Reflections in the sand: understanding bird die-offs from beach surveys in the Monterey Bay National Marine Sanctuary, 1997 – 2007

Hannah Nevins*1, Jim Harvey1, Jean de Marignac2, Elizabeth Phillips1, Corinne Gibble1, Dave Jessup3, Melissa Miller3, Jack Ames3, Scott Benson1,4, and Andrew DeVolgelaere2 & BeachCOMBERS **

Methods

We use standardized survey methods to obtain baseline rates of seabird deposition (birds /km/mo.) along area beaches, and to identify unusual mortality events.

Methods include:
• Volunteers are trained to identify marine birds and mammals
• Two observers per beach
• Same survey segments each month (1-3 km, see map left)
• Standard Datasheets
• Mark birds to avoid double-counting

Results

Since 1997, we have documented 15 unusual stranding events as evidenced by monthly carcass deposition exceeding the “Threshold level” (see right panel). We have also identified and additional 8 events which were determined by >2% of birds recorded as oiled and attributed to oil spills of unknown source.

Another four additional mortality events were documented by unusual location, spatial distribution, or number of rare avian species along Monterey Bay area beaches (e.g. 2006 Red Phalarope event & 2007 Puffin invasion).

Trends?

Causes of the 15 major bird die-offs were attributed to a variety of sources (graph right), including:
• environmental phenomena (n = 4) such as starvation due to el Niño or upwelling failure
• harmful algal blooms (n = 3)
• population fluctuations (n = 5) such as increased young produced or adults in area
• human activities such as fishery bycatch or entanglement (n = 2)
• oil spills (n =1)

Using this approach, we provide a relative measure of the relative frequency and severity of bird die-offs in the Sanctuary in the past and provide a framework to evaluate trends in cause of future mortality events.

Introduction

We reflect on a decade of beach survey data conducted by the Coastal Ocean Marine Bird and Mammal Education and Research Surveys (BeachCOMBERS) to monitor monthly changes in beached birds and mammals in the Monterey Bay National Marine Sanctuary. This program is dependent upon trained volunteers who serve as “citizen scientists” collecting valuable information in a standard effort to provide important information about the incidence of factors affecting marine birds and mammals in the sanctuary.

How do we know when a die-off is significant?

To determine if an increased number of dead birds in an area is really a major event or not, we use our past data to determine the long-term average and standard deviation, from which we calculate the threshold level (line). For example, the long-term mean deposition of Common Murres (graph below) is generally greater in the summer than the winter – light blue bars). If deposition is greater than the threshold level for a given species, we can say is unusually increased relative to the norm for that time of year.

Thanks…to all our BeachCOMBERS volunteers!

Interested in becoming a volunteer? Contact: Jean deMarignac@noaa.gov

*BeachCOMBERS, Moss Landing Marine Laboratories, 8227 Moss Landing Road, Moss Landing, CA 95039 USA. hnevins@mlml.calstate.edu.
**Monterey Bay National Marine Sanctuary, 299 Foam St., Monterey, CA 93940 USA. *Department of Fish and Game, Marine Wildlife Veterinarian Care and Research Center, 1451 Shaffer Road, Santa Cruz, CA 95060 USA. NOAA-Fisheries, Southwest Fisheries Science Center, La Jolla, CA. **too numerous to list