

2010 winter wreck of the Northern Fulmar (*Fulmarus glacialis*) in central California



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As fall transitions to winter, days grow shorter and temperatures drop, signaling to seabirds that they should head south from their Arctic and Sub-Arctic summer habitats. Among those migrants is the Northern Fulmar (*Fulmarus glacialis*, NOFU for short), which arrived in Monterey Bay in droves during November 2010. Although NOFUs are regular winter migrants in central California, during some winters large numbers of NOFUs strand on local beaches (termed a “wreck”). NOFU wreck events have been documented during the winters of 1907-1908, 1976, 1984, 1995, and more recently, 2003-2004.

Punctuated by a number of winter storms, November 2010 proved to be a difficult month for NOFUs. Rehabilitation centers were inundated with live NOFUs, which were arriving cold and hungry. The Monterey SPCA (MSPCA) Wildlife Center received 61 live NOFUs in November, sometimes receiving 8 or 9 birds a day. Although many of those NOFUs died shortly after arrival, or were euthanized due to a poor prognosis, staff at the MSPCA stabilized several birds, which were transferred to the International Bird Rescue Research Center (IBRCC) in Cordelia, CA.

In addition to being cold and hungry, NOFUs treated at IBRCC were diagnosed with hyponatremia (low sodium levels) and exhibited necrosis (dead tissue) and hemorrhaging (bleeding) in the webbing of their feet (Fig. 1). By providing supplemental sodium, IBRCC staff members were able to correct the hyponatremia, which greatly improved the prognosis of the NOFUs in treatment. IBRCC rehabilitated and released several of the NOFUs they received.

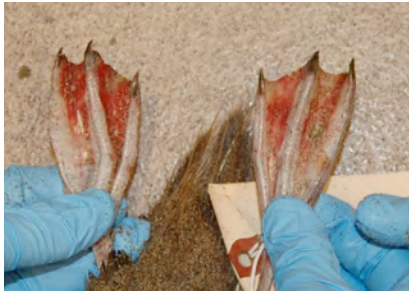


Figure 1 Northern Fulmar feet with hemorrhaging.

Hundreds of NOFUs never made it to the MSPCA or IBRRC for treatment. During the first week of December BeachCOMBERS (Coastal Ocean Mammal and Bird Education and Research Surveys) volunteers documented record numbers of NOFU carcasses on beaches in Santa Cruz, Monterey, and San Luis Obispo counties. On a single day during the first week of December 2010, surveys of 16 beaches in the three counties counted 1,221 beach-cast NOFUs (Fig. 2). BeachCOMBERS collected NOFU carcasses during October (n = 2), November (n = 4), and December (n = 28), which were transported to CDFG for post-mortem examinations. By

comparison, Beach Watch, a volunteer beach monitoring program that conducts surveys between Bodega Head and Año Nuevo, reported 505 NOFUs on their beaches (J. Roletto and K. Lindquist, personal communication). This number was less than that reported in the last big winter wreck in December 2003, when Beach Watch reported 766 NOFUs in the same area.

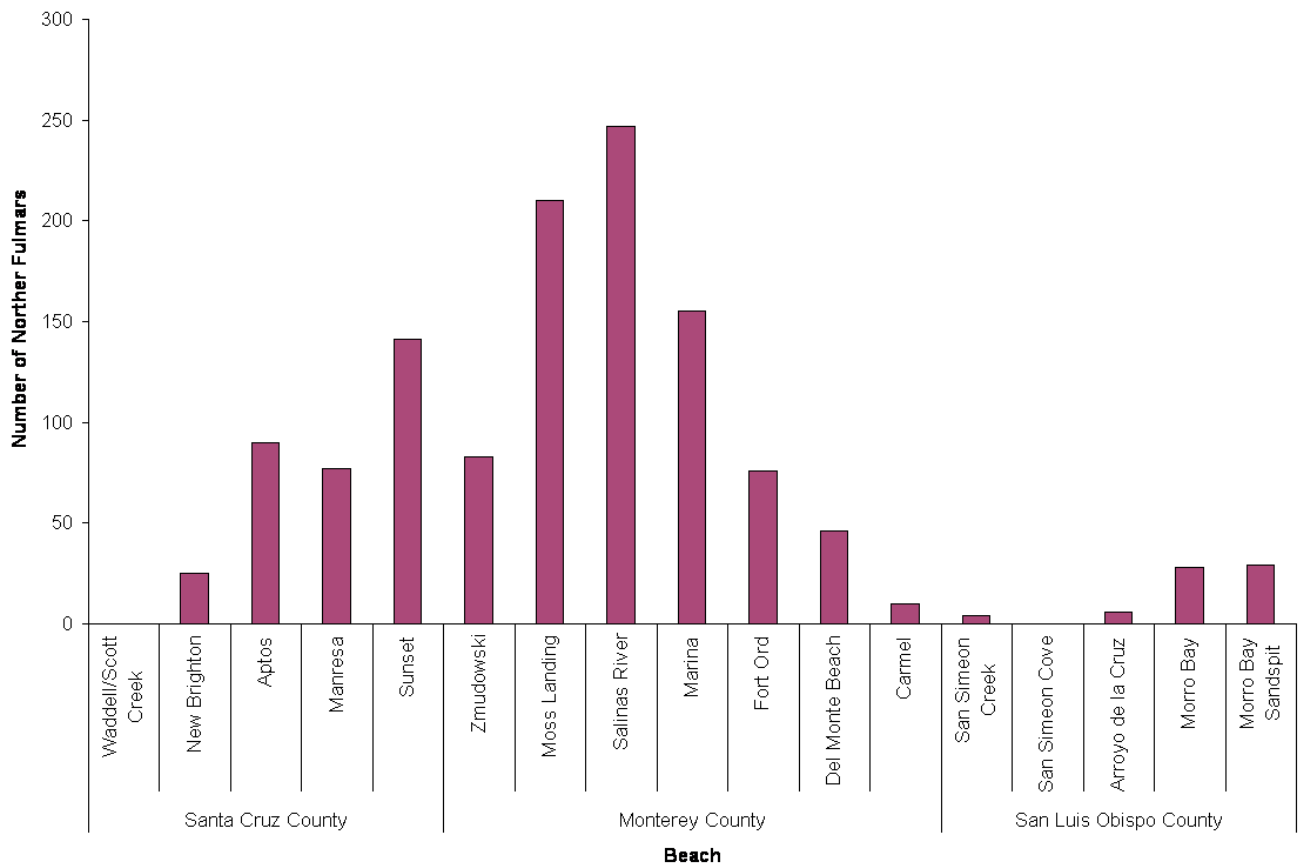


Figure 2. Counts of Northern Fulmars on beaches in Santa Cruz, Monterey, and San Luis Obispo counties during surveys conducted the first week of December 2010.

With the help of many volunteers, we conducted necropsies (i.e. animal autopsies) on 81 NOFUs that were collected by BeachCOMBERS during surveys (n = 34), obtained from the MSPCA (n = 37), the Peninsula Humane Society (n = 4), and collected opportunistically (n = 6). Although some NOFUs were scavenged or decomposed too severely to obtain relevant information (n = 10), we were able to determine the sex, age class, and nutritional condition of the remaining birds. The sex ratio of NOFUs was 1.2M:1F (n = 39 males, n = 32 females), but this event primarily affected hatch-year birds (98%; n = 70).

Table 1. Fat deposition and pectoral muscle condition of NOFUs examined as part of the 2010 NOFU event. Fat deposition was scored on a 0-3 scale (0=no fat, 1=trace amounts of fat, 2=moderate fat, 3=marked fat), as was pectoral muscle condition (0=markedly below keel, 1=moderately below keel, 2=mildly below keel, 3=even with or above keel).

| | Number of NOFUs | | | | Total |
|------------------|-----------------|---------|---------|---------|-------|
| | Score=0 | Score=1 | Score=2 | Score=3 | |
| Subcutaneous Fat | 70 | 1 | 0 | 0 | 71 |
| Internal Fat | 70 | 1 | 0 | 0 | 71 |
| Pectoral muscle | 20 | 48 | 4 | 0 | 72 |

All NOFUs examined were emaciated. Poor nutritional condition was indicated by 1) low body mass (average=382.7g ± 44.4g) of dry birds (n = 41), 2) little or no subcutaneous or internal fat (Table 1), and 3) withered pectoral muscles (Table 1). Additionally, many birds appeared pale internally, which is an indicator of anemia. Other interesting findings included severe feather mites (n=9), reddish beaks, presumably caused by hemorrhaging (n=3), and a facial lesion, presumably pox (n=1).

Stomach contents were collected for later examination of prey parts and plastics. cursory examination of a subset of stomachs (n = 8), however, indicated a great incidence of small pieces of plastic in the ventriculus and proventriculus (Fig. 3).



Figure 2. Stomach removed from a NOFU examined at MWVCRC. Plastics were found inside the stomach (inset).

Bird sightings in Monterey Bay do indicate that there are more NOFUs than normal, which may contribute to the increased deposition of birds on beaches. The underlying cause of the event, however, likely is related to reduced body condition as a result of reduced prey availability or increased competition among NOFUs for food. In either case inexperienced, hatch-year birds are not finding sufficient food resources to meet their nutritional needs, despite great number of jellies, which are a food source for NOFUs in Monterey Bay this year. Intake of live NOFUs at rehabilitation centers has slowed dramatically during December, and we anticipate new carcass deposition on beaches will decrease by the January round of BeachCOMBERS surveys.

Thanks to the BeachCOMBERS volunteers and local public for collecting and bringing birds to local agencies for rehabilitation, and volunteers and staff at the Monterey SPCA, IBRRC, and MWVCRC. This work was

supported in part through a grant from the Monterey Bay National Marine Sanctuary (MBNMS), the Monterey Bay Sanctuary Foundation (MBSF), and the Sanctuary Integrated Monitoring Network (SIMoN). Moss Landing Marine Laboratories (MLML) and the California Department of Fish and Game (CDFG) Office of Spill Prevention and Response (OSPR), the Marine Wildlife Veterinary Care and Research Center, and Oikonos Ecosystem Knowledge Plastics Study provided substantial in-kind support. On-going and future investigations will benefit from continued systematic beach surveys, timely data collection and analysis, and summary reports such as this. If you have questions or comments regarding this or other mortality events in the area please contact Hannah Nevins (831-212-7218, hnevins@mlml.calstate.edu).

