

## Coastal Ocean Mammal and Bird Education and Research Surveys (Beach COMBERS)



**Figure 1:** Beach COMBERS volunteers document their findings of beachcast sea birds and marine mammals.



**Figure 2:** Red dots indicate location of 27 Beach COMBERS beach survey segments within the Sanctuary. Map Credit: Chad King (MBNMS).

### Management Issue

Ecosystem conservation begins with an understanding of human caused and natural changes to the ecosystems of the Monterey Bay National Marine Sanctuary (MBNMS or Sanctuary). Long-term systematic surveys of beachcast marine bird, mammal and turtle carcasses provide a baseline index to determine the frequency and magnitude of ecosystem changes over time.

### Project Description

Since May 1997, volunteer “citizen scientists” and sanctuary partners have conducted systematic surveys as part of the Coastal Ocean Mammal and Bird Education and Research Surveys (Beach COMBERS) in the MBNMS. The main goal of the program has been to distinguish human and natural impacts to marine bird and mammal populations in the Monterey Bay ecosystem. Marine birds and mammals are conspicuous top predators and the deposition of these dead organisms on beaches has been used as an indicator of marine ecosystem health, including availability of prey resources, anthropogenic impacts, and natural die-offs.

The specific objectives of the Beach COMBERS program are to: 1) obtain baseline information on rates of beach deposition of marine birds and mammals; 2) assess causes of seabird and marine mammal mortality; 3) assist resource management agencies in early detection of unusual rates of natural and anthropogenic mortality; 4) assess abundance of tar balls (oil patches) on beaches; 5) build a network of interacting citizens, scientists, and resource managers; and 6) disseminate information to the resource managers, public, and educational institutions.

Pairs of trained volunteers survey their assigned beach during the first week of each month at low tide (Fig. 1). Data have been collected for 27 beach segments over the course of the project (Fig. 2). This long-term monitoring of beached marine birds and mammals has enabled resource managers to determine trends in deposition. Managers have used this knowledge to better identify significant mortality events triggered by natural and anthropogenic environmental perturbations affecting wildlife including oil spills, fishery interactions, harmful algal blooms, and natural starvation events.

### Collaborative Implementation

The Beach COMBERS project is a shared effort among:

- Monterey Bay National Marine Sanctuary
- Moss Landing Marine Laboratories
- California Department of Fish and Game
- California State Parks



## Citizen Science Creating Data Products

- Beach COMBERS is a citizen monitoring program with academic oversight:
  - Since 1997, over 190 volunteers have been trained in conservation science.
  - Volunteers currently survey 79 km of beaches in the Sanctuary every month.
- Beach COMBERS data have been used in a top international science publication *Nature*.
- Beach COMBERS data contribute to NOAA's National Marine Mammal Health and Stranding Response Program.

## Detection of Significant Events

- Analysis of mortality events detected by Beach COMBERS volunteers (Table 1) has shaped management and policy:
  - Beach COMBERS survey data were an essential source of information used to understand the threats to wildlife from gillnet fisheries. This information led to modified State Fish and Game regulations.
  - Beach COMBERS provided some of the first data regarding the impacts of harmful algal blooms and domoic acid toxicity on seabirds and marine mammals.
  - Beach COMBERS has provided resource managers with valuable information on how to respond to oil spills and has documented long-term changes in the numbers of oiled animals.

## Informing Resource Managers

Beach COMBERS data helps managers effectively respond to media inquiries about the status of Sanctuary resources. Being equipped with long-term monitoring data gives MBNMS staff the authoritative voice they need to speak to scientific and public audiences.

## Challenges

Beach COMBERS has proven to be a critical program for “keeping a finger on the pulse of the Sanctuary.” Continuance of this long-term program will increase stewardship and understanding of marine birds and mammals and the ecosystems on which they depend in the Sanctuary. However, additional funding is essential to provide needed investments in equipment, volunteer recruitment and training, data analysis, and reporting information to managers.

Year	Event Detected	Nature of Cause
1997	Gill net by-catch	Human
1997-98	El Niño	Natural
1997-98	Pt. Reyes tarballs	Human
1998	Domoic acid bloom	Natural
2000	Grebe die-off	Natural
2001	El Niño	Natural
2001	Entanglement issue	Human
2003	Surf Scoter	Natural
2003-04	Fulmar die-off	Natural
2004-05	Upwelling failure	Natural
2006	Grebe event	Natural
2006	Common Murre baby boom	Natural
2006-07	Alcid die-off	Natural
2007	Domoic acid bloom	Natural
2007	Mystery foam	Natural

*Table 1: Fifteen unusual mortality events detected from 1997-2007 in which one or more species exceeded the threshold limit.*

## Internet Presence

Learn more about Beach COMBERS at:

<http://www.sanctuariesimon.org/monterey/sections/beachCombers>

<http://www.youtube.com/watch?v=1rJYPSuEJd4>

Or contact Andrew DeVogelaere at [andrew.devogelaere@noaa.gov](mailto:andrew.devogelaere@noaa.gov)

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