

Photo-identification of killer whales from the eastern tropical Pacific

Paula A. Olson and Tim Gerrodette
Southwest Fisheries Science Center NOAA
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
Paula.Olson@noaa.gov

ABSTRACT

A photographic catalog of killer whales from the eastern tropical Pacific has been established at Southwest Fisheries Science Center. Photographs were collected opportunistically during 14 surveys for cetacean abundance conducted by Southwest Fisheries Science Center between 1977 and 2006. To date 162 individual whales have been identified from the photos. 11 of the 162 whales have been re-sighted. The re-sighting intervals ranged from 6 months to 14 years. The furthest distance traveled by a whale between re-sightings was 1,000nmi. Six whales exhibited movement in and out of the Gulf of California and around the Baja Peninsula. Five whales were re-sighted together in the same group, in 1999 and 2006. The re-sight of this group is the first in offshore, deep pelagic waters.

KEYWORDS: PACIFIC OCEAN, PHOTO-ID, MOVEMENT

INTRODUCTION

Killer whales (*Orcinus orca*) are the most cosmopolitan of cetaceans, but most of our knowledge of this species comes from research on coastal populations in mid to high latitudes. Little is known about killer whales in the pelagic, tropical environment. A photographic catalog of killer whales from the eastern tropical Pacific (ETP) was established at Southwest Fisheries Science Center (SWFSC) in order to investigate the distribution, movement, and external characteristics of killer whales in this region.

The catalogue is based on photographs collected opportunistically during cetacean surveys in the ETP conducted by SWFSC. Additional photos were added to the collection from naturalists working on wildlife cruises and other independent photographers. The catalogue is a work in progress as all the photographs have not yet been analyzed. This report summarizes the work and the results so far.

METHODS

Photographs were collected during 14 surveys conducted by SWFSC between 1977 and 2006. Sighting data were recorded for all killer whales detected during the surveys and photographs were taken when time and weather permitted. From 1992 onward there was a more directed effort in obtaining killer whale photographs during the surveys and this effort was often combined with biopsy sampling. SLR cameras with slide and B&W film

were used during cruises 1977-2003. Digital SLR cameras were used to collect images during the two most recent surveys in the ETP in 2003 and 2006. (For more information on field methods used during the surveys see Jackson *et al.*, 2004.) Photographs in film format are being digitized in order to create an electronic archive and to facilitate matching.

Whales were photo-identified as individuals using natural markings based on methods from Bigg *et al.* (1987). Individually unique features used to identify whales include the shape of the dorsal fin and any nicks, the shape of the saddle patch and any scars. Photographs of individuals were compared with one another.

RESULTS

Over 1,000 photographs have been examined from 9 of the 14 years of photos. This represents one third of the photos in the collection. The majority of photos that remain to be analyzed are digital photos from the 2006 season. 85% of the photos in film format have been digitized.

A total of 162 individual whales were identified from the photos examined so far. Whales were photographed in both inshore and offshore areas (Fig. 1).

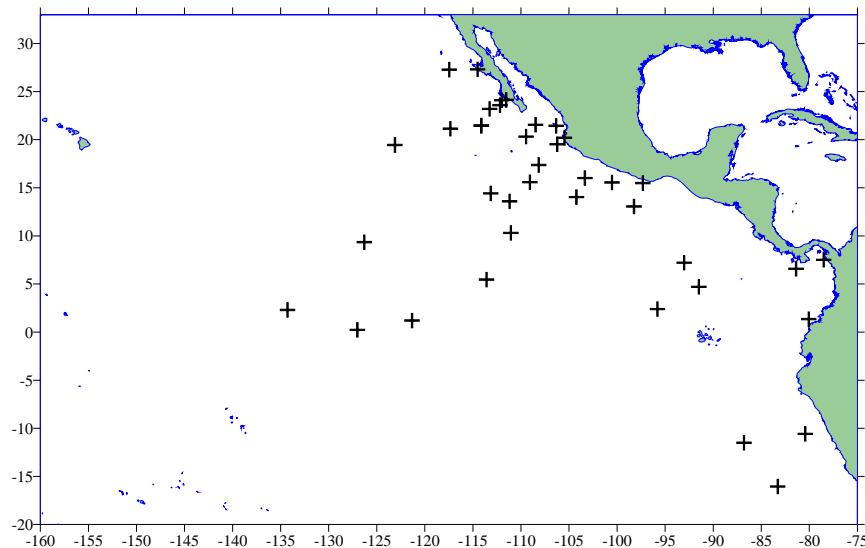


Figure 1. Locations of 162 photo-identified killer whales in the eastern tropical Pacific. Note that usually more than one whale was photo-identified at each location.

11 of the 162 whales were re-sighted. Six of the whales were re-sighted multiple times. During one sighting, three of the whales were observed preying on a bottlenose dolphin. The whales were not re-sighted with the same associates, except for two whales that were that were seen together, 10 years apart. All six whales match to individuals in a catalogue maintained by Mercedes Guerrero-Ruiz at Universidad Autónoma de Baja California Sur, La Paz, México. These whales exhibited movement in and out of the Gulf of California, around Baja, to Cabo Corrientes and Isla Socorro (Fig. 2). The re-sighting intervals

ranged from 6 months to 14 years. The furthest straight-line distance traveled by a whale between re-sightings was 1,000nmi.

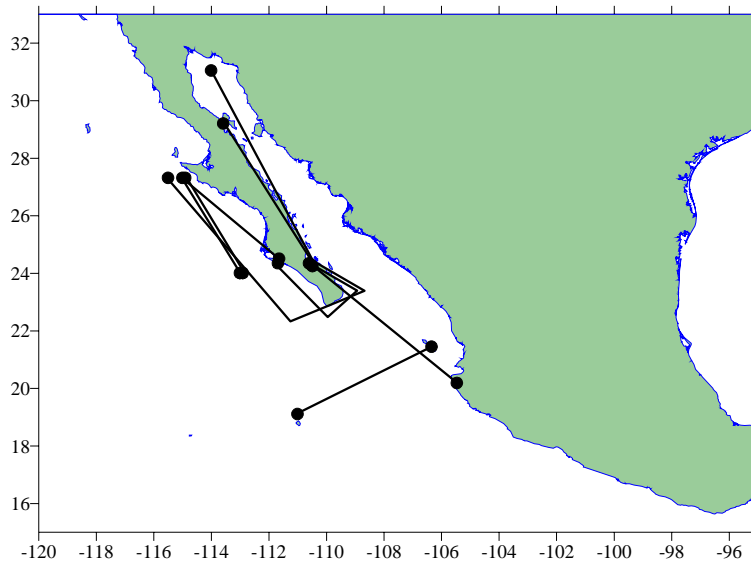


Figure. 2. Locations of six killer whales re-sighted in the Baja California region, 1992-2003.

Five of the whales were re-sighted together, in 1999 and 2006. The two sighting locations, offshore mainland Mexico, were separated by 149nmi. In 1999 they were part of a larger group of nine whales composed of varying age classes and in 2006 part of a similar group of eight.

Examining photographs to identify individuals provides a good opportunity for reviewing external characteristics of the whales, especially the saddle patches and dorsal fins. All of the saddle patches on the whales were closed (without the intrusion of black into the white saddle as observed on “resident” killer whales in the northeast Pacific). Most of the saddle patches on killer whales in the ETP are faint; some are barely visible. The saddle patches are often more narrow than what is observed in other populations.

DISCUSSION

Our results add to the body of evidence that killer whales range widely throughout the Baja California region. The photograph catalogs of Guerrero-Ruiz *et al.* (1998) and Black *et al.* (1997) also show movement by whales within and in and out of the Gulf of California. These waters support a variety of marine mammals, making it a likely area for mammal-eating killer whales to forage regularly, such as the three whales observed preying on the dolphin. Further research is needed in order to characterize the dietary preferences and types of killer whales found in this region.

The re-sighting data here and in Guerrero-Ruiz *et al.* (1998) suggest that group structure in the Baja region may be more fluid than what is observed in well-studied killer whale populations such as those of the northeast Pacific. However the re-sighting in 2006 of what appeared to be a family group first photographed in 1999 suggests a stable group structure for these individuals. Killer whales in the northeast Pacific are known for sympatric population sub-structuring (e.g. Hoelzel *et al.*, 1998); such structuring may occur in the ETP as well. The re-sight of this group is the first in offshore, deep pelagic waters.

This catalogue will be useful in investigations of killer whale movements, distribution, population structure, and external morphology.

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