

Fisheries Resource
Conservation Council

Conseil pour la conservation
des ressources halieutiques

Ottawa, Canada
K1A 0E6

August 23, 1993

Honourable Ross Reid, P.C., MP
Minister of Fisheries and Oceans
House of Commons
Ottawa, Ontario
K1A 0A6

Dear Minister:

In a letter of July 30 1993, you requested that the Fisheries Resource Conservation Council, in its upcoming report on advice for the 1993 fishing season, provide advice to you on "conservation of the silver hake stock and the traditional species harvested as a bycatch", making recommendations on "conservation and resource implications associated with the incidental bycatch of traditional species" and "the ability of the silver hake stock to sustain the current level of fishing activity".

This letter addresses these matters, particularly silver hake stock status, bycatch of traditional species, and predator-prey relationships. However, it should be noted that given the time frame for the preparation of this report, it has not been possible to examine to the extent desirable the ecological interactions amongst silver hake, traditional groundfish species, and other relevant predators and prey.

1. 4VWX SILVER HAKE STOCK STATUS

The 4VWX silver hake fishery is located in the "silver hake box", particularly in the 4W area. It is "recruitment-driven", relying on fish of ages 2 and 3. The assumed natural mortality rate for silver hake ($M=0.4$) is twice that for traditional groundfish species ($M=0.2$) giving an $F_{0.1}$ fishing mortality reference level of 0.72. Silver hake is caught in a "small-mesh" fishery with a 60mm mesh (which has remained constant since it was raised from 40mm in 1977). Recent TACs and nominal catches in the fishery have been as follows:

| | TACs | Catch (000t) |
|------|------|-----------------------------------|
| 1989 | 135 | 88 |
| 1990 | 135 | 69 |
| 1991 | 100 | 68 |
| 1992 | 105 | 32 |
| 1993 | 86 | 29 (preliminary to August 1 1993) |

While there appears to be much that is not known about silver hake, DFO stock assessments indicate that:

- (a) The abundance of silver hake is currently at a relatively low level, due to poor recruitment. Since the year-classes recruiting into the fishery this year were of average to low strength, the fishery was predicted to be poor this year.
- (b) There may be an increase in stock abundance, indicated in a July 1993 research vessel survey, but at present this involves mostly juvenile fish.
- (c) Prior to 1985, fishing mortality was below the target $F_{0.1}$ reference point, while since 1985, fishing mortality has approximated $F_{0.1}$.

Taken together, this information suggests that the silver hake stock is currently at a low level, but the stock shows some signs of increasing in the near future. Despite this, there is some reason for concern about the state of the resource.

The explanation for recent poor year-classes is unclear, but a number of possibilities have been raised, including:

- (a) The present situation may simply reflect "natural" fluctuations in recruitment, causing the silver hake stock to be very low in the 1960s, high in the early 1970s, low in the late 1970s, high throughout the 1980s, and declining back to late-1970s levels over the past three years.
- (b) Oceanographic factors (such as cold water) may be affecting silver hake together with other species, although research is as yet inconclusive in drawing cause-and-effect relationships in this regard.

- (c) Seal predation may be reducing the stock considerably. DFO data show that silver hake are consumed by grey seals (but only in summer months), comprising 26% of the average seal's summer diet in 1989 at Sable Island but only 5% of the average summer diets in 1991-1992, when silver hake abundance was lower. As grey seal pup production is increasing at 12-13% per year, this could be an increasing factor in the natural mortality of silver hake.
- (d) Fishing pressure may be a key consideration in the recent decline of the silver hake stock. However, at this point over-fishing cannot be proven, given that (i) DFO scientists report a lack of a clear relationship between the spawning biomass and the subsequent recruitment (which would be necessary if high catches were to cause low recruitments) and (ii) fishing mortality has approximated $F_{0.1}$ since 1985 (although no retrospective analysis has been done to confirm this).

It is of interest that catches have averaged only 60% of TAC levels (which, according to DFO scientists, have been set at $F_{0.1}$ levels), even though fishing mortality has matched $F_{0.1}$ since 1985. This may be related to an over-estimation of past $F_{0.1}$ catch levels, due to high levels of uncertainty in silver hake assessments.

Of the quota allocated to foreign vessels (as opposed to that caught under Canadian auspices), catches have ranged from 64-90%. This under-catching may be due to management actions or other factors, although in other fisheries, this situation has (in retrospect) been a warning signal of a low stock abundance not recognized in the assessment process.

Finally, it is crucial to note that the NAFO Scientific Council will be carrying out a new assessment of the silver hake stock at its meeting in September 1993, so that any judgement regarding the stock should be reserved until following that time, if at all possible.

2. IMPACTS ON TRADITIONAL SPECIES: COD, HADDOCK AND POLLOCK

2.1 Bycatch.

The allowable bycatch of cod, haddock and pollock in the small-mesh silver hake fishery is set as a percentage of the overall catch (by weight) in that fishery, enforced on a company-specific or a trip-specific basis. Specifically, this is 1% by weight of all licensed species (silver hake, argentine, squid and mackerel) for haddock and 4X cod, and 5% for 4W cod and for pollock. DFO data suggests that these limits have not been exceeded in any of the past 5 years, except for an excessive pollock bycatch in 1992, which led to a closure of the silver hake fishery. Several points should be noted in this regard:

- (a) While the limits are lower than in many similar fisheries internationally, they are set arbitrarily, not necessarily with specific conservation targets in mind.
- (b) The data on bycatch levels is dependent entirely on the accuracy of the "100% observer coverage" on foreign vessels. While 100% of the vessels have observers onboard, questions have been raised about the extent to which any one observer can monitor round-the-clock activity on-board. DFO expresses confidence that the observer system produces accurate results, but some fishermen strongly doubt this. The Council has not been able to verify the accuracy of bycatch figures in the silver hake fishery.
- (c) From a conservation perspective, although bycatch limits appear low as percentages of silver hake catches, they can be high as percentages of the catch of depressed cod and haddock stocks. For example, averaged over the 4-year period 1989-1992, the number of 4TVW haddock taken as bycatch in the silver hake fishery represented 12% of the total catch of that haddock stock landed in all directed and bycatch fisheries combined. The corresponding figures are 9% for 4VWX pollock, 1% for 4VsW cod, 1% for 4X haddock, and 0.2% for 4X cod. This bycatch, especially for haddock, was primarily comprised of juveniles, which had not yet contributed to the spawning stock.

- (d) An important point regarding future silver hake fisheries is the role of new grates introduced this year in the fishery. These appear to have the potential to vastly reduce current bycatches of cod, haddock and pollock. Observers report that the grates were not always used properly.

2.2 Predator-Prey Relationships

Evidence presented by DFO to the Council indicates that silver hake play a minor role in the diet of cod, haddock and pollock. In particular, this role is negligible for haddock, very small for cod, and small for pollock. However 50% of the silver hake fish consumption was silver hake, indicating great cannibalism. While DFO concludes that "there is no support, in available data, for a hypothesis that silver hake is a major forage fish for other gadoids", it should be noted that many fishermen believe it to be "common knowledge" that silver hake are an important food source for traditional groundfish species. The Council notes the dated nature of available scientific information.

Although silver hake are major predators, evidence presented by DFO suggests they do not represent substantial consumers of other groundfish. However, since silver hake have a similar diet to cod, haddock and pollock, there may be competition for food, although evidence of this is lacking.

It is clear that grey seals feed on silver hake as well as other groundfish. However, given the greater reliance on cod relative to silver hake in the seals' diet, and given the continued rapid growth in the grey seal population, DFO has indicated that "there is little reason to believe that a larger standing stock of silver hake would reduce the predation rate by grey seals on cod".

RECOMMENDATIONS

Stock status information suggests that the silver hake stock is currently at low abundance, although not necessarily at critical levels. On the other hand, statistical evidence indicates that bycatch in the silver hake fishery can represent a significant proportion of total fishing mortality imposed on some depressed traditional species, even if bycatches are within currently accepted limits as measured by weight of silver hake caught. Hence, such catches cannot be neglected in efforts to maximize

conservation of depressed stocks. Since the silver hake fishery is essentially completed for 1993, it is now opportune to plan conservation actions for the 1994 season. As part of this, there are some efforts that can be made in this calendar year:

1. Since some concern exists regarding the status of the silver hake resource, and since the NAFO Scientific Council will be carrying out a new assessment of the stock at its meeting 7-10 September 1993, any judgement regarding the need for conservation actions should be reserved until following that time, if at all possible. The FRCC will provide specific advice for 1994 in its subsequent report.
2. A retrospective analysis should be carried out as soon as possible to determine the validity of the levels of fishing mortality on silver hake that have been calculated in recent years.
3. The Department of Fisheries and Oceans should conduct a careful examination, in part through the forthcoming Fall workshop, to ensure that conservation measures in the traditional groundfish fisheries are not compromised by fishing activity in the small-mesh silver hake fishery. In particular, it would be useful to examine such management issues as possible minimization of bycatch through adjustment outward of the "silver hake box", mandatory and correct use of grates, and other options.



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Chairman