Some questions about the use of Marine Mammal Observers in the mitigation of loud noise sources.

Mark Peter Simmonds[1] and Marijke N. de Boer[2]

1. Humane Society International,
c/o 5 Underwood St, London N1 7LY, UK.

2. Seven Seas Marine Consultancy,
2611RE Delft, The Netherlands.

Abstract

Here we ask a series of questions intended to provoke discussions that we hope will help to lead to improvements in practice related to the deployment of Marine Mammal Observers in the mitigation of noisy activities at sea. Further to an informal survey of practitioners, we believe that the following issues need to be further considered: observer distance from sound source; the practicalities of multi-species monitoring; the duration of monitoring periods and the independence, training and authority of MMOs.

Introduction

Marine noise is increasingly recognised as a problem for marine animals and various initiatives are underway by international and other bodies to address this (Simmonds et al., 2014). There are three main methods currently in use (i) operational procedures such as a 'soft start'; (ii) real-time mitigation measures based on the detection of animals close to airguns; and iii) the use of time and area closure zones (from which noisy activities would be excluded) to avoid vulnerable wildlife (Weir and Dolman, 2007). In this paper we focus on the second method and the use of human Marine Mammal Observers.

In 1998, the Joint Nature Conservation Committee (JNCC) was the first regulatory body to issue statutory marine mammal mitigation measures for use during industrial seismic surveys in UK waters and, in 2002, Australia's Department of Environment and Heritage followed suit (Weir and Dolman, 2007). A number of other countries have since developed guidelines. So it is that Marine Mammal Observers (MMOs) are widely and increasingly used in attempts to mitigate the adverse impacts of loud noise sources. In some instances, their deployment is a requirement for licensing of an activity. Typically the MMOs monitor wildlife within a certain distance (a 'safety' or 'exclusion' zone) of a noisy operation, such as the seismic sources used in exploration of the sea bed by the fossil fuel industry. Once vulnerable animals – and cetaceans have been the main focus of mitigation efforts to date – are detected, noisy operations can cease or, where they have not been initiated, operations can await the passage of the animal from the designated safety zone before commencing.

Concerns have been raised previously about the effectiveness of existing approaches. Weir and Dolman (2007), for example, noted that marine mammal mitigation measures currently in use worldwide showed considerable variation in parameters such as the exclusion zone radius, the marine mammal species included in mitigation, and delay/shut-down procedures; they also emphasised that relatively few aspects of current mitigation have a firm scientific basis and proven efficacy in the field.

It is not clear to what extent, if any, such concerns may have been addressed in the intervening years and, in addition, little attention seems to have been given to the effectiveness of the MMOs, including that they are working within an increasingly complex framework of laws and other requirements.

We do not intend here to review the legislation under which MMOs work around the world but just to raise some aspects of practice. The monitoring distance and the radius of the safety/exclusion zone is typically 500m.We judge this to be a likely practical limit of visibility on days of clear weather and calm seas for small cetaceans. However, as noted, this zone can be variable. For example, in Australia, this distance varies from 0.5 to 3km whilst, in New Zealand, it varies from 0.2km to 1.5km (EPBC, 2008; DOC, 2013). Monitoring is also increasingly conducted by acoustic means. In the latter case, a Passive Acoustic Monitor (PAM) listens through hydrophones for cetacean vocalisations.

In many instances, an environmental impact or marine mammal impact assessment of some kind takes places before the activity and this may define the mitigation measures to be followed for that particular seismic activity. MMOs may be called upon to advise on the assessment, indeed, the duties of MMOs in the 21st century may be varied and complex. Table 1 shows an indicative list of responsibilities.

Table 1. An Indicative List of Responsibilities of Marine Mammal Observers

a. Facilitating the understanding of the mitigation requirements by seismic and maritime personnel.

b. Monitoring for wildlife (including pre-shooting searches and general searches) - All marine mammals (and often turtles) which are detected must typically be recorded, even if they are outside the mitigation zone or not in the survey area.

c. Requesting required mitigation actions (such as stops or delays) where necessary.

d. Collecting and recording required data, e.g. effort, operations and sighting data (e.g. JNCC, 2010).

e. Reporting on compliance and non-compliance

f. Writing of final survey report, including all above information (a-f)

In addition, on occasion MMOs are also asked to check the Environmental Assessment Reports prior to the start of the operations and advise on whether they should be amended. As a seismic operation is, of course, an expensive undertaking, the MMO working on such operations is in a position of considerable responsibility.

Mitigation procedures may also be amended during the operation. For example, the Australian guidelines state that if sightings of whales have been frequent, or are higher than were anticipated during the planning of the survey (i.e. as highlighted in the Environmental Impact Assessment), the proponent should contact the Authority (or Permit Provider) to discuss appropriate night-time provisions and whether additional management measures should be employed for day and/or night-time operations (EPBC, 2008).

Weir and Dolman (2007) previously noted that the efficiency of visual detection will depend on a range of factors including the number of marine mammal observers (MMOs) present, their experience, the regularity of their breaks, their dedication, their objectivity (crew member or independent consultant), their enthusiasm, and their level of training. In the questions that we pose below we echo some of these points and expand into new ones.

Questions

These questions are based on informal interviews with people working within the MMO industry
.

1. **Distance from sound source**

In the case of towed seismic airguns, there appears to be an increasing trend in the distance of the sound sources from MMOs. If this is correct, then is the duty MMO close enough to be able to effectively view the zone around the sound source?

In some cases, spotter aircraft are used or additional MMOs are placed on extra vessels (e.g. a chase vessel) to help monitor the exclusion zone. Should this be standard practice/when should this be required?

2. **Complex multispecies requirements**

As the guidance for MMOs has become more complicated (e.g. dealing with different exclusion zones for different species) is the guidance based on sound science and can the MMOs be reasonably expected to apply the prescribed measures in practice?

For example, in some cases, negative changes in the behaviour of an animal will determine whether the seismic source should be terminated or not, but can a MMO effectively detect such changes in the behaviours of a range of species which might include cetaceans, basking sharks and sea turtles?

3. Authority of MMOs

Do the MMOs have adequate authority during operations - and support from all those concerned - in terms of implementing shut-downs or whatever actions are prescribed when animals are in the safety zone or similar?

In the guidelines of some nations it is clearly stated that 'observers have the authority to order a delay or shutdown of operations (e.g. DOC, 2013). However, in practice this may be questioned by the contractor or client representative and may require 'proof' in the form of photographs or video taken by the MMO or from visible light cameras (which are installed on the bridge or bridge wings of some vessels). This is not always possible to achieve (e.g. photography may be inhibited because of sun glare or torrential rain). Furthermore, it is not a requirement for the MMO to use a camera with a powerful zoom lens. In a recent set of guidelines it has been suggested that remote vessel tracking and externally mounted cameras may also potentially be employed to verify the accuracy of MMO and PAM operator data (Naranjit & Higgins, 2014).

4. Independence of MMOs

Are the MMOs sufficiently independent from the industry or other party requiring the noisy activity to be undertaken? Should MMOs be recruited by either the contractor making the survey or the oil company concerned?

MMOs are sometimes involved in making changes to the proposed mitigation measures (often so-called 'local additions' or a mixture of different guidelines) as part of the Environmental Assessments that they will work under. So should the link between the permit provider (country) and MMO be more strongly developed (for example through the deployment of country representative on surveys)?

5. Training and assessment of MMOs

Are MMOs in all cases appropriately skilled and trained? Is there a standard for training that is internationally recognised and appropriate?

Weir and Dolman (2007) noted that training in some instances may be limited to a one day theoretical course.

6. Observer Effort

How many observers should be deployed for any particular activity?

Observer malaise or exhaustion has been raised as an issue and the methods used for MMOs might be compared with the methods used in cetacean sightings surveys where rotation of observers is usually mandated along with limitation of observation periods. Some MMO guidelines require that the observation period should be restricted to a maximum of 2 or 4 hours of continuous watching (MMS, 2007; Naranjit & Higgins, 2014). However, in practice, watch periods of up to 6 or 12 hours are sometimes carried out.

7. Data availability

Finally, should the data collection part of the MMOs responsibility be improved or made publically-available in order to contribute to our knowledge of species-presence and behaviour especially in regions where there has been little previous study?

Conclusions

The use of MMOs has increased substantially in recent years but this still relatively new 'marine mitigation industry' has not, as far as we are aware, been subject to any independent scrutiny of its practices. Nonetheless some members of the industry formed their own association in 2007 with a mind to achieving improved standards (MMOA, 2007) and in 2012, this association published its own position statements on a range of issues, including suitable training and experience for MMOs.

We believe that answering the questions outlined above would help to strengthen environmental practices and we welcome comments from others interested in this matter. Whilst we have focused here mainly on the visual monitoring done by MMOs, which we believe is still the principle way in which MMOs function, similar issues apply to PAM operators and for both types of monitoring, as far as we are aware, no independent assessment has been made of the effectiveness of MMOs and whether suitable standards are being applied world-wide.

References

DOC (2013) *Code of Conduct for Minimising Acoustic Disturbance to Marine Mammals from Seismic Survey Operations*. Publishing Team, Department of Conservation, PO Box 10420, Wellington 6143, New Zealand. http://www.doc.govt.nz/Documents/conservation/native-animals/marine-mammals/2013-seismic-survey-code-of-conduct.pdf

EPBC (2008) *EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales.* Australian Government Department of the Environment, Water, Heritage and the Arts, September 2008. http://www.environment.gov.au/system/files/resources/8d928995-0694-414e-a082-0ea1fff62fc8/files/seismic-whales.pdf

JNCC (2010) *Guidelines for Minimising Acoustic Disturbance to marine mammals from seismic surveys.* Joint Nature Conservation Committee, Peterborough.
http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Seismic%20Guidelines_Aug%202010.pdf

MMOA (2007) Marine Mammal Observer Organisation website: http://www.mmo-association.org/ Last visited 4/5/2014

MMOA (2012) *The Key Issues That Should Be Addressed When Developing Mitigation Plans To Minimise The Effects of Anthropogenic Sound On Species Of Concern*. Marine Mammal Observer Organisation. 32 pages. Available online at: http://www.mmo-association.org/MMOA_position_statements_Version1.pdf

MMS (2007) *Implementation of seismic survey mitigation measures and protected species observerprogram*. US Department of the Interior, Minerals Management Service. 2007. Notice to Lessees and Operators (NTL) of Federal Oil, Gas, and Sulphur Leases in the Outer Continental Shelf, Gulf of Mexico OCS region. Available online at: http://www.gomr.boemre.gov/homepg/regulate/regs/ntls/2007NTLs/07-g02.pdf. OMB Control Number: 1010-0151.

Naranjit, A. and Higgins, E.F. (2014) *Requirements for the mitigation of acoustic disturbance from offshore seismic surveys to marine life in Trinidad and Tobago. Version*: Draft 2, April 2014. http://media.wix.com/ugd/0d8f54_d92fb38fef5d45fb861e135639314975.pdf

Simmonds, M.P., Dolman, S.J., Jasny, M., Parsons, E.C.M., Weilgart, L. Wright, A.J. and Leaper, R. (2014) Marine noise pollution – increasing recognition but need for more practical action. *The Journal of Ocean Technology* 9 (1), 71-90:

Weir, C.R. and Dolman, S.J (2007). Comparative Review of the Regional Marine Mammal Mitigation Guidelines Implemented during Industrial Seismic Surveys, and Guidance Towards a Worldwide Standard *Journal of International Wildlife Law and Policy, 10:1–27, 2007*