

BIRD ENTANGLEMENTS OBSERVED DURING BEACH MONITORING SURVEYS

EMMA MOORE¹, SHANNON LYDAY², JAN ROLETTO³, KATE LITTLE⁴, JULIA K. PARRISH⁴, HANNAH NEVINS⁵, JAMES T. HARVEY⁵ & JEAN DE MARIGNAC⁶

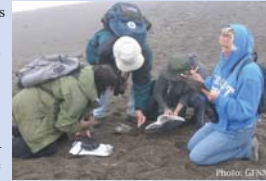
ABSTRACT

COASST¹, Beach Watch² and BeachCOMBERS³ conduct long-term monitoring surveys providing baseline data on seabird mortality along the West Coast of the United States. This study investigates entanglement among bird carcasses from data collected by these citizen scientist programs between 2001-2005. The bird carcasses recorded as entangled ranged from 0.2% - 1.2% annually. Of the sixteen bird species documented as entangled, the most frequently observed were Common Murre (*Uria lomvia*) and Western Gull (*Larus occidentalis*). The entanglement materials identified were primarily fishing related. In order to determine the sources of the entanglement materials, it is recommended that the programs record additional details in standardized categories. Entanglements observed in carcasses during beached bird monitoring surveys are a conservative view of the actual entanglement rate that is occurring at sea.



METHODOLOGY

Beach monitoring survey data in this study were collected by trained volunteers from 2001-2005. Surveyors monitor designated beaches during monthly or bi-monthly surveys and collect data on bird carcasses encountered (Figure 1). During data collection entanglements are recorded as fishing gear or as other marine debris. However, further details about the type of entanglement material are recorded arbitrarily. Data fields extracted from each program included: data source, date, area, species, entanglement material and any comments. Species were identified to the lowest possible taxonomic level.



RESULTS

- 152 entanglement records (0.59% of total bird carcasses) were extracted from the three beach monitoring programs during 2001-2005. Records of entanglements occurred in 16 identified species (Table 1).
- Common Murre and Western Gull were the most frequently documented beached bird species. Common Murre accounted for 27.6% of all the entanglement records (Table 1).
- Entanglement materials were primarily fishing related, constituting 84% - 96% of entanglement records (Figure 1). Additional details recorded informally included type of fishing gear, e.g. net, salmon flasher, line and hook.

Table 1. Entangled birds (n=152) recorded from 2001-2005.

Common name	n	Entanglement material (where identified)
Black-footed Albatross	1	Rope
Brandt's Cormorant	11	Fishing line, fishing hook, rope and metal
Brown Pelican	5	Fishing hook, hook and sinker
California Gull	4	Fishing line
Common Merganser	1	Fishing line
Common Murre	42	Balloon, fishing line, fishing hook, fishing net, hook, line and sinker, plastic, salmon gear
Double-crested Cormorant	3	Fishing line
Glaucous-winged Gull	5	Fishing line, fishing hook, fishing net
Heermann's Gull	1	Fishing line
Northern Fulmar	3	Balloon & string, fishing line and sinker
Pelagic Cormorant	6	Fishing line, fishing hook, line and sinker
Short-tailed Shearwater	1	Fishing line
Sooty Shearwater	11	Fishing line, fishing hook
Surf Scoter	1	Fishing line
Western Grebe	8	Fishing line, string
Western Gull	25	Fishing line, fishing hook, line and sinker
Unidentified spp.	24	Fishing line, fishing hook, plastic, rope and string

DISCUSSION AND CONCLUSION

Entanglements were seen in a wide range of birds that inhabit the California Current; the most frequently documented species were Common Murre and Western Gull. Both species breed locally and population numbers are relatively abundant (Leet et al. 2001). Although the beach monitoring data indicates entanglement is not a major cause of mortality, these land based observations represent an unknown fraction of entanglements occurring at sea. To address the sources of entanglement, the programs should adopt new survey categories providing details of material type. Continued monitoring will be valuable in providing an overview of the impacts for each species, identifying trends and highlighting any particular areas of concern.

RECOMMENDATIONS

Recommendations for further understanding entanglement issues in order to develop solutions include:

- standardized protocols for recording entanglements and materials;
- refined documentation of types of entanglement materials to address sources;
- continued documentation of entanglements by surveyors;
- promotion of outreach materials and programs on the impacts and reduction of marine debris; and
- continued involvement in beach clean-ups.



REFERENCES

- Laist, D.W. (1997) Impacts of marine debris: Entanglement of marine life in marine debris including a comprehensive list of species with entanglement and ingestion records. In: J.M. Coe and D.R. Rogers (eds), *Marine Debris: Sources, Impacts and Solutions*. Springer-Verlag, New York, NY, pp 99-139.
- Leet, W.S., Dewees, C.M., Klingbeil, R. and Larson, E.J. (eds) (2001) *California's Living Resources: A Status Report*. The Resources Agency, The California Department of Fish and Game, University of California.

ACKNOWLEDGEMENTS

COASST, Beach Watch and BeachCOMBERS extend special thanks to the hundreds of volunteers who have spent thousands of hours surveying beaches. Thank you to Bridget Watts and Tim Reed.

¹MSc Student of Distance Learning Program, Center for Environmental Policy, Imperial College, London, UK, emmajmoore@hotmail.com; ²Beach Watch, Farallones Marine Sanctuary Association, PO Box 29286, San Francisco, CA 94129; ³Gulf of the Farallones National Marine Sanctuary, Ft. Mason, Bldg 201, San Francisco, CA 94123; ⁴Coastal Observation and Seabird Survey Team (COASST), School of Aquatic and Fisheries Sciences, 1122 NE Boat St, Box 355020, University of Washington, Seattle, WA 98195; ⁵Coastal Ocean Mammal and Bird Education and Research Survey (BeachCOMBERS), Moss Landing Marine Laboratories, 8272 Moss Landing Road, Moss Landing, CA 95039; ⁶Monterey Bay National Marine Sanctuary, 299 Foam St, Monterey, CA 93940.

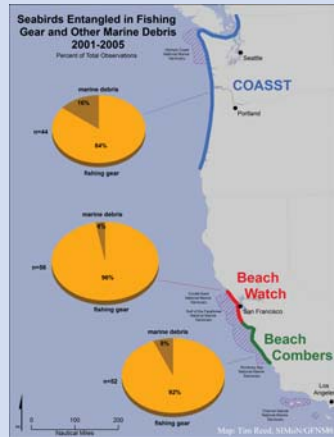
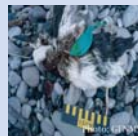
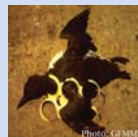


Figure 1. Areas covered by beach monitoring programs.



INTRODUCTION

Entanglement is defined as 'an interaction between marine life and entanglement material whereby the loops and openings of various types of debris entangle animal appendages or entrap animals' (Laist 1997). The materials observed in entanglements can be categorized into three groups:

- active fishing gear
- discarded fishing gear
- other marine debris

Observations of entanglements at sea are often chance encounters, hence entanglement studies tend to be made from land-based observations, where live or dead animals strand on beaches, or are viewed as visibly entangled during population surveys (Laist 1997).

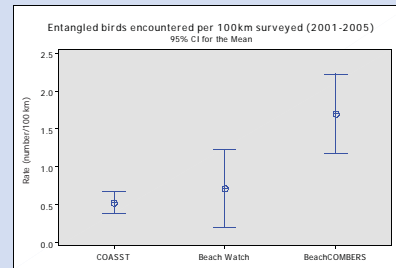


Figure 2. Mean rate of entangled carcasses encountered per 100 km for 2001-2005.

- The mean rate of entangled carcasses encountered ranged from 0.5 - 1.7 birds per 100 km surveyed (Figure 2).
- The annual percentage of entangled birds documented by each beach survey program ranged from 0.2% to 1.2% (Figure 3).

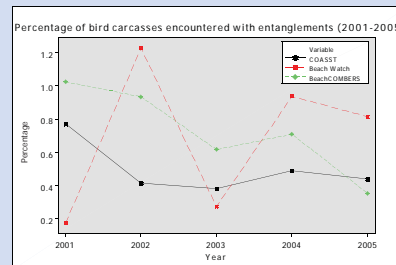


Figure 3. Percentage of entangled carcasses encountered.

