MARINE DEBRIS in Alaska: Coordinating Our Efforts

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Background

The MCA Foundation (MCAF) is the nonprofit arm of the Marine Conservation Alliance (MCA), a fishing industry trade association whose members include fishermen, seafood processors, and fishing communities involved in the Alaska groundfish and crab fisheries. MCA began sponsoring marine debris cleanup work on St. Paul Island in 2003, and with funding from NOAA MCAF has continued the work since then. In 2006, the program was expanded to include Southeast Alaska, Prince William Sound, St. George Island, and Norton Sound, and 74.1 tons of debris were removed that year (Fig. 1). In addition, in 2006 surveys were conducted on Unalaska Island to assess debris accumulations. In 2007, cleanup work began in Unalaska, Gore Point, and Yakutat and continued in other locations. MCAF cleanup programs in 2007 collected 175.4 tons of debris (Fig. 1), and 2,100 miles of shoreline were surveyed to plan future cleanup efforts, in western Alaska from Cape Wales to Egegik and on the east side of Kodiak Island.

In 2008, MCAF plans to continue most of these cleanup projects and initiate new cleanups in Southeast Alaska, Kodiak, the Alaska Peninsula, Bristol Bay, and the Yukon Kuskokwim Delta.

Pribilof Island debris accumulation studies

In 2006, MCAF contracted with the St. Paul Island Tribal Ecosystem Conservation Office (Tribal ECO) to continue beach cleanup work; they focused efforts on 4 km of beach at the island's North Point. During a one-week period in May, 19,765 pounds of debris (8,965 kg) were removed from the beach (2,241 kg per km). In 2007 MCAF staff returned to North Point, where

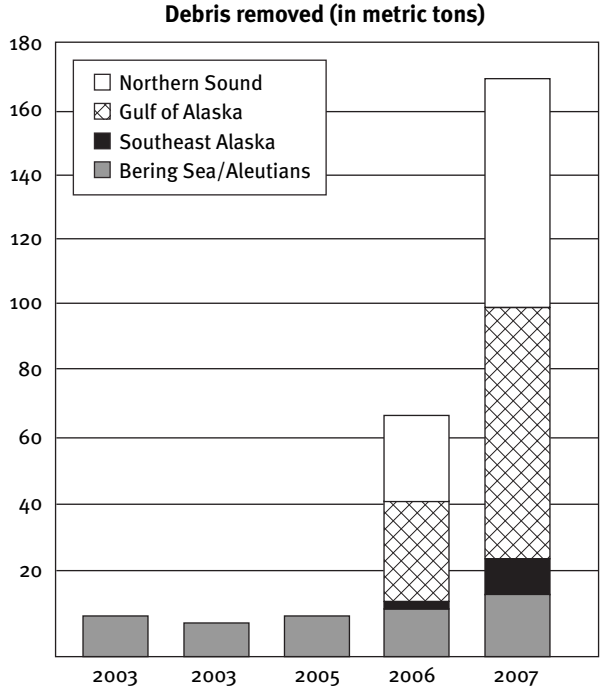

Figure 1. Mass of marine debris removed from selected Alaska coasts, 2003-2007.

they collected 822 pounds of debris on 1 km of beach that had been cleaned the previous year, an annual accumulation rate of 373 kg per km. Analysis of the debris revealed items related to the crab fishery, i.e., buoys and several tangles of line that accounted for 70.5% of the total. There were two small scraps of trawl net that weighed 13 pounds, or 1.6%. Much of the remaining debris was of marine origin: hawsers, tote covers, gloves, hard hats, and fish baskets. There were 52 plastic bottles made of polyethylene terephthalate (PETE), some with foreign labels. Less than 0.01% was locally generated.

On neighboring St. George Island, MCAF contracted with Kayumixtax ECO to clean 4.8 km of beaches including five fur seal rookeries and the village site. In 2006, 10,828 pounds (4,912 kg) of debris were removed or 1,023 kg per km. In 2007, the same beaches were cleaned again and 6,005 (2,724 kg) pounds of debris were removed, an annual accumulation rate of 568 kg per km. Debris identified from the crab and trawl fisheries accounted for only 35% of the total weight; of that, crab gear outweighed trawl web by a 4:1 ratio.

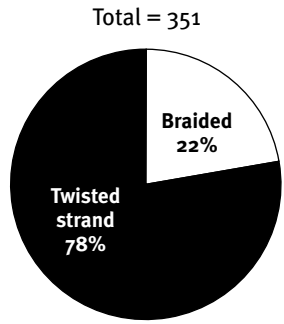

Figure 2. Percent of trawl twine types collected and sampled from Alaska cleanup projects in 2006 and 2007.

Discussion

Trawl net analysis

As part of MCAF's cleanup program, cleanup contractors are asked to provide samples of net collected during cleanup efforts, and more than 500 net samples were collected from across the state in 2006 and 2007. MCAF recorded the net samples based on protocols established by ghost-net identification programs in Australia and the northwest Hawaiian Islands. Samples were then shown to net design and construction experts for their analysis. The samples included trawl net, gillnet, seine gear, cargo netting, and mesh of undetermined use. Of the total number of net samples statewide, 351 were identified as trawl gear. Of these, 275 (78%) were constructed of twisted strand polyethylene (PE) twine and the remaining 76 (22%) were made of braided polyethylene (Fig. 2).

The domestic fishing industry almost exclusively uses nets made from braided, not twisted strand, polyethylene. Twisted strand polyethylene was the dominant twine type used by foreign and joint-venture fisheries prior to 1990 and it is unknown what percent of foreign fishing fleets use twisted strand today.

Mesh size

MCAF measured mesh size (distance between the centers of knots in stretched mesh) to identify the most likely fishery of origin for collected nets sampled in 2006 and 2007. Nets with very small mesh sizes, <50 mm, are likely shrimp trawls. Nets with mesh sizes of 50 to 100 mm are probably more than 20 years old, dating to when fishermen used a smaller mesh trawl to maximize the overall catch. Fishermen today use a larger, more selective mesh size to reduce the catch of juvenile fish and nontarget species. Netting with mesh sizes of 100 to

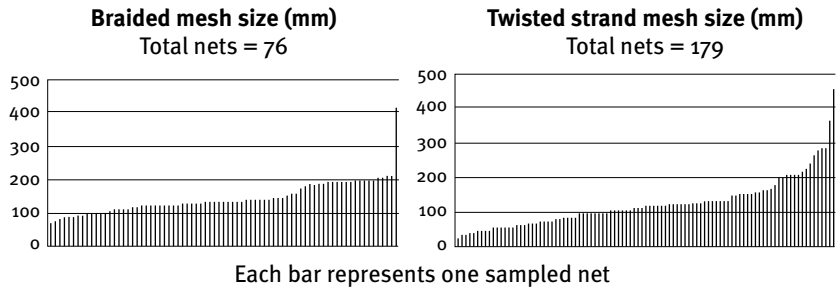

Figure 3. Representation of mesh sizes of twisted and braided strand nets sampled in 2006 and 2007.

150 mm is consistent with the pollock fishery, which accounts for one-half to three-quarters of the Bering Sea catch by weight. Mesh sizes of around 200 mm are used for larger groundfish such as flatfish and cod. Mesh sizes over 200 mm are probably from the outer wings of the nets.

Preliminary analysis indicates a significant amount of small mesh size gear (<100 mm) among the twisted strand samples (Fig. 3). Other net samples fall within the range of gear for pollock (100-150 mm) and flatfish (200 mm) and with several samples in excess of 250 mm. A similar pattern is apparent among the braided gear samples, although with less variation in mesh size at both extremes.

Relative age

Polyethylene is difficult to age, but five indicators of general condition help judge the relative age of the netting: chafing, fraying, color, stiffness, and the presence of marine growth. Some netting appeared obviously aged: (1) chafed knots, (2) frayed and stiff twine, (3) faded color, and (4) marine growth or detritus. Of samples of twisted strand mesh, 150 of 179 (83%) showed clear signs of age (i.e., all four signs of age). Of the 76 samples of braided gear, 38 or 50% showed clear signs of age and 20 samples or 26% showed no signs. The remaining 18 samples, 24%, fell in between with two or three signs of relative age. It is impossible to distinguish aging as a result of active fishing and movement in the nearshore zone.

Conclusion

The first year of MCAF's derelict fishing gear accumulation and identification program documented higher rates of accumulation in the Pribilof Islands than previously reported on the Bering Sea side of Amchitka Island. Located

amid one of the world's richest fishing grounds, the Pribilof Islands are highly impacted by derelict fishing gear. Passage of the American Fisheries Act in 1998 "rationalized" the Bering Sea pollock trawl fishery, which resulted in a reduced fishing effort and ended the race for fish, factors that may reduce debris derived from domestic trawling. The Bering Sea crab fishery was similarly rationalized in 2005, resulting in a 60% reduction in effort. It will be interesting to see if rationalization results in a similar reduction in debris observed on the Pribilof Islands.

One year's data are very limited, however, and these studies will be continued and expanded to other parts of the Alaska coastline so we can get a better idea of accumulation rates. Identification of derelict fishing gear remains problematic. While it is difficult to positively identify the specific source of most nets, reasonable conclusions can be drawn about its country of origin and fishery use by examining the twine type, mesh size, and wear. The majority of the sampled trawl netting appears to be of foreign origin based on the predominance of twisted strand polyethylene collected. Ocean currents transport fishing floats and plastic bottles from Asia to Alaska. Additionally the Bering Sea and North Pacific have been intensively trawled for the past 60 years. Foreign trawlers operated in these waters for the first 30 years, followed by a decade of U.S./foreign joint ventures and two decades of exclusively domestic trawling. Significant derelict fishing gear accumulations were documented in the early 1970s, well before the start of the domestic fishery. It is hoped that further sampling and analysis may lead to more conclusive results.

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