

**Australian Marine Mammal Centre**  
**Final Report**  
(subclause 9 and Schedule Item 5 of the Funding Agreement)

---

- **Project No.** – RFT012/0607
- **Title** - Establishment of an Australian centre for marine mammal age determination using tooth structure
- **Chief Investigator** – Dr Catherine Kemper
- **Organisation** – South Australian Museum, Adelaide, SA

**Activity Period** – March 2007 to December 2008

**Table of contents**

1. Activity Summary
2. The Outcomes/Objectives
3. Appropriateness
4. Effectiveness
5. Financial Account of the Activity

**1. Activity Summary**

A clear summary of approximately 500 words outlining the work undertaken and any significant findings (for publication on the Department's web site)

The method of estimating marine mammal age using tooth structure is well established but little expertise on this technique exists in Australia. As a result, most researchers needing to use the method travel outside Australia for training. During 2007, four investigators (C. Kemper, K. Evan, R. McIntosh, J. McKenzie) established

a Marine Mammal Aging Facility at the South Australian Museum, an institution with significant marine mammal collections and research programs that would benefit from knowing animal age. Funding was obtained from ACCAMS to set up a laboratory and conduct a workshop for 6 to 8 participants from around Australia to get initial training in preparation and evaluation techniques for aging marine mammals using tooth structure. An instruction manual was prepared for the workshop (and has since been refined as more knowledge is gained) and will be made available on the Museum's website.

The workshop and manual concentrated on two commonly-used methods 1) decalcified, thin-sectioned, stained small to medium-sized teeth (e.g. dolphins and seals) and 2) acid-etching of larger teeth (e.g. sperm whales and killer whales). The manual goes through a step-by-step approach to each technique, from obtaining teeth (including how to extract from live animals) to aging the prepared specimens. It incorporates the extensive experience of the investigators in using these techniques on marine mammals in Australia. Both methods use Growth-Layer-Groups (GLGs) as a means of estimating the number of years that an animal has been alive. Interpreting these GLGs requires a great deal of experience and it is recommended that several readers (and several estimations per reader) are done in order to be confident that the age arrived at is as accurate as possible. A comprehensive reference list of papers on marine mammal aging using tooth structure is included in the manual.

It is intended that the facility be operated in several ways:

1. It be available for Australian researchers (trained in the techniques) to process marine mammal teeth
2. The South Australian Museum/Investigators listed above prepare and/or interpret teeth under contract for external researchers
3. The South Australian Museum/Investigators listed above train researchers on a

one-to-one basis, for a fee

Although not part of the funding agreement, during 2008, a university student from Italy conducted a project in the facility under the direction of C. Kemper. About 80 Indo-Pacific Bottlenose Dolphins were aged and sexual maturity of males determined for about 50 animals. Preliminary information on the age of sexual maturity of females was also obtained. A subset of the animals was 'known age' as a result of long-term studies in the Adelaide region.

## **2. The Outcomes/Objectives**

The degree to which the Activity has achieved the objectives

### **Objective 1: Set up laboratory**

Achieved in August 2007, with refinements and minor modifications carried out later in 2007 and in 2008. The major piece of equipment purchased was a cryostat, for thin-sectioning decalcified teeth and bone. The lab was used during 2008 by a student from Italy who determined the ages of about 80 Indo-Pacific Bottlenose Dolphins from South Australia. There is interest from several researchers to use the facility during 2009.

### **Objective 2: Run a workshop to train Australian researchers**

The workshop was held from 22-25 August 2007 (3 1/2 days) at the SA Museum. Karen Evans, Rebecca McIntosh and Catherine Kemper contributed to the instruction of participants. Seven participants attended the workshop; Christine Fury (Southern Cross University), Susan Gibbs (Macquarie University/SA Museum), Isabel Beasley (DPIW, Hobart), Sam Thalmann (DPIW, Hobart), Kate Charlton (Monash

University), Amy Stump (SA Museum) and Chandra Salgado (Curtin University). The workshop was run free of charge to participants but each had to fund travel and accommodation costs in Adelaide.

**Objective 3: Produce a manual outlining how to prepare and evaluate marine mammal teeth for aging.**

The manual was made available at the workshop but has since undergone some refinement and additions as result activities during late 2007 and 2008. A near final version will be submitted with this report. It is envisaged that the manual will be made available on the website of the South Australian Museum during its upgrade in 2009.

**Objective 4: Make frozen tissues available from aged dolphins for telomere length research**

No requests have been made for tissues.

**3. Appropriateness and 4. Effectiveness**

**The appropriateness of the approaches used in the development and implementation of the Activity**

In general, approaches were appropriate to the activities carried out but the following comments and recommendations are made below:

1. In a letter from Andrew McNee to Catherine Kemper dated 30 November 2006, it was made apparent that the Department “was keen to discuss a business case with you with a view to long term funding.” Since the South Australian Museum is unable to maintain the facility without some external

support, it would be very interested in proceeding with such discussions.

2. A request was made in the initial application to ACAMMS for funding to study age and sexual maturity in Indo-Pacific Bottlenose Dolphins from South Australia but this was not included in the funding received. Carrying out such a research project in the new laboratory is an excellent way of refining techniques and training personnel. It also produces tangible data for the scientific community.
3. Workshops at the SA Museum should be limited to no more than 6 participants.
4. Future workshops should include funding for staff from the South Australian Museum to run them. This could come from charges made to participants who attend or from additional funding from government.
5. More time (and funding) should have been included for preparing the manual.