



## **BEACHED SEABIRD AND MARINE MAMMAL CARCASS MONITORING 2012 Annual Report**



**January 2013**

*Title page photographs, top: California brown pelican, north Gold Bluffs Beach, Prairie Creek Redwoods State Park, 2 August 2012– much larger numbers of pelican carcasses were recorded in 2012 than in all previous survey years in Redwood National and State Parks, bottom: southern sea otter, north Gold Bluffs Beach, Prairie Creek Redwoods State Park, 15 January 2012 – first record of species in Redwood National and State Parks.*

## INTRODUCTION

Beached carcass monitoring surveys are conducted to ascertain baseline information about seabird and marine mammal mortality that occurs along portions of the Redwood National and State Parks (RNSP) coastline. The main objectives are to gather trend data on mortalities and determine whether the mortalities resulted from natural or anthropogenic events. Documenting natural mortalities can help biologists monitor events such as the expected deaths of post-fledging and adult breeding seabirds, fatal injuries from predation and other natural hazards and diseases in a population. Also, population effects of natural climatic events (e.g. El Nino) can be monitored more effectively.

The north coast of California receives traffic from container vessels and tug pulled barges carrying petroleum products, and while these ships are not visible from the coastline, they are a constant presence. Consequently, the cumulative impact of any small, unpublicized leaks, spills or accidents could contribute directly to seabird and marine mammal mortality along the RNSP coastline. The presence of petroleum products on carcasses can provide information on “background” levels of these contaminants in the marine environment. In addition, baseline data on the presence (or absence) of petroleum products on wildlife can be valuable for comparison when a large scale spill does occur. Entanglement in fishing gear and human trash, such as plastic bags and six-pack rings, has been documented as a cause of death for some marine fauna, and is also monitored for frequency of occurrence within RNSP.

## METHODS

The first surveys to monitor seabird and marine mammal mortalities were performed by RNSP staff during 1997. These surveys continued during 1998 and 1999, with 2 surveys performed in the winter (January and December) and three surveys performed in the summer (May, June, July). These surveys were usually done in conjunction with ongoing western snowy plover (*Charadrius nivosus*) surveys, since they took place in the same locations. Surveyors would walk one direction in the back-beach dune areas surveying for snowy plovers, and then return along the rack line of the beach looking for any marine mammal or seabird carcasses.

Beginning in 2000, beached marine mammal and seabird carcass surveys were expanded in an attempt to include all months of the year. Winter surveys (Jan.-Feb. and Nov.-Dec. of the same calendar year) were typically only conducted on Gold Bluffs Beach (north and south sections) and Freshwater Spit, whereas surveys from March-October were conducted on all the beach stretches during all years. Since 2005, regular winter surveys have been occasionally cancelled due to the low presence and persistence of carcasses and staff safety concerns (e.g. dangerous surf). There are currently six beach stretches surveyed within RNSP for carcasses, from south to north they are: Freshwater Spit, Mussel Beach, Gold Bluffs Beach (divided into 3 sections), and

Crescent Beach. The total distance of the six beaches is 25.8 km. Beach stretches were surveyed in accordance with the RNSP beached carcass survey protocol (see Holm 2008 - Appendix B), and all data was collected on beached carcass data sheets (see Holm 2008 - Appendix C) and entered into the RNSP Fish and Wildlife Branch carcass database.

In 2002 and 2003 all bird carcasses found along surveyed beaches were individually tagged and numbered. Approximately 40% of the bird carcasses were re-sighted on subsequent carcass surveys (Holm 2003). Thus, approximately 60%, on average, of the bird carcasses found were new. A 60% raw bird carcass count correction factor is used throughout this report in conjunction with the actual raw counts.

Most of the marine mammal carcasses recorded were detected during regular beached carcass surveys on the six index beach stretches. Some marine mammal carcass records, however, were from incidental sightings of beached carcasses from non-survey beach stretches. The information presented for marine mammals is therefore representative of the entire RNSP coastline. All marine mammal counts are actual numbers. Marine mammal carcass locations are noted when first recorded and not counted during subsequent surveys or incidental reports.

## RESULTS

### Survey Effort

All Redwood National and State Parks beaches were surveyed once per month in 2012. Surveyors spent a total of 226 person hours looking for beached carcasses (Fig. 1). Surveyors covered 25.8 km of beach each month during non-winter months. A total of 14.2 km of beach was surveyed each month during the winter.

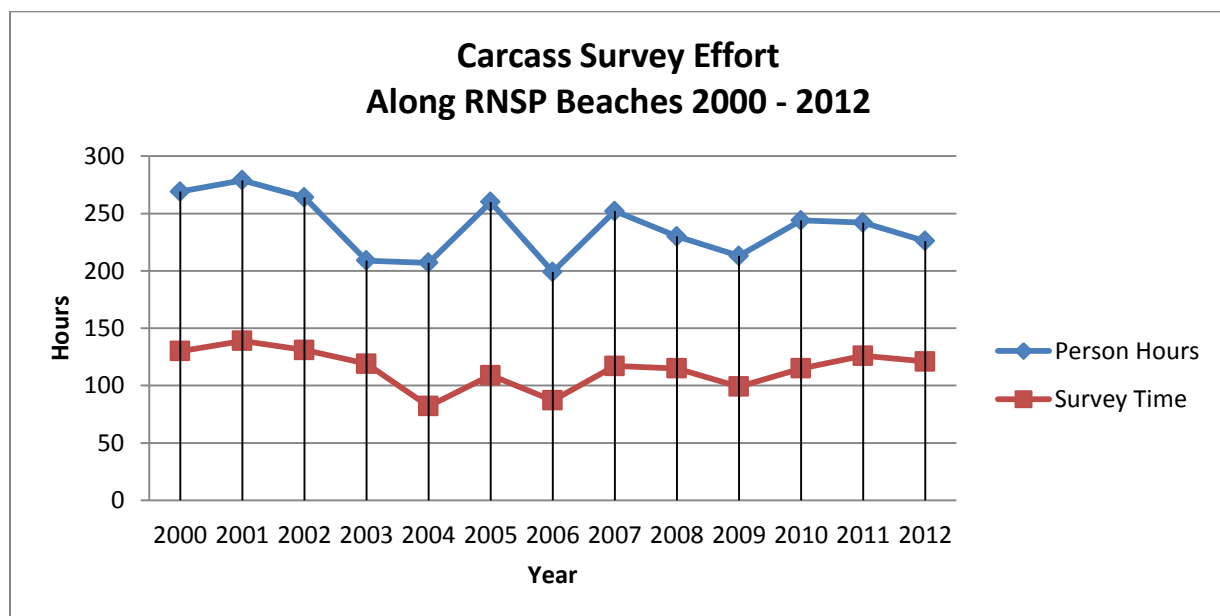


Figure 1. Beached carcass survey effort along RNSP beaches from 2000 - 2012.

## Bird Carcasses

### *2012 Non-winter Surveys (March – October)*

There were 736 bird carcasses (raw count) recorded from March to October in 2012. The total raw number of carcasses recorded was above the average recorded from 2000 to 2012 (mean = 667, SD = 70) (Fig. 2). Seventy-four percent of the 2012 carcasses were detected during the peak months of July – October, similar to the pattern seen in 2008-2011 (Fig. 3). Seventy-five percent of all carcasses were detected on the three Gold Bluffs Beach stretches, while 10% were found on Crescent Beach, and 15% on Freshwater Spit/Mussel Beach.

### *2011-2012 Winter Surveys (January – February and November – December)*

In the winter months there were 76 bird carcasses found, similar to all previous years but 2011 (Fig.2).

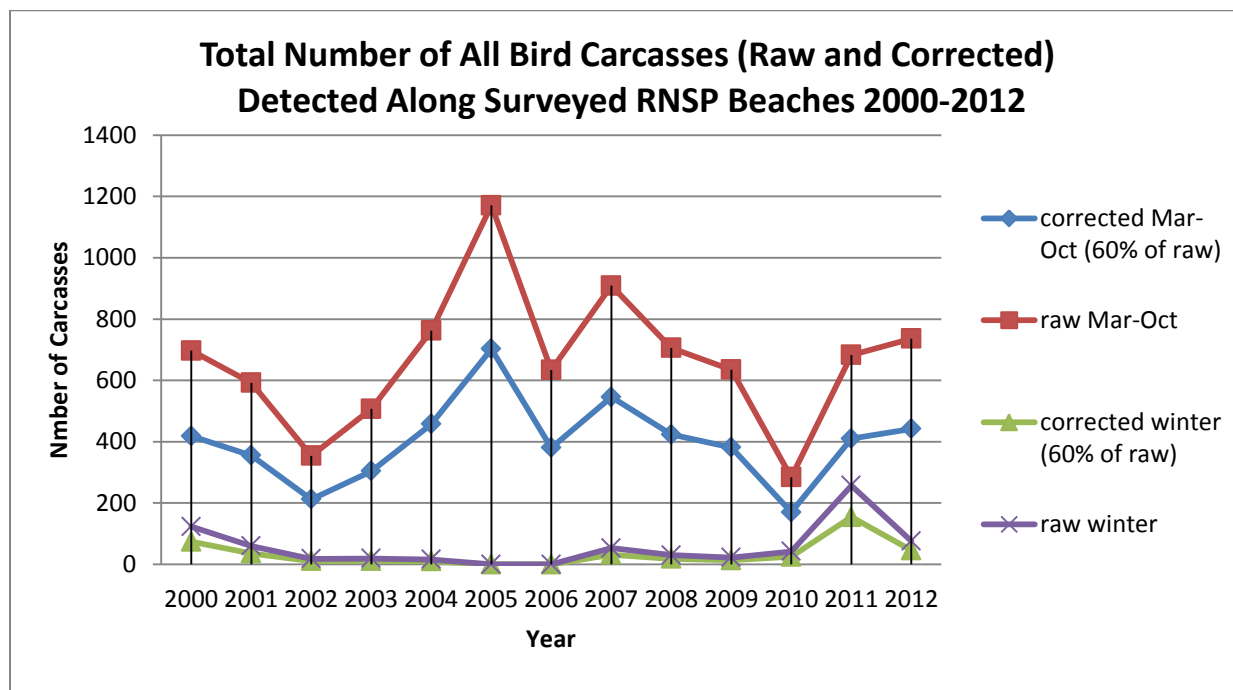


Figure 2. Total number of bird carcasses detected (raw and corrected) along surveyed RNSP beaches, winter and March through October 2000-2012.

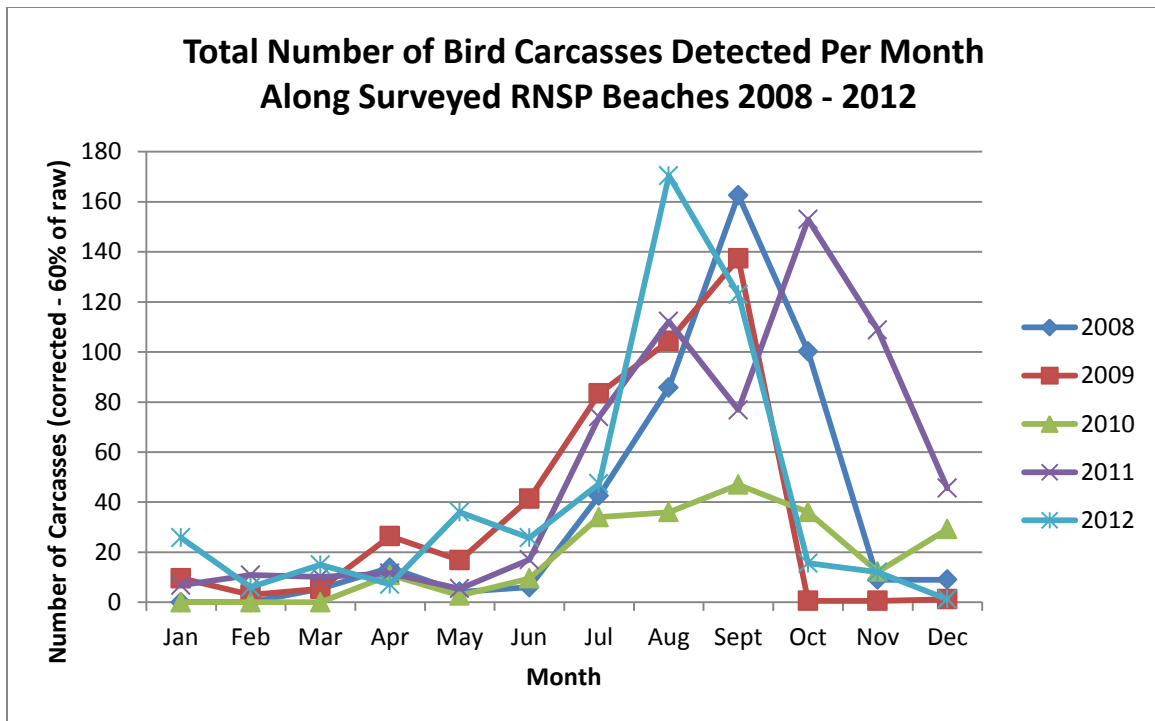


Figure 3. Total number of bird carcasses detected (corrected – 60% of raw count) per month along surveyed RNSP beaches in 2008 - 2012.

#### *Bird Species Detected*

Like all previous years but 2010, by far the most common species or species group recorded in 2012 were common murre. The second most common group of bird carcasses found were unknown gull species and the third most common species found were California brown pelicans. Forty-five (corrected, 60% of raw) brown pelicans were found on RNSP beaches in 2012, as compared to an average of five ( $SD = 5.52$ , range 0 – 19) recorded during the years previous to 2011. In 2011, the previous record year, 25 (corrected, 60% of raw) brown pelicans were recorded. The large number of unknown species most likely was distributed across many taxonomic groups because comments made about the unidentifiable carcasses indicated field marks of the the Alcidae, Procellariidae and Laridae families as well as other groups. Of special note was the number of brown pelicans found in 2012, by far the highest ever recorded. The rest of the carcasses found were spread over a wide variety other species or groups (Table 1, Figure 4).

Table 1. Raw and corrected (60% of raw) number of bird carcasses by species or group found along RNSP survey beaches in 2012.

| Species or Group         | Raw # | Corrected # | Species or Group         | Raw # | Corrected # |
|--------------------------|-------|-------------|--------------------------|-------|-------------|
| Common murre             | 297   | 178         | Brandt's cormorant       | 6     | 4           |
| Gull unk. species        | 185   | 111         | Rhinoceros auklet        | 5     | 3           |
| California brown pelican | 75    | 45          | Horned puffin            | 5     | 3           |
| Bird unk. species        | 62    | 37          | Loon unk. species        | 3     | 2           |
| Cormorant unk. species   | 38    | 23          | Northern fulmar          | 2     | 1           |
| Grebe unk. species       | 19    | 11          | Pacific loon             | 2     | 1           |
| Heerman's gull           | 13    | 8           | Caspian tern             | 1     | 1           |
| Western gull             | 13    | 8           | Double-crested cormorant | 1     | 1           |
| Sooty shearwater         | 13    | 8           | Shearwater unk. species  | 1     | 1           |
| White-wing scoter        | 11    | 7           | Canada goose             | 1     | 1           |
| Surf scoter              | 9     | 5           | Barn owl                 | 1     | 1           |
| Scoter unk. species      | 7     | 4           | Common raven             | 1     | 1           |
| Western grebe            | 6     | 4           | Mallard                  | 1     | 1           |
| Pelagic cormorant        | 6     | 4           | Osprey                   | 1     | 1           |
| California gull          | 6     | 4           |                          |       |             |

Over the last 13 years, excepting 2010 for common murres and 2012 for brown pelicans, the three most commonly detected species (common murre) or groups of species (gulls and cormorants) have roughly tracked each other. Common murre carcasses were detected at the fifth lowest rate since standardized surveys began (Fig. 4). Common murres were below the 13 year average in 2012 for the corrected (60% of raw) number of carcasses detected per kilometer of surveyed beach (2012 = 6.91; 2000 – 2012 mean = 8.53, SD = 4.55). Gulls were slightly above the 13 year average (2012 = 5.04; 2000 – 2012 mean = 4.10, SD = 1.26) while cormorants were also above the average (2012 = 1.18; 2000 - 2012 mean = 0.95, SD = 0.65).

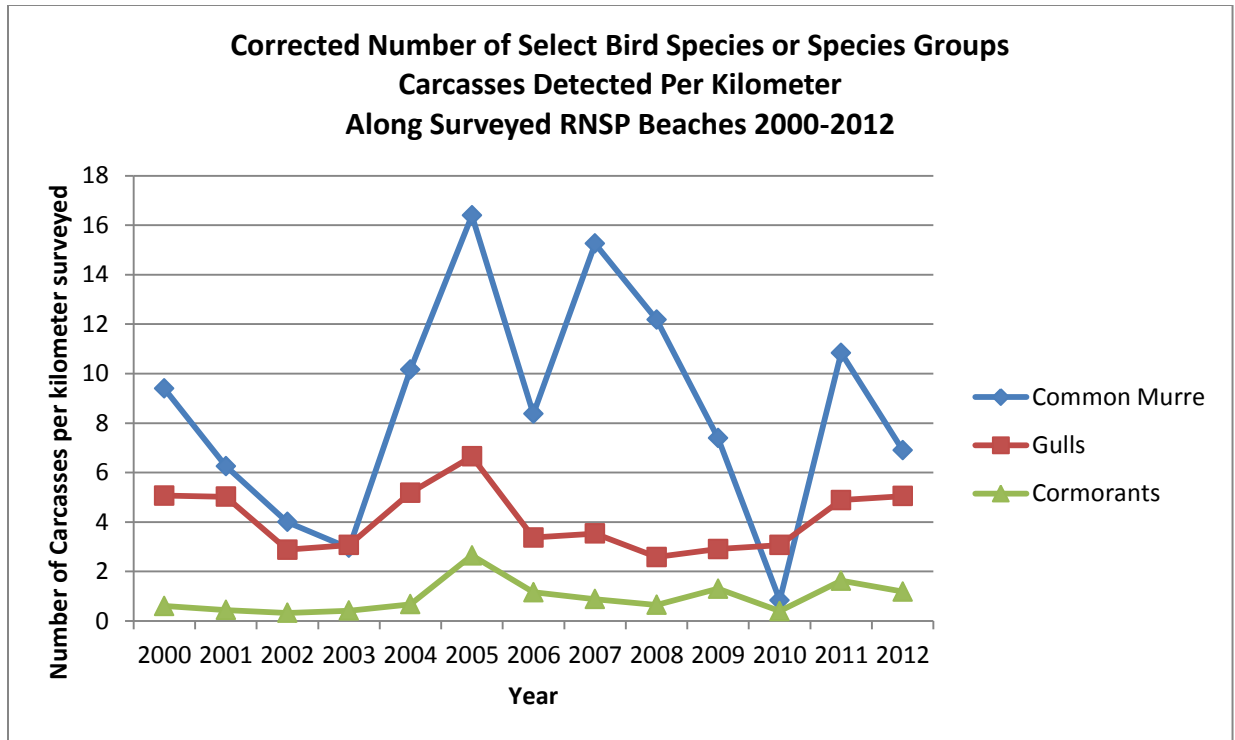


Figure 4. Corrected (60% of raw) number of common murre, gull and cormorant carcasses detected per kilometer of surveyed RNSP beaches from 2000 to 2012.

### Marine Mammal Carcasses

The carcasses of eight California sea lions (*Zalophus californianus*), one harbor seal (*Phoca vitulina*) and one federally threatened southern sea otter (*Enhydra lutris nereis*) – the first record for the species in RNSP, were recorded on the RNSP coastline during 2012. The sea otter was discovered on Gold Bluffs Beach in January, 2012 by research technicians working under marine mammalogist Dr. Dawn Goley of Humboldt State University, Arcata, California. The otter was an adult male in good nutritional condition at time of death as determined by abundant subcutaneous fat. No cause of death was determined due to the state of decomposition. Genetic testing confirmed that it was a southern sea otter (J. Kunz, pers. comm.).

No other marine mammal species were recorded in 2012. This past year was a continuation of typical numbers of California sea lion carcasses seen before 2009 and 2010. No alive but obviously emaciated yearling California sea lions were seen in 2012, unlike 2009 and 2010. All other marine mammal species were below typical numbers found in previous years (Fig. 5). All of the marine mammals were categorized as undetermined deaths. Marine mammal carcasses were found along all RNSP beaches.

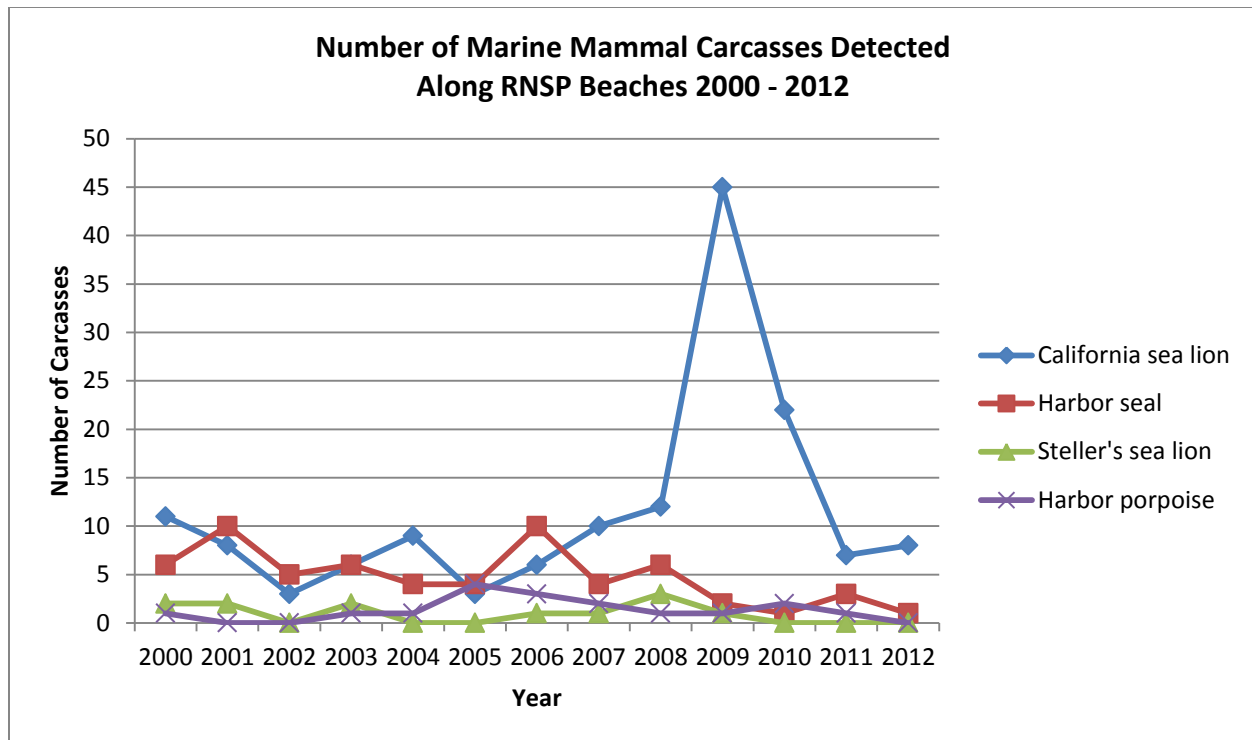


Figure 5. Number of common marine mammal carcasses recorded along the entire RNSP coastline from 2000 – 2012.

## DISCUSSION

The most significant event this year was the largest number of recorded brown pelican carcasses since standardized surveys were started in 2000. Young pelicans were obviously suffering from insufficient food resources as evidenced by their odd behavior and large numbers of carcasses discovered along the coast of California in the summer of 2012 as reported in the popular media. In the local area and within RNSP, young brown pelicans were reported in the popular media and observed by park staff to be diving into fish waste bins at fish processing plants, begging for scraps at recreational fish processing stations, wandering across marina parking lots, roosting on inland buildings, chasing Frisbees at beaches, and not flushing from closely approaching people. The most common reason for the widespread die-off by scientists quoted in the popular media is that upwards of 50% of juvenile pelicans die during their first year. As the pelican population recovers and grows, ever more dead and dying juvenile pelicans will be found along the coast and begging for food from humans.

The second significant event in 2012 was the first time discovery of a southern sea otter carcass in RNSP. It is unknown why the otter was so far from the nearest extant population of southern sea otters in central California. The presence of the otter this far north was highly unusual (J. Kunz, pers. comm.).

As demonstrated and discussed in previous years, the inter-annual variation in beached common murre carcass numbers may be a reflection of the variation in breeding success of the nearby colonies. The 2005 and 2011 spikes in beached murre carcasses followed the extremely productive 2004 and 2010 local murre colony breeding seasons. The four largest local murre colonies all experienced large increases in 2004 with Castle Rock increasing 36% over the previous nine year average, False Klamath Cove Rock (located within RNSP) increasing 8%, Green Rock increasing 24% and Flatiron Rock increasing 29% (Capitolo et al. 2006). In 2010, the local common murre colonies had very high fledging rates as compared to previous years (Golightly pers. comm., RNSP unpub. data) and may have had very high juvenile murre survivorship as indicated by the low numbers of murre carcasses recorded that year (Fig. 4). Many of the subsequently increased population of returning adults in 2005 and 2011 may have bred and then possibly overwhelmed local food resources, resulting in the larger die off seen in late summer and fall of 2005 and 2011. This past year's murre carcass deposition rate may indicate a trend where it can be expected that post productive year mortality will increase for a few years and then cycle back down again (Fig. 4). There are also a large number of different gull species that reside or migrate along RNSP beaches as well as very large cormorant breeding colonies. Carcass deposition for both of these species groups was approximately average when compared to the previous eleven years (Fig. 4). The location of RNSP within the seabird breeding "hotspot" of Crescent City to Trinidad (i.e. over 60% of all seabirds in California breed along this 50 mile stretch of coast) argues for continued beached carcass monitoring. If seabird carcass numbers continue to track breeding colony variation through the years, then carcass surveys may become an additional indirect method for monitoring regional seabird mortality, productivity *and* possibly survivorship.

Mortality based on man-made events should be quite evident, immediate and causative. It appears that human caused mortality along RNSP beaches has been quite minor since surveys were expanded in 2000. Spacing surveys by approximately 4 weeks likely allows managers to detect such trends, yet probably helps reduce double counting of carcasses to some extent. Because human caused mortality and other non-lethal impacts can occur at any time during the year, surveys for beached carcasses need to be conducted at regular intervals throughout the portion of the year that the species are present off of the RNSP coastline. Short-term trends in natural mortality are probably insignificant, and only after many years of data collection will any natural patterns become evident. The RNSP beached carcass dataset is becoming more and more valuable the longer that the information is systematically collected.

Next year will be the fourteenth year of consistent beached carcass surveys. RNSP's almost decade and a half worth of results should be compared with beached carcass occurrences in other portions of the Pacific coast. Beached carcass data is currently being collected in other areas of Humboldt and Del Norte counties outside of RNSP and on much of the coasts of Oregon and Washington by the Coastal Observation and Seabird Survey Team (COASST) and along Marin county beaches by groups working with the Gulf of the Farallons National Marine Sanctuary (Coast Watch). These organizations should be good sources of comparative data if standardized results can be obtained in a timely manner.

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## **PERSONAL COMMUNICATIONS**

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## **LITERATURE CITED**

Bensen, K.J. 2010. Beached Seabird and Marine Mammal Carcass Monitoring – 2009 Annual Report. Unpub. Report on file at South Operations Center, Redwood National and State Parks, Orick, CA. 10 pp.

Capitolo, P.J., G.J. McChesney, H.R. Carter, M.W. Parker, J.N. Hall, R.J. Young, and R.T. Golightly. 2006. Whole-colony counts of Common Murres, Brandt's Cormorants and Double-crested Cormorants at sample colonies in northern and central California, 1996-2004. Unpublished report, Department of Wildlife, Humboldt State University, Arcata, California; and U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex, Newark, California. 40 pp.

Holm, G. 2008. Surveys for Beached Marine Mammal and Seabird Carcasses. Unpublished report on file at South Operations Center, Redwood National and State Parks, Orick, CA. 16 pp.

Holm, G. 2003. Surveys for Beached Marine Mammal and Seabird Carcasses. Unpublished report on file at South Operations Center, Redwood National and State Parks, Orick, CA. 15 pp.

Sowls, A.L., A.R. DeGange, J.W. Nelson and G.S. Lester. 1980. Catalog of California Seabird Colonies. U.S. Department of the Interior, Fish and Wildlife Service, Biological Services Program. FWS/OBS 37/80. 371 pp.