

## **Biological mortality anomalies in the northern and central California ecosystem, 2014-2015**

**Kirsten Lindquist<sup>1</sup>, Jan Roletto<sup>2</sup>, Taylor Nairn<sup>1</sup> and Dru Devlin<sup>1</sup>**

<sup>1</sup> Farallones Marine Sanctuary Association, 991 Marine Drive, The Presidio, San Francisco, CA 94129; [klindquist@farallones.org](mailto:klindquist@farallones.org), [taylor.nairn@noaa.gov](mailto:taylor.nairn@noaa.gov), [ddevlin@farallones.org](mailto:ddevlin@farallones.org)

<sup>2</sup> Greater Farallones National Marine Sanctuary, 991 Marine Drive, The Presidio, San Francisco, CA 94129; [jan.roletto@noaa.gov](mailto:jan.roletto@noaa.gov)

### **ABSTRACT**

Beach Watch ecosystem monitoring project is a partnership of Greater Farallones National Marine Sanctuary and Farallones Marine Sanctuary Association. Established in 1993, Beach Watch (BW) engages citizen scientists in bi-monthly surveys for live and beach cast birds and mammals on sanctuary beaches from Año Nuevo State Reserve, San Mateo County to Bodega Bay, Sonoma County. In November 2014 additional surveys were added to the project, extending north to Manchester Beach, Mendocino County. Currently, over 1300 surveys are performed annually, spanning 280 km of coastline. The Beach Watch project provides over 22 years of status and trend data for over 300 species of coastal wildlife. The most abundant beach cast species are Common Murres (*Uria aalge*), Northern Fulmar (*Fulmarus glacialis*), Western Gull (*Larus occidentalis*), Brandts Cormorants (*Phalacrocorax penicillatus*) and California Sea Lions (*Zalophus californianus*). All beach cast birds and mammals are documented with measurements and photographs. Species identification, age, and sex are reviewed and confirmed by seabird and marine mammal experts on staff.

In 2014 and 2015 BW surveys documented unusual mortality events in two seabird species, Cassin's Auklets (*Ptychoramphus aleuticus*) and Common Murres and one pinniped species, the threatened Guadalupe Fur Seal (*Arctocephalus townsendi*). Cassin's Auklets are zooplanktivores feeding nearly exclusively on krill. Murres and Fur Seals are piscivores. BW collected specimens of each species for necropsy to determine cause of death.

Cassin's Auklets, a pelagic species, are historically rare on beached bird surveys in north central CA typically found at a rate of 0.017 birds/km surveyed. In July 2014 through February 2015 emaciated Cassin's washed ashore in above average numbers. During November and December Cassin's were observed at a rate of 2.82 birds/km an increase of over 166 times baseline rates. Guadalupe Fur Seals are uncommon in the north central coast of CA and rarely found on beach surveys typically found at a rate of 0.0002 mammals/km. In March through July 2015 Guadalupe Fur Seals were documented at a rate of 0.025 mammals/km, an increase 124 times baseline. Common Murres are the most common species of beach cast bird documented on BW surveys typically at a rate of 0.28 birds/km. In September through November of 2015 Common Murres were documented at a rate of 5.95 birds/km, an increase of over 20 times baseline.

BW data clearly show three anomalous mortality events in 2014-2015 including multiple trophic levels. Necropsies, performed by multiple agencies, suggest emaciation as the cause of death for all three species. During these mortality events, a prolonged period of unusually high sea surface temperature occurred, including the "Warm Water Blob" (WWB) and El Niño. These environmental conditions appear to have affected prey availability. We continue to investigate the warm water impacts on seabirds and marine mammals in central and northern CA.