

Agenda Item 14.5.2

Implementation of the ASCOBANS Triennial
Work Plan (2007-2009)

Review of New Information on Pollution,
Underwater Sound and Disturbance

Acoustic Disturbance

Document 38

**Underwater Noise as Threat to
Cetaceans – a discussion paper by the
ASCOBANS AC Chair**

Action Requested

- take note of the information submitted
- comment

Submitted by

AC Chair



NOTE:
**IN THE INTERESTS OF ECONOMY, DELEGATES ARE KINDLY REMINDED TO BRING THEIR OWN
COPIES OF DOCUMENTS TO THE MEETING**

Underwater noise as threat to cetaceans – a discussion paper by the ASCOBANS AC Chair

Motivation

Resolution No. 4 of the 5th Meeting of Parties to ASCOBANS (2006) on *Adverse Effects of Sound, Vessels and Other Forms of Disturbance on Small Cetaceans* “requests Parties and Range States that have not yet done so to introduce **guidelines on measures and procedures for seismic surveys** in order to minimise risks to small cetaceans following current best practice; reiterates and extends its invitation to Parties and Range States to

- (1) develop, with military and other relevant authorities, **effective mitigation measures** including environmental impact assessments and relevant standing orders to reduce disturbance of, and potential physical damage to, small cetaceans;
- (2) conduct further research into the effects on small cetaceans of:
 - (a) vessels, particularly high speed ferries;
 - (b) acoustic devices used by the fishing and fish-farming industries including deterrent (scarers) and warning (pingers) devices and fish-finding sonar;
 - (c) extractive and other industrial activities, including wind-farms;
 - (d) other acoustic disturbances.

This should include **research on physical and behavioural effects**, and be **at the individual and population level**;

- (3) conduct research and develop appropriate management measures, guidelines and technological adaptations to **minimize any adverse effects on small cetaceans of the above sound sources**;
- (4) develop and implement procedures to assess the effectiveness of any guidelines or management measures introduced;
- (5) report on high energy seismic surveys per one degree by one degree rectangle using shot point density.” [All highlighting by the author of the discussion paper]

The *ASCOBANS Triennium Work Plan for 2007 – 2009* asks the Advisory Committee to “continue to review the extent of negative effects upon small cetaceans of sound, vessels and other forms of disturbance on small cetaceans and to review relevant technological developments with a view to **providing recommendations to Parties, by the 6th Meeting of the Parties, on possible ways to mitigate those negative effects**”.

The *Marine Strategy Directive* as adopted by the EU Parliament on 11 December 2007 defines in Article 3, Paragraph 5:

““good environmental status” means the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations, i.e.:

b) hydro-morphological, physical and chemical properties of the ecosystems, including those properties which result from human activities in the area concerned, support the ecosystems as described above. Anthropogenic inputs of substances and energy, **including noise**, into the marine environment do not cause pollution effects;

Good environmental status shall be determined at the level of the Marine Region or Sub-Region as referred to in Article 4, on the basis of the qualitative descriptors in Annex I. Adaptive management on the basis of the ecosystem approach shall be applied with the aim of attaining good environmental status”.

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 2010 (Article 26, Paragraph 1).

Sound sources

Broadly speaking, anthropogenic underwater noise pollution usually originates from one of three general sources: shipping, military activities, or industrial activities:

Shipping constitutes a rather diffuse and omnipresent sound source that is difficult to quantify and even more difficult to evaluate, which, however, is not to imply its insignificance. On the contrary, there are indications that on a worldwide scale, its magnitude doubles frequently and thus may well have a masking effect on cetaceans (cf. AC12/Doc. 8(P)).

Easiest to record and to quantify are perhaps two types of vessels that are particularly fast and noisy – two properties that may be equally displeasing for cetaceans: The impact of **fast ferries** such as catamarans has long been recognized as a threat to cetaceans, both for the risk of ship strikes and for their noise emissions (cf. reporting of Parties). **Jet skies** are not just fast and noisy but also highly mobile and frequently used very close to shore thus impairing a habitat that may be less impaired by other noise sources (cf. Information Document to AC-15 submitted by Sven Koschinski, GSM).

Military sound sources include **SONAR** which is now of growing concern under ASCOBANS too: The ASCOBANS area was recently extended. In the extension area live deep-diving beaked whales which may be harmed by SONAR use (also compare AC12 /Doc. 12(P)). The potential impact of SONAR should be discussed in more detail also with Klaus Lucke, invited expert to AC-15.

Another military source of underwater noise pollution are **detonations**, either when testing new vessels (smaller charges) or when blasting underwater unexploded ordnance (UWUXO), e.g. in the Baltic Sea originating mostly from World War II (cf. AC14/Doc. 27(O) and AC14/Doc. 28 (O) as well as AC13/Doc. 33(P)).

Exposure experiments of Klaus Lucke on a captive harbour porpoise resulted in estimated distances of 13 to 33 km from the detonation of a 350 kg torpedo necessary to prevent hearing damage to a porpoise. According to calculations of the Ministry of the Interior of Schleswig-Holstein (Germany) such detonation could be fatal to any submerged mammal at a distance of up to four kilometers.

Industrial noise frequently originates from few, more or less stationary sound sources during resource exploration (eg., seismic exploration; cf. Gordon et al. 2003) and extraction (eg., drilling), as well as construction (eg., pile driving) and operation of wind turbines (cf. Danish environmental impact studies at the windparks of Horns Rev and Nysted) and the operation of deterrent devices in fisheries (cf. AC14/Doc. 26(O)). Impaired areas may range up to dozens or even to over a hundred kilometers due to some of the loudest manmade sounds such as pile-driving and seismic airgun pulses.

Potential Impact

Cetaceans (at least the Toothed Whales including dolphins and porpoises) rely on their hearing for orientation and foraging and are thus likely to be impacted easily and severely even on a population level. In the absence of a less harmful parameter, currently the temporary threshold shift (TTS) values are being determined for different cetacean species (cf. the presentation of Klaus Lucke). The injury that results in TTS is considered to be not of permanent nature and thus acceptable. However, cumulative effects either of repeated exposures or of several sound sources at the same time as well as masking effects of vital sounds are not regarded in the current approach. All such impacts can result in reduced nutrient uptake, increased stress levels and a reduced immune response as well as reduced fecundity and increased chronic mortality among others.

A way forward

As a basis for discussion to advance with ASCOBANS goals as stated in Resolution No. 4 of MOP-5 and with the Advisory Committee's task to provide recommendations to Parties, by the 6th Meeting of the Parties, on possible ways to mitigate those negative effects (see the introduction of this text), a number of potential mitigation measures are suggested as follows:

within Marine Protected Areas:

- Introduction of a maximum speed limit of 15 knots for all vessels
- No loud industrial activities such as drilling, blasting or ramming
- Any noise-emitting activity outside an MPA needs to have a buffer zone around it to reduce the noise levels received inside the MPA

outside and inside Marine Protected Areas:

- Recovery of ammunition, as far as possible, and destruction on land (rather than detonation at sea)
- The sound pressure level of any inevitable detonation or ramming should be reduced to acceptable levels (yet to be determined) using technical mitigation measures such as bubble curtains etc.
- Similar measures should be developed for airguns and SONAR to reduce the impacted part of the water column to the absolute minimum necessary
- ASCOBANS Resolutions such as No. 4 of MOP-5 should be adhered to and implemented (inc. the development of guidelines etc.).

- Additional mitigation measures may be necessary outside MPAs as highly mobile cetacean populations cannot be protected efficiently in small reserves alone. Depending on the biology of the cetacean species affected, these additional mitigation measures may only be necessary in certain areas at certain times thus possibly leading to a zoning concept for noise pollution in European waters.

From soft law to internationally binding law

AC 15 is asked to explore the possibilities and reach consensus about the corner stones of a strategy on how the technical needs for cetacean protection might be transformed into binding international legislation, or at least into a first step in EC legislation.

The goal could be to use AC 16 and MOP 6 for coming to binding regulations, or at least for reaching a consensus on respective incentives to other appropriate legislative bodies concerned.

Recent literature

Gordon, J., D. Gillespie, J. Potter, A. Frantzis, M. P. Simmonds, R. Swift & D. Thompson 2003: A Review of the Effects of Seismic Surveys on Marine Mammals.

Marine Technology Society Journal 37 (4): 16-34.

Simmonds, M., S. Dolman & L. Weilgart 2004: Oceans of Noise 2004. WDCS Science Report, 168 p.

Southall, B. L., A. E. Bowles, W. T. Ellison, J. J. Finneran, R. L. Gentry, C. R. Greene Jr., D. Kastak, D. R. Ketten, J. H. Miller, P. E. Nachtigall, W. J. Richardson, J. A. Thomas & P. L. Tyack 2007:

Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations.

Aquatic Mammals 33 (4): 411-521.