

# SIXTY TONS IN SIX YEARS: REDUCING THREATS TO CALIFORNIA MARINE WILDLIFE THROUGH LOST FISHING GEAR RECOVERY

**Kirsten V.K. Gilardi,<sup>1\*</sup> J.R. Renzullo<sup>1</sup>**

<sup>1</sup>*SeaDoc Society, Wildlife Health Center, School of Veterinary Medicine, University of California, Davis, California, 95616, USA*

## ABSTRACT

Commercial and recreational fishing gear that is accidentally lost or intentionally discarded (i.e. "derelict") in the marine environment impacts marine life and underwater habitat worldwide,<sup>2,8</sup> including in California.<sup>5,6,9,10</sup> Since 2006, the California Lost Fishing Gear Recovery Project ([www.lostfishinggear.org](http://www.lostfishinggear.org)), a program of the SeaDoc Society at the UC Davis Wildlife Health Center, has removed more than 60 tons of lost commercial and recreational fishing gear and debris from California coastal waters, as well as more than one million feet of monofilament line from public-access piers. Based on successful programs in the Northwestern Hawaiian Islands,<sup>3</sup> where derelict gear impacts the recovery of the endangered Hawaiian monk seal,<sup>7</sup> and modeled on a similar program in Washington State, the Project contracts with commercial urchin harvesters to locate and recover lost gear utilizing SCUBA diving methods and equipment. A toll-free hotline (1-888-491-GEAR) fields citizen reports of gear loss or sightings. To date, the Project has recovered more than 1,200 lost commercial fishing nets, traps and pots entangling 690 live invertebrates (e.g. lobster, crab) and 106 live fish (e.g. sheepshead, garibaldi, sculpin, sharks and hagfish), which were rescued and released. A total of 64 organisms have been discovered dead in recovered lost gear, including nine cormorants, 4 common dolphins and 1 California sea lion. The Project has collaborated with the Monterey Bay and Gulf of the Farallones National Marine Sanctuaries on deep water lost gear recovery, and has organized local community groups to install and maintain fishing line recycling bins on public fishing piers to encourage appropriate disposal of unwanted hooks and line. The ultimate goal of the project is to transfer lost gear recovery operations to commercial fishermen's associations so that fishermen will serve as local leaders in lost gear recovery, garnering public support for their industry; a pilot effort has laid the groundwork for this transfer in Eureka. To better understand the impacts of lost gear on public-trust resources, the Project maintains a comprehensive database, has conducted epidemiologic research on rates of gear entanglement and ingestion in coastal wildlife,<sup>1</sup> and in collaboration with the Northwest Straits Initiative, modeled the impacts of derelict nets on Dungeness crab in Puget Sound.<sup>4</sup> Lost fishing gear is a proven mitigation measure that reduces risk of injury and death for coastal marine wildlife in California.

## ACKNOWLEDGEMENTS

The authors thank the commercial fishermen and their crews who have worked tirelessly to recover lost fishing gear: Mark Brubaker, Glen Dexter, Barry Lundgren, Mike Neil, Tony Schroeder, and Randy Kann; as well, Dave Bitts, Aaron Newman, Joe Dow and Zeke Grader have provided valuable input from the commercial fishing industry. Crayton Fenn (Innerspace Exploration, Seattle, WA) conducted sidescan sonar surveys for lost gear; Jeff June (Natural Resource Consultants, Seattle, WA) and Ginny Broadhurst (Northwest Straits Initiative, Mt. Vernon, WA) provided expert advice in launching the program, as did Sheila Semans, Paul

Dayton and Ed Saade. The following agencies and organizations provided funding to support the project: the California Coastal Commission, California Ocean Protection Council/State Coastal Conservancy, California Wildlife Conservation Board, National Oceanic and Atmospheric Administration, National Fish and Wildlife Foundation, the Barrett Foundation and the Laurel Foundation.

## LITERATURE CITED

1. Dau BK, Gilardi KVK, Gulland FMD, Higgins A, Holcomb JB, St.Leger J, and Ziccardi MH. 2009. Fishing gear-related injury in California marine wildlife. *Journal of Wildlife Diseases* 45(2): 355-362.
2. Dayton PK., Thrush SF, Agardy MT and Hofman RJ. 1995. Environmental effects of marine fishing. *Aquatic Conservation: Marine and Freshwater Ecosystems* 5: 205–232.
3. Donohue MJ, Boland RC, Sramek CM, and Antonelis GA. 2001. Derelict Fishing Gear in Northwestern Hawaiian Islands: Diving Surveys and Debris Removal in 1999 Confirm Threat to Coral Reef Ecosystems. *Mar. Poll. Bull.* 42(12): 1301-1312.
4. Gilardi KVK, Carlson-Bremer D, June JA, Antonelis K, Broadhurst G and Cowan T. Marine species mortality in derelict fishing nets in Puget Sound, WA and the cost/benefits of derelict net removal. *Marine Pollution Bulletin* 60:376-382.
5. Goldstein T, Johnson SP, Phillips AV, Hanni KD, Fauquier DA, and Gulland FMD. 1999. Human-related injuries observed in live stranded pinnipeds along the central California coast 1986-1998. *Aquatic Mammals* 25(1): 43-51.
6. Hanni, KD and Pyle P. 2000. Entanglement of pinnipeds in synthetic materials at Southeast Farallon Island, California, 1976-1998. *Marine Pollution Bulletin* 40: 1076-1081.
7. Henderson JR. 2001. A Pre- and Post- MARPOL Annex V Summary of Hawaiian Monk Seal Entanglements and Marine Debris Accumulation in the Northwestern Hawaiian Islands, 1982-1998. *Mar. Poll. Bull.* 42: 584-589.
8. Matsuoka T, Nakashima T, and Nagasawa N. 2005. A review of ghost fishing: scientific approaches to evaluation and solutions. *Fisheries Science* 71: 691-702.
9. Stewart B and Yochem P. 1987. Entanglement of Pinnipeds in Synthetic Debris and Fishing Net and Line Fragments at San Nicolas and San Miguel Islands, California, 1978-1986. *Mar. Poll. Bull.* 18 (6B): 336-339.
10. Zabka T, Haulena M, Puschner B, Gulland F, Conrad P, and Lowenstine L. 2006. Acute lead toxicosis in a Harbor Seal (*Phoca vitulina richardsi*) consequent to ingestion of a lead fishing sinker. *Journal of Wildlife Diseases* 42 (3). 651-657.