



PROJECT CETACEOSMADEIRA II

IDENTIFYING CRITICAL MARINE AREAS FOR THE BOTTLENOSE DOLPHIN AND
SURVEILLANCE OF THE CETACEANS CONSERVATION STATUS IN MADEIRA ARCHIPELAGO

Project Nº LIFE07 NAT/P/000646

Deliverable E.5 - I

Report on the Technical and LIFE+ networking workshop of Project CETACEOSMADEIRA II

6th – 8th November 2012, Caniçal, Madeira Island, Portugal

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PREFACE

This document reports the outcomes of the technical workshop organized within project CetaceosMadeira II to address scientific questions related with the objectives of the project and to promoted the LIFE+ projects networking. The workshop took place in the Madeira Whale Museum auditorium, Caniçal, Madeira Island, Portugal between the 6th and 8th November 2012.

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LIST OF ABBREVIATIONS

CMII – Project CetaceosMadeira II

MWM – Madeira Whale Museum

SAC – Special Area of Conservation

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1. WORKSHOP PROGRAM

06 Nov 2012

Opening Session -----

Chairman: **John Baxter**

09:00 - Workshop opening (by the Regional Secretary of Environment Representative– Dr. João Correia (Regional Director of Environment) and Eng. the President of Machico Municipality)

- Brief presentation of the workshop participants and their fields of interest

Session 1 -----

Chairman: **John Baxter**

09:45 - Presentation of the project CETACEOSMADEIRAI (by Luís Freitas)

- goals
- methodology
- open discussion / questions

10:15 - *Coffee break*

10:45 - Presentation of the project's **OBJECTIVE 1**: Identify the areas of importance for the bottlenose dolphin in the coastal waters of Madeira archipelago, with the aim of establishing adequate marine Nature 2000 sites for this species.

- Data analysis - preliminary results
- Discussion: round table

12:30 - *Lunch*

Session 2 -----

Chairman: **Luís Freitas**

14:00 - Participants presentation of previous experience / case studies related with Natura 2000 Network and its importance as marine sites for cetaceans, covering:

- criteria for sites selection
- management and conservation measures implement in SAC's
- monitoring and follow up
- cost-Benefits analyses of SAC's

Speakers - (20 min for each [15 min presentation + 5 min questions])

1. Michael Tetley
2. John Baxter
3. Peter Evans
4. Renaud de Stephanis

15:30 - *Coffee break*

16:00 - **Continuation Session 2**

Speakers - (20 min for each [15 min presentation + 5 min questions])

5. Simon Ingram
6. Rui Prieto
7. José Vingada

17:30 - João Correia - Environment Regional Director, to present the position of the Madeira Regional Government of Madeira regarding OBJECTIVE 1: political receptivity and implications

17:45 - Discussion: round table

18:15 - End of day 1

07 Nov 2012

Session 3 -----

Chairman: **Philip Hammond**

09:00 - Challenges in implementing the project's OBJECTIVE 1: How to evolve from scientific results to SCA's establishment and management taking into account the information from day 1:

- the data collected
- the experience from other areas
- the intentions of the Regional Government

12:30 – Lunch

Session 4-----

Chairman: **Simon Ingram**

14:00 - Presentation of the project's OBJECTIVE 2: Define areas of operation for the whale-watching boats in Madeira archipelago waters and establish the respective carrying capacity

- data analysis
- preliminary results

15:15 - Participants presentation of previous experience / case studies related with the establishment of areas of operation for the WW companies and their respective carrying capacity, covering:

- Establishment of operation areas;
- Difficulties in implementing WW operation areas (considering stakeholders, conservationists and government managers);
- Criteria for the determination of the carrying capacity in each WW operation area;
- Economic and commercial impact;
- Methodologies used to monitoring;
- Advantages and disadvantages of noticed from the creation of operational WW areas;

Speakers - (20 min for each [15 min presentation + 5 min questions])

1. David Lusseau
2. Peter Evans
3. Renaud de Stephanis

16:15 - Coffee break

16:30 - Continuation Session 4

4. John Baxter
5. Rui Prieto

17:15 - Pedro Mendes Gomes - Talk of an invited stakeholder from a local WW operator / ACIF –

17:30 - Paulo Oliveira Talk of an invited manager from the Environmental Secretary – to present the position of the Regional Government of Madeira with OBJECTIVE 2: political receptivity and implications

17:45 - Discussion: round table

18:15 - End of day 2

08 Nov 2012

Session 5-----

Chairman: **David Lusseau**

09:00 - Challenges in implementing the project's **OBJECTIVE 2**: How to evolve from scientific results to the establishment of WW operation areas and carrying capacity taking into account the information from day 2:

- the collected data
- the experience from other areas
- the intentions of the Regional Government

12:30 - *Lunch*

Session 6-----

Chairman: **Luís Freitas**

14:00 - Presentation of the project's **OBJECTIVE 3**: Surveillance of the conservation status of cetaceans' species in Madeira offshore waters

- Data analysis
- Preliminary results

14:30 - Discussion: round table, covering:

- The determination of the conservation status in dynamic populations of cetaceans
- Challenges for offshore populations and areas with low effort
- Lack of data to use the computer software ©RAMAS
- How to overcome it?
- Cetacean Conservation Status Study cases

16:00 - *Coffee break*

16:30 - Presentation of the results of the workshop to the Regional Government of Madeira

17:00 - Workshop closing session

17:30 - End of day 3

2. LIST OF PARTICIPANTS

2.1. Invited speakers

- John M Baxter – Principal Adviser, Marine Scottish Natural Heritage, Scotland
- João Correia – Environment Regional Director, Madeira Regional Government, Madeira
- Peter Evans – Sea Watch Foundation, Wales
- Pedro Mendes Gomes – whalewatching operator, representative of ‘Câmara de Comércio e Indústria da Madeira’ (ACIF), Madeira
- Simon Ingram – Plymouth University, England
- David Lusseau – University of Aberdeen, Scotland
- Paulo Oliveira – ‘Parque Natural da Madeira’ Director, Madeira Regional Government, Madeira, Project LIFE+ Ilhéus do Porto Santo.
- Rui Prieto – Departamento Oceanografia e Pescas, Universidade dos Açores, Azores
- Renaud de Stephanis – CIRCE, Project LIFE+ INDEMARES Golfo de Cádiz, Spain
- Mike Tetley – WDCS – Whale and Dolphin Conservation Society, England
- José Vingada – Universidade do Minho, Project LIFE+ MARPRO, Portugal Mainland

2.2. CM II Project speakers

- Filipe Alves – biologist, Museu da Baleia da Madeira
- Ana Dinis – biologist, Museu da Baleia da Madeira
- Luís Freitas – project manager / biologist, Museu da Baleia da Madeira
- Cátia Nicolau – biologist, Museu da Baleia da Madeira
- Cláudia Ribeiro – biologist, Museu da Baleia da Madeira

2.3. Other participants

- Ana Cañadas – CM II Project consultant, Alnilam Investigación y Conservación
- Phil Hammond – CM II Project consultant, University of St. Andrews
- Marisa Ferreira – Universidade do Minho, Project LIFE+ MARPRO
- Jorge Santos – Universidade de Aveiro, Project LIFE+ MARPRO
- Dília Menezes – Parque Natural da Madeira, Project LIFE+ Ilhéus do Porto Santo
- Carolina Santos – Parque Natural da Madeira, Project LIFE+ Ilhéus do Porto Santo
- Carlos Freitas – Parque Natural da Madeira, Project LIFE+ Ilhéus do Porto Santo
- Sérgio Pereira – Parque Natural da Madeira, Project LIFE+ Ilhéus do Porto Santo
- Valter Miranda – Parque Natural da Madeira, Project LIFE+ Ilhéus do Porto Santo
- Pedro Gouveia – Parque Natural da Madeira, Project LIFE+ Ilhéus do Porto Santo
- Isabel Freitas – Parque Natural da Madeira, Project LIFE+ Ilhéus do Porto Santo

- Nelson Santos – Parque Natural da Madeira
- Abdurrahman am – whale-watching boat ‘Bonita da Madeira’
- Cristiana Pita - whale-watching boat ‘Bonita da Madeira’
- Luís Dias - whale-watching boat ‘Ventura do Mar’
- Carlos Silva - whale-watching boat ‘Sea the Best’
- Claudia Gomes - whale-watching boat ‘Ribeira Brava’
- Conceição Pereira - whale-watching boat ‘Ribeira Brava’
- Ana Nóbrega – Museu da Baleia da Madeira
- Sílvia Carreira – Museu da Baleia da Madeira
- Ana Alves – Museu da Baleia da Madeira
- Adalberto Carvalho – Museu da Baleia da Madeira
- Miguel Silva – Museu da Baleia da Madeira
- João Viveiros – Museu da Baleia da Madeira
- Ana Nóbrega – Museu da Baleia da Madeira

3. SPEAKERS PRESENTATIONS

Session 1 – objective 1 – *Bottlenose dolphin SAC*

1. **Luís Freitas** - Project CetaceosMadeira II: Geral Objectives, Questions and Methodologies;
2. **Cláudia Ribeiro** - Identifying areas of importance for the bottlenose dolphin in the coastal waters of Madeira - Establishment of Marine Nature 2000 Sites. Systematic monitoring of density and abundance to sustain conservation measures using Distance sampling analysis: preliminary results;
3. **Luís Freitas** - Project CetaceosMadeira II: Bottlenose dolphin abundance estimates and distribution using spatial modeling;
4. **Ana Dinis** - Project CetaceosMadeira II: Bottlenose dolphins photo-identification: preliminary results;
5. **Cláudia Ribeiro** - Summary of preliminary results for the Objective 1 of the project CetaceosMadeira II;

Session 2 – objective 1 – *Bottlenose dolphin SAC*

6. **Mike Tetley** - Bottlenose Dolphins and Marine Protected Areas: a summary of global coverage and focus on Natura 2000;
7. **John M Baxter** - Moray Firth SAC: Identification, Management and Monitoring;
8. **Peter Evans** - Bottlenose dolphin conservation management in Wales;
9. **Renaud de Stephanis** - Management of Marine Protected Areas and cetaceans in the South of Spain: Management based in Science?;
10. **Simon Ingram** - Bottlenose dolphins in Irish coastal waters and the Shannon SAC;
11. **Rui Prieto** - Incorporating information on bottlenose dolphin distribution into marine protected area design (in the Azores);
12. **José Vingada** - Definition of new Marine Natura 2000 sites. The Portuguese Mainland Experience under the MarPro Framework;
13. **João Correia** - Marine policy: The Madeira Government Approach;

Session 3 – objective 2 – *WW areas of operation and carrying capacity*

14. **Ana Dinis** - Whale Watching industry in Madeira Island;
15. **Luís Freitas** - Project CetaceosMadeira II: Cetaceans abundance estimates and distribution vs. whale-watching operation using spatial modeling;
16. **Filipe Alves** - Preliminary results for the Objective 2 of the project CetaceosMadeira II: pressure of the whale-watching industry to cetaceans;

Session 4 – objective 2 – *WW areas of operation and carrying capacity*

17. **David Lusseau** - A sustainable whale-watching industry;
18. **Peter Evans** - Bottlenose Dolphins vs. Recreation;
19. **Renaud de Stephanis** - Whale watching in the Strait of Gibraltar;
20. **John M Baxter** - Scottish Natural Heritage. Dolphin Space Programme;
21. **Rui Prieto** - The Whale Watching regulatory process in the Azores;
22. **Pedro Mendes Gomes** – Concerns of the whale-watching industry in Madeira: by ACIF (Câmara de Comércio e Indústria da Madeira);
23. **Paulo Oliveira** - Position of the Regional Government of Madeira to the Objective 2: political receptivity and implications;

Session 6 – objective 3 – *Surveillance of conservation statuses*

24. **Cátia Nicolau** - Preliminary results for the Objective 3 of the project CetaceosMadeira II: Occurrence of cetaceans and assessment of the potential impacts;

4. OUTCOMES OF THE WORKSHOP

The workshop was organised in 5 working sessions, two dedicated to objective 1, two to objective 2 and one session to objective 3 of the project. For each objective the CMII scientific team presented to the workshop participants the methodologies and preliminary results from the field work carried out to collect data to address the respective objective. In the immediate next session the invited speakers gave their presentations sharing the experiences and knowledge related with the objective at hand (objectives 1 and 2). At the end of each session there was a debate regarding the data or topics presented with relevance to address the issues related with each objective. After each session there was a meeting between Luís Freitas (the project manager) and the chairman of sessions of each objective, and one or two additional invited participants to resume the outcomes of the sessions of each objective. Bellow we present the notes (more specific/technical or more general) compiled at those meetings, based on the speakers presentations and related discussions.

4.1. Project objective 1

“Identify the areas of importance for the bottlenose dolphin in the coastal waters of Madeira archipelago, with the aim of establishing adequate marine Nature 2000 sites for this species”

Distance and spatial modelling

- The presentation of abundance estimates, either calculated through *Distance Sampling* and/or *Spatial Modelling*, should be accompanied by the respective maps of uncertainty. There are two options to present the maps of uncertainty: (1) distribution map of CV, which is a better approach but more difficult to integrate the average number, or (2) maps of 95% CI, with a lower limit map and with an upper limit map.
- Two of the problems in obtaining unbiased absolute abundance estimates from *Distance Sampling* is the ‘availability bias’ and the ‘perception bias’. An experiment/methodology developed by Juame Forcada (see forcada et al, 2004; or contact him) should be conducted to estimate a correction factor. However, it should be pondered if it is really necessary to conduct such an experiment that could be considered low priority as there are alternatives. Instead, it can be used the correction values for bottlenose dolphin in the Mediterranean calculated by Juame Forcada in its study. For other species, a literature review should be done to get the respective correction factors, or alternatively contact specialists. For example, Amaia Gomes de Segura, a PhD student of Tony Raga, obtained values for the striped dolphin. These values could be used for similar delphinidae species such as the common dolphin and the Atlantic spotted dolphin.

For beaked whales Natasha Aguilar could provide such values and, finally, for the baleen whales there is only a small bias so there is no need for correction. For bias source, the 'perception bias', Phil Hammond should be contacted to indicate the best studies available in literature.

- The next steps to complete the *Distance Sampling* analysis and *Spatial modelling* should be to include all data in the dataset (for absolute abundances estimates data from 2007-2012 period with perpendicular distance measurements; for habitat use data from systematic and random nautical surveys, data from observers on board whalewatching and data from observers on board fishing vessels collected within the 2001 - 2012 period and study area) and to use activities and year (with variation between periods of years) as covariates.

Photo-identification

- On what regards the bottlenose photo-id dataset analysis, a left truncation of the dataset should be done to try to reduce the number of transients. The analysis should focus on the south Madeira, which has a larger dataset, allowing to include data from the whale-watching operators. The consequence will be to take out some transients from the analysis. The few sightings from Porto Santo will not contribute very much to a robust analysis.
- The mark-recapture methodology will allow overall abundance estimate, the survival rates, and the number of calves (and the reproductive proportion of females with calves). It will also give an indication of the range of the species (i.e. the dispersion), which is important to justify the big size of the SAC.
- From photo-id data, information on 'residency' can be obtained using mixed models – for future analysis – outside the timeframe of the present project.
- This methodology will also give information on the species social structure. But possibly there are not enough recaptures to develop such analysis. Including data from the whale-watching operators will increase the size of the dataset. Yet, a low priority should be given to this subject.

SAC

- The creation of a SAC must be essential for the reproduction and the 'natural history' of the species in Madeira. A vital rule is 'bigger the better', mainly because we are dealing with highly mobile species. The establishment of a SAC and its boundaries should be justified within southern north Atlantic context, Portugal context and the importance in expanding the Natura 2000 Network interconnectivity.

Arguments to justify the designation of the SAC for the bottlenose dolphin

- The data on the bottlenose dolphin obtained in the last 12 years, namely, abundance estimates, distribution, dispersion, residency, habitat use and so on, are a solid ground to justify the designation of a SAC for this species in Madeira archipelago coastal waters.
- The limits for the SAC should take in consideration the high mobility of bottlenose dolphins (like other oceanic cetacean species) and the examples from other areas that passed through this same scenario in the past (such as the Moray Firth, the Shannon, or the Wales) and where animals were known to move or expand their range.
- The SAC limits should be established based on fixed features, such as depth contour (preferable) or distance from shore. That limit should include the area of the whale-watching in Madeira.
- It is instructive to go through the exercise of filling the Natura 2000 SAC application forms, and note the 'other species' in the application. The application should be in line with the European Marine Strategy.

Conservation objectives

- The conservation objectives should be simple and generic, which will simplify the process and reporting, and they should be faced on a long-term strategy (e.g. if we consider the analysis of the biological parameters). By considering the analysis of the biological parameters we can easily establish alarm limits and assess natural fluctuations. The management plan should be dynamic, allowing a short-term tactic. An important aspect is that management objectives should not be included in the conservation objectives.

Monitoring

- The monitoring the biological parameters of the population could be based on systematic nautical surveys and the establishment of the necessary effort based on the analysis of the present data (available at the MWM). For that Simon Ingram can provide useful guidance and expertise.
- Another important tool for monitoring the biological parameters of the population is to use photo-identification methods. The effort to obtain data for photo-identification related analysis could be concentrated in the waters of Madeira Island, assuming it is representative of all Madeira coastal waters. This issue should be investigated.

- The present monitoring plan for the cetaceans in Madeira, which already contains systematic nautical surveys and photo-identification methods, should be checked/revised/adapted to incorporate the knowledge gained in this project (CM II) and the important inputs from this workshop.
- A six year cycle of assessment of the conservation status of the main cetacean species and reporting of the monitoring program seems to be a good plan. It is enough to collect the necessary data with an acceptable sea effort (already tested) and it is line with the Habitat Directive and the European Marine Strategy.
- Monitoring some environmental variables/parameters in the different sea surveys can be logistically/technically difficult and expensive. However, some parameters may be worthwhile collecting especially if it is done automatically. Some of those data may be used to calibrate/validate data collected by satellite.

Research

- Further research should be directed to collect valuable information on biological parameters of the selected cetacean species populations for the assessment of the conservation statuses. Apart from the already mentioned systematic surveys to analyze the animals abundance and spatio-temporal distribution and the photo-identification to analyze population parameters such as abundance and survivorship, the research methods could be broaden to gather important biological/ecological data. Among others, the study of movements with telemetry, the analysis of stable isotopes of bottlenose dolphins skin/blubber biopsies as well as prey from the same period of the year, the use of laser and photographs to research differences in ecotypes. For the latter methodology David Lusseau can provide information and guidance.

SAC Proposal, road map and management plan

- The SAC proposal from the project should cover the conservation objectives, the SAC boundaries with its justification, the monitoring plan, the research objectives and the road map.
- The SAC management plan should include the monitoring of human activities, the definition of core areas (if these are needed as management measures) and be reflected on a draft document (in progress document, without final look, dynamic/adjustable through regular revisions) with the participation of the different stakeholders. Futher information and experience can be obtained from John Baxter regarding the Moray Firth SAC process.

4.2. Project objective 2

“Define areas of operation for the whale-watching boats in Madeira archipelago waters and establish the respective carrying capacity”

Definitions/concepts

- To properly achieve the goals of Objective 2 the concept of carrying capacity should be carefully understood; define what target to achieve - the species conservation status; the population viability with an understanding that we can have threats to populations related to disturbance of the boats - how often an animal is disturbed, and what proportion of the population that is disturbed to a level that will affect the vital rates.

Definition of management units

- In wide ranging populations, the threat is expected to be minimal, but there is also the aim to keep the animals around the Madeiran waters for socioeconomic and ecological reasons. In order to do that the same reasoning applied to the whole population must be considered for a section of the population that is called a management unit.
- The management units must be defined, e.g. section of the population that might be repeatedly exposed to the whale-watching in Madeira. For some species like the common dolphin and the Atlantic spotted dolphin it may be assumed that most individuals are likely to have similar exposure rates. For other species, like the bottlenose dolphin, the short-finned pilot whale and the (probably) beaked whales, some animals will have a greater exposure rate due to the presence of resident groups. After a discussion among the participants in the workshop a consensus was reached on the definition of management units as the calving resident groups, because they are the species and groups more likely to drive the viability of the industry (year around); they are more likely to be exposed to whale-watching and are more likely to have their vital rates affected.
- The management objective should be to maintain a favorable status of the management units that should be revisited in the next assessment, in 6 years (reporting cycle), to better understand if these management units make sense. That is why the monitoring and research should be prioritized to assess this issue.
- In addition to the density estimates from *Distance Sampling* and *Spatial modelling*, mark-recapture methods can be used to define the management units, to estimate their abundance

and vital rates, with the added value that photo-identification data can also be useful for the SAC (for the Objective 1).

Definition of areas of operation

- Taking advantage of the spatial management tool established in the legislation, the definition of areas of operation appears to be a less challenging approach than the carrying capacity. Therefore, as a form of spatial planning, two ways of using the 'areas of operation tool' were identified. First, in cases of competition excess challenging the viability of the whale-watching industry, defining areas of operation can be used to help reduce the capacity stress in the industry through the homogenization and spreading of the whale-watching effort. Second, in cases of ecological threats (identified overexploitations) these 'areas of operation' can also be established to reduce the interaction rate. In that case, one way to define zoning is to focus on limiting the interaction based on the animals' activity, with an understanding that there is a temporal component to be considered (temporal closures).

Management cycle

- The SAC reports provide an opportunity to create adaptive management procedures for whale-watching, synchronized with the SAC cycle. In this cycle, limits to the operation can be set based on the objectives of the SAC management plan. Then, monitoring and research can be carried out to assess the sustainability of the agreed levels, and new levels can be set based on this assessment.

Monitoring and research priorities

- In the first reporting cycle the research priorities should be to identify the management units, together with the definition of their vital rates, and to continue monitoring of the whale-watching activities and their interactions with cetaceans.
- The next step should be to estimate the exposure rates, and to develop measures to determine the condition (health) of the individuals. That could include the calving success, the reproductive output and the body condition, the later based on photogrammetry.
- With the existing data, model the spatial patterns of the animals activities, determine the animals response to the interactions with the whale-watching boats, assess the animals diet (using stable isotopes), study the fishing effort, estimating uncertainty of all parameters and functional responses.

- To measure the impact of the whale-watching industry in Madeira several parameters could be monitored, namely, the calving rate/success, the residency pattern, changes in abundance, the exposure rate and the vital rates. It is important also to understand the animals' activities spatial and temporal patterns and assess the impact of the whale-watching boats in those activities.
- Based on the data collected so far it should be established baseline references.
- David Lusseau can provide valuable help regarding these issues and several papers should be consulted, namely, Lusseau & Higham (2004) and Anwar (2006).

4.3. Project objective 3

“Surveillance of the conservation status of cetaceans’ species in Madeira offshore waters”

It was agreed that with the data collected during the Objective 3 of the project it would be very difficult to accurately define conservation status for the cetacean species in the Madeira offshore waters. That was mainly caused by the use of opportunistic platforms (the tuna fishing vessels) that did not allowed to cover all the Madeira EEZ, and because it did not allow to estimate population demographic parameters. Yet, that data, collected on a very cost-effective ways, allowed to carry out the first assessment of the cetaceans' occurrence and of the pressure of the main anthropogenic activities upon the cetaceans in the Madeira offshore waters. Additionally, it provided valuable information to help defining surveillance methods if future monitoring is to be developed.



Workshop group photograph

09th November 2012