PROGRESS REPORT ON THE ONGOING TELE-NECROPSY INITIATIVE

Issue: Tele-necropsy initiative

Background

Based on the Recommendation 14.4 from the ACCOBAMS Scientific Committee, which stated that the use of new technologies increases the possibility of remote training, support and advice in case of cetacean strandings by using virtual reality and tele-necropsy, Parties requested during MOP8, the development of tele-necropsy initiatives in the ACCOBAMS Area (Resolution 8.2).
Morocco became a pilot country to further develop the innovative approach of tele-necropsies

Progress report on the ongoing tele-necropsy initiative

Training in telenecropsy and standardization of cetacean stranding response methods

During the eighth meeting of the parties to ACCOBAMS (MOP8), Morocco expressed its interest in leading a pilot project, aimed at setting up a regional scientific photography protocol adapted to cetacean strandings.
The main objective of this initiative was to organize training in scientific imaging, in order to standardize and unify stranding intervention methods, as well as to develop a specific regional photography protocol that will serve as a prerequisite for telenecropsy. This training will improve collaboration between persons in charge of stranding response and optimize the quality of data collected during stranding interventions.
For that, ACCOBAMS Secretariat designed two experts of Liege University (Thierry Jauniaux and Etienne Levy,) to train the Moroccan teams who intervene on strandings, the members of the *Institut National de Recherche Halieutique* (*INRH*) stranding monitoring network.

The training took place in several phases:
1. a theoretical part online,
2. practical training, during which the two experts travelled to Morocco,
3. ACCOBAMS also provided Moroccan experts to take part in the annual necropsy workshop at the University of Liège in Belgium.

Training history

Initial training: April 2023 (distance learning)
INRH teams involved in monitoring strandings took part in the first phase of theoretical training in April, and followed two online sessions:
- A session on the basics of photography on April 3, 2023,
- A session on the external examination of animals on April 11, 2023.

Practical workshop 1: July 2023 - Liège (face-to-face)
The 16th Marine Mammal Necropsy Workshop was held from July 11 to 13, 2023, at the University of Liège, Liège, Belgium. ACCOBAMS supported 2 Moroccan veterinarians.

Practical Workshop 2: September 18-20, 2023 - Tangier (face-to-face)
The main aim of this workshop was to organize training in scientific imaging for the various people involved in strandings. It helped to improve collaboration between the various persons and optimize the quality of data collected during stranding operations. Two days were devoted to members of INRH's Stranding Monitoring Network. The last day was aimed at a wider audience, including the various stakeholders, both internal and external to INRH, involved in stranding management.

Practical Workshop 3: November 2023 - Monastir (distance learning/Presential)
This workshop was held in conjunction with the Sixth Conference on Cetacean Conservation in Southern Mediterranean Countries. November 13-15, 2023, Monastir, Tunisia.
One day was devoted to telenecropsy (dolphin necropsy performed by the Tunisian team, Thierry Jauniaux, photos and videos by the Moroccan team), and Etienne Levy remotely, with the participation of all country representatives.

Telenecropsy field trial (remote) : January 2024 - Kenitra
Between January 7 and 31, 2024, eight unusual whale strandings were reported in Morocco, involving three *Balaenoptera acutorostrata*, two *Balaenoptera physalus* and three *Megaptera novaeangliae*. The ACCOBAMS response team was contacted to assist the Moroccan team. A telenecropsy was carried out on one of the strandings (a fin whale) with the assistance of ACCOBAMS experts, revealing signs of gastritis, severe kidney congestion and the presence of external parasites. Details of all these actions are attached.

Practical Workshop 4: February 2024 - Tangier (face-to-face)

Practical workshop 5: July 2024 - Liège (face-to-face):
ACCOBAMS delegated two Moroccan experts to attend training on marine mammal necropsy, which was held at the Department of Veterinary Pathology of the University of Liège, Belgium from July 9 to 11, 2024.

During the project, different technologies and tools have been used

Tools used:

- **What's App**: for short, instant exchanges. E.g.: notification of a stranding, quick and precise questions about training.
- **Discord**: centralizes communications and media for training, meetings and telenecropsies. Works like a forum, with traceability guaranteed and optimum photo and video quality. Allows very high quality videoconferencing (with a maximum of 25 participants).
- **NAS**: file server specialized in high-resolution photo storage and indexing, with data protection (redundant hard disks, encryption, file integrity checks). Accessible from anywhere in the world from any device (computer, smartphone, tablet).

Tools developed :

- **Guideline of reference photographs for a stranding**: pdf document including the views to be taken, as well as checklists for correctly performing biometry and taking samples. To be translated into French and Arabic, but also simplified for external users.
- **Arabic translation** completed
- **Graduated ruler** allowing copyrighting of photos, indicating the unique reference number but also standardization of color and brightness calibration of scientific photographs.

Tools to be developed

Dolfake: Anatomically realistic cetacean mannequin for training teams in stranding management (biometry, photography, reporting, sampling, etc.). A first initiative of Dolfake has been done in April 2024 and a Dolfake interest demonstration has been shown during the European Cetacean Society conference 2024.
- Application to aggregate data in the field in a standardized way (form-type application integrating guidelines) A demonstration prototype already exists.

Progress report
- Observations

The team has demonstrated a good understanding of the issues involved in scientific photography but need training in respect established protocols (Dolfake interest see below).
As regards taking photographs in the autopsy room, the team has made considerable progress in respecting established protocols and shown impressive rigor in taking photographs of the internal examination.
Although there are still a few points to be perfected, the results have already exceeded expectations in terms of image quality and, consequently, the production of scientific data.
As far as outdoor photography (on the beach) is concerned, few strandings have occurred since the start of the training program, or were subject to severe time constraints.
The team still lacks practice and needs to improve its working methods to gain in confidence, efficiency and speed.
The main problem is the lack of training linked to the need to wait for a stranding before being able to practice. This weakness will be offset by the creation of the Dolfake.
The advantages of this device are numerous:
- No biological risk
- No time limit for taking photos (no decomposition)
- Preservation of animal welfare
- Low unit cost
- Training sessions can be standardized by making identical mannequins available to several teams.
- The Dolfake can be used for communication purposes, as well as for training in biometric measurements (to be verified).

Future strategy and suggestions
- Wait for training results on mannequins to validate the team

- Adapt photo-sharing protocols to facilitate team work
- Ask participants to use self-assessment and cross-assessment between colleagues to lighten the workload of experts and enable them to assess their maturity in terms of their ability to train others.
- The dolfake will be an excellent tool for self-assessment with predictable organization of training sessions.
- Add photo-processing software training to make teams fully autonomous in managing their images (preparation for peer-reviewed articles, communication, internal training, etc.) Priority to in-house training and coaching.
- Assistance with the creation of communication workshops using photography to raise awareness among the ever-valuable population.
- Assistance with partner training (trainer monitoring)

The team must define its own objectives in terms of measurements/photos/surveys to be carried out on site, depending on the level of training of those involved.
The experts should be able to follow the team's progress to support them in their choices: training new scientific photographers and strengthening their national stranding network.
Launch the development of a simple dummy (training in biometry and external examination photographs) that would enable the training of a maximum number of new operators and the maintenance of the skills of those already trained. If the concept is successful, more sophisticated models will be developed to keep pace with the increasing complexity of the procedures required during a stranding (taking samples, performing an autopsy, photographing internal organs, etc.).

SWOT analysis

Strenghts	**Weaknesses**
1. Strong motivation always valid always variable, with some heterogeneity between participants. 2. Network clearly identified and well distributed network to be strengthened still valid. 3. Feedback and suggestions for improving training courses are relevant, particularly as regards translation into Arabic and French and promotion of practical training. The provision of guides in Arabic has contributed to this improvement. 4. Good performance in autopsy room photography.	1. Haste in executing protocols significant improvement noted heterogeneity, some participants not applied. 2. Some participants did not follow protocols with the necessary rigor. 3. Lack of training still valid, especially for outdoor shots, but depends on the participants. 4. Heterogeneities in performance were noted in July 2024, indicating a need for harmonization of skills
Weaknesses	**Threats**
1. The possibility of training partners internally represents an opportunity to strengthen skills and improve the standardization of interventions... 2. Teleautopsy probably possible in the vicinity of large conurbations (to be verified), see below. 3. The creation of a scientific photography certificate is an ongoing project, which could reinforce the competence and professional recognition of our partners. 4. Teleautopsy possible indoor still valid 5. Possible collaboration with neighboring countries still valid, but priority should be given to developing the national network	1. Heterogeneity in the quality of images from different participants net progress here Unmotivated participants remain 2. Difficulty in defining the boundary between image quality and shooting speed. 3. A shift from photography to teleautopsy A shift from findings to photography. Still observed, should continue as long as photography is not routine. The development of a step-by-step application could improve the problem. 4. Specific training is still needed to strike a balance between the quality of the shots and the speed with which they are taken.