Background

BeachCOMBERS (Coastal Ocean Mammal and Bird Education and Research Surveys) conducts standardized monthly surveys of beachcast marine birds and mammals in Central and Southern California to assess trends in deposition and assist in the early detection of natural and anthropogenic mortality events.

113 trained volunteers survey 112 km of beaches between Santa Cruz and Los Angeles (CA, see map below).

Methods:

- Volunteers survey in pairs, once each month
- They record data on each bird or mammal they encounter, including:
  - Species, sex, age, oiling
  - External findings suggesting cause of death
  - Number of encounters (beach retention)
- Fresh carcasses are collected for necropsy at the Marine Wildlife Veterinary Care and Research Center (MWVRC) in Santa Cruz
- In 2013 South Coast region joined the program
- Natural oil seeps are more common in this region
- Oil sampling and notation of oil on beach segments began in 2013

Do oiled beaches always lead to oiled birds?

![Image of oiled birds]

- Oiled birds have been recorded since 1997
- Oil is noted as a suspected contributing factor to cause of death when birds appear to have been floating alive (upright) in oil
- More oiled birds are found during winter surveys
- Tarballs have been recorded on surveys since 2013

Take-away: Oiled birds are not found more frequently when more tarballs are reported

Effort-based surveys detect major die-off events

![Graph showing mean monthly deposition per km for four species that experienced major mortality events in the last seven years: Common Murre, Brandt’s Cormorant, Cassin’s Auklet, and Northern Fulmar. Separate bars are depicted for the long-term average (with standard deviation) and years with a mortality event. Threshold for a die-off event (dashed line) is twice the standard deviation.]

Collaboration with Marine Wildlife Veterinary Care and Research Center

<table>
<thead>
<tr>
<th>NAME</th>
<th>OATTS</th>
<th>GROSS FINDINGS</th>
<th>AGE CLASS</th>
<th>NO. EXAMINED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Murre 2015</td>
<td>Aug-Jan</td>
<td>Emaciation, potential HAB interaction (tests pending)</td>
<td>Hatch year majority</td>
<td>61*</td>
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<tr>
<td>Brandt’s Cormorant 2015</td>
<td>Aug-Sep</td>
<td>Emaciation</td>
<td>Young of the year</td>
<td>10</td>
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<tr>
<td>Cassin’s Auklet 2007</td>
<td>Oct-Dec</td>
<td>Emaciation</td>
<td>Hatch year/ immature majority</td>
<td>12</td>
</tr>
<tr>
<td>Northern Fulmar 2010</td>
<td>Nov</td>
<td>Emaciation, plastics</td>
<td>Hatch year</td>
<td>34</td>
</tr>
<tr>
<td>Brandt’s Cormorant 2009</td>
<td>Apr-Jul</td>
<td>Emaciation</td>
<td>Adults majority</td>
<td>54</td>
</tr>
<tr>
<td>Common Murre 2007</td>
<td>Mar</td>
<td>Emaciation</td>
<td>Immature majority</td>
<td>44</td>
</tr>
</tbody>
</table>

Table 1: Major findings of the necropsies of seabirds collected during major die-offs. Colors (yellow, red, blue, and green) link necropsy findings to species in Fig. 2. *Necropsy assistance by USGS National Wildlife Health Center.

- Gross finding of emaciation can indicate limited prey abundance, increased competition for food, or a failure at seabird breeding colonies
- Harmful algal bloom toxin level detection can indicate that additional health factors contributed to the decline and eventual mortality of seabirds

What’s next for BeachCOMBERS?

1. Online visualization of monthly data trends will allow anyone timely access to detection of major die-offs.
2. Continued collaboration with MWVRC will continue to improve our understanding of the causes of die-offs.
3. Expansion of standardized oil monitoring on beach surveys will provide baseline comparison for surveys conducted during oil spills, particularly on southern California beaches where natural oil seeps are common.