

6th Meeting of the ASCOBANS Jastarnia Group Hel Marine Station, Poland 23-24 February 2010

1. Opening of the Meeting

Krzysztof Skóra, Director of Hel Marine Station, welcomed the participants to the Station. He introduced Rüdiger Stempel (Coalition Clean Baltic), who would be chairing the meeting, and the invited expert, Arne Bjørge (Norway). Heidrun Frisch welcomed participants on behalf of the ASCOBANS Secretariat.

Monika Lesz representing the Polish Ministry of the Environment also welcomed delegates to Hel. She explained that she was the Polish Focal Point for CMS, ASCOBANS and the IWC. Given that ASCOBANS dealt with many crosscutting issues, she was particularly pleased to note the presence of her colleague Lidia Kacalska-Bienkowska of the Ministry of Agriculture.

2. Adoption of the Agenda

The Chair pointed out that a revised agenda had been produced as the original contained a numbering error. The revised agenda was adopted as presented.

3. Joint Jastarnia Group/SAMBAH Session

The Chair invited Julia Carlström (SAMBAH Project Manager / AquaBiota Water Research) to make a presentation on the Static Acoustic Monitoring of Baltic Harbour Porpoises (SAMBAH) project (Annex 4). She presented an outline of the project, the objectives of which included: estimating density, abundance and distribution; identifying habitat preferences and "hotspots"; increasing knowledge on the Baltic harbour porpoise among decision makers and the public; and implementing best practice methods for cost efficient large scale surveillance.

SAMBAH would be relevant to the EU Habitats Directive, the European Marine Strategy, ASCOBANS, HELCOM and national strategies of EU member states among others. The Project partners included the Kolmården Animal Park, the Swedish Environmental Protection Agency (SEPA), Turku University of Applied Sciences, the Finnish Environment Ministry, the University of Gdańsk, the National Environmental Research Institute (NERI) in Denmark and the Danish Forest and Nature Agency. Also involved were AquaBiota Water Research, the Centre for Research into Ecological and Environmental Modelling (CREEM), St Andrews University and several agencies in the Baltic States acting as sub-agents to Kolmården. The Stralsund-based German Oceanographic Museum was a quasi-partner, as Germany was not officially participating in the project.

A map showed the area covered by SAMBAH. Germany was the only EU Baltic Sea state not participating, and there would be no devices set there, although it was intended to carry out complementary research in parallel. Russia was also ineligible and there were only limited links with interested parties in Russia. Penina Blankett (Finland) suggested using the HELCOM SEAL contacts to improve communication. The project would not cover water deeper than 80 metres or shallower than 5 metres and it was intended to leave the devices in the water for two years. The overall duration of the project would be five years (2010-2014).

The equipment used would be echo-location detectors. A call for tenders to supply them had been issued and the deadline had just expired the previous day. The detectors would be lifted up to the surface every three months to download data and replace batteries. The information obtained on echolocation activity would be analysed to determine porpoise density and density data would be fed into a habitat-modelling programme.

Any porpoises opportunistically caught in pound nets in Danish waters would be tagged to show their diving behaviour and two-dimensional movements. How population density would be estimated was still under consideration, but this would ultimately lead into habitat

modelling based on population statistics and an environment model, which would combine to produce a population model and evaluate the relative importance of different habitat types.

Arne Bjørge (Norway) pointed out that experience from SCANS showed that group sizes differed significantly between open and inshore waters, so extrapolating figures for partial data was difficult. Len Thomas (CREEM) welcomed these comments, as he felt that it was vital that people should have confidence in the figures. The different group size mentioned by Mr Bjørge could be further tested using more data from other sightings.

Permits were required to deploy the detectors, and potential conflicts and problems had been identified. These were fisheries, munitions, shipping and the seabed substrate. Agencies being contacted included shipping authorities, navies, environmental protection agencies and fisheries boards.

Results and progress would be reported on a dedicated website (to be updated twice a year), at a workshop during the 24th Meeting of the European Cetacean Society in March 2010, at national information meetings and at exhibitions at Kolmården, Hel and Särkänniemi Adventure Park. Polish TV would also broadcast information and a Polish leaflet was planned. Results would be distributed to international databases and non-technical reports would be prepared for managers and decision-makers. A workshop was planned for managers in Sweden. There were plans to produce a dedicated leaflet in collaboration with ASCOBANS to inform marine users of the project. It would also be covered in *Europeche* and *Eurofish Magazine*.

The Chair posed two related questions: how the Jastarnia Group could assist with the implementation of SAMBAH (e.g. through gathering information on anchoring positions, the location of munitions and obtaining permits for setting devices) and how SAMBAH might assist in the implementation of the Jastarnia Plan. However, he asked how flexible SAMBAH could be in accommodating the wishes of the Jastarnia Group. By collaborating, the Group and the Project could help disseminate information to stakeholders such as fishermen, managers and the public.

Eugeniusz Andrulowicz (Sea Fisheries Institute, Gdynia, Poland) asked whether any general assessment had been carried out on acoustic pollution in the Baltic and whether any concrete examples from major construction projects such as port facilities were available. Mats Amundin (Kolmården Djurpark, Sweden) as a member of the ASCOBANS Working Group on noise said that recommendations had been formulated regarding how to carry out assessments. Shipping was one of the main sources of background noise but a systematic programme was needed to evaluate ambient noise focussing on two low frequency bands. Further recommendations were presented on noise arising from oil exploration, pile-driving and pneumatic sounds, restricting the number of blasts and the number of days activities could be carried out.

The Chair asked for a report on the previous day's SAMBAH group meeting. This had however primarily dealt with the administrative aspects of the project and preparing documentation for the Commission. The SAMBAH Steering Group would next meet in Stralsund immediately prior to the ECS meeting.

Stefan Bräger (Germany) thanked Mr Amundin and his team. He felt that the project was undertaking work described in recommendations 6 and 12 of the Jastarnia Plan for which no funding had previously been found. Karl-Hermann Kock (Germany) called for better coordination, suspecting that many activities were being carried out in parallel without everyone being aware. German work outside the project should be coordinated with SAMBAH. Len Thomas (CREEM) wondered how much information was already available and suspected that SAMBAH would provide data (on species' speeds, for instance) which had already been gathered. In reply, Mats Amundin (Sweden) said that leisure boat owners were being asked to report opportunistic sightings. Mr Thomas suggested that the sorts of information that would be useful should be listed and made available. He also said that greater effort to collect data in areas of low Porpoise density was needed to base conclusions on firm numbers and avoid having to use assumptions.

Penina Blankett (Finland) mentioned that the harbour porpoise database that had previously been maintained in Germany had been taken over by HELCOM. All HELCOM members would collaborate in gathering data in GIS format.

Stefan Bräger (Germany) saw scope in ASCOBANS and SAMBAH collaborating over face-to-face contact with fishermen, although he also warned of possible problems, such as fishermen being receptive to survey work but resentful if the issue of bycatch was raised. Karl-Hermann Kock (Germany) stressed that the Baltic RAC was the key forum to approach and Juha Kääriä (Turku University of Applied Sciences, Finland) said this would be the best means of trying to involve the Russian Federation.

Julia Carlström (SAMBAH Project Manager / AquaBiota Water Research) suggested that ASCOBANS could promote SAMBAH through the International Day of the Baltic Harbour porpoise (IDBHP) and on the Agreement's website. HELCOM and HELCOM SEAL should be used, alongside German bilateral contacts, to involve Russia. In this regard, Karl-Hermann Kock (Germany) asked whether it would be possible to organise a meeting in Kaliningrad. Krzysztof Skóra (Poland) said that the University of Gdańsk did have some contacts there. Penina Blankett (Finland) said a major stumbling block for Russian involvement was not reluctance on the part of the Russians but lack of funding.

To improve coordination between the Jastarnia Group and SAMBAH, the Chair suggested that someone be appointed as the SAMBAH contact point. As many people were involved in both organisations, there were several possibilities.

Stefan Bräger (Germany) commented that in the event of SAMBAH finding harbour porpoises in the waters of Estonia and Latvia, these countries would be obliged to take measures under the Habitats Directive, which would in turn facilitate the implementation of the Jastarnia Plan. These countries would then almost certainly seek guidance on where the "hotspots" were, to inform decisions on site designations. SAMBAH also created an infrastructure for monitoring obligations under the Directive in future. Penina Blankett (Finland) agreed that designating sites on the basis of very intermittent sightings was difficult. The accepted wisdom that harbour porpoises did not occur in Estonian and Latvian waters had again surfaced at a recent seminar on the Habitats Directive and the Baltic, at which it had been stated that the harbour porpoise was not found there. Mats Amundin (Sweden) also pointed out that suitable habitats in these countries should be identified to accommodate the species should its numbers start to recover. Karl-Hermann Kock (Germany) however expressed doubt about the effectiveness of Natura 2000 sites for long-ranging migratory marine mammals, as these sites were too small to be meaningful.

The Chair asked what measures could be implemented to ensure that the devices were not removed or if they did come adrift that they were returned. Iwona Pawliczka (Hel Marine Station, Poland) suggested that this question be put to the fishermen and also suspected that some devices were being deliberately destroyed or removed. Fishermen had to be convinced that the project was not a threat to them. Eugeniusz Andrulowicz (Poland) proposed that seminars be organised for fishermen at national or RAC level. Karl-Hermann Kock (Germany) suggested that those fishermen who had proved receptive to bycatch mitigation measures in the past be approached in the first instance. They might have useful insights into possible further gear modifications. Mats Amundin (Sweden) cited an example from Sweden where supportive fishermen had actually helped set the devices. Arne Bjørge (Norway) suggested that devices should have a message and contact address attached to them.

Jonas Teilmann, (NERI, Denmark) said that in Denmark licences were required to set the devices and lists indicating their location were published, so everyone knew where they were. He asked whether there was any software available which could chart the devices. The devices were included in printed charts in Denmark. Stefan Bräger (Germany) pointed out that in Germany some fishermen were objecting to devices being installed because they allegedly interfered with fishing activities. Ms Carlström said that a poster explaining the SAMBAH project intended for fishermen also described the devices so that fishermen could

recognise them. Petra Deimer (GSM, Germany) suggested that fishermen should be involved in drafting such material, as it was difficult to achieve the right tone. She had offered to submit an article to the German fisheries magazine *Das Fischerblatt* but had not been taken up yet. Mats Amundin (Sweden) suggested that boards of fisheries be asked to assist as they dealt regularly with fishermen. Juha Kääriä (Turku University of Applied Sciences) agreed that the wording of such material was vital and suggested that an expert currently based in Finland who was about to move to Sweden might be able to assist. Mr Teilmann said that other actors needed to be approached. Other boats than fishing vessels also became entangled in the devices' moorings. It was important to avoid provoking confrontation with fishermen and it should be stressed that SAMBAH was not aiming to restrict fisheries. Penina Blankett (Finland) proposed siting the SAMBAH poster in ports where all users could see it.

Returning to the point of how SAMBAH could help the Jastarnia Plan, Stefan Bräger (Germany) said that as the latest genetic information was reinforcing the idea of there being separate populations, SAMBAH might try to reflect these same divisions. Ms Carlström confirmed that the information could be presented variably in terms of time and space. Jonas Teilmann (Denmark) however warned that the division of the population was not entirely clear and it was impossible to draw distinct boundaries because of behavioural variations according to gender and age (males seemed to cross the boundary more frequently). Karl-Hermann Kock (Germany) wondered whether in the light of the relatively young age of the Baltic (a few thousand years) the differences between the sub-populations were really so pronounced.

In response to a question from Karl-Hermann Kock (Germany) concerning a 2009 study, which had discovered tonnes of World War II munitions, Mats Amundin (Sweden) said that this had been taken into account in setting the acoustic devices.

RECOMMENDATIONS

- *The SAMBAH project team should be represented at future Jastarnia Group meetings.*
- *Jastarnia Group members should promote the Project including by providing data.*
- *The ASCOBANS Secretariat should promote the project internationally (including with the European Commission and with the Baltic RAC).*
- *Parties and the Secretariat should try to involve Russia building on inter alia its involvement with harbour seals (and offer financial assistance for Russian participation).*
- *National activities related to SAMBAH (including in non-SAMBAH countries, in particular Germany) should be coordinated to avoid duplication and information should be shared.*
- *The ASCOBANS Secretariat and Parties should promote SAMBAH in IDBHP (e.g. the Secretariat should promote SAMBAH on the ASCOBANS website).*
- *Efforts should be made to ensure that devices are left in place or returned when dislodged. Possible means of achieving this might include marking devices with a contact address and offering rewards to people returning them. Such measures should address all sea users and not just fishermen.*
- *Supportive fishermen should be involved in outreach initiatives to inform the wider fisheries community about SAMBAH.*
- *Secretariat and Parties should lend support in obtaining permits to set devices by contacting the relevant authorities, and national representatives should assist the Secretariat in identifying the right contact persons to approach.*

4. Presentation by Invited Expert, Arne Bjørge (Norway)

Arne Bjørge (Norway) made a presentation entitled “How to monitor bycatch of marine mammals in a ‘modern artisanal’ fishery” (Annex 5), based on one given at the SAFESEA Seminar in Portugal. It focused on a modern artisanal fishery, which used small vessels, and where most of the fishermen were part-time. The size of the vessels made observer programmes difficult to implement. Norway had a large EEZ of 1.8 million square kilometres where purse seine pelagic nets and trawls were used. These fisheries did not seem to have a great problem of bycatch and observer programmes were deemed unnecessary. The focus was therefore placed on the coastal zone with its fleet of 5,000 small vessels (under 15 metres). Data indicated that the spawning biomass had been increasing since 1980, while the number of vessels operating had declined from 25,000 to 5,000. Overall engine power had not declined. The larger vessels did not pose a problem, but the smaller ones did. The focus was on monitoring bycatch including sea birds.

Norway had a good system of recording landing data. Boats under contract recorded bycatch levels in the low hundreds for harbour porpoises and in double figures for seals (Harbour, Grey and Harp). Three years’ worth of data were considered necessary for extrapolation purposes before discussions over possible mitigation were started with fishermen. It appeared that large nets for anglerfish might need to be modified. Acoustic nets (rather than “pingers”) seemed to be an option. Bycatch occurred at depths of 100-150 metres in anglerfish fisheries. Similar numbers of bycatch were also recorded in cod fisheries, but these involved far higher fishing effort. Examinations of the stomach contents of bycaught harbour porpoises revealed no anglerfish; the porpoises hunted smaller prey on the seabed. Mats Amundin (Sweden) thought therefore that the porpoises were directing their echolocation downwards in search of prey and therefore did not detect the nets. Arne Bjørge (Norway) said that pingers were unpopular and were not very effective, and therefore not the mitigation measure of choice. Fishermen would be offered modified nets that reflected sound.

Iwona Pawliczka (Poland) asked what the follow-up measures would be, as small vessels posed a problem elsewhere. Arne Bjørge (Norway) replied that they had tried to make reporting marine mammal bycatch mandatory, first when logs were maintained manually and also with electronic logs, but fishermen tended not to report. Use of automatic CCTV was also being considered. The cameras would be triggered when gear was deployed, but the equipment was expensive. The number of observers was low so confidence in the figures for bycatch obtained was limited. The project aimed to identify the worst offending gear, the peak times and areas for bycatch. The project had covered two boats from each of nine regions. Christina Rappe (Sweden) commented that CCTV in Sweden had in the end proved very successful, but it had taken time for fishermen to accept it. Fitting the equipment to small vessels was feasible, but expensive. There were also legal considerations in Norway under data protection and privacy legislation. Petra Deimer (Germany) wondered whether this could be circumvented if the fishermen fitted the cameras themselves. Krzysztof Skóra (Poland) showed some photographs from Lotte Kind-Larsen’s study which was featured on the Marine Station’s website. Karl-Hermann Kock (Germany) said that the German government was interested in installing 8 CCTV sets on vessels in the Baltic after the first trials were successful. In the absence of firm abundance figures, it was difficult to estimate a rate for bycatch, but it was thought from a pilot study in 2003 that 30 harbour porpoises per year were by-caught in German set net fisheries in the North Sea.

5. Implementation of the Jastarnia Plan and the Recommendations of the 5th Meeting of the Jastarnia Group

5.a. Bycatch Reduction

aa. Reduce Fishing Effort in Certain Fisheries

There were no comments from the floor concerning the existing Recommendation or other related activities.

bb. Involve Stakeholders in the Work of Reducing Bycatch of Harbour Porpoises

Stefan Bräger (Germany) referred to the forthcoming workshop in Stralsund on 20 March 2010, which was intended to contribute to the ASCOBANS strategy of involving fishermen in bycatch mitigation. Other means had not proved very successful, so an attempt would be made to involve fishermen directly. The workshop would comprise two parts: one open to all participants and a second closed session to design a strategy, which would include using local languages as far as possible. There was strong interest in the Netherlands, where bycatch and mutilated stranded animals caused public outrage.

Karl-Hermann Kock (Germany) reported on the ICES bycatch group, which had met in early February. Most people there agreed that EC Regulation 812/2004 had failed in the Baltic because most vessels were excluded. There was great interest in the use of CCTV. The Jastarnia Group should continue to exert pressure on the Commission to change the Regulation.

Arne Bjørge (Norway) commented that most fishermen generally favoured mitigation, as they did not want marine mammal bycatch. This wasted their time, damaged their nets and cost them money. In Norway, the emphasis was placed on the use of better gear rather than on reduction of fishing effort. Karl-Hermann Kock (Germany) said that there had been a great increase in bycatch in the Western Baltic in recent years. The reasons were unclear, as it had not been established that fisheries effort had increased. Lidia Kacalska-Bienkowska (Poland) proposed that the Baltic RAC be involved, as the local fishermen trusted it.

The Chair welcomed the suggestions for new ways of contacting fishermen and alluded to the ASCOBANS fishermen's leaflet, which would be discussed later (see agenda item 5.d.aa.bbb).

Arne Bjørge (Norway) suggested that a future invited guest could be José Vingada of the Department of Biology at the University of Minho, Portugal.

RECOMMENDATIONS

- *The Group notes the recent promising new methods of monitoring and mitigating bycatch across the greater Baltic region and recommends that options of compiling this information and making it available to those not or not fully aware of it be explored. The Jastarnia Group and the ASCOBANS Secretariat should take the lead in this process.*
- *A targeted approach to involving stakeholders such as fishermen should be adopted. With respect to fishermen, this should involve working primarily with those who have been receptive in the past.*
- *Bycatch mitigation activities of the Jastarnia Group should be coordinated with the related work of other regional bodies and organizations in order to avoid duplication of effort.*

cc. Replace Fishing Methods Known to be Associated with High Porpoise Bycatch (i.e. Set Nets) and Introduce Alternative Gear Considered Less Harmful

Mats Amundin (Sweden) reported that the Swedish Board of Fisheries had undertaken trials of a new cod trap. Reports would be made available to the Group (Annexes 6 and 7). Former Jastarnia Group Chair Sara Königson was involved in the project. The new traps were being subsidised but also involved changes to fisheries methods. The traps were collapsible but still quite large when folded. Arne Bjørge (Norway) pointed out that the traps tended to result in a higher quality, live catch that commanded better prices at market. Karl-Hermann Kock (Germany) said that this might not apply to German part-time fishermen who tended to sell direct rather than through established auction markets.

Stefan Bräger (Germany) sought clarification whether the recommendation referred to the Marine Stewardship Council's labelling schemes. He said that in the Netherlands such accreditation was highly sought after by fishermen and it encouraged the use of pingers.

dd. Implement a Pinger Programme on a Short-term Basis

This topic had been subject of one recommendation from last year's meeting. Krzysztof Skóra (Poland) made a short presentation on the pinger project in Puck Bay and the experiences gained after one year. Data showed that bycatch had declined while strandings had increased. A voluntary reporting scheme in operation from 1990 to 1999 showed which nets had the worst record. It appeared that now set nets rather than semi-drift nets were the greater problem. Puck Bay accounted for just 1% of Polish EEZ but 40% of bycatch. The fleet operating there was made up overwhelmingly of smaller vessels.

A map showed the deployment of pingers and detectors across the mouth of Puck Bay from Hel to Gdynia. The bay was monitored for nets indicated by their flags. Data were also gathered for bottom-set gear. The nets were mapped month by month and it was evident that over 1,200 nets were deployed in a small area. The tourism industry was also using the water (windsurfing etc.) and during the summer, ferry services crossed the bay. Fisheries used the whole bay throughout the year. Meetings were held with the fishermen's leaders and the fishermen themselves to try to reduce conflict, but still some instruments were deliberately damaged.

Some harbour porpoises were detected and in April 2010, pingers would be set on the bottom of the bay as part of a collaborative project between WWF and the University of Gdańsk.

Mats Amundin (Sweden) asked whether the pingers were intended to deter the porpoises from entering parts of their normal habitat. Krzysztof Skóra (Poland) confirmed that this was the case but this was considered preferable to bycatch. It was too early to determine whether porpoises habituated to pingers. Parallel efforts were being made to improve gear. It was estimated that for the EU policy on pingers to be properly implemented, thousands would be required if deployed on all nets, but 64 were sufficient for barring the entrance of Puck Bay in the way the project proposed. Mr Skóra said that pingers were obligatory elsewhere but fishermen did not like them and he was trying to help develop alternatives. Iwona Pawliczka (Poland) added that the number of nets made having one pinger each prohibitively expensive. For this reason, the project involved a line of pingers across the mouth of the Bay. The click detectors already deployed also served to establish whether harbour porpoises crossed into these waters. Some animals had been detected by the acoustics expert from the data received. Any data that were difficult to interpret were sent to Nick Tregenza. Eugeniusz Andrulowicz (Poland) asked whether intermediate results were yet available from the survey and inquired as to difficulties in picking up the porpoise clicks despite ambient noise. Ms Pawliczka confirmed that the devices were effective at picking up the porpoises' clicks. Mr Amundin agreed, saying that the clicks could be heard even above ambient noise because ship engines had lower frequencies. There were some problems with sand disturbance in areas with strong currents and some loud noises overloaded the

system. The software was effective at filtering unwanted noise out. Jonas Teilmann (Denmark) said tests on captive animals established baseline of the sounds that they made.

Line Kyhn (NERI, Denmark) suggested testing pingers on individual nets to establish whether Porpoises did in fact habituate to these devices. Krzysztof Skóra (Poland) said that the fishermen did not accept that there was a bycatch problem and it was very difficult to persuade them to change their minds. The University's figures suggested that at a very minimum, four porpoises were caught each year in Polish waters. Eugeniusz Andrulowicz (Poland) said that fishermen were under the impression that the research was aimed at closing the fishery. Mr Skóra said that the real purpose had been explained repeatedly, but to no avail.

Arne Bjørge (Norway) questioned the suitability of the area for using pingers. He thought that providing acoustically reflective nets would be preferable. If fishermen saw that these were as good as traditional ones, they might be weaned off the old gear responsible for bycatch. Krzysztof Skóra (Poland) said that he planned a move to traps and Swedish style nets, but local fishermen were very conservative. Poland received much EC money for fisheries, but the fishermen wanted to decide how to spend it and certainly did not like the idea of any of it being used to finance University of Gdańsk projects. Iwona Pawliczka (Poland) added that the Sea Fisheries Institute tended to side with the fishermen so the University had to conduct the trials of the modified nets itself. Winning over the Sea Fisheries Board was vital for success. Karl-Hermann Kock (Germany) feared that the modified nets might not be the answer and Mr Bjørge said that he had seen reports to this effect but doubted the reports' validity. Mats Amundin (Sweden) cited the findings of Finn Larsen of the DTU Aqua in Denmark, which showed that the new nets had less bycatch, not because of their reflectivity but because of their stiffness. Mr Kock asked how effective they were at catching target species and Mr Bjørge felt that the distance between the nets would also be a factor.

Petra Deimer (Germany) reiterated the point made earlier by Poland that while the number of reported bycatch incidents had declined, strandings had increased. There had been 170 stranded specimens on the German Baltic coast alone. It was important to record strandings and examine the carcasses to establish the cause. It should not be assumed that all were the result of fisheries interactions.

Stefan Bräger (Germany) felt encouraged by the Swedish project on modified fishing gear and hoped that other Baltic countries would seek to benefit from this experience. The Group could play a role in collecting and disseminating information on gear modification.

Lidia Kacalska-Bienkowska (Poland) said that cod traps were not always suitable because of seabed topography, particularly in open areas with few rocks, such as those found along the Polish coast. Karl-Hermann Kock (Germany) disagreed, saying stretches of the German coast were similar in having few rocks but traps were still effective. The boats were small and the traps relatively large even when collapsed, but there were solutions to this problem. Arne Bjørge (Norway) described collapsible traps specifically designed for small boats in California. These traps were 1.5 metres by 1.5 by 10 metres. He said that the German trial of this gear had not been carried out properly, and he hoped that the money would be found to allow new trials to be conducted appropriately. Stefan Bräger (Germany) asked what other governments were doing to promote the use of modified gear. Ms Kacalska-Bienkowska welcomed the use of traps, as they were effective with regard to target species and reducing bycatch. Iwona Pawliczka (Poland) said that fishermen still claimed that traps did not work. The Chair distributed an excerpt of the report of the second meeting of the HELCOM Fisheries/Environmental Forum, Annex III of which concerned the use of bycatch-safe fishing gear in Lithuania. Mr Bjørge said that gillnets were being replaced by longlines to reduce the bycatch of seabirds. This seemed strange as normally birds were attracted by the bait, but some new line setting methods were obviously effective. Mr Kock referred to recent research undertaken under CCAMLR, which had shown that the incidental catch in longlines had been reduced almost to zero. Mr Bräger commented that bird bycatch was

very species-specific. Mats Amundin (Sweden) undertook to circulate information on the occurrence of porpoises around fishing nets (Annex 8).

The Chair suggested that it would be useful to have an overview of all possible actions from which to compile a “wish list”. The Secretariat could act as a central point for distribution and sought a volunteer to oversee coordination. Karl-Hermann Kock (Germany) suggested that as these issues would be discussed in other fora (such as the ECS and the Study Group for Bycatch of Protected Species), the Chair, Peter Evans and Simon Northridge should liaise to minimise duplication and maximise collaboration. Krzysztof Skóra (Poland) suggested that both DG Mare and DG Environment should also be involved.

5.b. Research and Monitoring

aa. Analyse Stock Affinities of Harbour Porpoises in the “Transition Zone” of the South-western Baltic

This subject was covered by the sixth Recommendation from the previous meeting but the suggested working group had never been convened. The Chair drew attention to a paper by Wiemann et al. (2009) on “Mitochondrial Control Region and Microsatellite Analyses on Harbour Porpoise (*Phocoena phocoena*) Unravel Population Differentiation in the Baltic Sea and Adjacent Waters”, which had been circulated by email before the meeting.

Jonas Teilmann (Denmark) said that several parallel pieces of work had been combined into one comprehensive paper, based on hundreds of samples of DNA. The results showed a difference between the populations in the Danish Straits and the North Sea with a transition zone in the Kattegat. He recommended that the Baltic Sea population should be treated as a management unit but deciding where the border should lie was not easy. The ongoing ASCOBANS-funded morphometric survey examining bone samples in museums across the region was due to be completed in the summer of 2010 (with the contract ending in November) and would supplement morphological data, but the funding of the new project would not enable genetic testing to be carried out.

Stefan Bräger (Germany) felt that the key element of the survey would be data from the transition zone and asked whether Mr Teilmann was content that this would be adequately covered. Iwona Pawliczka (Poland) pointed out that the source of samples was bycatch and that the transition zone did not cover Polish waters. Mr Teilmann (Denmark) explained complicating factors in the transition zone whose boundaries varied with the movement of fish and topographical features. Animals moved from the Danish Straits into the Baltic and back again. He was trying to discern patterns and the extent of such movements. SAMBAH might establish how many animals were entering this area from outside. The extent to which these movements were affecting the genetic make-up of the populations was also unclear. Ms Pawliczka said that samples should continue to be collected as the opportunities arose. Mr Teilmann agreed that genetic analysis should be repeated periodically, perhaps at intervals of 5-10 years, taking into account that techniques were improving all the time, so Parties should continue to collect samples. Bycaught specimens were often more valuable from a research point of view than stranded ones.

Penina Blankett (Finland) said that some specimens had never been analysed. She feared that the samples would be disposed of before anyone had looked at them and sought advice on what to do with two specific specimens dating from 1996 and 1999. Jonas Teilmann (Denmark) agreed to provide the appropriate tubes so that the samples could be sent to him.

The Chair recalling that the working group suggested in last year’s recommendation had not been convened asked whether this should still be pursued. Karl-Hermann Kock (Germany) suggested that, rather than a full working group, one individual might follow the issue and produce a short report; Jonas Teilmann (Denmark) volunteered. Stefan Bräger (Germany) felt that the study being conducted would provide the answers rather than a working group. Mr Teilmann asked what the longer-term strategy would be and questioned whether the

survey would address all questions. He also suggested that the Group could recommend that the survey be extended to cover genetics.

RECOMMENDATION

- *A summary of current and historic morphological data should be included in Anders Galatius' and Jonas Teilmann's study and presented to the 2011 Jastarnia Group.*

bb. Develop and Apply New Techniques (e.g. Acoustic Monitoring) for Assessing Trends in Abundance

This subject had been fully examined during the SAMBAH presentation and no additional points were raised.

cc. Develop Interactive Pingers or Pingers Using Frequencies not Audible to Seals

Mats Amundin (Sweden) said that he had not himself undertaken any new work in this regard but was aware of other projects using tones above the frequencies audible to seals. He would circulate an interesting study on the ability of seals to learn to use pingers as "dinner bells" (Annex 9). Jonas Teilmann (Denmark) asked whether the idea of using interactive pingers had been abandoned. Mr Amundin still felt that they were a good idea, but his trials had produced inconsistent results. One young animal seemed to enjoy triggering the pingers while its mother was nearby bottom grubbing. The pinger proved to be of no deterrent value at all to this individual. Pingers could still be of value in alerting harbour porpoises to the presence of nets. It was worth continuing this research as knowledge of porpoise echo locating behaviour improved. The Chair mentioned a project proposed by Boris Culik under consideration for part funding by the "Friends of CMS". The project was also to be considered by the Advisory Committee for support.

dd. Investigate Possible Detrimental Effects of Various Types of Sound Disturbance (including Pinger Signals, Noise from Vessels, Wind Parks or Construction and Seabed Exploration for Oil and Gas) on Harbour Porpoises

Mats Amundin (Sweden) and Jonas Teilmann (Denmark) were both on the Task Group developing indicators for Good Environmental Status for the revision of the European Marine Strategy Framework Directive. The European Parliament would be discussing the strategy in the summer.

Eugeniusz Andrulowicz (Poland) asked whether there was any information available from Danish studies into wind farm construction. Jonas Teilmann (Denmark) said that there had been studies concerning the effects on birds, fish, seals and porpoises. Seals seemed to be least affected. Findings for porpoises were different in Denmark and the Netherlands however: in the Baltic, the animals moved away and did not come back, whereas in the Netherlands they vacated the areas near pile-driving during construction but returned after work was completed. Indeed, there were more porpoises there now than before. Mr Teilmann surmised that this might be the result of there being less trawl fishing in the area around wind turbines rather than porpoises using the foundations as artificial reefs. He also confirmed that the worst time was during pile driving. In Danish waters, however, pile driving was not possible and concrete foundations were used, which were less noisy to construct. Stefan Bräger (Germany) said that German studies showed that harbour porpoises could be displaced from an area of 1,000 sq km and that bubble curtains during pile-driving were a good idea. Monika Lesz (Poland) asked whether there were any other recommended mitigation methods, as Mr Skóra had said it was difficult to do studies in Poland because of the low numbers of harbour porpoises. The Secretariat pointed to the recommendations made by the Working Group on noise to the Advisory Committee. While there were no

detailed technical guidelines, the MOP had adopted a resolution with general recommendations. Signe Sveegaard (Denmark) felt that specific references to bubble curtains should have been included.

Eugeniusz Andrulowicz (Poland) asked whether the effects of explosions were being monitored. Mats Amundin (Sweden) reported that he had liaised with the Swedish navy after it had located World War II mines and was proposing to blow them up. He persuaded them to set up pingers to clear the area and blow up the munitions in stages rather than all at once. Krzysztof Skóra (Poland) reported that the Polish military had been very cooperative when 500 kg of explosives had been found in a sunken German ship. Petra Deimer (Germany) said that the German navy usually used bubble curtains, with small explosions to frighten animals away and larger explosions to destroy the munitions. Observers were also invited to act as spotters for marine mammals. Bubble curtains were expensive because the equipment was usually destroyed in the operation. The curtains were effective in that they absorbed 90% of the energy.

The Chair enquired whether any baseline studies were being carried out into noise levels. Mats Amundin (Sweden) confirmed that SEPA was investigating noise emanating from leisure boats. The results had not been fully analysed but Ms Carlström was working on it and should be finished this year. Stefan Bräger (Germany) reported that some work was being done in Germany and more was about to start. He also asked about EIAs in Finland and Sweden with regard to pipelines. In answer to a question on how the results were used, Jonas Teilmann (Denmark) said that it was important to establish temporal and spatial baselines.

Krzysztof Skóra (Poland) had read documents relating to the pipeline to find references to harbour porpoises. With regard to Finnish waters, it was stated that harbour porpoises were so rare that the impact would be minimal. It was important to determine whether the noise from the pipeline would have a permanent effect. Jonas Teilmann (Denmark) said that the pipeline affected Danish waters and that he had been asked to assist with the German survey. Stefan Bräger (Germany) said that monitoring was required during and after construction, while Mats Amundin (Sweden) lamented the fact that the SAMBAH survey would be taking place at the same time as the pipeline was constructed.

ee. Monitor Bycatch in Fisheries Known to be Harmful to Harbour Porpoises to be Able to Estimate Bycatch Levels

ff. Further Develop Sustainable Alternative Fishing Gear with no Bycatch of Harbour Porpoises

Mats Amundin (Sweden) reported that some work was being done in Sweden looking into bycatch from small vessels and the results would be published in due course. In connection with the issue of bycatch by recreational fisheries, there followed a discussion about the legal regimes operating in the different countries with regard to landowners' rights to set nets in lakeside or coastal waters adjoining their property and how this was compatible with the Habitats Directive. The traditional outlook of the landowners had proved an obstacle and Christina Rappe (Sweden) thought that bycatch from leisure fishermen was as high as from commercial nets. Arne Bjørge (Norway) reported a similar position in Norway where Norwegian nationals had the right to set nets. Land ownership extended only to one metre beyond low tide, so marine areas were not covered. Protected area status meant that certain types of gear could not be used. It was speculated that commercial fishermen would be more receptive to restrictions if the same rules were equally strictly applied to the leisure fishermen. Jonas Teilmann (Denmark) said that there were restrictions in estuaries and special provisions to protect salmon and trout. Other provisions could be applied to protect marine mammals. He was sceptical about the usefulness of requiring nets to be inspected more frequently. He felt that the simplest solution would be to prohibit such nets, but Karl-Hermann Kock (Germany) warned that there would be outrage from the net users, especially the 600 part-time fishermen in Germany. Petra Deimer (Germany) pointed out that anglers

did not catch marine mammals. In Finland, hundreds of thousands of people used nets, making it difficult to impose bans. The government could however issue advisories and was just beginning to review the relevant legislation, but it would be difficult to repeal people's long-standing rights. Mr Amundin recalled the incident when a common dolphin had been caught in a net. This had highlighted the bycatch issue and a great deal of publicity ensued.

In summary, the Chair said that two distinct types of fisheries were being discussed: part-time professional fisheries and leisure or sports fisheries. It would be easier to make recommendations concerning the latter than for those whose livelihoods were at stake. Arne Bjørge (Norway) agreed but said that the extent of leisure fisheries should not be underestimated. Jonas Teilmann (Denmark) said that Regulation 812 should be cited as it specified which fisheries should be required to deploy pingers. The Regulation, although it distinguished between different sized vessels, had accepted the principle and no distinction should be made between fishery types, as it was the gear that posed the problem.

RECOMMENDATIONS

- *With respect to recreational fisheries, Parties should work towards banning those types of gear known to pose a threat to harbour porpoises.*
- *The possibility of using cod traps, as successfully applied in Sweden, or other gear as an alternative to pingers elsewhere in the Baltic and the greater Baltic region, as well as the possibility of reflecting their use in a porpoise-friendly label should be investigated.*

gg. Compile Data on Fishing Effort

Karl-Hermann Kock (Germany) described the cross-boundary nature of the problem concerning data. Although he had access to German data, he was not allowed to pass it to other countries unless the data remained anonymous. Hanna Paulomäki (HELCOM) reported that HELCOM had good information from all countries except Russia. The data covered the gear used in each country and information on landings but not fisheries effort. Arne Bjørge (Norway) said that landing data was clear; fishing effort was less concrete.

Signe Sveegaard (Denmark) observed that the Group had made no recommendation on this subject before, but might reconsider. Stefan Bräger (Germany) felt that it would be useful to have landings data and the associated bycatch figures. Arne Bjørge (Norway) said that in Norway comprehensive landings data were maintained, as landings were used as a basis to calculate wages and pensions. The Chair noted that the new Jastarnia Plan urged immediate action on fishing effort and therefore a recommendation from the Group would be appropriate. Penina Blankett (Finland) said that relevant information was gathered for the HELCOM Fisheries/Environmental Forum and in other meetings. She was requested to ask the HELCOM Fisheries/Environmental Forum to provide figures on the number of fishermen, preferably according to the size of vessel. Mr Bräger recalled that the Jastarnia Group had considered commissioning a survey on fisheries efforts but had then decided this was not feasible. Basic data on the number of people engaged in fisheries would however be a start. The Group would have a clearer idea of the number of stakeholders and whether they were counted in hundreds or thousands.

RECOMMENDATION

- *Parties are urged to undertake studies of fisheries effort as contained in recommendation 11 of the Jastarnia Plan.*

hh. Examine Habitat Preference for Harbour Porpoises

Marine habitat mapping was reported to be under way in the context of the Habitats Directive. There was potential read across to SAMBAH.

ii. Investigate the Prevalence of Derelict (“Ghost”) Gear and the Feasibility of its Removal

Mats Amundin (Sweden) mentioned a continuing contract with Swedish fishermen to collect ghost gear. Arne Bjørge (Norway) said that the Norwegian Fisheries Directorate had run a programme to remove ghost nets for some time. The statistics had been posted on the Directorate’s website. Stefan Bräger (Germany) referred to an EU-wide marine litter initiative which covered ghost nets and in which all EU member states would be involved. Krzysztof Skóra (Poland) reported that the Academy in Szczecin had researched the problem. Barnacles were found to attach themselves and drag the nets to the seabed. The greater threat was posed by unmarked, often illegal nets, which were also a hazard to divers. The barnacles preferred warmer water and the nets most commonly lost were those set at the surface where they were hit by vessels and battered by waves. The University had set aside some land where retrieved fragments of net could be deposited, but only a few fishermen took advantage of this.

5.c. Marine Protected Areas (MPAs) and Special Areas of Conservation (SACs)

The network of MPAs (and SACs) was being expanded and last year’s meeting had proposed a workshop on criteria and best practice of management measures to be implemented in MPAs for harbour porpoises. Signe Sveegaard (Denmark) pointed to overlaps with SAMBAH, but said that protected areas would have less impact in the Baltic where the harbour porpoise population was so sparse. Stefan Bräger (Germany) said that the proposed workshop was contingent on voluntary contributions being offered and as none were, the workshop had not taken place. Heidrun Frisch (Secretariat) explained that the establishment of protected areas was not among the two priority issues identified for the Agreement at the last Meeting of the Parties.

Eugeniusz Andrulowicz (Poland) felt that the concept of a site network should be expanded, as it was not clear how the sites were meant to inter-relate. Stefan Bräger (Germany) reiterated a point mentioned earlier by Mr Kock that the current MPAs were too small to be effective. The Chair pointed to Recommendation 14 of the Jastarnia Plan, which raised the question of the rationale behind MPAs and addressed their inadequate size. The Recommendation was to expand the network of MPAs in the Baltic, to improve its connectivity and to develop appropriate harbour porpoise management plans for the areas concerned. The MOP had accepted this recommendation and it was now incorporated in the Jastarnia Plan. Mr Bräger felt that the Group should lend its expertise to help design the SPAs being designated under the Habitats Directive Natura 2000 network.

Hanna Paulomäki (HELCOM) said that HELCOM was also looking at the coherence and interconnectivity of sites as the harbour porpoise was on her organization’s red list.

The Chair proposed that the Group recommend that its expertise be made available to governments seeking to develop management plans for MPAs and SACs designated for harbour porpoises.

RECOMMENDATION

- *The Jastarnia Group should make its expertise available to governments seeking to develop management plans for SACs/MPAs designated for the harbour porpoise.*

5.d. Public Awareness

aa. Develop a Comprehensive Public Awareness Campaign

HELCOM

Hanna Paulomäki (HELCOM) thanked all who had helped with the migration of the porpoise database from FTZ to HELCOM. The old ASCOBANS data had been received and HELCOM was in the process of updating and posting the information in a downloadable format on its website. She said that a common reporting format should be developed and asked for the contact details of appropriate people in each country. She also asked whether data should be updated continuously or periodically, as she wanted to send out a questionnaire requesting updated data soon. Mats Amundin (Sweden) suggested that HELCOM contact Peter Evans of the Sea Watch Foundation as he maintained a similar database. Ms Paulomäki then sought guidance on whether data submitted needed to be verified. Petra Deimer (Germany) referred to the GSM database on opportunistic sightings and the associated interactive map maintained by the German Federal Nature Conservation Agency (BfN). Krzysztof Skóra (Poland) requested that HELCOM add a link on its website to the Hel Marine Station site.

Hanna Paulomäki (HELCOM) also thanked the Group and specifically Mr Bräger for the draft HELCOM harbour porpoise fact sheet. The document still needed to take into account data from further countries before it could be finalized.

RECOMMENDATION

- *Parties should designate Focal Points dealing with the Baltic harbour porpoise database and provide the details of these Focal Points to the Secretariats of ASCOBANS and HELCOM.*

ASCOBANS Fishermen's leaflet

The Chair introduced the draft of the fishermen's leaflet, circulated by email prior to the meeting, which had been prepared on behalf of the Secretariat at the request of the Parties. Fishermen were important stakeholders who needed to be made more aware of ASCOBANS' conservation objectives. Initial reaction to the draft leaflet indicated that some fine-tuning would be necessary. The leaflet needed to be progressed urgently. Heidrun Frisch (Secretariat) said that comments made by the Jastarnia Group would be taken into account and a new draft would be presented at the Advisory Committee.

Penina Blankett (Finland) had consulted colleagues in the Ministry of Agriculture and the consensus was that the leaflet was too long and technical. The leaflet should be far simpler and preferably no more than two sides of A4. The final product should be laminated. The key points needed to be presented more crisply and the tone should be less accusatorial. Petra Deimer (Germany) thought the leaflet would be more user-friendly if fishermen were involved in drafting it. She agreed that the tone should not be confrontational.

Jan-Erik Holmberg (Swedish Fishermen's Federation) showed the meeting a Swedish leaflet published by the Swedish Board of Fisheries. Fishermen had been consulted in the drafting stage of this publication to good effect. The leaflet included a form for fishermen to complete, which they were asked to return to the Natural History Museum. The response rate was low. Penina Blankett (Finland) thought that the producer of a recent video on seals might be able to help, although his services might have to be paid for. If this was the case, the Chair asked that Parties consider making voluntary contributions available. Krzysztof Skóra (Poland) said that Hel Marine Station produced many leaflets and sought the assistance of the Sea Fisheries Institute to draft them as they had a better understanding of the approach that would resonate best with fishermen. He also thought that the ASCOBANS leaflet should be complemented by nationally produced ones.

Karl-Hermann Kock (Germany) stressed the importance of follow-up action. He recounted his experience of twenty years before when a lecture had been held at a port. Immediately afterwards, fishermen provided much information but because the follow-up action was insufficient, the flow of information soon dried up.

At the request of the Chair, Eugeniusz Andrulowicz (Poland) agreed to consult colleagues in the Fisheries Ministry and to feed comments back through Mr Skóra, who felt that it would be better to have the endorsement of the Ministry of Agriculture and Fisheries, rather than that of the Environment Ministry, to gain wider acceptance from fishermen. Penina Blankett (Finland) asked whether the target audience was primarily professional fishermen or whether leisure fishermen were also envisaged.

Heidrun Frisch (Secretariat) explained that the drafts of the three sub-regional versions had been paid for from the German voluntary contributions. There were no further funds currently earmarked for new contracts but the Advisory Committee might make more funding available given that bycatch was one of the two priority issues. It was hoped to go to production as soon as possible after the Advisory Committee. Comments would also be solicited from participants at the Stralsund workshop. Ms Frisch took note of all comments made and would pass these to the consultant to take into account when producing a revised draft.

RECOMMENDATION

- *The Jastarnia Group noted the draft of the fishermen's leaflet prepared for the Advisory Committee. The Group feels the draft needs substantial rewording or may even need to be totally rewritten. The Jastarnia Group suggests a new draft be prepared for the AC. The Baltic RAC should be contacted for the Baltic version. If necessary, Parties and the Secretariat should seek funding to enlist a Baltic expert to help with the Baltic version.*

5.e. ASCOBANS: Cooperation with Other Bodies

aa. Strive for Close Consultation and Cooperation between ASCOBANS and Other Relevant Regional and International Bodies

The Chair stated that HELCOM, with HELCOM SEAL and the Fisheries/Environmental Forum, was an obvious partner for the Jastarnia Group and ASCOBANS. The Jastarnia Group had suggested that funding be made available to enable a representative to attend HELCOM meetings. Heidrun Frisch (Secretariat) explained that while the amount allocated to experts on mission in the new ASCOBANS budget had been slightly increased by the Meeting of Parties, available resources were still very limited and not exclusive to the Jastarnia Group. It would therefore still be necessary that the majority of representatives be funded from other sources.

Karl-Hermann Kock (Germany) urged greater collaboration with both the ECS and ICES to ensure that no work was duplicated. Both the ECS and the Advisory Committee should combine to exert pressure on the European Commission to amend Regulation 812/2004 to make it more effective in the Baltic. Arne Bjørge (Norway) suggested that all bycatch information should be fed to Simon Northridge as his group had the widest remit.

Hanna Paulomäki (HELCOM) pointed out that HELCOM SEAL now also dealt with harbour porpoises, but was careful not to duplicate the work of the Jastarnia Group. There was considerable cross-membership of many of the fora operating in the Baltic which should help prevent duplication. Arne Bjørge (Norway) mentioned that one topic at its next meeting was likely to be completion of the HELCOM red list of marine mammals.

RECOMMENDATIONS

- The AC Chair and the Secretariat should approach the European Commission to draw attention to the need to address the bycatch problem in the Baltic.
- *The Secretariat should contact EAZA suggesting that they participate in the 2010 IDBHP as part of the 2009-10 carnivore campaign.*
- *The Jastarnia Group should step up cooperation with the Baltic RAC*

6. Coverage of the Western Baltic, Inner Danish Waters and Kattegat/Skagerrak Area

The Chair explained the background of the geographic coverage of the Jastarnia Plan. After the adoption of the North Sea Plan, it was evident that there was a gap between the two. The options seemed therefore to adopt a third plan for the Western Baltic, Inner Danish Waters, Kattegat and Skagerrak or to extend the Jastarnia Plan north-westwards.

Petra Deimer (Germany) expressed her fears for harbour porpoises in German waters of the Baltic if they were not covered by any Conservation Plan. She said that at the very least the Jastarnia Plan should include the Western Baltic. She also advocated aligning ASCOBANS with HELCOM and abandoning the use of the ICES areas, which were relevant to fisheries and not conservation. Tiedemann's studies showed that there were genetic similarities. Signe Sveegaard (Denmark) stated that the dividing lines referred to were artificial and there were more sensible demarcations that could be used.

Heidrun Frisch (Secretariat) recalled that the Group had made similar recommendations before and they had always been rejected by the Advisory Committee. She was concerned whether the same recommendation would stand any better chance of acceptance now. The Chair reminded the Group that the line from the Darß dated back to the former ASCOBANS Baltic Discussion Group and that there had never been clearly set boundaries for the Jastarnia Plan. It was widely accepted that a gap existed between the Jastarnia and North Sea Plans and that it should be filled somehow. Extending the North Sea Plan to the South East after its adoption seemed unlikely. A third specific plan might be the solution. Karl-Hermann Kock (Germany) did not favour a third plan because of the administrative burdens that this would entail. He felt that the Inner Danish Waters should be added to the Jastarnia Plan. Genetics data also supported this. It was however pointed out that the threats and challenges faced by harbour porpoises in the Baltic Proper and Inner Danish Waters were different as was the conservation status of the porpoises in those waters. A single Plan might therefore not be appropriate to the varying circumstances. Jonas Teilmann (Denmark) did not share that view. SCANS had shown a significant decline in numbers. Porpoise numbers were higher in the west but the problems were the same. Mats Amundin (Sweden) felt that the Jastarnia Plan should be flexible enough to deal with different levels of threat. If it could not, then it had not been designed properly. Stefan Bräger (Germany) also favoured having a single plan for the entire Baltic but recognised that this option had its critics. A third specific plan would be manageable as only three States would be involved and it could be overseen through the Jastarnia Group. The western population of the harbour porpoise was higher but still not in a favourable conservation status, and the transition zone was a grey area not easily defined.

The Chair sought consensus on the best approach. He suggested that the solution might be to revise the Jastarnia Plan, through a working group, and take in the waters covered by HELCOM's definition of the Baltic. The Plan was in any case subject to regular reviews. But he also recalled that one of the key countries, Denmark, had repeatedly expressed opposition to this option in the past. Hanna Paulomäki (HELCOM) however pointed out that Denmark had adopted the HELCOM Baltic Sea Action Plan, which mentioned the same goal as the Jastarnia Plan, namely to reduce bycatch to as close to zero as possible. Heidrun Frisch (Secretariat) quoted from the current Jastarnia Plan, which imposed a bycatch limit of no more than 1-2 animals only to the surveyed area used as a basis for the abundance

estimate. With Danish waters being outside of this area, the goals to restore population to 80% of carrying capacity and reduce bycatch towards zero, which was already adopted by Denmark in the BSAP, would apply.

Signe Sveegaard (Denmark) highlighted a problem with the Habitats Directive, which referred to national populations of species. This definition was artificial as there were no “Danish” porpoises since they were migratory. Karl-Hermann Kock (Germany) added that the dividing lines were not distinct and males and juveniles frequently crossed the transition zone. He suggested adhering to scientific arguments and avoiding political aspects. Jonas Teilmann (Denmark) agreed to approach the Danish authorities and make the case for extending the plan.

It was agreed that the Chair of the Group would prepare a paper for submission to the Advisory Committee, explaining the rationale behind the Group’s recommendation of how best to cover the gap area.

RECOMMENDATION

- *Taking note of recent studies indicating that there is no clear-cut separation between the eastern and western populations of Baltic harbour porpoises, the Jastarnia Group recommends that the present Jastarnia Plan be extended to cover the Baltic as defined by HELCOM, without prejudice to the provisions of the Plan with respect to harbour porpoises in the area east of the Darss-Limhamn Ridge.*

7. Any Other Business

Krzysztof Skóra (Poland) pointed out that practice varied across Europe with regard to landing of bycatch. In some countries, fishermen were fined and in others they were encouraged to hand over carcasses with financial incentives. An overview of customs in each of the countries might be helpful. Karl-Hermann Kock (Germany) said that in Germany it was illegal to pay a bounty for a carcass. The Federal State of Schleswig-Holstein used to pay €50. For a short period, Norway had paid fishermen for bycaught carcasses and had received on average 75 per annum. When the payment programme ended, numbers fell to single figures.

Stefan Bräger (Germany) said that the German Oceanographic Museum used to pay fishermen €50 not as bounty but to cover their costs. As a result the Museum had an extensive collection of bones, which benefited scientific research. He understood that it was illegal to land bycaught harbour porpoises in the Netherlands, but this law was under review. Arne Bjørge (Norway) said it was similarly illegal in Belgium.

Heidrun Frisch (Secretariat) said that an intern with an appropriate background might be able to carry out the study. Stefan Bräger (Germany) thought an alternative would be Richard Caddell, who had attended Jastarnia Group meetings in the past and who was a lawyer.

RECOMMENDATION

- *The Secretariat should produce a synopsis of bycatch-related national regulations of relevance to individual fishermen, especially with regard to fines for bycatch and incentives for those delivering carcasses.*

International Year of Biodiversity (2010)

Penina Blankett (Finland) asked whether any specific new actions were being proposed as a contribution to the International Year of Biodiversity. She suggested that the International Day of the Baltic Harbour Porpoise (IDBHP) might be linked to IYB in some way as it was

probably too late to organise anything new. The Chair agreed that it would make sense to use events already planned and enhance them through association with IYB. Petra Deimer (Germany) however felt that this might lead to confusion and blurring the message.

Stefan Bräger (Germany) asked whether there were any activities already in the pipeline for IDBHP. Petra Deimer (Germany) said that her NGO, GSM, would organise a porpoise-watching excursion from a boat based at Fredericia in Denmark. Iwona Pawliczka (Poland) had just found some information on EAZA's European carnivore campaign, which mentioned harbour porpoises, so EAZA should be made aware of IDBHP.

Norwegian Report on Ghost Nets

Arne Bjørge (Norway) circulated by e-mail a Norwegian report dating from 2005 which indicated that ghost nets were still catching marine organisms up to seven years after they were lost (Annex 10).

8. Date and Venue of the Seventh Meeting of the Jastarnia Group

The Chair had been in contact with the Danish authorities and it seemed likely that an offer to host the Meeting would be forthcoming. The precise dates and venue had not been established.

9. Closure of the Meeting

After the customary expression of thanks to the hosts, the organisers, the Chair and the participants, the Meeting was closed at 13.00 hrs.

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Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Joint Jastarnia Group/SAMBAH Session
4. Presentation by Invited Expert
5. Implementation of the Jastarnia Plan and the Recommendations of the 5th Meeting of the Jastarnia Group*
 - a. Bycatch Reduction
 - aa. Reduce Fishing Effort in Certain Fisheries
 - aaa. Implementation of relevant JG 5 Recommendations
 - bbb. Other related activities
 - bb. Involve Stakeholders in the Work of Reducing Bycatch of Harbour Porpoises
 - aaa. Implementation of relevant JG 5 Recommendations
 - bbb. Other related activities
 - cc. Replace Fishing Methods Known to be Associated with High Porpoise Bycatch (i.e. Set Nets) and Introduce Alternative Gear Considered Less Harmful
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
 - dd. Implement a Pinger Programme on a Short-term Basis
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
 - b. Research and Monitoring
 - aa. Analyze Stock Affinities of Harbour Porpoises in the "Transition Zone" of the South-western Baltic
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
 - bb. Develop and Apply New Techniques (e.g. Acoustic Monitoring) for Assessing Trends in Abundance
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
 - cc. Develop Interactive Pingers or Pingers Using Frequencies not Audible to Seals
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
 - dd. Investigate Possible Detrimental Effects of Various Types of Sound and Disturbance (including Pinger Signals, Noise from Vessels, Wind Parks or Construction and Seabed Exploration for Oil and Gas) on Harbour Porpoises

* Insofar as recommendations by JG 5 relate to areas of activity newly introduced by the revised Jastarnia plan they will be covered under the agenda items relating to the respective areas of activity.

- aaa. Implementation of relevant JG 5 recommendations
- bbb. Other related activities
- ee. Monitor Bycatch in Fisheries Known to be Harmful to Harbour Porpoises to be Able to Estimate Bycatch Levels*
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
- ff. Further Develop Sustainable Alternative Fishing Gear with no Bycatch of Harbour Porpoises
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
- gg. Compile Data on Fishing Effort
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
- hh. Examine Habitat Preference for Harbour Porpoises
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
- ii. Investigate the Prevalence of Derelict (“Ghost”) Gear and the Feasibility of its Removal
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
- c. Marine Protected Areas
 - aa. Expand the Network of Protected Areas in the Baltic Sea and Improve its Connectivity to ensure the Development of Appropriate Harbour Porpoise Management Plans for these Areas
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
- d. Public Awareness
 - aa. Develop a Comprehensive Public Awareness Campaign
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
- e. ASCOBANS Cooperation with Other Bodies
 - aa. Strive for Close Consultation and Cooperation between ASCOBANS and Other Relevant Regional and International Bodies
 - aaa. Implementation of relevant JG 5 recommendations
 - bbb. Other related activities
- 6. Coverage of Western Baltic, Inner Danish Waters and Kattegat/Skagerrak Area
- 7. Any Other Business
- 8. Date and Venue of the 6th Meeting of the Jastarnia Group
- 9. Closure of Meeting

Recommendations to the Advisory Committee

1. The SAMBAH project team should be represented at future Jastarnia Group meetings.
2. Jastarnia Group members should promote the Project including by providing data.
3. The ASCOBANS Secretariat should promote the project internationally (including with the European Commission and with the Baltic RAC).
4. Parties and the Secretariat should try to involve Russia building on inter alia its involvement with harbour seals (and offer financial assistance for Russian participation).
5. National activities related to SAMBAH (including in non-SAMBAH countries, in particular Germany) should be coordinated to avoid duplication and information should be shared.
6. The ASCOBANS Secretariat and Parties should promote SAMBAH in IDBHP (e.g. the Secretariat should promote SAMBAH on the ASCOBANS website).
7. Efforts should be made to ensure that devices are left in place or returned when dislodged. Possible means of achieving this might include marking devices with a contact address and offering rewards to people returning them. Such measures should address all sea users and not just fishermen.
8. Supportive fishermen should be involved in outreach initiatives to inform the wider fisheries community about SAMBAH.
9. Secretariat and Parties should lend support in obtaining permits to set devices by contacting the relevant authorities, and national representatives should assist the Secretariat in identifying the right contact persons to approach.
10. The Group notes the recent promising new methods of monitoring and mitigating bycatch across the greater Baltic region and recommends that options of compiling this information and making it available to those not or not fully aware of it be explored. The Jastarnia Group and the ASCOBANS Secretariat should take the lead in this process.
11. A targeted approach to involving stakeholders such as fishermen should be adopted. With respect to fishermen, this should involve working primarily with those who have been receptive in the past.
12. Bycatch mitigation activities of the Jastarnia Group should be coordinated with the related work of other regional bodies and organizations in order to avoid duplication of effort.
13. A summary of current and historic morphological data should be included in Anders Galatius' and Jonas Teilmann's study and presented to the 2011 Jastarnia Group.
14. With respect to recreational fisheries, Parties should work towards banning those types of gear known to pose a threat to harbour porpoises.
15. The possibility of using cod traps, as successfully applied in Sweden, or other gear as an alternative to pingers elsewhere in the Baltic and the greater Baltic region, as well as the possibility of reflecting their use in a porpoise-friendly label should be investigated.
16. Parties are urged to undertake studies of fisheries effort as contained in recommendation 11 of the Jastarnia Plan.
17. The Jastarnia Group should make its expertise available to governments seeking to develop management plans for SACs/MPAs designated for the Harbour porpoise.
18. Parties should designate Focal Points dealing with the Baltic Harbour Porpoise database and provide the details of these Focal Points to the Secretariats of ASCOBANS and HELCOM.

19. The Jastarnia Group noted the draft of the fishermen's leaflet prepared for the Advisory Committee. The Group feels the draft needs substantial rewording or may even need to be totally rewritten. The Jastarnia Group suggests a new draft be prepared for the AC. The Baltic RAC should be contacted for the Baltic version. If necessary, Parties and the Secretariat should seek funding to enlist a Baltic expert to help with the Baltic version.
20. The AC Chair and the Secretariat should approach the European Commission to draw attention to the need to address the bycatch problem in the Baltic.
21. The Secretariat should contact EAZA suggesting that they participate in the 2010 IDBHP as part of the 2009-10 carnivore campaign.
22. The Jastarnia Group should step up cooperation with the Baltic RAC.
23. Taking note of recent studies indicating that there is no clear-cut separation between the eastern and western populations of Baltic harbour porpoises, the Jastarnia Group recommends that the present Jastarnia Plan be extended to cover the Baltic as defined by HELCOM, without prejudice to the provisions of the Plan with respect to harbour porpoises in the area east of the Darss-Limhamn Ridge.
24. The Secretariat should produce a synopsis of bycatch-related national regulations of relevance to individual fishermen, especially with regard to fines for bycatch and incentives for those delivering carcasses.

SAMBAH

Static Acoustic Monitoring of the Baltic Sea Harbour Porpoise



Mats Amundin
Kolmården Wildlife Park

Julia Carlström
AquaBiota Water Research

An EC LIFE+ Nature project



AquaBiota
WATER RESEARCH



Outline of presentation

- **SAMBAH objectives, targeted EU policies**
- **SAMBAH organisation, project outline**
- **Methods**
- **Information and permits needed for deployment of detectors**
- **Dissemination**
- **Cooperation Jastarnia Group - SAMBAH**

SAMBAH objectives

- **Estimate density, abundance and distribution within the project area**
- **Identify habitat preferences, hotspots and areas with higher risk of conflicts with anthropogenic activities**
- **Increase the knowledge about the Baltic harbour porpoise among policymakers, managers, stakeholders, users of the marine environment and the public**
- **Implement best practice methods for cost efficient, large scale surveillance of harbour porpoises in a low density area**

Targeted EU policies etc

SAMBAH will provide results that are fundamental for the implementation of:

- **Habitats Directive (1992/43/EEC)**
- **Marine Strategy Framework Directive (2008/56/EC)**
- **ASCOBANS Recovery Plan for Baltic Harbour Porpoises (Jastarnia Plan)**
- **HELCOM's BSAP and recommendation 17/2**
- **Several national strategies developed under those international rules and agreements**

SAMBAH organisation

Coordinating beneficiary

- Kolmården Wildlife park, SE

Associated beneficiaries

- SE: Swedish Environmental Protection Agency
- FI: Turku University of Applied Sciences, Finnish Ministry of the Environment, Särkänniemi Adventure Park
- PL: University of Gdańsk, Institute of Meteorology and Water Management, Chief Inspectorate for Environmental Protection
- DK: National Environmental Research Institute, Danish Forest and Nature Agency

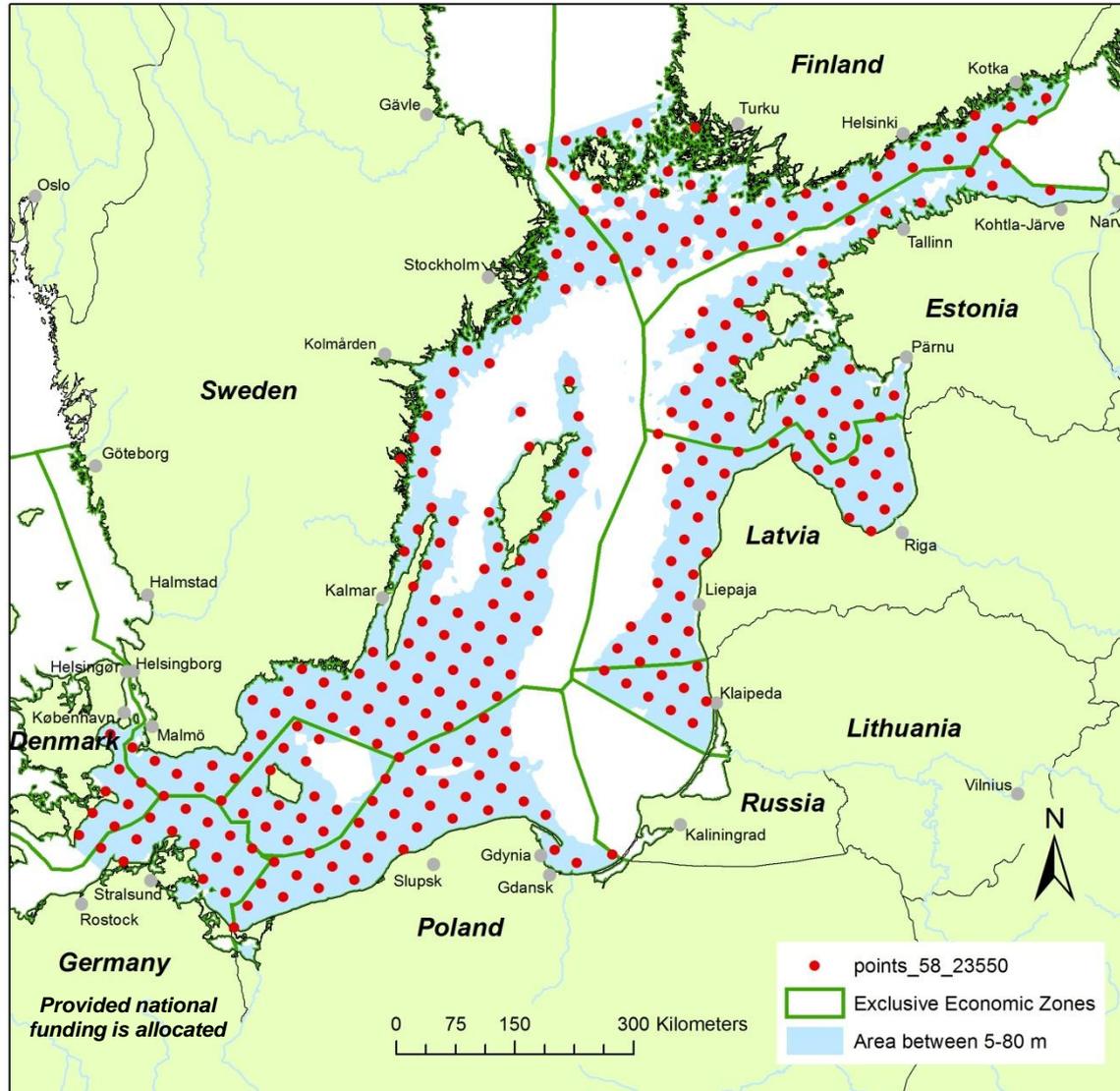
Collaborators

- AquaBiota Water Research (SE), CREEM, St Andrews University (UK), State Nature conservation Centre (EE), Latvian Institute of Aquatic Ecology (LV), Klaipeda University Coastal Research and Planning Institute (LT)
- German Oceanographic Museum in Stralsund (DE)

SAMBAH project outline

Deployments:

- Depth 5-80 m
- 300 units
- 2 years
- [Timetable.xlsx](#)



Methods

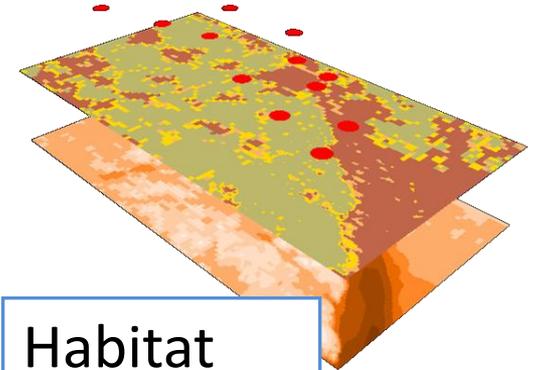


Data collection using SAM

Satellite and acoustic tagging of porpoises in Denmark



Density and abundance analyses



Habitat modelling

Tagging of porpoises

- Porpoises opportunistically captured in Danish pound nets
- Acoustic tags recording acoustic data, dive profiles and 2-dimensional movements
- Satellite tags recording position
- Data for density analyses
 - Mean click rate
 - Vertical orientation

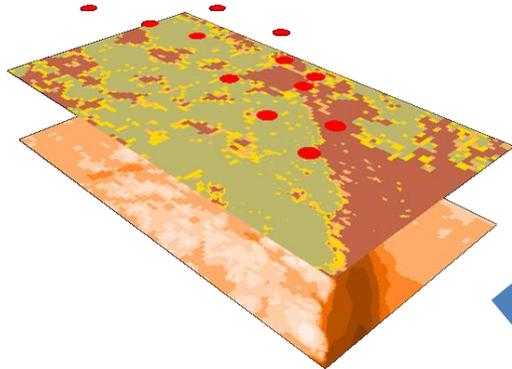


Estimating porpoise density from SAMBAH data

- Several different methods are being discussed
- All dependent on auxiliary data
- Variance have to be estimated for all parameters

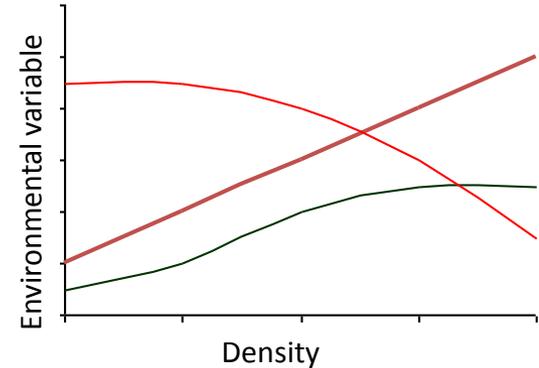
Habitat modelling

Response variable:
density estimates



Environmental variables
as raster data

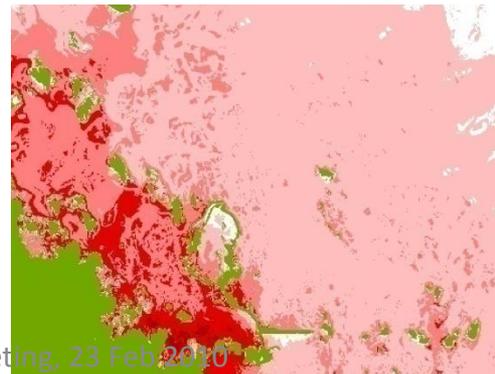
1



Statistical model

2

Prediction of density



- density grid of the whole study area
- important geographical areas
- important environmental factors

Information and permits for deployments of detectors

Compile information on environmental conditions, e.g.:

- Fishing activities
- Munitions
- Shipping
- Bottom substrate

Contact relevant bodies, e.g.:

- Maritime Offices
- Navies
- Environmental Protection Authorities
- Board of Fisheries

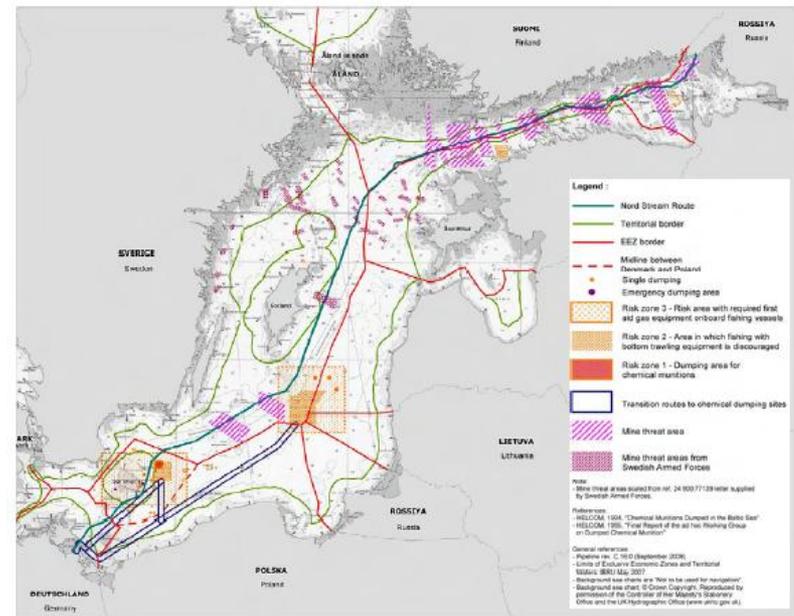


Figure 2.1 Areas of chemical and conventional areas in the Baltic Sea

SAMBAH dissemination actions

- Web site
- ECS workshop
- National information meetings
- Exhibition at Kolmården, Hel Marine Station and Särkenniemi Adventure Park
- Polish TV spot and leaflet
- Results to international databases
- Scientific publications
- Non-technical reports to managers, policymakers and stakeholders
- Swedish workshop for managers, policymakers and stakeholders
- Promotion of results (ASCOBANS, HELCOM, WWF Baltic Sea Office, CCB)
- End-of-project conference

SAMBAH web page

The image shows a screenshot of the SAMBAH.ORG website. The main header features the SAMBAH.ORG logo and a navigation menu with items: Home, Background & Objectives, Organisation, Methods, Actions, News, and Reports & Results. A dropdown menu is open under 'Organisation', listing: Funding, Partners, Kontakt, and Login. The main content area is divided into several sections: 'News' with a placeholder image and text, 'Contact' with an email address (info@sambah.org), and 'Detts ska vi göra' (What we should do) with placeholder text and a search bar. There are also two large images on the right side of the page, one showing a coastline and another showing waves. The footer includes logos for the European Union and the Norwegian government.

Dissemination done so far

- **Baltic RAC (Regional Advisory Council - CFP): SAMBAH probably invited to their General Assembly, May 2010, Klaipeda, LT**
- **ASCOBANS: will add general info on click detectors in their leaflet to fishermen**
- **ASCOBANS: plan to print a specific SAMBAH leaflet**
- **Europeche (European organization for professional fishermen): will inform their members**
- **EuroFish Magazine (widest distributed European fisheries magazine): has published a note on SAMBAH on their web page and in their magazine**

Cooperation

Jastarnia Group - SAMBAH

- How to make the results of SAMBAH as useful as possible to reach the goals of the Jastarnia Plan?

Can the Jastarnia Group support/assist SAMBAH in any way to:

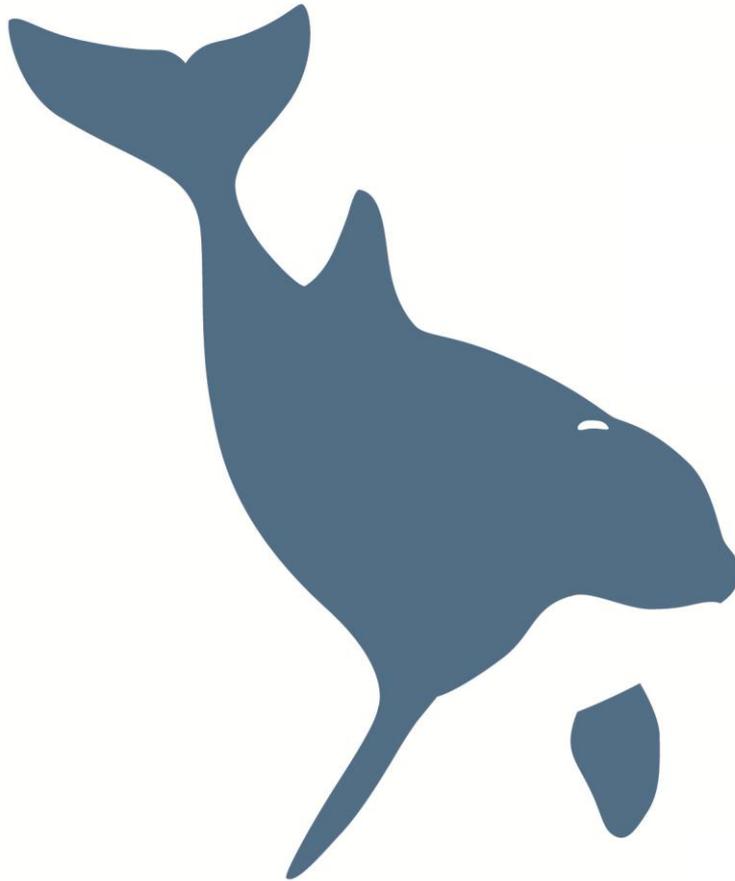
- Gather information on anchoring conditions?
- Receive necessary permits for deployments of detectors?

Cooperation

Jastarnia Group - SAMBAH

How can SAMBAH and the Jastarnia Group cooperate in spreading information to:

- Fishermen and other users of the sea to decrease the risk of losing SAM units?
- Managers to implement the results of SAMBAH to improve the management of the Baltic harbour porpoise?
- The public to increase their awareness of the Baltic harbour porpoise?



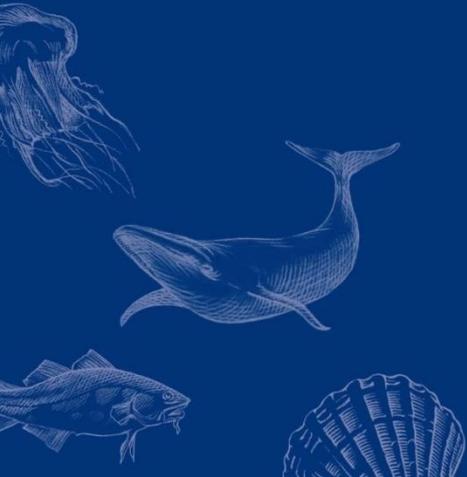
**Looking
forward to
cooperate!**



How to monitor marine mammal bycatch in a 'modern artisanal' fishery?

ARNE BJØRGE

*Institute of Marine Research
Norway*



Outline

- ✓ Background about Norwegian fisheries
- ✓ Pilot project in 2005
- ✓ Developing a monitoring program

Objectives

Limitations

Approach

- ✓ First stage results
- ✓ Next stage – extrapolation to entire fisheries
- ✓ Final stage – bycatch mitigation



Norwegian EEZ covers 1 878 961 km² and important fishing grounds.

The majority of Norwegian fish catches are taken by purse seine (pelagic fish) and trawl (demersal fish).

Onboard observers showed that these fisheries are relatively "clean" with regard to entanglement of marine mammals.



The Norwegian coast spans from 58°N to 71°N. Including islands, the shoreline is more than 83 000 km long. About 5,000 commercial small vessels (less than 15 m) are operating a variety of gear types in these waters.

The Lofoten fishery for spawning cod is one of the world's largest and most traditional gill net fisheries



1920



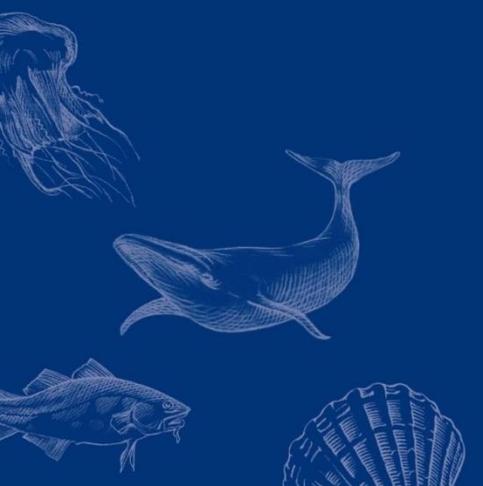
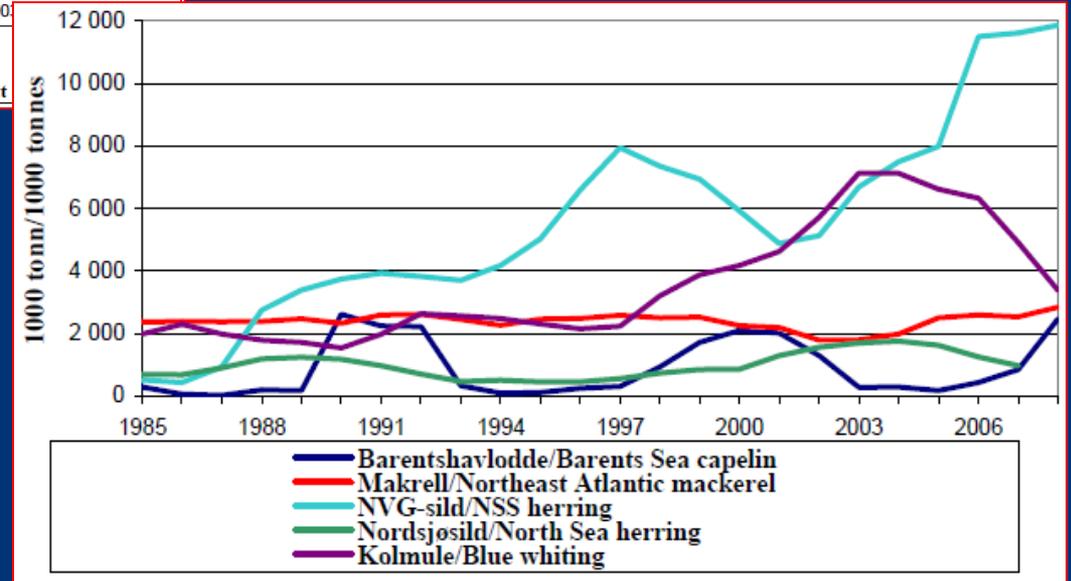
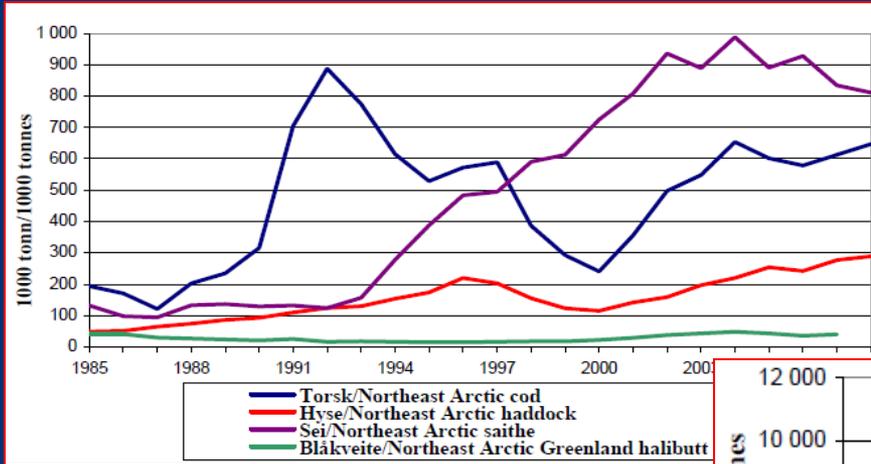
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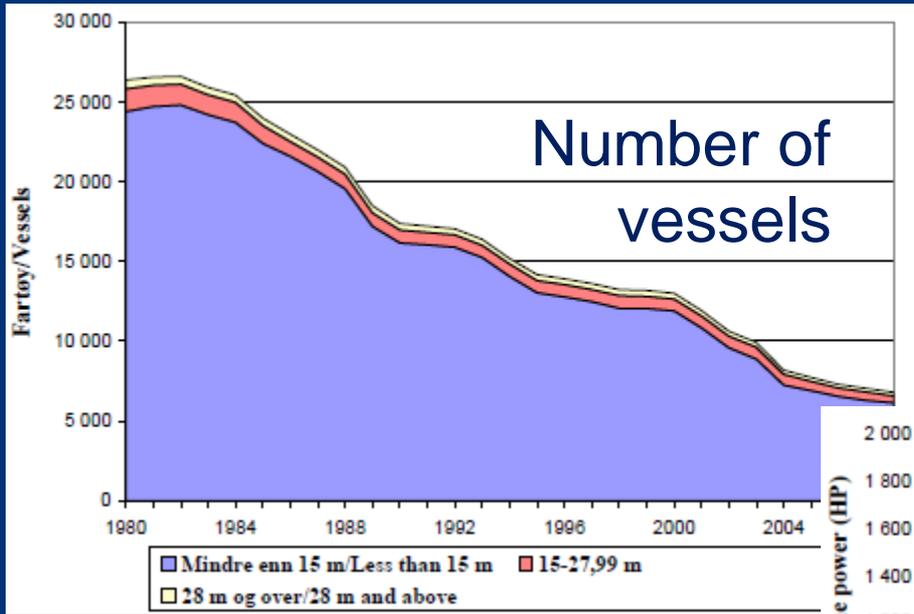
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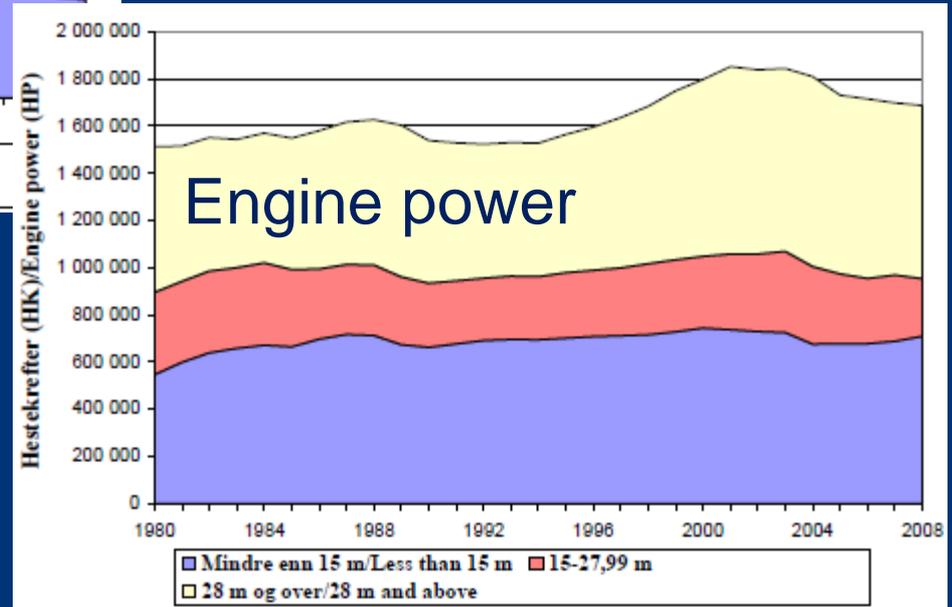
Norwegian fisheries:



Norwegian fisheries:



- < 15 m
- 15.-27.99 m
- ≥ 28 m



Developing a monitoring program: Pilot study in 2005

Interviews of fishermen revealed three bottom-set gill net fisheries with high risk of marine mammal entanglement .



Gill nets for cod *Gadus morhua* and other Gadoids



Large-mesh nets for anglerfish *Lophius piscatorius*



Nets for lump sucker *Cyclopterus lumpus*

Developing a monitoring program: Objectives

Identify fisheries (gear type, area and season) that have high bycatch of marine mammals (and sea birds).



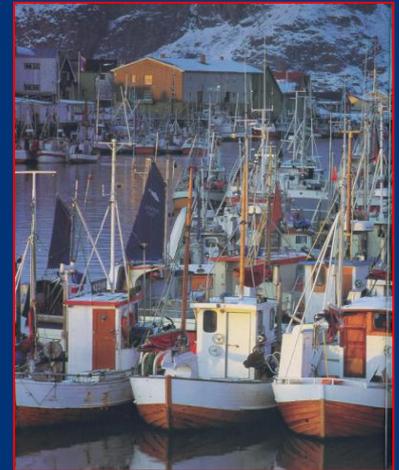
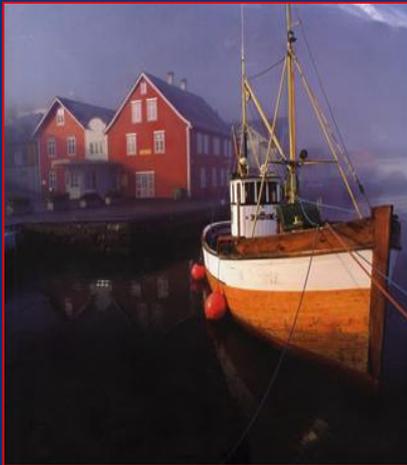
Develop case specific mitigation measures for "hot spots" to ensure sustainable fisheries.



"Ignore" fisheries with low risk for marine mammal bycatch, to allow enhanced focus on unsustainable fisheries.

Developing a monitoring program: Limitations

- The very long coastline,
- The large number of vessels,
- The inability of these small vessels to carry an observer for multi-day trips at sea .



Developing a monitoring program: Starting points

Landing statistics for target species are generally good for fisheries in Norway.

However, information on the fishing effort and catch composition of non-target species fish is poor for coastal fisheries by small vessels, e.g. coastal gill-netters.

Therefore, improvement of monitoring and management of takes of non-target species was needed.



Developing a monitoring program: Approach:

Starting in 2006 we contracted two fishing vessels in each of nine domestic fishery statistics areas to provide detailed statistics of effort, target species catch, bycatch of all non-target fish, sea birds and marine mammals.

The value of the contract is a significant proportion of the annual income of the contracted vessels.

Each of the vessels is visited regularly by scientific staff, and they stay onboard on day trips. Any discrepancy between statistics of trips with and without scientific staff onboard will result in cancellation of the lucrative contract.

First stage results:

The three first years of monitoring revealed frequent takes of three marine mammal species:

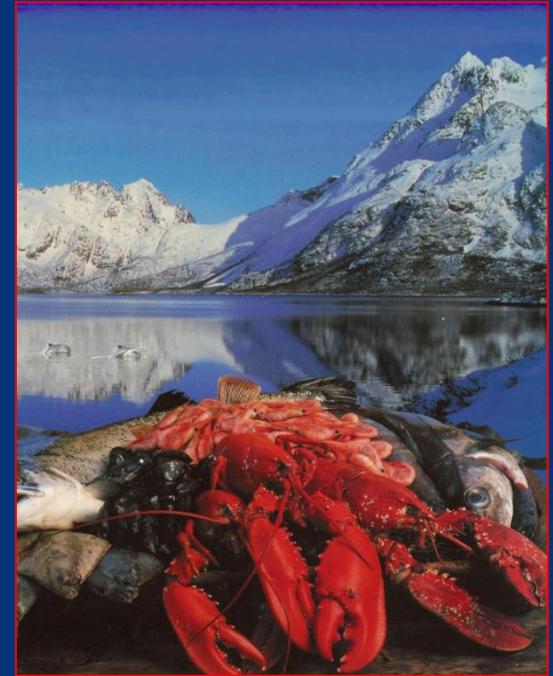


The annual takes by the contracted vessels were in the low hundreds for harbour porpoise, and less than hundred for harbour and grey seals.



Second stage:

The collected data from contracted vessels in combination with landings statistics of target species from the same vessel category and gear types will allow us to extrapolate to marine mammal bycatch in entire fisheries.



Extrapolation to entire fisheries will be made when data from the third year of monitoring become available.

Third stage:

Identify areas, gear types and seasons where mitigation measures are required.



Develop and implement case specific mitigation measures. Continue to monitor effects.

S-G Lunneryd: Cod Pot Trials

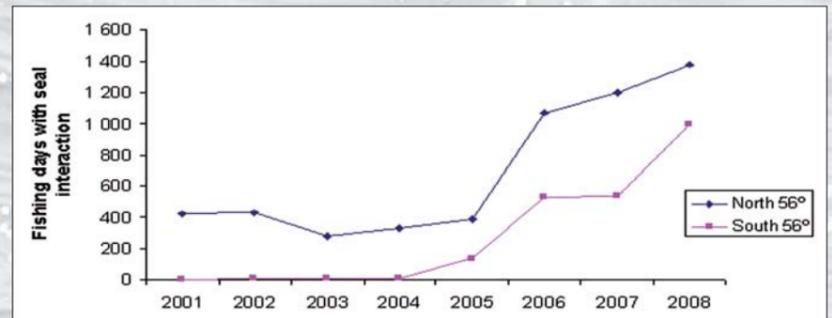
There is a lot of data that is not processed yet. Averaged catch is ca 3 kg per pot and emptying during the whole of 2009. It can be concluded that on certain days the pot fisher brought home more fish (2-300kg) than the set net fishers, in spite of the pot fishers only operating half the set of pots at a time (60 - 80 pots) of what they could manage. But the fishery is rather variable during the year. In another area the catches are only half of that in the test area, so it is dependent on high cod density. But basically this fishing method is not so much about catch volume but more about quality. If it is to be economically profitable, also the problem with seal damage to the pots needs to be solved. Then it will soon be the only way to fish for the coastal fishers.

The Board of Fisheries pays 600 000 SEK (ca 60 000€) per year for a boat, including everything, with 2 crew full time. In addition the fishermen can keep and sell the catch, which had a value of ca 150 000 SEK (ca 15 000€) during 2009. The fishermen are very happy with the method and want to carry on.



Cod pots – a solution to the seal-fishery conflicts?

Great economic loss in the cod gillnet fisheries in the Swedish Baltic Sea due to grey seals. North of latitude 56 over 50 % of the reported days of fishing were reported with a seal interaction during 2008, while in the area south it was almost 20 %.



The latitude 56° is just south the coast of the county Blekinge.

The two-chambered fishpot, an alternative fishing gear to gillnet



There is a need for an alternative fishing gear! This is a normal catch for many Swedish fishermen using gillnet.



Norwegian two-chambered fish pot floating with the current just above the bottom, baited with herring.

Step one

Testing fishing efficiency in commercial fishery. During 2009 the result is over 2 kg cod per pot and emptying.

Next step

Develop a seal-safe fish pot. Testing fishing efficiency in commercial fishery in the Baltic Sea.



A good catch with the fishpot.

Occurrence of harbor porpoises around fishing nets
Sven Gunnar Lunneryd et al.

Abstract

A major source of human-induced mortality in harbour porpoises (*Phocoena phocoena*) is entanglement in gill nets. There is little information available on why porpoises get entangled and on their acoustic and swimming behaviour around gill nets. Here we investigated the possibility of nets being attractive to porpoises, using acoustic data loggers to detecting the ultrasonic echolocation clicks emitted by the animals.

The data loggers were attached to fishing nets and in areas with similar oceanographic and bathymetric conditions at least 1 nautical mile away from any fishing gear. Trammel nets, hake gill nets and a combination of an experimental fishing net and a turbot gill net were used. There was no significant difference in the harbour porpoise clicking activity around the gill nets as compared to the control locations. The nets had no significant effect on the duration of harbour porpoise encounters around the loggers. No diurnal patterns were found in harbour porpoise clicking activity, neither around nets nor in control areas.

This study suggests that harbour porpoises are not attracted to gill nets, but rather encounter them by coincidence. This result may have important implications for developing more efficient mitigation methods for this species.

**CAN GREY SEAL (*HALICHOERUS GRUPUS*)
LEARN TO USE ACOUSTIC DETERRENENTS TO
LOCATE FISHING GEAR?**

Master Degree project

Department of System ecology, Stockholms University & Swedish Board of Fisheries

Supervisor: Magnus Appelberg;

Department of System ecology, Stockholms University & Swedish Board of Fisheries

Secondary supervisor: Sara Königson;

Swedish Board of Fisheries



Abstract

Harbour porpoise (*Phocoena phocoena*) is the only commonly seen cetacean in Swedish waters. The harbour porpoise is protected due to a reduction in population size. One of the main reasons for the reduction is presumed to be a high amount of by-catch in the net-fisheries. European Council Regulation No. 812/2004 lays down measures concerning incidental catches of cetaceans. Vessels that measure 40 feet or more are prohibited to use net links without using active acoustic deterrents in certain areas and fishing with driftnets in the Baltic will be forbidden from the year 2008. In the Baltic Sea the grey seal (*Halichoerus grampus*) population has increased, and this has led to a growing conflict between seals and fisheries. Seals damage the fishermen's catch and fishing gear. Another part of the conflict is the increase of by-caught seals. It has been suspected that sound, such as a seal deterrents or the sound from the fishermen's boat, can work as a dinner bell for seal and help the seals locate the nets. If that is the case, active acoustic deterrents placed on net links, could lead to an even increased conflict between fisheries and seals. To evaluate effects of acoustic deterrents an observer joined a professional fisherman fishing for cod (*Gadus morhua*) in the central Baltic Sea for 14 weeks in 2006. Systematic visual seal observations were carried out for 2 minutes at the boats four cardinal points at every fishing occasion. Only grey seals and no other seal species were seen at the seal observations. Net links with active and inactive acoustic deterrents were set out randomly and all cods caught in both net links were counted and then calculated into CPUE (number of cod/ (100meter net and hour)). Damaged cods were also counted and thereafter calculated into DPUE (number of damaged cod/ (100meter net and hour)). The CPUE and DPUE for net links with active and inactive acoustic deterrents were compared over the whole study period. The study was also divided into four periods dependent on the number of fishing occasions. The CPUE and DPUE for the net links with active acoustic deterrents were compared to the net links with the inactive acoustic deterrents in all four periods to analyze change over time. There was a significant reduced CPUE in net links with active acoustic deterrents for the whole period. There was also a significantly higher DPUE in the net links with active acoustic deterrents compared to the net link with inactive acoustic deterrents during the last period. In addition, a study of hidden losses, i.e. fish lost from the net links by seals without them leaving any trace, such as fish rests, was carried out on net links with active and inactive acoustic deterrents. By leaving marked entangled cods in both links with acoustic deterrents, and then resetting the net links again, it was possible to estimate the hidden losses. When emptying the two net links the numbers of fully retrieved, damaged and disappeared cods were counted. Studies on spontaneous cod losses were made by setting out a net link with a known number entangled and marked cods, and then the links were retrieved immediately. The amount of cods that fell off during the handling was counted to estimate the natural losses. Data from an earlier study on spontaneously fall off was used as a complement in the calculations. If more cods fell off than the calculated natural losses it was assumed that there had been a seal visit. The hidden damage study showed significant higher amount of damage and hidden losses in the net links with active acoustic deterrents compared to the net links with inactive acoustic deterrents. These results indicate that grey seals can use acoustic deterrents to localize fishing gear, thereby causing negative effects on fisheries.

Key words: Harbour porpoises, (*Phocoena phocoena*),. Grey seal, (*Halichoerus grampus*),. Atlantic cod, (*Gadus morhua*),. Acoustic deterrents, Aquamark 100.

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1. Introduction

In Sweden the harbour porpoise (*Phocoena phocoena*) is the only common cetacean, and it has been protected since 1973 due to a reduction in population size (Berggren, 1994). Many populations of harbour porpoises are substantially reduced from historical levels and the Black and Baltic Sea populations are among the most threatened (Reeves *et al.*, 2002). However the harbour porpoise stock identity in the Baltic Sea has not been fully understood, but because of high mortality in the Baltic Sea and small migration between the Baltic Sea and the Danish waters, the Baltic harbour porpoise is considered an endangered subpopulation and should be administrated as a separate population (Lindahl *et al.*, 2003). One of the main reasons for the decline is presumed to be high amount of by-catches in fisheries, especially bottom-set gillnets (Berggren *et al.*, 2002; Reeves *et al.*, 2002). To decrease the by-catch, considerable effort has been devoted to develop acoustic deterrents for use together with gillnets and driftnets. Results from studies indicate that acoustic deterrents significantly reduce the probability of harbour porpoise entanglement in bottom-set gillnets used in the fishery (Gearin *et al.*, 2000; Kastelein *et al.*, 2007). The European Council Regulation No. 812/2004, no. 88/98 sets preventive measures to reduce the by-catches of cetaceans. All vessels that are 40 feet (12 meter) or more in certain areas are prohibited to use any bottom-set gill net, entangling net or driftnet for fishing without the simultaneous use of active acoustic deterrents. In an experiment in Argentina acoustic alarms were used to avoid by-catches of the Franciscana dolphin (*Pontoporia blainvillei*). The by-catches of the dolphin decreased, but during the experiment they found that pinnipeds, sea lions (*Otaria flavescens*), damaged the fish caught in net links with active acoustic deterrents significantly more than in net links with inactive acoustic deterrents (Bordino *et al.*, 2002). Therefore it is suspected that

acoustic deterrents emitting a sound, which pinnipeds can hear, might work as a dinner bell. Also earlier studies have shown that grey seals (*Halichoerus grypus*) can learn to localize fishing gear by acoustic deterrents as were meant to harass seals (Königson, 2007). In Sweden the grey seal has increased dramatically (Karlsson and Helander, 2005) and in 2006 the number of counted grey seals in the Baltic were 20.700 (Ministry of agriculture and forestry, 2007). Photo ID studies indicate that the count covers 60-70 % of the total population (Swedish Environment Protection agency, 2001) which means that the population is now well over 25,000 animals. The gaining population has led to a growing conflict between grey seals and fisheries (Lunneryd *et al.*, 2004). Seals damage both the catch and fishing gears. An increasing number of by-caught seals are also a part of the conflict. The by-catch of seals does not affect the seal population but are unethical and a problem for fishermen (Lunneryd *et al.*, 2004; Königson *et al.*, 2007). Today more than 400 grey seals are caught in the Swedish fisheries (Lunneryd *et al.*, 2004). Beside the apparent losses such as damaged fish and fishing gear, there may also be significant hidden losses. Such losses would include fish that are removed completely from the fishing gear, leaving no traces. Königson *et al.* (2007) described these losses in the gillnet fisheries for herring. Fjälling (2005) estimated the hidden losses in salmon set-traps to be at least 20% of the total catch, and more than 50% of the potential catch for an average day with a seal visit. In addition to these losses, seals can scare fish away from the fishing gear, creating additional hidden losses (Königson *et al.*, 2007).

Grey seals forage both individually and cooperatively in groups. Their foraging strategies exhibit considerably plasticity depending on type and distribution of the food resource (Berta *et al.*, 2006). Grey seals hear and call both under water and in air, and are potentially subject to noise effects in both media (Richardson *et al.*, 1995). The grey seals can hear underwater sounds at frequencies from 1 kHz up to 60 kHz, however, above 60 kHz the sensitivity is

poor, and different frequencies cannot be discriminated (Richardson *et al.*, 1995). The aim of this study was to evaluate if grey seals can use acoustic deterrents to localize fishing gear and thereby increase the seal-fishery conflict. If seals do use the acoustic deterrents as dinnerbells this could lead to a reduction in catch, an increase in damaged catch and an increase of hidden losses. Therefore we wanted to examine if the catch per unit effort (number of cod/(100m net and hour)) did decrease in net links with acoustic deterrents compared to net links with inactive acoustic deterrents. We also wanted to examine if the damaged fish per unit effort (number of damaged cod/(100m net and hour)) did increase when acoustic deterrents were used on the net links. At last, the amount of hidden losses, i.e. fish lost from the net links without leaving any trace, were compared between net links with active and inactive acoustic deterrents to evaluate if the hidden losses were higher in net links with acoustic deterrents.

2. Material and Methods

2.1 Experimental design.

The field study was carried out in cooperation with a local fisherman in Byxelkrok which is a small town situated at northern Öland on the Swedish east coast (fig.1). The study started March 31 and ended July 14, 2006. The observer joined the fisherman on his daily fishing trips and noted the caught fish (whole and damaged cod and additional by-catch of other species) and the net links soak time. Positions for the net links were taken with a GPS. At every setting and retrieving of the net links, systematic visual seal observations were carried out for 2 minutes at the boats four cardinal points. Bottom-set gillnets (net links) with a mesh-size of 55 to 65 cm and 12 to 20 feet in height were used through out the study. The net links consisted most often of 8 to 10 nets linked together forming a net link with a maximum length of 1100 meter. The soak time was at minimum 12 hours and at maximum 49 hours depending on weather and catch. Five to six net links were set out on every fishing trip in two separate

areas. In each area, a net link was placed with either active or inactive acoustic deterrents attached to the head rope of the net link (defined as active or inactive net links). The minimum distance between the area with active and inactive net links were at least 0.5 nautical miles. The acoustic deterrents were mounted at every 200m on the net links. Other net links in the studied areas had no acoustic deterrents attached and were placed randomly in both areas, but only the net links with acoustic deterrents were used and compared to each other to ensure that the distance between the active and inactive net links used in the analysis did exceed 0.5 nautical miles.



Figure 1. Map of northern Öland, an island of the central east coast of Sweden. The square indicate the area where the fishing took place.

The used acoustic deterrents were the digital model AQUAmark 100 (fig. 2). It has a frequency of 20-160 kHz with a source level of 140 dB re 1 μ Pa @ 1m. Its weight is 410g and the pulse durable 200-300ms with pulse interval 4-30s (BIM, 2005). The acoustic deterrents

were coupled with floats on both sides to keep the deterrent floating and to workout as shock absorbers.

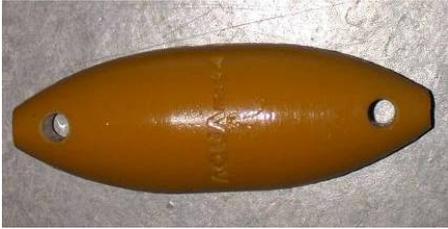


Figure 2. The acoustic deterrent, AQUAmark 100.

2.2 Caught cod (CPUE)

When retrieving the net links the observer counted the amount of whole cods in both active and inactive net links. The amount of cod was calculated in CPUE (number of cod/ (100meter net and hour)) for each net link. The whole study period was analyzed to assess if there was a total difference over the whole fishing period between active and inactive net links. The study was also divided into four periods determined by the number of fishing occasions, with equal fishing occasions of both active and inactive links per period. To be able to see if there had been any difference over time, i.e if the CPUE had increased over time, CPUE in the active net links were compared to the inactive net links in all periods. The four periods were: 5th of April to 26th of May, 27th of May to 16th of June, 17th of June to 30th of June and 3rd July to 13th of July.

2.3 Visible damage (DPUE)

When retrieving both the active and inactive net links the number of damaged cods was counted by the observer. DPUE (number of damaged cod/ (100 meter net and hour)) was calculated for each net link. Data were analyzed as described in earlier paragraph and included a comparison of the whole study period and a comparison of the four above

mentioned periods. All damaged cods were documented and divided into three categories; partly damaged, heads and unidentified remains (fig. 3).



Figure 3) Example of fish rests left in the net after a seal has visited the nets.

2.4 Hidden damage

The hidden damage was estimated by marking and leaving self entangled caught cods in the active and inactive net links (fig. 4). A minimum of five entangled cods were reset in active and inactive net link per fishing occasion. When there were no caught cods to be entangled, the observer manually entangled fresh or frozen cods. When the net links were retrieved the amount of remaining, damaged and lost fish was counted and the percentage of damaged or lost cod was calculated (number of marked damaged or lost cods/ (total amount of marked entangled cods)). This provided an estimate of the unknown loss, the so-called hidden damage.



Figure 4). Example of an entangled and marked cod left in the net and reset again.

The results from the active and inactive net links were compared over the whole study.

Corrections of data were made to account for fish that spontaneously fell of, by setting out net

links with a known number frozen entangled cods and then retrieving them directly. In an earlier study of spontaneously handling losses from manually and self entangled cods the maximum fall off was 8.9% (tab. 1) (Sundqvist, 2005). Based on these results, it was estimated that a seal disturbance occurred when more than 10% of the marked cods were missing. The amount of lost cods was calculated with a 10% fall of. The amount of the hidden damage was estimated in percentage and compared between the active and inactive net links.

Table 1.

Results from control trials where the amount of the spontaneously fall offs were calculated. The average percent fall offs with a bootstrapped 95% confidence interval (CI) are shown for different ways of entanglement.

Way of: Entanglement	No. of; Control trials	No. of; Marked fishes	No. of; Lost fishes	Average fall off % (95% CI max/min)
Self entangled	9	72	3	4.0 (8.9/1.1)
Manually entangled	9	51	2	2.6 (5.9/0.0)
Defrozen & Manually entangled	6	36	1	2.8 (8.3/0.0)

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2.5 Statistical analysis

The normal distribution of all data was examined with the Kolmogorov-Smirnov test. When the data was normal distributed the independent t-Test was used. The ranking test, Mann-Whitney U-Test, was used when data was not normally distributed. When the sample could not be adequately represented by a normal distribution to illustrate the sample variation, mean and confidence intervals were estimated by a bootstrap procedure (Haddon, 2001). A Visual Basic macro was used in Excel to simulate the data collection procedure with repeated re-sampling with replacement using 2000 iterations.

3. Results

3.1 Caught cod (CPUE)

A total of 4 394 cods were caught in the 77 active and inactive net links set out. In the active net links there were 1 559 cods caught at 38 occasions, and 2 835 cods were caught in the inactive net links at 39 occasions. The total CPUE was 0.06 whole cod/effort in active net links, and 0.13 cods/effort in inactive net links (tab.2).

Table 2. CPUE from active or inactive net links over the whole study period and the four periods. Confidence intervals are bootstrapped and statistical difference between active and inactive net links is indicated by a star.

	Active	95% CI max/min	Inactive	95% CI max/min	P<0.05
Total mean value (CPUE)	64.9 E-3	154.0 E-3 ± 22.9 E-3	126.5 E-3	293.8 E-3 ± 38.3 E-3	*
Mean value (CPUE) period 1	15.4 E-3	43.6 E-3 ± 9.2E-03	35.8 E-3	100.6 E-3 ± 22 E-3	-
Mean value (CPUE) period 2	95.1 E-3	236.3 E-3 ± 38.5 E-3	225.6 E-3	535.2 E-3 ± 94.4 E-3	*
Mean value (CPUE) period 3	118.7 E-3	335 E-3 ± 60.9 E-3	196 E-3	473.7 E-3 ± 89.6 E-3	*
Mean value (CPUE) period 4	30.6 E-3	80.8 E-3 ± 14.8 E-3	49.6 E-3	115.1 E-3 ± 16 E-3	-

There was a large variation in CPUE over the whole fishing season in both active and inactive net links. However, the CPUE in the active net links was significantly lower than in the inactive net links (t-test, $F=2.9$, $df=75$, $p<0.05$), fig. 5). There was no significant difference when comparing CPUE in the active and inactive net links in the last period (4). However, in periods 2 and 3 CPUE were significantly higher in active links than in the inactive links ($p<0.05$ Mann-Whitney U-test).

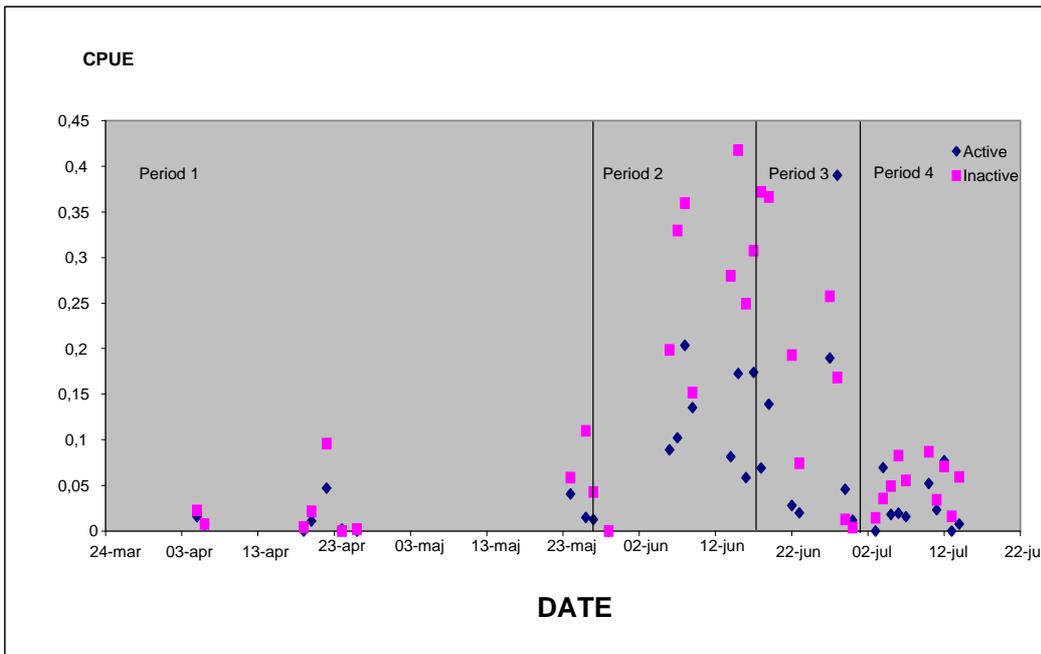


Figure 5.) The CPUE in active and inactive net links at every fishing occasion during the whole study.

3.2 Visible damage (DPUE)

There was 166 damaged cods found in the 77 active and inactive set out net links, 80 damaged cods were caught in active net links, and 86 damaged cods were caught in inactive net links. The percentage of net links set out and retrieved with visible rests of damaged cods was 61% of all active set out net links. 51% of the set out inactive net links where retrieved with visible rests of damaged cod. There was no significant difference in DPUE between the active and inactive net links over the whole study. However, there was a significant difference in DPUE during the last period with more damaged fish in the active net links ($P < 0.05$ Mann-Whitney U-test, tab.3).

Table. 3. DPUE from active and inactive net links. over the whole study period and the four periods.

Confidensintervals are bootstrapped and statistical difference between active and inactive net links is indicated by a star.

	Active	95% CI max/min	Inactive	95% CI max/min	P<0.05
Total mean value (DPUE)	7.6 E-03	20.5 E-03 ± 3.4E-03	7.4E-03	21.5 E-03 ± 3.6E-03	-
Mean value (DPUE) period 1	3.2 E-03	5.4 E-03 ± 1.3 E-03	4.0 E-03	7.3 E-03 ± 1.1 E-03	-
Mean value (DPUE) period 2	3.0 E-03	7.4 E-03 ± 0.5 E-03	6.6 E-03	12.7 E-03 ± 1.7 E-03	-
Mean value (DPUE) period 3	9.9 E-03	23.1 E-03 ± 4.0 E-03	15.6 E-03	47.1 E-03 ± 6.6 E-03	-
Mean value (DPUE) period 4	14.5 E-03	40.6 E-03 ± 6.5 E-03	3.3 E-03	4.0 E-03 ± 0.0 E-03	*

3.3 Hidden damage

Out of 266 entangled and marked cods left in the net link when set out, there were 169 cods damaged or lost (tab.4). At the 41 occasions of a total of 44 occasions when entangled cods were left in active and inactive net links, net links were subjected to seal damage.

Table. 4. Summary of data from net links where cods were marked and reset to estimate the hidden damage.

	Active	Inactive	Total
Number of marked and entangled cod	115	151	266
Numbers of damaged cods;	11	8	19
Numbers of lost ¹ cods;	83	67	150
Numbers of damaged and lost cods;	94	75	169

Lost¹= Amount of lost cods after calculating with 10% natural fall of.

There was a significant higher percentage of lost marked cods in the active net links (72%) compared to the inactive net links (44%) during the whole study (t-test, F=1.0, df=42, p<0.05). The results also show a significant higher amount of lost and damaged cods in the active net links (82%) compared to the inactive net links (50%) (t-test, F=1.4, df=42, p<0.05, fig. 6). However, there was no significant difference in damaged marked fish between active and inactive net links.

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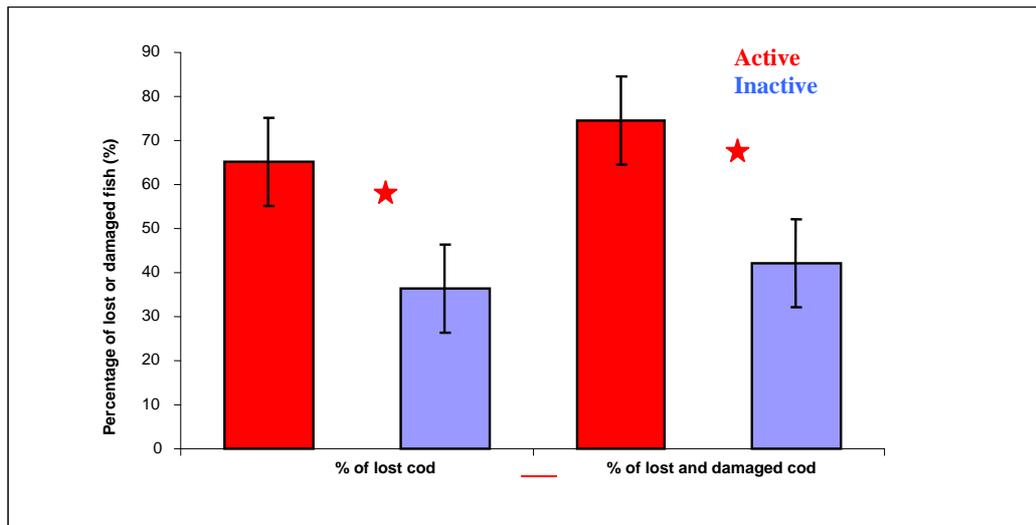


Figure 6.). The percentage of lost and damaged marked cods in the active and inactive net links, with significant higher hidden losses in the active net links. Error bars showing C.I. and stars indicate significant difference.

3.4 Seal observations

Only grey seals and no other species of seals were observed during the systematic seal observations made when net links were set or retrieved, and there were no differences in number of observed seals nearby the active or inactive net links. Out of 67 seal observations made when the active net links were set or retrieved, 3 seals were seen at the retrieving of the net link. And out of 69 seal observations made when the inactive net links were set or retrieved, 4 seals were seen also at the retrieving of the net link. When net links were set nearby the active and inactive net links, a total of 100 set out net links, 165 seal observations were carried out during setting and retrieving the nets. Only 3 grey seals were seen when retrieving the nets and no cormorants were observed.

4. Discussion

Except for the grey seal there are other conceivable predators on cod in the Baltic Sea. For example cannibalism by cod occurs. Cannibalism is more common by large cods (>35 cm) and rare by the smaller size range (<35 cm). However the size of cods being eaten is often around 5-15 cm (Uzars and Pliksh, 2000). The cods used in the hidden damage study exceeded that size (the smallest cod was 37 cm) and cods caught on net links were in the same range of length. Cormorants (*Phalacrocorax carbo*) can dive to great depths and damage the catch, however damages on the fish caused by cormorants do not often result in remains where head and backbone is left behind, they swallow the fish whole (Lunneryd, 2001). A large part of the remains left in the nets in the study included the head and had the backbone cut off (57%). Neither were cormorants seen in the vicinity of the fishing locations or by-caught in the nets. The Isopod (*Saduria entomon*) also scavenge on dead fish caught in nets, although they leave characteristic remains with intact fishbones and skeletons and no remains like that were found in the nets. Other seal species found in the Baltic Sea is the ringed seal (*Phoca hispida botnica*) and harbour seal (*Phoca vitulina*) (Ministry of agriculture and forestry, 2007; Königson, 2007). There is a small population of harbour seals south of the study area in the Kalmar Sound (Härkönen, 2006). However, there have been no reports from fishermen that harbour seals are interacting with fisheries in this area. The ringed seal lives in the northern parts of the Baltic Sea and individuals are only sporadic found further south (Ministry of agriculture and forestry, 2007). During the conducted seal observations no other seal species than grey seal were observed. Grey seals are the dominant species in the Baltic and they are abundant in the study area and they are the most likely predators attacking the nets in this study. Other studies have also concluded that it is the grey seal that causes damage and losses in the commercial fisheries (Fjälling, 2006; Ministry of agriculture and forestry, 2007; Königson, 2007).

CPUE was found to be significantly lower in the active net links than in the inactive net links over the whole study period. There were significantly more damaged fish (DPUE) in the active net links during the last period. However, this was not the case for the whole study period or in any of the other periods. The hidden losses study showed that when net links were subjected to damage by seals, most of the cods were lost without a trace, more than 70 % of the cods placed in the active net links were lost without a trace compared to only a loss of 44% of the cods placed in the inactive net links. The clearest evidence of increased seal disturbance in the active net links compared to the inactive net links were in the hidden damage study. With its significant higher amount of lost, and lost including damaged cods in the active net links it showed increased disturbance around the active net links. Because a larger amount of caught cod is lost without a trace in the active net links this could explain the decreased CPUE in the active net links. Losses due to damages by seals have earlier been estimated by counting the remains of fish left in the nets (Fjälling, 2006). However looking at the loss of cod due to seals with regard to the hidden damage study, the loss of fish to seals are at a far greater extent than if only counting the remains left in net links.

There have been different theories about how acoustic deterrents affect the fisheries. In an earlier study including fisheries and acoustic deterrents it was suggested that fish could avoid net links with acoustic deterrents because of their ability of sound detection (Kraus *et al.*, 1997), but Atlantic cod is presumed only to detect high sound levels at 38 kHz and strength 194.4 dB re 1 μ Pa (Astrup and Møhl 1993) and could therefore not hear the acoustic deterrents used in this study. In addition, a study of the effect of acoustic deterrents on cod showed no behavioural responses to the sound (Kastelein *et al.*, 2007). Fishermen have claimed that they can see on sonar how herring (*Clupea harengus*) avoid areas around net links when seals appear in the area (Königson, 2007). If cod also avoid net links because of seal presence this

could be an additional hidden loss and an explanation for the reduced CPUE in the active net link.

During the fishing season many fishermen were active and numerous net links were spread out in close vicinity of each other in the study area. Seals could easily feed by the net links and were not forced to forage actively, i.e. they didn't need to search for sounds from the active net links to get hold of their food. Because of a special permit we continued fishing after the fishing season ended, our net links were the only net links in the area. With a decreased number of net links in the area and therefore a decreased cod supply by the net links, the seals became forced to forage actively and the motivation to seek the active net links increased. This could be the reason why the damaged catch in the active net links increased the last period, because it was easier for the seals to locate net links which announce its present compared to silent net links in an open sea without any other net links in the vicinity. This could be evidence that suggests that the dinner bell effect occurred and that the seals learned to find fishing gear by the active acoustic deterrents.

Another problem with acoustic deterrents is that habituation will probably limit long-term effectiveness of acoustic deterrents scaring device (Richardson *et al.*, 1995). It is less likely to result in habituation if acoustic deterrents are used only for shorter periods than continuously (Kastelin *et al.*, 2006) and with random frequencies (Kastelin *et al.*, 2007; Richardson *et al.*, 1995). To avoid habituation both by grey seals and harbour porpoises another scaring device than acoustic deterrents AQUAmark 100 is needed. Habituation may be reduced by using scaring measures cautiously, in combinations, and by occasional reinforcement with more threatening stimuli (Richardson *et al.*, 1995). According to a study it was suggested that AQUAmark 100 with its high frequency would be the most difficult acoustic deterrents for the seals to hear comparing the acoustic deterrents available on the market (Hagberg, 2006). However these acoustic deterrents are not a solution to the harbour

porpoise by-catch problem when used in areas nearby seal populations. Another possibility to decrease the by-catch of harbour porpoises without increasing the seal fisheries conflict could be to use interactive acoustic deterrents which are triggered by the harbour porpoise echolocation signals. Because the interactive acoustic deterrents only emit sounds when a harbour porpoise is nearby and thereby it can't cause any dinner bell effect.

In summary, with reduced catch, increased damaged catch and increased hidden losses in active net links this study shows that in absence of other negative stimuli the grey seal associate the sound from the acoustic deterrents with fish and the dinner bell effect occurs. The grey seal do localize fishing gear by acoustic deterrents and continuous use of acoustic deterrents could add further problems to the already infected conflict between seals and fisheries in the future.

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FISKERIDIREKTORATET

Report

The norwegian retrieval survey for lost gillnets 2005



March 2006

**THE NORWEGIAN RETRIEVAL SURVEY FOR LOST
GILLNETS 2005.**

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Report from the Norwegian Directorate for Fisheries 2005

REPORT

TITLE	THE NORWEGIAN RETRIEVAL SURVEY FOR LOST GILLNETS 2005.
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INSTITUTION	The Directorate of Fisheries
GEOGRAPHICAL AREA	The continental slopes off Finnmark, Troms, Nordland, Trøndelag and Møre and Romsdal.
VESSEL	«M/S Vannafisk 1» / T-7-K
LOA / HP	46,54m / 1600hp.
TIME PERIOD	22.08. - 12.09.05.
FUNDED BY	National Funding system for Fisheries Research and Development
REMARKS	Copy of this report can be ordered from The Directorate of Fisheries. Development Section P.O. box 185 Nordnes 5817 Bergen Norway
KEY WORDS	Lost gear, retrieval survey

INTRODUCTION

The effect of lost gillnets on the ecosystem is not well understood, although limited investigations have shown that gillnets lost in deep water (>400m) can fish for years after they are lost because there is very little bio fouling in depths below 400m, and there is insufficient water turbulence to wrap the gear and prevent it from fishing.

Every year nets are lost in the Norwegian gillnet fisheries and to alleviate the impact of this lost gear, the Directorate of Fisheries has organised retrieval surveys annually since 1980. In all 10,784 gillnets of 30 metres standard length (approximately 320 km) have been removed from Norwegian fishing grounds in the period 1983 –2003 (Figure 1). These surveys have shown that it is possible to pick up lost nets with reasonably good efficiency. The experience from the surveys does show that it is important to have good information on the amount of gear lost and the positions where they are lost. It is also important to do the survey at a time of the year when good weather can be expected as the efficiency of the retrieval equipment is reduced in bad weather.

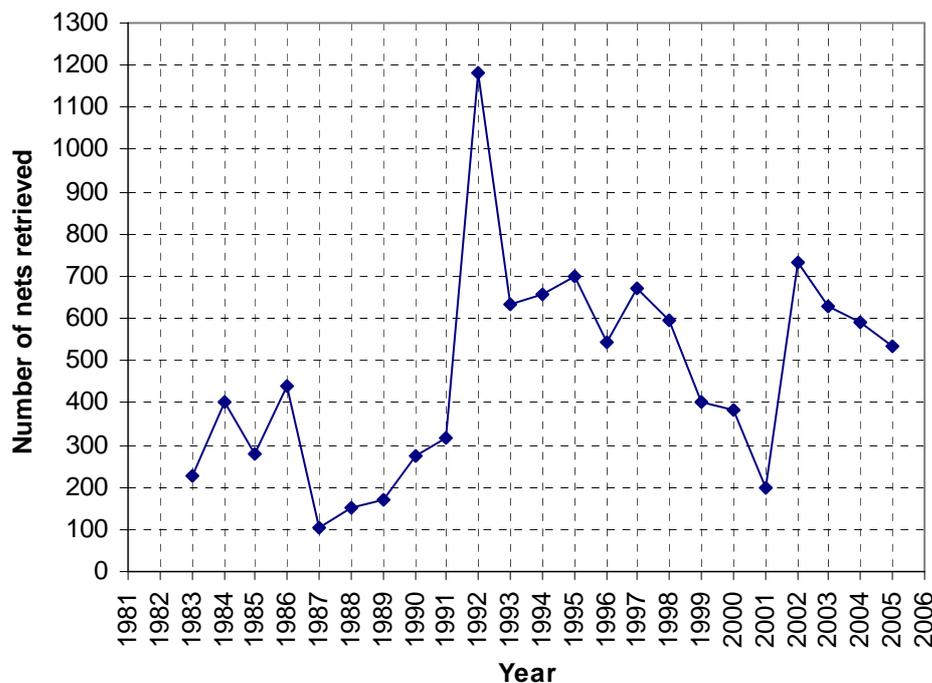


Figure 1. Number of nets retrieved from Norwegian fishing grounds by year, by the annual retrieval survey, 1983-2005.

Investigations made by the Marine Institute of Bergen (IMR) in 1999 and 2000 have shown that the amount of gillnets lost increases with depth and out of all the Norwegian gillnet fisheries, the Greenland Halibut Fishery is the metier where most nets are lost. In this fishery the nets tend to fish much longer after they are lost given the depths fished. The effort in the retrieval survey has therefore become more directed towards this fishery in recent years, particularly as effort has increased over the last years and thereby the number of lost nets is expected to have grown also.

Table 1. Number of nets retrieved from Norwegian fishing grounds by year, by the annual retrieval survey, 1983-2005.

Year	Northern Norway (N of 65° N)	Southern Norway (S of 65° N)	Total
1983	225	0	225
1984	401	0	401
1985	280	0	280
1986	438	0	438
1987	106	0	106
1988	153	0	153
1989	168	0	168
1990	0	273	273
1991	198	119	317
1992	731	449	1180
1993	503	130	633
1994	149	510	659
1995	305	396	701
1996	543	0	543
1997	487	185	672
1998	358	240	598
1999	308	93	401
2000	383	0	383
2001	141	56	197
2002	731	0	731
2003	312	318	630
2004	332	257	589
2005	264	272	536
Sum	7516	3298	10814

0= Not surveyed.

For 2005 “The Foundation for Exploratory Fisheries and Fishery Advice” granted NOK 1.500.000 (including VAT) to the annual retrieval survey for lost fishing gear. The goal for the survey was to remove as much lost fishing gear from fishing grounds as possible.

MATERIAL AND METHODS

Fishermen survey

As a part of the preparation for the survey The Directorate of Fisheries send out a questionnaire to the local Fishermen’s organisations, in order to collect information on the position of lost nets and also the number of lost nets during the last year. This exercise, however, has yielded little valid information and therefore in addition to the questionnaire, since 2000 the Directorate has hired Hareide Fishery Consultants to carry out a survey of fishermen in the different fishing ports in order to collect information directly from the fishermen on the position and amount of lost gear. This survey combined with telephone

interviews has proved very useful in collecting information on lost nets with up to 80% of lost nets reported being retrieved during the survey.

Because of the involvement in Irish and British retrieval surveys only telephone interviews were carried out this year. In previous years the Greenland halibut Fishery was allowed to operate for only one month and was closed around July 10th. This year the fishery was open for two periods and the last period was finished on August 20th. Fishermen are reluctant to report loss of gear until after the fishery is closed because they will try to creep for the lost nets before the fishery is closed. Since the survey started on August 22th it was not possible to complete all interviews before the survey started.

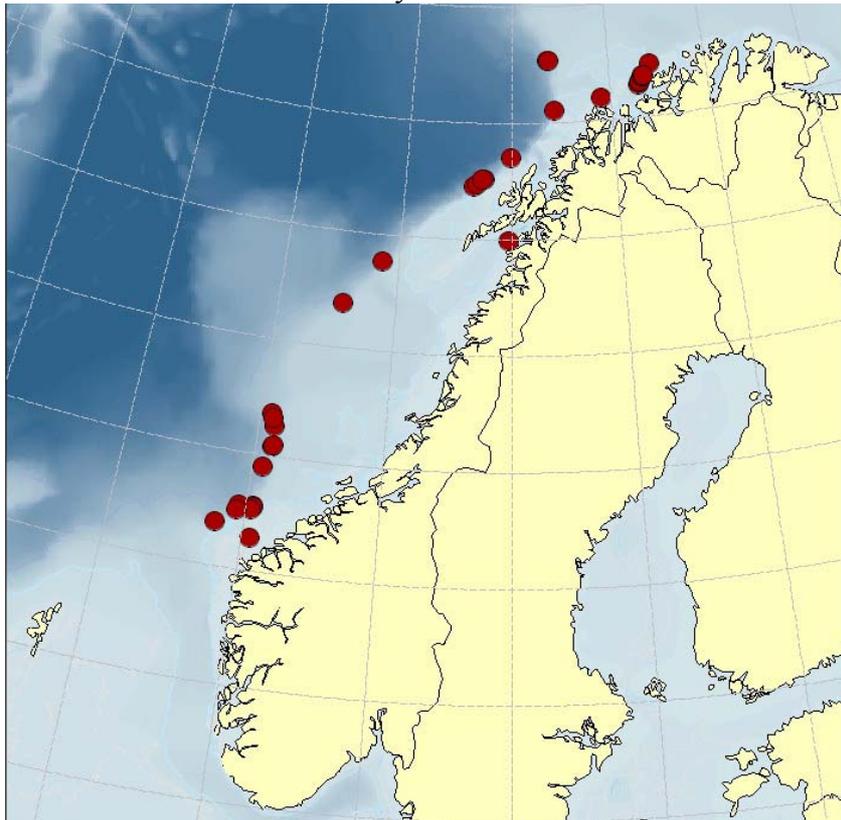


Figure 2. Positions of lost nets reported in 2005.

Skippers of 235 gillnet vessels were contacted by telephone and information on position and depth for 474 lost nets were collected (Figure 2). Of these nets 414 were Greenland halibut nets, 30 were saithe, and 30 were targeting cod.

Vessel

The stern trawler “M/S Vannafisk 1” was chosen for the retrieval survey (Figure 3). The vessel was built in 1971, but can still be regarded as a relatively modern fresh fish trawler, well maintained with good working space on trawl deck and relatively modern electronic equipment. For the survey the vessel was equipped with the retrieval equipment (“creeper”) which is used as standard on these surveys (Figure 4), with lost nets being hauled onto the net drum of the survey vessel.

Deck arrangements:

- Single trawl lane
- 2 main trawl winches (12 tons)
- 2 sweeper winches
- 2 Gilson winches
- 1 net drum
- 1 crane



Figure 3. Greenland halibutnets recovered

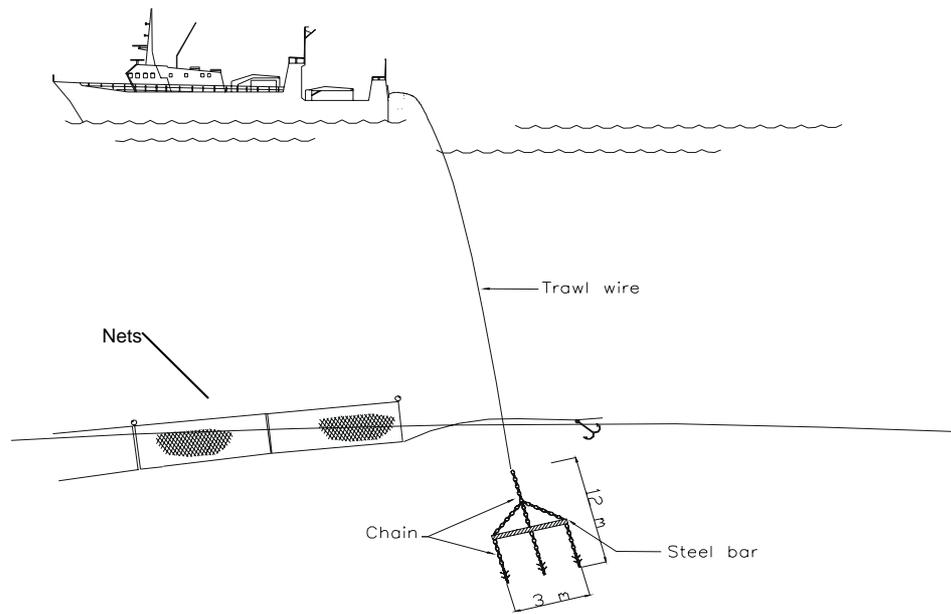


Figure 4. Retrieval gear used by The Norwegian Directorate of Fisheries (Furevik 2000).

The retrieval gear as shown in Figure 4 consists of a 3 metre long steel bar and three dredges, hinged from the bar connected with steel chains. Including the chains attaching the bar to the trawl wire, the gear is 12 meters long. Normally the length of the wire is between 1.5 and 2 times the actual depth, and for the “Vannafisk 1” survey a warp:depth ratio of 1.8 was used at a towing speed of 1-2 knots. The time of each haul varied between 0.5 and 4 hours, depending on indications of whether lost gear had been caught. After 4 hours the gear was routinely hauled to check for signs of lost gear or damage.

When creeping on the continental slopes at 200 – 800 metres, lost nets were normally found 0.5 to 1 nm NE of where they had been deployed, according to the fishermen’s records. The current, however, is not constant in direction and speed and therefore an area of approximately 2 nm² had to be covered before the entire area where the nets could be, was covered. On the continental shelf the currents are much slower and therefore creeping was directed in the reported positions where the nets were originally deployed.

In total 62 hauls were conducted. All of these were in positions where we had reliable information on positions of lost nets, or where there was good reason to believe that net had been lost. On grounds in Northern Norway (North of 65° N), 31 hauls were carried out and in Southern Norway also 31 hauls were carried out.

In the first two weeks of the survey the weather was very unstable. During the first 14 days of the survey only 6 days were suitable for creeping and on three of these, wind speeds were

more than Beaufort force 5 which is the highest limit of wind speed for effective creeping. The swell was more than 3 metres most of the time during this period.

During this period the deeper slope from Storegga (62°N) to 65°N was surveyed. The area between 65°N and Vesterålen was not surveyed this year because of the weather conditions. In this area two fleets of Greenland halibut nets were reported lost.

During the last 7 days of the survey the weather conditions were good with only one day when wind speed was force 5 or more.

Because of the lost time due to weather conditions the survey was completed at 69° 30 N, West of Andøya. The areas West of Troms were not surveyed. Two Greenland halibut fleets and 4 fleets of cod nets were reported lost in this area.

RESULTS

In total 536 nets were retrieved. Of these 434 were Greenland halibut nets which were retrieved from depths between 500 and 800 metres (Table 2), along with quantities of longlines, dahn lines, anchors etc. In total 2.5 – 3.5 tons of fish was caught in the retrieved nets, of this the major part was Greenland halibut, with 42 % of the Greenland halibut still alive.

Tabell 2. Total of gillnets during the Norwegian annual retrieval survey for lost gear in 2005.

	South Norway	North Norway	Total
Number of hauls	31	31	62
Greenland halibut nets (500-800 m)	220	214	434
Ling nets (150-400m)	52	0	52
Cod nets (100 -200 m)	0	50	50
Total	272	264	536

Table3. Total estimated catch of fish and crabs during the Norwegian annual retrieval survey for lost gear in 2005.

	South Norway	North Norway	Total
Greenland halibut (<i>Reinhardtius hippoglossus</i>)	1750	750	2500
Cod (<i>Gadus morhua</i>)	0	2	2
Catfish (<i>Anarhichas spp</i>)	0	15	15
Tusk (<i>Brosme brosme</i>)	75	0	75
Redfish (<i>Sebastes marinus</i>)	25	5	30
Rough head grenadier (<i>Macrourus berglax</i>)	80	40	120
Skates (<i>Raja hyperborea & Raja radiate</i>)	100	5	105
Deep water crab (<i>Lithodes maja</i>)	5	5	10
Fish and crabs total	2035	822	2857

Table 4 Total retrieval of fishing gear (except gillnets) during the Norwegian annual retrieval survey for lost gear in 2005.

	South Norway	North Norway	Total
Longlines and ropes (m)	450 meter	1500 meter	1950 meter
Dan lines (n)	5 stk.	2 stk.	7 stk.
Dredges/ anchors (no)	4 stk.	2 stk.	6 stk.
Wire (m)		250 meter	250 meter
Trawl		1 stk.	1 stk.

The fleets which varied between 30 and 50 nets, were each of 30 metres length. The normal length of fleets was 35 nets. The fish caught per fleet varied between 0 and 1500 kg. The Greenland halibut nets contained most of the fish (99.8%)

Based on the estimated catch the average catch per net (30 m) was 5.33 kg. The Greenland halibut nets contained 5.76 kg per net and the ling nets contained 0.1 kg per net. The weight of the skeletons and highly degraded fish is not included in the catch estimate.

Some of the nets were old. However it was estimated that 80% of the retrieved Greenland halibut nets originate from the fishery in 2005.



Figure 5. Part of trawl and gillnets recovered from haul 51

Discussion

The bad weather resulted in both ineffective creeping for long periods as well as long periods when creeping was not possible. This resulted in two areas where losses were reported, but no surveying was conducted. Most probably creeping in these areas would have resulted in at least 100 more nets being retrieved. The weather conditions in 2005 was far worse than the previous years. The area between 65°N and Vesterålen was not surveyed this year because of the weather conditions. In this area two fleets of Greenland halibut nets were reported lost.

The number of nets retrieved would probably be higher if the weather was good during the whole survey. Generally in swell conditions of more than 3 meters, the forces on nets from the movement of the vessel are high and the headline and lead line tend to break before the gear can be successfully hauled aboard.

A relatively large proportion of the nets lost in the Greenland Halibut Fishery belonged to vessels less than 10 meters. Some of these vessels were operating more than 100 nm offshore. These vessels are not capable of hauling their nets every second day as decided in the Norwegian Regulations. In addition to this the vessels do not have the necessary certificates to work so far offshore. These vessels are not fit for fishing in these offshore areas and it can also be a problem for them to retrieve their nets if they lose them at depths greater than 500m.

According to the Norwegian legislation every lost net should be reported. Very seldom this is done. Also very little information about lost nets is provided by the regional fishermen unions.

The amount of fishing gear used by some of the vessels in the Greenland halibut fishery, make it very likely that many vessels are not capable of hauling their nets every 48 hours.

In previous years the Greenland halibut Fishery was allowed to operate for only one month and was closed around July 10th. This year the fishery was open for two periods and the last period was finished on August 20th. Fishermen are reluctant to report loss of gear until after the fishery is closed because they will try to creep for the lost nets before the fishery is closed. Since the survey started on August 22th it was not possible to complete all interviews before the survey started. In order to solve this problem it is necessary that the Industry report their lost nets immediately to the Directorate of Fisheries.

A successful gear retrieval survey is also dependent on other factors. The gathering of information on lost nets was not as successful as in previous years. The reason for this is that the Greenland halibut fishery was open up to two days before the survey started. This made it impossible to get an overview of nets lost in the last fishing period. Fishermen are reluctant to report lost gear until the fishery is closed. Also the fact that interviews were only done by telephone may have influenced the results of the interviews. The interview surveys combined with telephone interviews has proved very useful in collecting information on lost nets with up to 80% of lost nets reported being retrieved during the survey. In 2005 the interviews were only done by telephone and the results were not as good as previous years. It is recommended to go back to the method of personal interviews.

The efficiency of the creeping operations is difficult to estimate because it is not always known if the retrieved fleet is the actual fleet that is targeted. To make this easier it is necessary to enforce the existing legislation on marking of gear. It can however be mentioned that from the one vessel that had lost 5 fleets of Greenland halibut nets four were retrieved. In average it took 5 hours effective creeping time per fleet to retrieve the four fleets even when their accurate positions were known.

There are many reasons for loss of nets and not all them can be blamed the fishermen themselves. Conflicts between towed and static gear sectors can be one reason and others can be conflicts with seismic vessels and the merchant fleet.

The annual gear retrieval surveys are not the only mitigating measure for reducing the effect of ghost nets. It is however a significant contribution to the effort of reducing the problems with the lost nets.

REFERENCES

Anon 1983-2003. Retrieval of lost fishing gears. Report series 1983-2003. Available from the Library of the Directorate of Fisheries (in Norwegian).

Appendix 1

Survey Narrative

Robert Misund and Sverre Haugen, 22.08 – 05.09.2005

Jarle Kolle, 05.09 – 12.09.2005

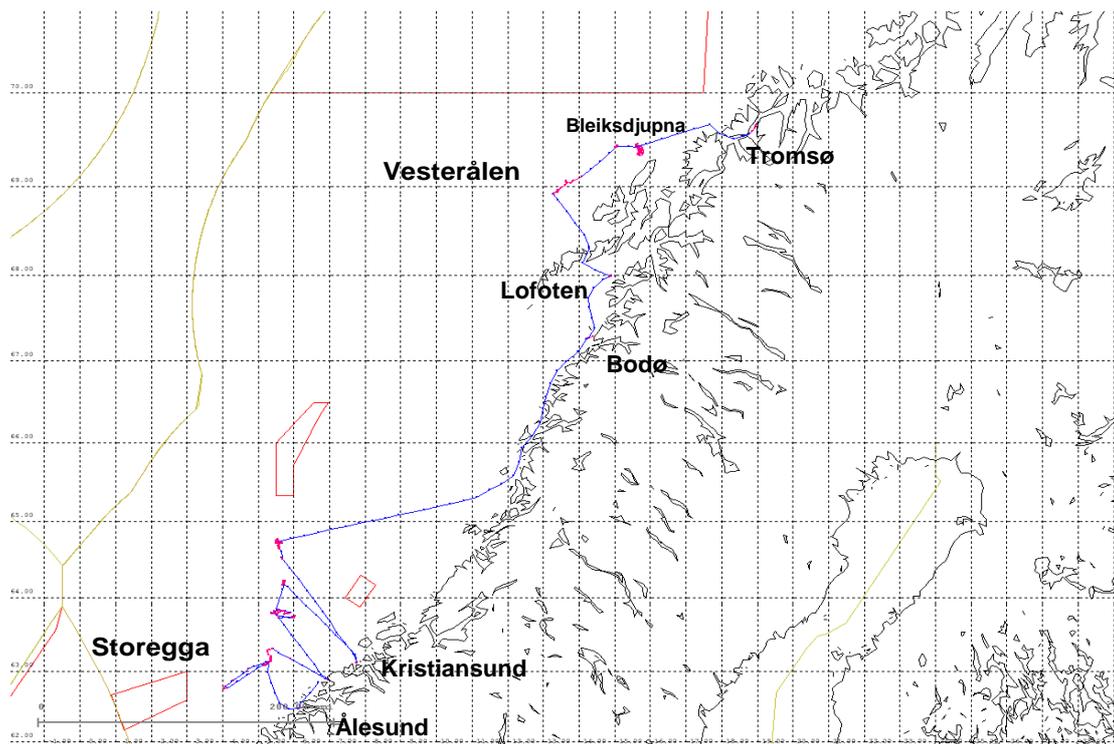


Figure 6. The track (Blue line) for the retrieval survey 2005. (Data from VMS tracking)

Monday August 22^d

"M.F.V. Vannafisk 1" left Ålesund at 1515LT, with an estimated voyage time of 5 hours to the Storegga survey area. Weather conditions in general were good (SW 3) with a slight swell. The creeping gear had been mounted and adjusted by the crew the previous day. Shot creeper at 250 m worked in depths between 150 and 250 with no results.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
22.8	1	21.00	63° 05.00	05° 16.80	253	No catch
		21.40	63° 06.30	05° 17.70	161	
22.8	2	22.00	63° 06.45	05° 17.45	162	No catch
		04.15	63° 04.93	05° 08.61	358	

Tuesday 22^d

Continued creeping in positions where loss of nets had been reported. At 0915 a fleet of 50 nets were successfully caught at 310 meter. The nets were ling nets and the catch was only 3 kg of redfish. These nets were most probably not lost this year. Weather conditions were good (force 3) increasing to force 5 during the day.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
23.8	3	05.40	63° 04.61	05° 09.79	330	50 gillnets
		09.15	63° 05.80	05° 08.08	309	3 kg redfish
23.8	4	13.45	62° 45.00	04° 04.00	448	Ca. 3-4 longlines
		16.55	62° 44.73	04° 00.39	456	
23.8	5	18.05	62° 50.41	04° 13.32	600	No catch
		20.15	62° 54.31	04° 17.04	609	
23.8	6	21.55	63° 00.55	04° 41.92	611	No catch
		23.50	63° 02.00	04° 42.90	625	

Wednesday 23^d

Continued creeping in the Storegga area for reported lost nets. No catch. With a very poor weather forecast a decision was made to steam for Harøysund. Started steaming at 17.10. Closer to shore we received better telephone signal and more fishermen could be contacted in order to collect more information.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
24.8	7	02.00	63° 07.40	05° 20.40	369	2 ling nets (60m)
		05.00	63° 08.00	05° 21.25	385	
24.8	8	05.40	63° 10.24	05° 21.00	490	No catch
		07.10	63° 11.79	05° 22.00	489	
24.8	9	07.35	63° 11.00	05° 21.42	486	No catch
		09.50	63° 08.35	05° 21.27	408	
24.8	10	10.40	63° 11.96	05° 22.30	460	No catch
		16.00	63° 19.00	05° 24.74	453	
24.8	11	16.25	63° 18.94	05° 25.27	452	No catch
		17.00	63° 18.10	63° 18.10	388	

Thursday 25th

Departed from Harøysund at 1400 LT and steamed to the nearest known positions of lost nets at 63° 48 N, 05° 26 E. Weather conditions were not suitable for creeping. Dodged for the rest of the day while waiting for improved weather.

Friday 26th

Bad weather prevented further surveying..

Saturday 27th

Weather conditions were much improved by Saturday morning and the survey resumed with haul 12 at 0540 LT. Hauls 12-16 were conducted in the same area with no results.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
27.8	12	05.40	63° 48.00	05° 25.77	670	No catch
		07.25	63° 48.00	05° 26.85	660	
27.8	13	08.05	63° 48.41	05° 26.66	662	No catch
		12.00	63° 48.28	05° 27.98	645	
27.8	14	14.45	64° 10.20	05° 43.10	610	No catch
		17.45	64° 11.18	05° 43.67	595	
27.8	15	18.20	64° 12.14	05° 44.05	590	No catch
		21.30	64° 12.82	05° 44.48	578	
27.8	16	21.55	64° 12.97	05° 44.21	583	Some 100 meters of longlines and dahn rope
		01.20	64° 12.47	05° 43.42	604	

Sunday 28th

With a very poor weather forecast (force 8-10 a decision was made to steam for Kristiansund. The Vannafisk 1 started steaming for port at 1400LT, and arrived Kristiansund at 2240LT..

Date	Haul no.	Local Time	Positions		Depth (m)	Details
28.8	17	02.25	64° 12.69	05° 43.88	590	No catch
		04.20	64° 12.54	05° 43.65	600	
28.8	18	05.00	64° 12.38	05° 43.33	607	No catch
		06.15	64° 12.24	05° 44.20	582	
28.8	19	07.20	64° 12.20	05° 44.13	590	No catch
		10.40	64° 11.78	05° 44.49	574	
28.8	20	11.45	64° 11.62	05° 43.73	591	No catch
		13.45	64° 11.26	05° 42.26	622	

Monday 29th

Due to poor weather forecast it was decided to remain in port until the following day.

Tuesday 30th

Still in port.

Wednesday 31st

The Vannafisk 1 departed from Kristiansund at 10.50 LT and steamed for positions for lost gear at 64° 30N , 05° 40 E. The creeper was shot at 2100..

Date	Haul no.	Local Time	Positions		Depth (m)	Details
31.8	21	21.00	64° 31.48	05° 40.60	618	No catch
		01.10	64° 30.65	05° 40.40	698	

Thursday September 1st

Caught a fleet of Greenland halibut gillnets after 5 hours creeping. The fleet was caught 0.6 nm NNE of the position where it was lost. Continued creeping for another fleet lost in same area but from another position. After 9 hours we caught one fleet 0.4 nm NNW of the position where it was lost. This fleet was stuck in an old fleet. Both fleets were successfully retrieved..

Continued creeping for 5 fleets Greenland halibut nets which were lost in the same area. Retrieved one of them after 30 minutes creeping.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
01.9	22	01.40 02.40	64° 30.35 64° 32.00	05° 40.55 05° 21.48	697 596	Ca 50 Greenland halibut nets. 9 Gr. Halibut of which 4 were not fit for human consumption and many skeletons. 2 rough head grenadiers (fresh), 1 skate (fresh), 2 crabs, many sponges and some stones.
01.9	23	04.30 13.40	64° 39.34 64° 40.51	05° 35.23 05° 34.18	600 570	Two fleets of Greenland halibut nets (ca 75 nets; 2100m) Ca 1500 kg Greenland halibut One of the fleets was new and the other was old.. The new was most probably lost because it was fast in the old.
01.9	24	18.10 18.45	64° 44.66 64° 44.87	05° 33.54 05° 31.39	552 570	25 nets + 1 dahn line+ 2 anchors and dahn. (Dahn was duly marked)) Catch of Greenland halibut, redfish, tusk, rough head grenadier and skates. Approximately 80% of the catch was rotten and not fit for human consumption.
01.9	25	20.25 03.00	64° 45.73 64° 44.77	05° 31.19 05° 31.19	572 556	25 nets + 1 dahn line+ 2 anchors and dahn. (Dahn was duly marked)) 250 kg fish, mainly Greenland halibut, Rough head Grenadier and skates. 80% of the catch was rotten and not fit for human consumption

Friday 2nd

Continued creeping for the four remaining fleets and retrieved one of them in haul 28 after retrieving the dahn line and dahn of the fleet in haul 27. The fleet was caught 0.25 nm NE of the position where it was reported lost.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
02.9	26	05.00 15.00	64° 43.62 64° 42.32	05° 32.07 05° 35.17	570 552	No catch
02.9	27	15.30 17.35	64° 42.82 64° 44.48	05° 34.88 05° 33.79	553 555	1 dahn line and dahn (duly marked)
02.9	28	18.50 22.25	64° 44.56 64° 42.64	05° 34.55 05° 36.90	548 532	25 Greenland halibut nets 1 dahn line and dahn (duly marked) 1 redfish (alive) and a few skeletons

Saturday 3rd

Continued creeping for the remaining three lost fleets. Retrieved one 0.5 nm NE of the position where it was lost after 3 hours. Continued creeping for the last fleet in 12 hours with no result. The wind deteriorated during the afternoon and it was decided to steam for Bodø for changing crew.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
03.9	29	00.50 03.20	64° 43.86 64° 43.27	05° 35.8 05° 32.62	543 575	25 Greenland halibut nets 1 dahn line and dahn (duly marked) 1 redfish (alive) and a few skeletons. Skates , rough head grenadiers and a few skeletons . Very much sponges.
03.9	30	05.15 13.15	64° 44.20 64° 44.21	05° 32.79 05° 31.52	560 573	No catch
03.9	31	14.20 16.10	64° 44.22 05° 31.52	05° 31.00 05° 31.52	570 570	No catch

Sunday 4th

"Vannafisk 1" arrived in Bodø at 22.40 LT
SW force 9, rain.

Monday 5th

Chief Scientist Robert Misund and Sverre Haugen were replaced by Jarle Kolle. Weather conditions improved during the day and the "Vannafisk 1" departed from Bodø at 2000 LT and steamed for positions where gear was reported lost west of Steigen in Vestfjorden area.

Tuesday 6th

Weather conditions were reasonable and the creeper was shot at 0630 LT. A total of 3 tows were completed with the creeper going fast several times . Caught 150 meters of wire and some pieces of gillnet.

Operations were ceased at 1245 LT and the "Vannafisk1" steamed for the slope off Vesterålen and creeping was resumed at 2100. Caught one fleet of Greenland halibut nets after one hour. This fleet was reported lost.

Contacted vessels that had been fishing for Greenland halibut in this area in August, but no vessel had lost nets or knew about any other vessels that had lost gear.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
06.9	32	06.35	68° 00.16	14° 55.52	283	No catch Got stuck. Difficult bottom.
		08.05	67° 59.14	14° 51.07	184	
06.9	33	08.25	67° 59.04	14° 52.19	213	Ca 150 m wire Φ 20mm, some pieces of gillnets
		11.35	67° 59.55	14° 53.14	228	
06.9	34	12.20	67° 59.47	14° 54.43	186	No catch Got stuck.
		12.45	67° 59.46	14° 53.01	192	
06.9	35	20.55	68° 55.15	13° 17.97	573	30 Greenland halibut nets.250 kg fish mainly Greenland halibut of which 60% was not fit for human consumption Some rough head grenadier and skates..
		22.05	68° 54.78	13° 17.90	676	

Wednesday 7th

Continued creeping in positions where gillnets were reported lost. Retrieved 94 nets in three different positions during the day. Some longlines, dahn lines and wire were also caught.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
07.9	36	01.10	68° 56.38	13° 24.91	661	No catch
		01.20	68° 56.51	13° 25.23	658	
07.9	37	02.55	68° 56.28	13° 23.96	727	No catch
		02.55	68° 56.59	13° 24.29	714	
07.9	38	03.45	68° 56.60	13° 25.10	662	28 Greenland halibut nets* * Very little sheeting left on the headline and ground lines. . 6 specimens of live Greenland halibut and 20 not fit for human consumption. 6 Rough head grenadiers of whom all was rotten and not fit for human consumption.
		05.25	68° 56.02	13° 23.28	712	
07.9	39	07.00	68° 56.49	13° 25.13	665	200 m longline and some dahn line
		09.40	68° 55.65	13° 21.27	549	
07.9	40	10.45	68° 55.95	13° 22.01	706	36 Greenland halibut nets 6 old nets + some old dahn line. Nets in poor condition, 35 specimens of Greenland halibut, and 60% not fit for human consumption.
		11.45	68° 57.05	13° 24.43	761	
07.9	41	14.20	68° 57.51	13° 25.48	670	No catch
		15.50	68° 57.43	13° 25.16		
07.9	42	16.50	68° 57.6 3	13° 16.13	612	No catch Clay, Creeping gear digging in.
		18.10	68° 57.62	13° 24.21	738	
07.9	43	19.40	68° 57.16	13° 25.12	685	No catch
		21.45	68° 57.42	68° 57.42	667	
07.9	44	22.50	69° 00.36	13° 36.41	630	No catch
		00.50	69° 00.36	13° 37.16	680	

Thursday 8th

Continued creeping in positions where two fleets were reported lost. No catch. Weather deteriorated to NE force 7. Worked in shallower waters at Jenegga where the Fishermen's union of Nordland County had reported lost gear. No catch. At 1310 LT Vannafisk 1 steamed for Langnesegga. Started creeping at 1800 LT for gear reported lost.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
08.9	45					
08.9	46					
08.9	47	10.25	69° 01.85	13° 45.30	229	20 meters old trawl wire (sweeps)
		13.05	69° 03.08	13° 53.76	226	
08.9	48	18.20	69° 25.40	15° 01.70	810	No catch
		19.35	69° 25.27	15° 02.42	789	
08.9	49	21.00	69° 25.41	15° 03.07	784	20 meters old trawl wire (sweeps)
		06.30	69° 25.05	15° 04.82	783	

Friday 9th

Continued creeping in same positions as the day before without any results. Moved to the "Bleiksdjupna. This area is very important area for gillnet fishery both for cod (upper slope;300-100m) and for Greenland Halibut (500-800m). Contacts were made with the Coastguard headquarter and the fishing vessels in the area in order to agree on removing nets from the survey area. It was agreed that the whole Western part of "Bleiksdjupna" was cleared for nets already. Creeping was resumed at 0810 LT. In second attempt(haul 51) remnants of a trawl and 60 Greenland halibut and cod nets were retrieved. The nets came up in big bundles together with dahn lines and longlines . The nest seemed to be old and there were only a few crabs and rough head grenadiers in them. Continued creeping in this area the rest of the day.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
09.9	50	08.10	69° 26.15	15° 36.07	648	No catch
		12.00	69° 21.87	15° 41.67	631	
09.9	51	13.05	69° 22.14	15° 42.96	681	Remnants of a trawl. 60 Greenland halibut and cod nets. 300m longlines, 1 anchor, dahn line and dahns (marked) All retrieved gear was old and there was no fish.
		15.30	69° 23.41	15° 42.46	890	
09.9	52	18.30	69° 23.39	15° 42.15	916	No catch
		18.50	69° 24.34	15° 41.26	839	
09.9	53	19.50	69° 24.82	15° 41.26	720	No catch
		20.15	69° 24.41	15° 41.49	764	
09.9	54	21.45	69° 24.69	15° 41.80	796	20 nets (marked)) 500 m longline, 1 dahn line, 1 dahn and 1 anchor.
		03.10	69° 21.56	15° 43.12	690	

Saturday 10th

During the night 2/3 of a Greenland halibut fleet was retrieved. Continued in same area and caught another 50 Greenland halibut nets. These nets belonged to two different fleets, one old and one new (2004 or 2005). In the new nets there was 300 kg of Greenland halibut (haul 57).

Date	Haul no.	Local Time	Positions		Depth (m)	Details
10.9	55	05.00 05.50	69° 29.13 69° 23.52	15° 43.23 15° 43.10	697 930	No catch
10.9	56	07 20 13.15	69° 23.44 69° 22.23	15° 44.53 15° 49.09	770 287	Some pieces of gillnets, some meters of headline rope.
10.9	57	13.40 17.00	69° 22.80 69° 25.70	15° 49.39 15° 39.52	557 833	50 Greenland halibut nets Old dahn line and dahn (marked) and 1000 m longlines. Ca 300 kg Greenland halibut, not fit for human consumption, skeletons and 50 fresh, 20 specimens of rough head grenadier , 3 specimens of catfish.
10.9	58	19.55 20.30	69° 25.63 69° 25.80	15° 41.92 15° 39.81	990 875	No catch
10.9	59	22.10 03.15	69° 25.82 15° 39.81	15° 39.49 15° 44.97	811 848	Wire Some pieces of sheet netting..

Sunday 11th

A fleet of 40 Greenland halibut nets were caught at 850 meters (haul 60). The nets seemed to be from 2005. The nets came up with anchor and dahn line. Only the dahns were missing. Approximately 200 kg of Greenland halibut were caught in the gear. Ceased creeping at 2130 LT and steamed for Tromsø.

Date	Haul no.	Local Time	Positions		Depth (m)	Details
11.9	60	05.00 09.20	69° 23.40 69° 25.95	15° 46.04 15° 36.08	787 848	40 Greenland halibut nets, dahn line and 1 anchor. 50 specimens of Greenland halibut 5 skates 4 catfish, 1 monkfish, 1 cod 3 redfish. Some stones and sponges
11.9	61	12.20 15.25	69° 26.03 69° 22.43	15° 35.58 15° 43.08	566 741	Sweep wire
11.9	62	16.15 21.10	69° 22.50 69° 25.59	15° 43.90 15° 36.51	830	300 meters warp from Danish seine.

Monday 12th

M.F.V. Vannafisk 1 arrived in Tromsø early in the morning, where retrieved gear, scientific equipment was taken of the vessel. The retrieved gear was discharged to a truck.

