

# **Examination of health effects and long-term impacts of deployments of multiple tag types on blue, humpback, and gray whales in the eastern North Pacific: Progress Report for 2010**

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## **LONG-TERM GOALS**

The goal of the project is to examine the long-term impacts of deployment of several types of tags, especially deep implant satellite tags that have been deployed on blue, humpback, and gray whales in the eastern North Pacific and to identify types of impacts and ways these might be reduced.

## **OBJECTIVES**

The project will have several objectives:

1. Examine the long-term survival of tagged animals in relation to animals that were not tagged.
2. Test for differences in the visual health status of tagged versus untagged animals.
3. Examine the condition of the tag site and evaluate healing in tagged animals.

## **APPROACH AND WORK PLAN**

The primary approach to be used in this study is follow up and examination of data and photographs from over 400 tagged blue, humpback, and gray whales in the eastern North Pacific. The proposed work involves three major components: 1) determine the photo-identification of the individual whales that have been tagged, 2) compile historical sighting histories and photos of these animals, and 3) obtain supplemental data on these animals in field seasons in 2010-12. This effort would then provide the information to examine differences in sighting rates, reproduction, survival, and health indices between tagged and untagged individuals as well as provide a record of photographs to document the condition of the tag site.

The project involves biologists at Cascadia who work with blue, humpback, and gray whales photo-ID, collaborators at OSU, a veterinary/pathology team, and other organizations involved in research on blue, humpback, and gray whales. Primary collaborators at OSU include 1) Bruce Mate, who conducted the majority of deep penetration tag deployments on these species in the eastern North Pacific and has the photographs and biopsy samples from these animals that have and will be examined to determine the photo-ID of these individuals, and 2) Scott Baker, who will be conducting the genetic analysis of samples collected to identify individuals tagged. The veterinary pathology team includes Drs. Frances Gulland, Michael Moore, Stephen Raverty, and Dave Rotstein.

The project was funded late in fiscal year 2010, so only some of the work called for in the first complete year of the project has been conducted. Field work in support of this project was conducted and collaborative agreements set up with OSU as discussed below. In 2011 we will complete the identification of the tagged individuals, conduct initial genetic tests, conduct visual health assessments of whales, and develop wound healing criteria with our veterinary pathologist team.

Examples of two types of suction-cup tags and one of the OSU implant tags are shown in Figure 1. The suction cup tags which have been deployed on over 200 individual blue and humpback whales have used several types of suction cups attaching different degrees of suction and typically stay attached for a few hours to a few days. The implant tags have mostly been deployed by Oregon State University (OSU) and have stayed attached for a year or more.



*Figure 1. Two blue whales in the Santa Barbara Channel shipping lanes on 16 August 2008 showing three different tag types to be used in this study (suction cup attached Mk10 Fastlock GPS tag and Bprobe and implanted OSU satellite tag.*

A key aspect of the proposed work is the use of the photo-identification to link to both Cascadia's catalog of identified blue, humpback, and gray whales and the long sighting histories of these whales and continued monitoring to examine survival rates and reproductive success (Table 1). This data is supplemented by continuation of the photo-ID efforts during 2010, 2011, and 2012.

*Table 1. Summary of photo-ID catalogs maintained by Cascadia Research that would be used for examining sighting histories of tagged whales.*

	Humpback	Blue	Gray
Primary region	US West Coast	E N Pacific	Pacific NW
Earliest	1979	1975	1977
Start of regular	1986	1986	1990
Records	14,424	8,867	12,130
Individuals	2,121	2,161	889
Abundance	1,600	2,000	250
IDed/year	300-500	200-400	150-250

## **WORK COMPLETED**

The project was funded late in fiscal year 2010, so only the initial few months of the project fell into FY 2010 and are covered in the report. Since receiving the award several key aspects of the work was conducted:

- 1) Initial discussions were undertaken with our veterinary pathologist team and some of the criteria for judging injury and healing conditions on tagged animals drafted.
- 2) Collaborative agreements were put in place with OSU to identify the best photo-identifications for matching to our catalogs of tagged whales and for completing the genetic tests of tissues collected from tagged whales.
- 3) Field work in 2010 included collecting photographs suitable for visual health assessment especially of blue whales encountered off California.

## **RESULTS**

Because this project is still in very early stages, few results are available at this stage other than as outlined above under work completed. Overall progress is underway and on schedule to generate the type of results assessing long-term impacts of different types of tag deployments.

## **IMPACT AND APPLICATIONS**

The project has potential impact and applications to several key areas: 1) the project is important to Quality of Life because tagging of cetaceans has become an important part of the research on marine mammals including how our activities impact them, but additional information is needed on the impact these tags have on the species being studied and ways we can decrease these impacts, 2) the project also is valuable to Science Education and Communication because it is important to be able to explain the methods being used to study the marine environment.

## **TRANSITIONS**

The proposed work will be valuable for future studies on ecosystem health and coastal resource management because it provides key information for other researchers using tags on cetaceans including the SOCAL-10 Behavioral Response Study that is using a variety of tag types to study how cetaceans respond to Navy mid-frequency sonar.

## **RELATED PROJECTS**

There are several related project being conducted as a part of this research. The SOCAL Behavioral Response Study to examine how cetaceans react to playback of mid-frequency sonar is a Navy-funded program which began in 2010 and involves Cascadia Research and a number of other collaborating groups. The BRS includes deployment of a variety of tags on blue whales, an important species in the work described here. The BRS has also included tag deployments on some other species like sperm whales which may allow follow up of tag impacts to these species. We are also obtaining follow up information and photographs when possible as part of the BRS that will be useful to the NOPP study.