

Northern Fisheries

Newsletter from the Nordic Working Group for Fishery Research – NAF

Issue 27 November 2005

Pinger Activated by Porpoises' Biosonar

Net fishing is dangerous for harbour porpoises (*Phocoena phocoena*) throughout the world. The porpoise is the only whale species with a permanent habitat in internal Nordic waters, and it often ends its days in fishing nets. According to a survey¹, the bycatch of porpoises in Danish fishing activities in the North Sea was about 5,600 individuals annually during the period 1987-2001. The bycatch has been subject to scrutiny for some time in Denmark, and various methods have been tested to reduce it. Many stakeholders from the fisheries sector and a number of research institutions have taken part in this work. The most recent invention is an interactive pinger scaring the animals away from the nets whilst at the same time causing less noise pollution than other pingers.



A porpoise near Fyns Hoved. Foto: Naper

Drowning in fishing gear, hunting in the past and environmental toxins have reduced the porpoise population in the Nordic waters. The number of porpoises in the Baltic Sea today is just a fraction of the original population. The problem of bycatches is exacerbated by strong modern nylon nets consisting of very thin lines that the porpoises are only able to discover at very short distance.

Acoustic alarms, called pingers, attached to fishing nets have proven to be effective against bycatches. Since 2000 it has been mandatory for Danish fishermen in the North

Sea to use pingers in their fishing nets on wrecks in the months of August to October, and as of June 1st 2005 EU-legislation calls for the use of pingers in several types of gillnet fishing with vessels over 12m in length. The present models of pingers have various disadvantages, however. One serious problem is that they continuously sound warning noises regardless of whether there are porpoises close by or not. This causes noise pollution at sea, and porpoises may habituate to the sound.

The NAPER project (New Alternatives to Porpoise Entanglement Reduction), supported

by NAF and managed by the research and exhibition centre Fjord&Bælt, has tested a new type of pinger – known as an interactive pinger. These are pingers that are activated by the porpoise's own biosonar, thus reducing the noise level and habituation.

The pingers were first tested on Eigil and Freja, the two porpoises at Fjord&Bælt, kept in an outdoor pool. It was found that call noises emitted at 5-30 second intervals stimulated the porpoises to use their own biosonar. When the sounds of the biosonar hit the pinger it emitted warning noises which made the porpoises move away from the pinger. The positive results lead to the new type of pingers being tested on wild porpoises. During three different periods in 2002 and 2003 interactive pingers were placed at

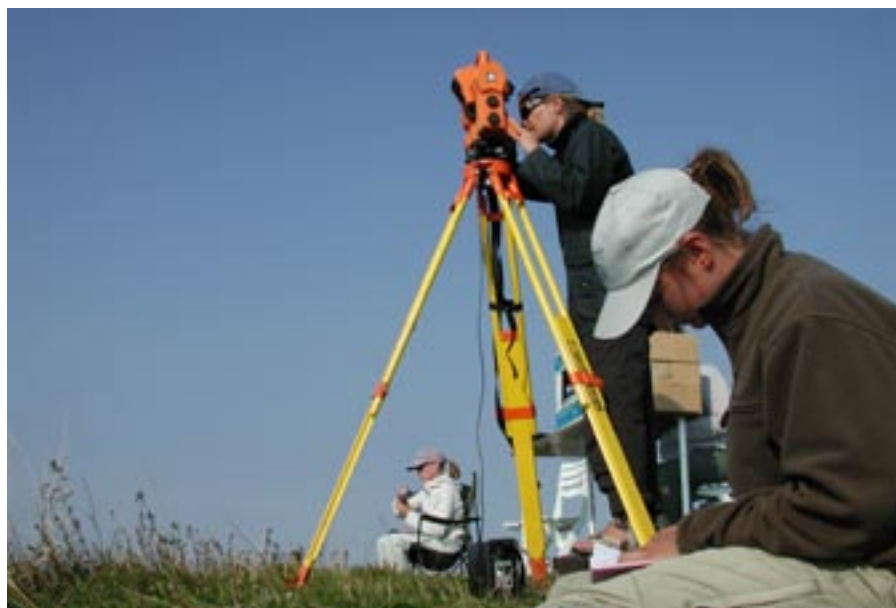
¹Vinther, M. and Larsen, F. (2004). Updated estimates of harbour porpoise by-catch in the Danish bottom set gillnet fishery. J. Cetacean Res. Manag. 6, 1, 19-24.

Fyns Hoved, in waters known to have a dense population of porpoises. The animals' individual diving rhythms and acoustic activity in different test regimes were compared.

A digital theodolite (instrument for measuring angles) placed at the top of a 20m high cliff registered time and position of all surfacings. At the same time the acoustic activity of the porpoises was registered by means of a hydrophone device. The researchers registered the diving length and diving time, swimming speed, evasion distance and the biosonar activity of the porpoises. Finally, the number of sound emissions from the interactive pingers was compared with the number of sound emissions from traditional pingers to register the level of noise reduction achieved.

The results showed that the interactive pingers only emit 1-3% of the amount of noise from traditional pingers, and that just a single warning noise made the porpoises move away from the immediate vicinity of the pinger. They did, however, stay in the area, since a single sound did not have a long-term effect on the behaviour of the porpoises. The Naper pinger is still at the prototype stage, but may already be considered as an interesting alternative to the traditional pingers.

To get a more realistic assessment of the concept, a number of interactive pingers were subsequently tested in a simulated bottom-



A theodolite was placed at the top of a 20m high cliff. Foto: Naper

set net. These tests have only just been completed, and the last data collection was made on September the 2005. Norway is also participating in this project, which is called NIPPER (Nordic Interactive Pinger for Porpoise Entanglement Reduction) and received support from the Nordic Council Working Group for the Environment and Fisheries, MiFi.

The field work was conducted in the daytime between 8 am and 8 pm, whenever light and weather and particularly wind permitted good observations of the porpoises. The field work was not without its problems, for example

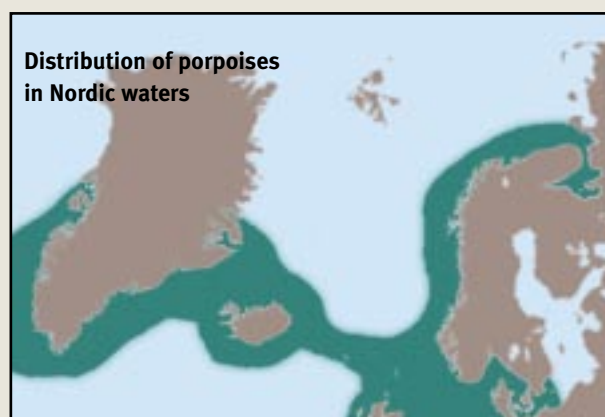
long periods of strong winds. The data is still being analysed, but the first results indicate that the interactive pinger works, and that the wild porpoises react like Eigil and Freja: The call noises stimulate them to use their sonar. The sonar triggers warning sounds from the pinger, causing the porpoises to leave the dangerous area close to the nets.

Partners

The NAPER project is financed by NAF and Kolmårdens Insamlingstiftelse and is being executed in cooperation between Fjord&Bælt,

The Porpoise is considered as threatened species

Porpoises either live alone or in small families of two to four individuals. The cow&calf constellation is the most common one, and large groups only occur where there is plenty of food. They feed mainly on herring and cod and a lot of demersal fish, of which they eat 2 – 3 kilos per day. The porpoises can stay submerged for about ten minutes and can dive to at least 240 m depth. The porpoise is not a curious animal, and generally prefers a certain distance to boats and people. The porpoise is the only breeding whale species in the Belt Sea and the Baltic Sea. Previously it was numerous in the western



Baltic Sea, but today it is estimated that the population amounts to only 600 individuals. In 1994 an estimate was made of the population in Kattegat, Skagerrak and the Danish waters (SCANS), and the result was about 36,000 animals. Including the North Sea the total population was about 240,000 individuals (Hammond *et al* 2002).

The porpoise is considered a threatened animal species and became protected in 1973. A fresh count made in July 2005, SCANS II, will help decide whether their numbers have changed.

Read more about the SCANS II project: <http://biology.st-andrews.ac.uk/scans2> ■

Danmarks Fiskeriundersøgelser (Danish Fisheries Research) (DK) and Kolmården djurpark (SE). The NIPPER project is executed in cooperation between the same institutions plus GDnatur (DK) and Havforskningsinstituttet (Institute of Marine Research) (NO). It is financed by the Nordic Council of Ministers' Working Group for the Environment and Fisheries and Kolmårdens Insamlingstiftelse and the project participants. Skov- og Naturstyrelsen (The National Forest and Nature Agency) has supported both projects. Fyns Statsskovdistrikt (Funen State Forest District), the Landowners at Fyns Hoved and Hjemmeværnet (The Home Guard) assisted with the practical arrangements for the projects.■

Project Manager

Geneviève Desportes

GSM: +45 20 25 02 67

Telephone: +45 65 32 17 67

E-mail: genevieve@natur.dk

GDnatur

9 Stejlestræde, DK-5300 Kerteminde

Read more about the Naper project:

www.fjord-baelt.dk/main_items.dk/2.2_nyhedsbrev/Flaskeposten_02_10_00.pdf

Danish fishermen shall use pingers

Since 2000 it has been mandatory for Danish fishermen to use pingers in the wreck net fishery in the months of August-October. This constitutes only a small part of the Danish net fishery, but a large proportion of the porpoise bycatch was found here. Since the new act came into force, the bycatches have been falling, but during the same period the wreck fishery has been changed by quotas and reductions of catches, thus making it difficult to know the effect of the new legislation on the use of pingers compared with other changes in fishing. On June 1st 2005 a new EU regulation on the use of pingers in several types of bottom-set net fishing with vessels of more than 12m length came into force. The pingers are not the only idea for reducing the bycatch of porpoises. In recent years trials have been conducted using nets designed to more easily register the echo localisation of the porpoises, and more rigid nets where the porpoises do not get entangled in the mesh so easily. But these nets have not had the desired effect and, furthermore, catches were smaller.■

NAPER - A Contribution to a new Fisheries Management

Traditionally, the objective of fisheries management has been to obtain a maximum yield from fish stocks in terms of quantity and income (Maximum Sustainable Yield, MSY). Each individual species was managed separately, and stocks were divided on the basis of waters, such as defined by the International Council for the Exploration of the Seas, ICES. The 1970s and 1980s saw the early steps towards recognition of a connection between species in nature, in the ecosystem, and the need for a sustainable basis for the exploitation of species. The Nordic countries have played a leading role in fishing with regard to developing methods to describe the interaction between species. In the 1970s the Danish researchers Knud Andersen and Erik Ursin developed the North Sea Model for analysing the interaction between fish species in the North Sea. This work has been an inspiration for other Nordic researchers who have developed methods to describe the interaction between the different groups of organisms in nature, from plant plankton via plankton eaters to predatory fish, birds and mammals.

In recent years, both politicians, managers and the fishermen's organisations have focused more and more on comprehensive management beyond the aim of maximising the yield of each individual species.

Concepts such as sustainability, ecosystem management, biodiversity and animal welfare have taken centre stage. Incorporating these concepts into management practices presents major challenges. What these concepts actually cover is far from

agreed. A vast data material is required, and for the material to be used new analysing tools need to be introduced. The Nordic Council of Ministers and NAF are trying to contribute to this development by giving high priority to support for conferences and projects to promote the development in this field.

One such example is the NAPER project, with the specific objective of developing a system to avoid porpoises being caught and drowning in fishing nets. In the North Sea an average of 5,600 porpoises die in fishing nets annually. This figure should be assessed against a total population of about 240,000 individuals. The bycatch of porpoises is therefore not decisive for the future of the population, but public awareness of animal welfare and animal protection has meant that it is no longer considered ethical and acceptable to let porpoises drown in fishing nets. The NAPER project has contributed to the development of new efficient alarms, pingers, that can reduce the bycatch of porpoises in net fishing. The project can therefore be seen as an element in the new fisheries management and helps to increase the acceptance of fishing and fishermen among the population.■

Helge Paulsen

Chairman of NAF

Danish Institute for Fisheries Research

New DVD & VHS:

Discrepancies in Fishing Legislation

Inkonsekvenser i fiskerilagstiftning

Discrepancies in Fishing Legislation

"Implementation of a rule should be in line with its objective", says a Swedish net maker. However, this is always not the case – at least not looking from a practical point of view. Through fisherman interviews and simple illustrations this film witness how easily many problems could be avoided. The solution is a more profound understanding through a better dialogue between those who make the rules and those who live by them.

Inkonsekvenser i fiskerilagstiftning

"Tillämpning av fiskeregler borde överensstämma med deras målsättning", säger en svensk trålbyggare. Dock är så inte alltid fallet – i varje fall om man ser situationen ur en praktisk synvinkel. Med fiskar-

nas egna ord och enkla illustrationer visas i filmen att många problem lätt skulle kunna undvikas.

Lösningen är en grundligare förståelse med hjälp av en djupare dialog mellan dem som gör upp regler och dem som skall leva efter dem.

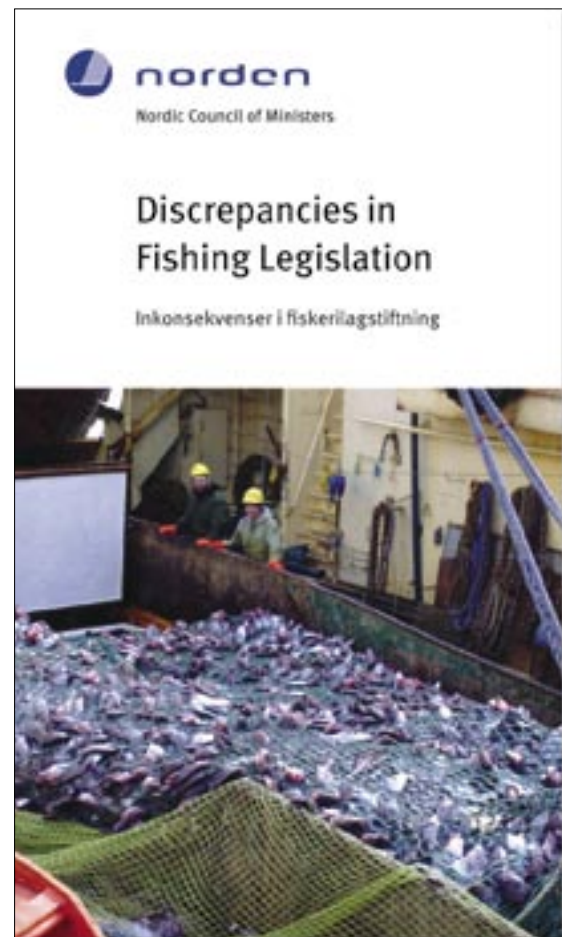
Order/beställ

DVD ANP 2005:764
ISBN 92-893-1214-9

VHS ANP 2005:765
ISBN 92-893-1215-7

Language/språk: English/engelska

Order from www.norden.org/publications
Beställ via www.norden.org/publikationer



norden

Nordic Council of Ministers

Store Strandstræde 18
DK-1255 København K

www.norden.org

Information on NAF and Nordic fishery cooperation:
Fishery consultant Ásmundur Guðjónsson

www.norden.org/fisk/

Tlf: +45 - 33960255
Fax: +45 - 33932047
E-mail: ag@norden.org

Nordic cooperation on fishery research

The Nordic Working Group for Fishery Research (NAF) co-ordinates joint research projects, takes the initiative to improve Nordic research cooperation, finds

suitable areas for Nordic cooperation, and evaluates the technical content of applications for support for research projects.

NORDIC FISHERY (Nordfiskeri) is published by the Nordic Council of Ministers.
Text: Lauri Dammert in cooperation with the NAPER-group. Layout: Lauri Dammert
Printed by Arco Grafisk