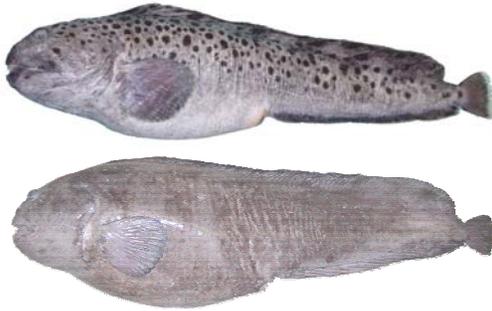




Newfoundland and Labrador Region

Stock Status Report 2004/031



Allowable Harm Assessment for Spotted and Northern Wolffish



Summary

Background

Spotted and Northern wolffish are designated as "threatened" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and is listed on Schedule 1 of the Species at Risk Act (SARA). The prohibitions associated with SARA are scheduled to come into force on June 1 2004 and subsequently SARA will provide legal protection to this population. 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 the carrying out of 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 the activity that would reduce the impact on the species have been considered and the best solution has 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 jeopardize the survival or recovery of the species.

The analysis provided herein will support the Minister of Fisheries and Oceans in determining the basis under which permits are to be issued in Atlantic Canadian waters. In the context of this status report, "harm" refers to all prohibitions as defined in SARA.

- Between the late 1970's and early 1990's, the abundance of northern wolffish and spotted wolffish had declined by over 90% on the Grand Banks and Northeast Newfoundland/ Labrador Shelf. The two species are listed as "threatened".
- There is no evidence of a decline on the Scotian Shelf or in the Gulf of St. Lawrence and the declines observed at the center of their distribution have ceased. Since the early 1990's, abundance of northern wolffish on the Grand Banks to Labrador Shelf has been stable while spotted wolffish has been increasing.
- The two species are incidentally captured in fisheries directing for other commercial species, mainly Greenland halibut and snow crab in some areas, but are also taken in smaller amounts in a wide variety of demersal fisheries in Atlantic Canada.
- A scientific evaluation was carried out to identify potential sources of harm and to determine a level of incidental harm, if any, that would not jeopardize survival or recovery of the two species.

- There is scope for human induced mortality without jeopardizing survival of the species.
- Several measures have been instituted that mitigate mortality of wolffish in the fisheries. A key measure, live release, introduced in 2003, aims at minimizing wolffish mortality.
- Mortality of northern and spotted wolffish due to incidental capture in fisheries is expected to decrease over the next few years as fisheries that incidentally capture the largest numbers of wolffish are expected to decline.

### **Issue**

COSEWIC indicated that over three generations, between the late 1970's and early 1990's, the abundance of northern wolffish (*Anarhichas denticulatus*), and spotted wolffish (*A. minor*) had declined by over 90% on the Grand Banks and Northeast Newfoundland/ Labrador Shelf. As a result, the two species were listed as "threatened". The COSEWIC Reports did not examine trends in other areas, namely the Gulf of St. Lawrence or the Scotian Shelf/Bay of Fundy/Georges Bank, where the population indices have been stable.

Specific threats cited by COSEWIC were bycatch mortality in commercial fisheries and habitat degradation due to trawling.

In respect to SARA Sect. 73, a scientific evaluation was carried out to identify potential sources of harm and to determine a level of incidental harm, if any, that would not jeopardize survival or recovery of spotted and northern wolffish. This was done in support of advice to the Minister of Fisheries and Oceans concerning SARA preconditions, primarily that the incidental harm would not threaten the survival and recovery of the species.

### **Assessment of Issue**

#### **Description of the Species**

Northern and spotted wolffish, although distributed throughout the Canadian Atlantic and Davis Strait are concentrated mainly on the northeast Newfoundland/Labrador Shelf and the outer portions of the Grand Banks. They are also encountered on the Scotian Shelf, Bay of Fundy, Gulf of St Lawrence and into Davis Strait, but at far lower concentrations. Their broad distributions, coupled with sedentary habits suggest the possibility of the existence of Evolutionary Significant Units (ESU's) or sub-populations. However, for the purpose of determining a level of allowable harm, the species are considered to be single populations.

Northern and spotted wolffish are primarily demersal, except at the larval stage when they are found in near surface waters. Wolffish are a family of fish which apparently have limited dispersal and exhibit nesting habits. Based on limited knowledge, northern wolffish are thought to mature at sizes greater than 80 cm while spotted wolffish mature at about 75-80 cm. Their fecundity is low and wolffish fall into the "low productivity" category. Spawning time is thought to occur late in the year for both species.

Within Canadian waters, spotted and northern wolffish are incidentally captured in fisheries directing for other commercial species, mainly Greenland halibut and snow crab in some areas, but are also taken in smaller amounts in a wide variety of demersal fisheries in Atlantic Canada. The largest catches of northern and spotted wolffish now occur on the northeast Newfoundland/ Labrador Shelf and the slope of the Grand Banks. There, the Greenland halibut fishery now takes about 90% of the northern wolffish and about 80% of the spotted wolffish catches. Catches of both species have increased over the past 10 years but are not to the levels observed in the 1970's and 1980's. In other areas, namely Georges Bank, the Bay of Fundy, Scotian Shelf and Gulf of St. Lawrence, estimates of bycatch by species have not been determined but are thought to be very low.

***Species Status***

In May 2001, spotted and northern wolffish were designated by COSEWIC as “threatened” (likely to become “endangered” if limiting factors are not reversed while “endangered” refers to species facing imminent extirpation or extinction), citing greater than 90% declines over three generations in their abundance and biomass at the center of their distribution on the Grand Banks to Labrador Shelf between the late 1970’s and early 1990’s. These declines have since ceased.

***Scope for Human-induced Harm (or Mortality)***

Although northern and spotted wolffish are designated as “threatened”, their distribution continues to be widespread. For both species, there is no evidence of a decline on the Scotian Shelf or in the Gulf of St. Lawrence and the declines observed at the center of their distribution have ceased.

Since the early 1990’s, abundance of northern wolffish on the Grand Banks to Labrador Shelf has been stable while spotted wolffish abundance has been increasing. Relative to the average of the survey index values from 1977-1994, the abundance at the end of the decline (1991-1994) was 2% of the long term average for northern and 22% for spotted wolffish. Since 1995, the index has increased to 8% for northern and 57% for spotted wolffish, based on the average abundance observed in 2002/2003. In other areas of the Atlantic, abundance trajectories for both species have remained stable over the period of the surveys.

Current survey indices of abundance are 1.2 million fish (3999 t) for northern and 3.2 million fish (7431 t) for spotted wolffish on the Grand Banks to Labrador Shelf. Estimates are not available for other areas.

**Given that abundance of the two species over all parts of their range has changed little or has increased for the past 12 years and that the level of human induced mortality has also been relatively constant during this time, there is scope for human**

**induced mortality without jeopardizing survival of the species.**

***Maximum Sustainable Mortality***

For the short term, current levels of mortality of northern wolffish in particular should be kept below or near current levels. If the species show significant changes in abundance (increases or decreases) in the future, the level of maximum allowable mortality can be adjusted accordingly.

***Potential Sources of Mortality and Aggregate Harm***

Incidental capture in commercial fisheries has been identified as the primary source of human induced mortality for northern and spotted wolffish. The main fishery that captured the two species in the 1980’s was directed for cod. In recent years, the Greenland halibut and snow crab fisheries have captured the large majority of the two species. Average estimates of amounts captured at the center of distribution (Grand Banks to Labrador Shelf) in 2000-2002 were 1044 t for northern wolffish and 394 t for spotted wolffish. Bycatch levels increased significantly in 2002. Fisheries on the Scotian Shelf, Gulf of St. Lawrence and in the Arctic take both species but in far less numbers.

Other potential sources of harm (habitat alteration, oil exploration and production, pollution, shipping, cables and lines, military activities, ecotourism, scientific research) are considered to have negligible impacts on the ability of both northern and spotted wolffish to survive and recover.

***Alternatives to Activities***

While northern and spotted wolffish are taken mainly in the Greenland halibut and snow crab fisheries, to varying degrees, they are captured in virtually every demersal fishery (about 35 directed species) in the Canadian Atlantic and Davis Strait. They are captured in various types of trawls, in gillnets, on longlines and in traps. There is little evidence of seasonality to the catches, thus, the only alternative would be fishery closures. Detailed economic analyses are not required to demonstrate that closures of Atlantic

demersal fisheries would adversely affect the Atlantic economy and the livelihood of thousands.

### ***Feasible Mitigation Measures***

Several measures have been instituted that mitigate mortality of wolffish in the fisheries. Sorting grates, introduced in the shrimp fisheries in the early 1990's have resulted in the release of wolffish less than about 20 cm at the point of capture and sorting grates in the yellowtail fishery on the Grand Banks, instituted to reduce cod bycatch where necessary, may have also resulted in the release of wolffish.

A key measure, live release, introduced in 2003 aims at minimizing wolffish mortality. This measure is considered to be effective because wolffish do not have air bladders (thus are not trapped at the surface by inflated bladders) and the majority of captured wolffish are very lively when first captured. Education programs have been implemented to promote live release techniques that are aimed at increasing survival. Research activities are needed to determine post release mortality rates for wolffish taken in various commercial fishing gear.

### ***Expected Mortality***

Although a substantial increase was observed in 2002, mortality of northern and spotted wolffish due to incidental capture in fisheries is expected to decrease over the next few years. Two fisheries for Greenland halibut and snow crab that incidentally capture the largest numbers of wolffish are expected to decline due to reduced quotas and mandatory release being instituted to increase the survival of bycaught wolffish. Conversely, incidental catches may be expected to increase as the abundance of wolffish increases.

### ***Rationale for Permitting***

Given the steady state of the northern wolffish population trajectory and the increasing trajectory for spotted wolffish over the past 12 years, current levels of mortality do not appear to be negatively affecting the survival of the species. Assuming that the use of sorting grates in the shrimp fishery continues to be mandatory and that fisher education effectively increases the survival of released wolffish through better handling practices, enhanced survival is anticipated. Further, over the past 15 years, demersal groundfish fisheries have been substantially reduced. Currently, several of the more significant fisheries that incidentally capture wolffish (Greenland halibut and crab to name two) are presently in decline in some areas and thus reduced effort should result in a further reduction in bycatch mortality.

### ***Sources of Uncertainty***

Information on bycatch levels of wolffish by species depends on observer coverage because northern and spotted wolffish must be released at sea and landing statistics do not differentiate species. However, observer coverage can be very low in some fisheries which leads to a greater degree of uncertainty in the estimates of mortality. Further, the largest fishery that occurs in the NRA (Northwest Atlantic Fisheries Organization Regulatory Area), adjacent to Canadian waters directs for Greenland halibut. It is expected that this fishery takes significant amounts of both wolffish species but statistics on wolffish captures by species from this area are not available.

The standard Canadian surveys yield indices: absolute estimates of size of the populations of the two species are not available. As well, indices of abundance and biomass are not available in a regular time series from the Flemish Cap where large bycatches of wolffish have been recorded.

## Conclusion

Given that mortality due to fishing is considered the dominant source of human induced mortality for northern and spotted wolffish and that the populations of both species have been steady or increasing prior to any prohibitions, **it appears that the recent (2000-2002) level of mortality does not impair the ability of the species to recover.** However, **all efforts should be taken to enhance survival in the fisheries,** primarily through mandatory release of wolffish in a manner that will increase the chance of survival. This can only be accomplished through education and permit conditions requiring the release of wolffish in a manner that will enhance their survival. As well, any gear modifications that lead to a reduction in the bycatch of wolffish (for example the Nordmore grate employed in shrimp fishery) should be employed wherever possible.

Should there be a large increase in the size of any fisheries that take significant amounts of wolffish, other options may have to be considered.

Finally, it is critical that the populations and sources of harm be monitored to ensure that recovery continues to take place.

## References

- Simpson, M. R. and D. W. Kulka 2003. Formulation of an Incidental Harm Permit Strategy for wolffish species (Anarhichadidae) DFO Can. Sci. Advis. Sec. Res. Doc. 2003/047 48 p.
- Kulka D. W. and M. R. Simpson 2004. Determination of Allowable Harm for Spotted (*Anarhichas minor*) and Northern (*Anarhichas denticulatus*) Wolffish. DFO Can. Sci. Advis. Sec. Res. Doc. 2004/049 48 p.

Simpson, M.R. and D.W. Kulka. 2002. Status of three Wolffish species (*Anarhicus lupus*, *A. minor* and *A. denticulatus*) in Newfoundland waters (NAFO Divisions 2GHJ3KLNOP). DFO Can. Sci. Advis. Sec. Res. Doc. 2002/078.

## For More Information

Contact: David W. Kulka  
Fisheries and Oceans Canada  
P.O. Box 5667  
St. John's, NL A1C 5X1

Tel: (709) 772-2064  
Fax: (709) 772-7269  
E-Mail: [kulkad@dfo-mpo.gc.ca](mailto:kulkad@dfo-mpo.gc.ca)

This report is available from the:

Newfoundland and Labrador Region  
Science, Oceans and Environment Branch  
Fisheries and Oceans Canada  
PO Box 5667  
St. John's NL A1C 5X1

Telephone: (709) 772-2027/8892  
Fax: (709) 772-6100  
E-Mail: [richardsed@dfo-mpo.gc.ca](mailto:richardsed@dfo-mpo.gc.ca)  
Internet address: [www.dfo-mpo.gc.ca/csas](http://www.dfo-mpo.gc.ca/csas)

ISSN 1480-4913 (Printed)  
© Her Majesty the Queen in Right of Canada, 2004

*La version française est disponible à l'adresse ci-dessus.*



## Correct citation for this publication

DFO, 2004. Allowable Harm Assessment for Spotted and Northern Wolffish. DFO Can. Sci. Advis. Sec. Stock Status Report 2004/031.