is a solitary, sedentary, slow swimming species, found throughout the North Atlantic. Based on survey data, it is most common in the Gulf of Maine and Western Scotian Shelf. It prefers a rocky bottom or gravel. It is considered a deep-water species although it has been found in waters as shallow as 20 metres.

Cusk are caught as a bycatch in many fisheries. The highest documented landings are in the cod and haddock longline fishery where they can be landed legally. Catches by trawlers are low due to cusk's habit of hiding in crevices and preference for rocky bottom. A by-catch cap of 1000t for Northwest Atlantic Fisheries Organization (NAFO) divisions 4VWX was first implemented in 1999. In 2003 and 2004 this cap was reduced to 750 tons for 4VWX5Z. The effectiveness of this measure for reduction of the mortality rate is unknown, but the absolute catch of cusk has been lower since caps were imposed.

Species Status

In May 2003, COSEWIC designated cusk as "threatened" (likely to become endangered if limiting factors are not reversed, while endangered refers to species facing imminent extirpation or extinction), citing an abundance decline rate of over 90%, and that the fish occurs in fewer and fewer DFO RV survey trawls over the 32-year time series.

There are no precise estimates of absolute cusk abundance. Current levels are considered lower than historical on the basis of a decrease in areas of cusk concentration seen in both commercial fisheries and the DFO RV survey. Catch rates in the groundfish longline fishery decreased in the early 1990s but changes in fishing patterns for target species may be a contributing factor. Cusk do not show a truncated size distribution, a sign of a severely depleted stock. Modal length appears to have decreased somewhat since 1960s but the full length range is still present. Cusk are still encountered routinely in the groundfish longline fishery and approximately 1000t have been landed annually in recent years.

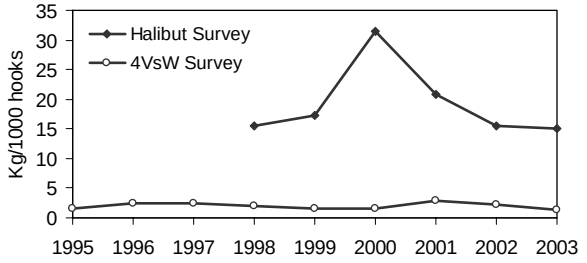
The annual DFO bottom-trawl research survey data are not considered a reliable index of abundance because the survey does not cover cusk's preferred habitat, uses inappropriate gear to sample cusk, and only samples part of this deep-water species' distribution.

Two industry surveys provide useful indices for the areas covered however there are no surveys designed specifically to sample cusk, nor do any surveys cover its full depth distribution in Canadian waters. Both industry surveys use longline gear and sample on a variety of substrates, including rocky habitat. The surveys considered do not cover the full

time period examined in the COSEWIC status report.

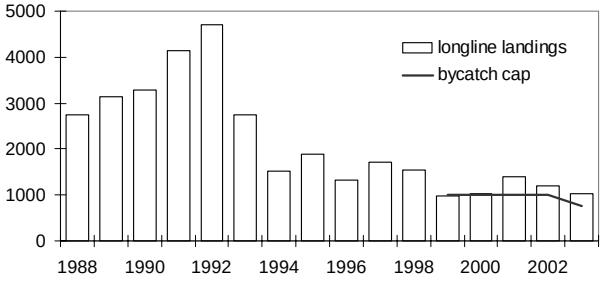
The Halibut Industry longline survey, which began in 1998, covers cusk's distribution on the Scotian Shelf and along the slope (sets up to 1000m), but does not include sets in the Gulf of Maine or on Georges Bank in all years. Catches in the fixed station portion of this survey appear stable, fluctuating without trend. The 4VsW Sentinel longline survey sets have a depth distribution similar to that in the DFO bottom-trawl survey, not sampling deep water. Since the beginning of the survey in 1995, catches in the random sampling portion of this survey have fluctuated without trend. The area surveyed does not include cusk's centre of distribution (4X5Z) but the data corroborate the lack of trend seen in the Halibut Industry survey data nonetheless.

Cusk Catch Rates in Industry Surveys



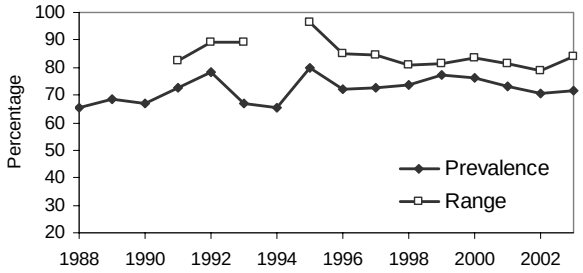
Reported commercial landings from the cod and haddock longline fishery averaged 1156t from 1999 to 2002 when the bycatch cap was at 1000t. Reported landings in 2003 were 1036t after a reduction in cap to 750t.

Reported Cusk Landings from Longline Groundfish Fishery



An analysis of commercial catch data indicated that there has been no change in the range (percentage of 5-minute square units with longline activity in which cusk was reported) and prevalence (percentage of trips that report cusk) in the 4X groundfish longline fishery. This suggests that cusk are still widespread and routinely encountered. Due to concern over data quality, such as misreporting, and changes in fishing patterns the commercial catch data were not considered further.

Range and Prevalence of Cusk in the 4X Groundfish Longline Fishery



Scope for Human-induced Harm (or Mortality)

There are no reliable quantitative indices of abundance prior to the 1990s. However the absence of cusk from locations where they were once found, as indicated by members of industry and the DFO bottom-trawl survey, suggest that cusk were more abundant in the 1980s and early 1990s. The magnitude of this change is unknown. While cusk does not show the usual signs of a depleted stock (such as reduction in size range or in geographic range) there is considered to be scope for an increase in abundance. Since the mid 1990s indices of cusk abundance have fluctuated without trend. This implies that the current rate of mortality caused by all sources of bycatch could continue over the permitting period without jeopardizing survival or recovery of the species. A decrease in human-induced mortality would likely be required for abundance to increase.

Potential Sources of Mortality and Aggregate Harm

The main source of human-induced mortality is bycatch in fisheries directed at other species and the highest documented is in the groundfish longline fishery for cod and haddock. There is anecdotal information that

cusk are caught incidentally and discarded in some invertebrate trap/pot fisheries. Increased monitoring is required to quantify this occurrence. Exploitation rate due to the bycatch is unknown. There is no reason to expect any increase in effort, and hence in bycatch mortality, in these fisheries during the permitting period.

Alternatives to Activities and Feasible Mitigation Measures

Bycatch caps have been implemented by Fisheries Management. The groundfish longline industry has responded with a change in temporal and spatial distribution of effort to reduce cusk bycatch. Further redistribution of effort to avoid cusk may be possible. Management with direct time and area restrictions may contribute to a reduction in mortality but this needs to be explored further.

Documented cusk bycatch is highest in the longline fishery targeting cod and haddock. It has also been observed in the halibut longline fishery and is reported to occur in some pot and trap fisheries. An investigation of alternative fishing methods to reduce cusk bycatch is required. It is *technically feasible* that the longline quota for cod and haddock be taken by alternative gear, such as bottom trawl which has a much lower bycatch rate of cusk, although there would be large social and economic repercussions. The analysis of the biologically feasible alternatives *must* be augmented by information from other sources, including Fisheries Management and stakeholders with regard to social and economic implications in order to determine the best solution.

Sources of Uncertainty

Fishing mortality in invertebrate trap and pot fisheries is unquantified. Cusk are most often dead when brought to the surface from deep waters due to the tendency of their stomachs to evert when brought to the surface. The survivorship of bycatch in shallow waters is unknown. Monitoring of these fisheries to quantify bycatch and mortality is required.

Conclusion

Current levels of mortality are not thought to jeopardise survival or recovery of cusk during the permitting period.

There is no scientific information currently available to allow the determination of a recovery target, however there is scope for an increase in abundance.

The current trajectory in abundance indices appears flat, suggesting that a decrease in human induced mortality is required for an increase in abundance.

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