

**QUALIFIED MONITORING FOR AN EFFECTIVE CETACEAN CONSERVATION:
AN EXPERIENCE IN THE ITALIAN CONTEXT**

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Oceanomare Delphis Onlus (ODO) is a non-profit organization established in Italy in 1999 in order to promote the knowledge and practices of conservation of cetaceans and marine biodiversity in the Mediterranean Sea, implementing non invasive studies, promoting conservation and education programs, raising public awareness on cetaceans and marine environment. Believing that science and knowledge are crucial to the understanding of how the natural world works and how humans impact on it, and that it is essential to incorporate scientific information into decisions management of the marine environment, ODO aims to produce scientific evidences through filed studies and stimulate the collaboration between scientists, conservation professionals, administrators and policy-makers.

In 2008 the Marine Strategy Framework Directive 2008/56/EC established a method for community action in the field of the politics for the sea and introduced the noise amongst the marine environmental quality parameters. The legislation identifies the underwater noise as an intentional or accidental introduction of acoustic energy in the water column, from pointed or diffuse sources, and begins to require the Governments to address the problem by acting with measures that prevent any kind transboundary damage. As a matter of fact, even in the absence of scientific certainty of serious or irreversible damage, Countries have the duty to provide effective actions to prevent environmental degradation.

Aside from the different anthropogenic activities that may generate noise (boat traffic, fishing, oil industry, scientific research etc.) or the way in which the sound propagates from the source on the basis of water temperature, density or pressure and surface and seabed characteristics, it is important to emphasize that the concept of noise pollution has been extended to the aquatic environment when it has come to the certainty that the noise exposure can produce a negative effects on several phyla of marine organisms. Among these, marine mammals and especially cetaceans, appeared heavily impacted because of their complex acoustic system involved in critical processes as communication, navigation, orientation and prey location.

Although there are still gaps and unresolved questions about the real adverse effects of potentially impacting activities such as seismic surveys, explosives uses, excavation, military exercises, seabed mapping, dredging etc. on marine mammals, the alarming data resulted from the most recent researches have clearly highlighted the need to implement legislation on underwater noise, in order to precisely identify criteria and exposure values effectively harmful for animals, and to establish specific local regulations as well as international agreements.

As well as all the seas around the world, this conservation issue especially concerns the Mediterranean Sea (Pace *et al.* 2015), well known for its biodiversity, but also for its extreme vulnerability to acoustic

pollution. All cetacean species present in the basin are included in the IUCN Red List, in categories that highlight the need for further information and/or urgent protection actions.

As for Italy, the Directive 2008/56/EC was implemented by Legislative Decree n° 190 (10/13/2010), establishing that the appointed authority for the Marine Strategy was the Italian Ministry of the Environment and Protection of Land and Sea (MATTM). For the coordination of national activities the MATTM uses a technical commission (Environmental Impact Assessment, EIA, established by DPR. n°90 on May 14, 2007), consisting of 50 members appointed by decree among professionals and experts with adequate technical qualifications in environmental matters. Subdivided into three subcommittees, EIA first proceeds to investigate and then, in plenary, emits advices on environmental compatibility. Finally, the MATTM uses the Institute for Environmental Protection and Research (ISPRA) for a scientific-technical support.

To date, the MATTM, after the ratification of a number of agreements (CBD, Habitat Directive, Bonn Convention, CITES, Barcelona Convention for the Protection of the Marine Environment, IWC etc.) and the subscription of other pacts such as ACCOBAMS and Pelagos Sanctuary, is committed to the conservation of cetacean populations by issuing new regulations that, beyond personal initiatives, promote the systematic implementation by offshore industry and other operators of "best practice" aimed at preventing, mitigating and minimizing noise impact on animals.

A legislative measure in this direction dates back to 2012 and concerns the wreck removal project of the ship "Costa Concordia" at the Giglio island in Italy (CTVA-2012-1720, 05/14/2012). The document issued by the EIA Commission of the MATTM, among other requirements, affirms the presence on board the operative vessels of two *qualified and certified* MMOs (Marine Mammal Observer), *expert* in recognizing cetaceans and belonging to *accredited institutes*. In the EIA view, the MMO was an independent professional, usually with a background in biology and marine conservation, whose main role was to collect data on the presence of cetaceans in the work area, and to implement in real time appropriate mitigation measures against the potential noise impacts on the species. In addition to visual surveys, MMOs may use passive acoustic monitoring (PAM) to detect marine mammals using hydrophones.

Despite the national legislation's requirement of specific qualification and certification, in Italy this professional role does not officially exist, since there are no MATTM recognized training organizations able to release a MMO certificate valid for Italian or Mediterranean waters. For this reason, on two different occasions, in 2012 and in 2014, Oceanomare Delphis Onlus has independently organized for the first time in Italy two training courses for MMOs, in order to obtain an official certificate (released for UK waters). The courses, both held in Rome, were led by Carolyn Barton, the first MMO engaged on board of a seismic survey vessel in UK waters and now approved JNCC trainer (Joint Nature Conservation Committee).

About 50 Italian people with a background in biology, naturalism, environmental engineering, acoustics, etc, received the JNCC approved MMO certificate. Since 2012, ODO leads several monitoring/research projects with MMO/PAM operators, even in collaboration with Universities, research institutions and Marine Protected Areas, to 1) collect data on cetaceans, and 2) implement, manage and optimize mitigation measures during noisy sea operations.

As for the "Costa Concordia" project, which lasted four years until January 2016, the monitoring work was commissioned at first by Titan-Micoperi S.r.l., and then by the Consortium of Inter-University Center for Marine Biology and Applied Ecology (CIBM) of Livorno, and was done in collaboration with the Department of Environmental Biology of the Rome University "La Sapienza". ODO monitoring program concerned three main activities, sampled during daylight in good weather conditions (Table 1):

- 1) the daily evaluation of the noise level a) in the yard area surrounding the Costa Concordia wreck during the "parbuckling" phase (August 2012-July 2014), b) during "towing" phase (*i.e.* the ship transport to Genoa, five days at the end of July 2014), and c) in the yard area during the "site remediation" phase (June 2015-January 2016);
- 2) the daily visual monitoring of marine mammals' presence;
- 3) the daily acoustic monitoring of marine mammals' presence.

Table 1. Summary of the activities and effort during Costa Concordia project (2012-2016).

ACTIVITY	Parbuckling phase	Towing phase	Site Remediation phase
Noise evaluation			
N. of acoustic recordings	2.580	85	125
N. of minutes analyzed	8.624	255	1.840
PAM			
N. of acoustic recordings	1.036	n.a	220
N. of minutes analyzed	6.180	n.a	2.830
N. of cetacean acoustic encounters <u>in the exclusion zone</u> (1000m radius from the Costa Concordia wreck)	0	n.a	0
N. of cetacean acoustic encounters <u>out of the exclusion zone</u> (within 2500m radius from the Costa Concordia wreck)	27	n.a	2
Visual surveys			
N. of surveys	874	1	202
N. of hours	1.874	62	528
N. of km	10.062	469	4.192
N. of cetacean visual encounters <u>in the exclusion zone</u> (1000m radius from the Costa Concordia site)	1	n.a	1
N. of cetacean visual encounters <u>out of the exclusion zone</u> (within 2500m radius from the Costa Concordia site)	26	5	7
Encountered species	<i>T. truncatus</i> <i>S. coeruleoalba</i>	<i>T. truncatus</i> <i>S. coeruleoalba</i> <i>B. physalus</i>	<i>T. truncatus</i>

A further MMO/PAM assignment was received by ODO in January 2014 from CNR-ISMAR of Ancona (Italy) on behalf of ENI S.p.A. Exploration & Production Division. In this case, the research service contract (CIG. 293039701B, 01/31/2014) required to carry out a monitoring project of cetaceans present during the building of two offshore platforms (named Fauzia and Elettra) for the production of hydrocarbons and related sealines, in the Adriatic Sea (for details see DVA-DEC-2013-103 and DVADEC- 2013-104). Even in this case, as it happened for Costa Concordia, the legislation sanctioned the environmental compatibility of the project, only if guaranteed the respect of a number of specific

requirements. In particular, in order to protect marine mammals from possible impacts caused by underwater noise, qualified MMO experts in recognizing cetaceans and belonging to accredited institutes were required to be present on site during the building of the platforms, drilling and pipe assembly. For the same reasons, specific mitigation measures were needed, including suspension of the activities, postponement of their start until at least 30 minutes after the last sighting and soft-start if marine mammals were present in a radius of at least one nautical mile around the shipyard, writing of conclusive reports etc.

In this project, the activity of observation and listening of the presence of marine mammals was conducted 24/24h by ODO's MMOs for 31 weeks (from January to August 2014) for a total duration of about 5,300 hours. During the work, a total of 296 surveys (154 visual, 121 acoustic and 21 visual + acoustic) were carried out. The most sighted species was the bottlenose dolphin (*Tursiops truncatus*) (70% of cases) with an average group size of about 5-6 individuals but, given the risk of extinction of its Mediterranean subpopulation, an interesting sighting regarded 7 common dolphins (*Delphinus delphis*).

In total 902 cetaceans have been counted, mainly adults (79%), with a total time spent in observation of about 300 hours. Travelling was the activity mostly exhibited in the area, but also significant interactions with trawling vessels (following boats) were observed.

In both projects (Concordia and ENI), the drafting of final reports to be submitted to the MATTM appears crucial for the conservation of marine mammals since, with monitoring activities carried out in a similar way such as a scientific study, data collected during the work represents an important contribution to the knowledge of distribution and other characteristics of marine mammal populations, in different periods of the year or in scarcely studied areas.

Thanks to the experience gained in these projects and with the aim of implementing rules and guidelines for a more *effective* protection of the animals, in 2014 Oceanomare Delphis started to strongly suggest to the MATTM EIA Commission to introduce a new approach for the MMO/PAM monitoring activities during air-gun, yard and building operations, and any other noisy actions at sea. The main suggestion was to carry out continuous surveys (not only during procedures) including two additional phases, before and after the impacting activity, to provide more detailed information for the assessment of the possible impacts of anthropogenic noise on marine mammal populations present in the areas. In particular, the introduction of these additional monitoring periods should have allowed obtaining extremely important data on different levels:

- systematic comparison of the situation in the study area before, during and after the work;
- possibility of early detection of situations deserving special care;
- data collection on a larger time window to evaluate any perturbation effects.

The positive, continuous relationship and cooperation between Oceanomare Delphis and the MATTM EIA Commission, and the technical contribution of the Interdisciplinary Center for Bioacoustics and Environmental Research (CIBRA) of the Pavia University, led in June 2015 to new regulations, definitely introducing this new approach in the MATTM Decrees on geophysical airgun technique for oil exploration. Among other requirements, ante-during-post MMO/PAM monitoring activities were established as a measure to mitigate the possible effects of these geophysical procedures on marine mammals. This innovative element, never appeared in this form in other legislations, puts Italy at the forefront in the international field. It represents an important opportunity to deliver excellence in

technical and scientific areas, helping to fill the gap in the knowledge of the seismic surveys consequences on cetacean presence, distribution and behaviour.

At present, with numerous decrees issued with similar prescriptions, the situation in Italy is of complete innovation in the field of monitoring and mitigation, and presents a kind of trial phase aimed at ensuring the timely transfer of the rules on the field and, therefore, the attainment of the objectives the legislator predetermined for protection.

Since the MATTM required the submission of a monitoring and mitigation plan of the effects of geophysical surveys on marine mammals for the verification of compliance with the law, Oceanomare Delphis was asked by different companies to provide support in the preparation of this document.

Alongside visual observations, the presence in the monitoring of an important acoustic component, leads to the signing of a research agreement between ODO and CIBRA, in order to perform a joint and coordinated program of study on the impacts of airgun for the optimization of monitoring works and mitigation procedures, in accordance with current legislation on environmental impact of seismic exploration with airgun. The complementarity of the skills (visual and acoustic monitoring) allows to provide the companies with operational programs in line with the new ministry legislation, with a strong scientific component and view.

In summary, since 2012 in an ever growing manner, ODO has been involved in activities requiring the presence of qualified MMOs and PAM operators. Today, together with CIBRA, ODO maintains an intermediate, independent position between the parties (MATTM and companies) acting to:

- 1) support the MATTM and EIA Commission in developing sound guidelines based on scientific evidence also gathered during well-organized and planned monitoring activities operated by companies in order with MATTM decrees;
- 2) address companies receiving MATTM decrees to develop monitoring and mitigation plans strictly complying with EIA requirements;
- 3) provide companies with well experienced MMO/PAM operators.

Although Oceanomare Delphis started in 2014 a specific dialogue with the MATTM on critical issues such as the professional role and the most effective training activities for MMOs and PAM operators, political reasons delayed the process (i.e. changes in the MATTM Directors, changes in the Committees' members, etc).

In our view, and in full agreement with CIBRA, 1) the identification of a certification path to qualify Italian (or Mediterranean) MMOs to recognize their professionalism, 2) the selection of trainers with strong backgrounds and field experiences in different MMO/PAM contexts to ensure the quality of the training and the full coverage of the needs, and 3) the complete definition of the professional profile of MMOs, are crucial to accomplish the essential mitigation role, and to take the opportunity of rigorous and structured gathering of new scientific data (useful for decision making purposes). In particular, the establishment of a certification process for MMOs and PAM operators has a number of positive aspects:

- 1) ensure a responsible and structured approach to the problem related to mitigation activities;
- 2) add value and provide new job opportunities, even abroad, to young graduates in scientific disciplines;
- 3) confirm Italy as a leading innovator in the effective evaluation of underwater noisy operations.

Trained and qualified professionals, whose skills have been acquired through high level courses and direct experience is the first guarantee of expertise and solidity in the management of the whole matter. The establishment of a recognized "school" would allow the relevant institutes (such as the MATTM in Italy) to standardize the level of preparation of the operators, and to agree on methodologies and data collection formats. Specific databases will be acquired, with homogeneous and comparable scientific information, to be conveniently shared between operators and scientists through a cooperative approach that only supports an effective protection and conservation activity.

References : Pace D.S., Tizzi R. and Mussi B. (2015) Cetaceans Value and Conservation in the Mediterranean Sea. JBiodivers Endanger Species, <http://dx.doi.org/10.4172/2332-2543.S1.004>