

THE INCIDENCE OF MARINE DEBRIS IN THE SOUTH-WEST OF THE WORLD HERITAGE AREA

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INTRODUCTION

Plastic items and other human sourced debris are now common pollutants of the world's oceans, with an estimated 6.4 million tons of debris discarded into them each year (Laist 1987; Younger 1992). In Australia, we are now discovering that our coasts are increasingly polluted with debris. This debris washed ashore presents problems for land, wildlife and fisheries management. It diminishes the scenic value of beaches, incurs hefty costs in tourism loss and cleanups and can be a navigation hazard, causing damage to equipment and vessels. Most alarmingly, debris which is adrift endangers many species of marine wildlife through entanglement or ingestion, a threat that is now well documented for marine mammals (Fowler 1988), seabirds (Day *et al.* 1985) and other animals (Laist 1987).

For effective action to be taken, it is important to determine the type, quantity, distribution and sources of debris. This information is being collected in many countries through beach surveys. Here in Tasmania, a community based marine debris research/education program was established in January 1990 (Slater 1991), and is the first such comprehensive, state-wide survey in Australia. This paper reports the results of the beach surveys within the southwest of the WHA and discusses their management applications.

METHODS

A survey form was designed for the project which records information about 49 items of 19 categories (Slater 1992). Between January 1990-June 1991 ten beaches and one island in the southwestern section of the WHA were surveyed: Prion Beach, New River Beach, Window Pane Bay, Hidden Bay, Wilsons Bight, New harbour, Noyhemer Bay, Ketcham Bay, Osmiridium Bay, Louisa Bay and Louisa Island. Fourteen sites were included covering a distance of 15.7 km. Statewide a total of 150 sites were surveyed during the same period.

RESULTS

Debris from the WHA sites accounted for 5% of the State total (50,211 items). This represented an average of 165 items/km compared with an average of 300 /km statewide. The debris was composed of plastic (61%), foam (2%), metal

(21%) and glass (16%). Non-plastic items consisted mostly of drink cans and bottles (stubbies!). Fishing debris made up 80% of the 1,528 plastic items recorded, which is twice the statewide average. The most common items of fishing debris were nylon rope, strapping bands, bait holders (baskets) and ice bags/liners. Sixty-four plastic containers were recorded, mostly large buckets, crates, drums and barrels, probably also sourced to fishing. One 300m length of nylon longline was found on Louisa Bay and a tangled 200m long ball of black plastic packing twine on South Cape Bay. In the WHA, items identified as harmful to wildlife through entanglement or ingestion (Manski *et al* 1991) accounted for 40% of plastic. On a statewide basis they comprise 59%. Five cases of entangled wildlife were recorded from sites in the WHA:

- Fairy penguin (*Euclyptula minor*), in fishing rope, South Cape Bay, 1992
- Gannet (*Morus serrator*), in plastic strapping, Pedra Branca Island 1991
- Gannet, in nylon line, Pedra Branca Island 1991
- Australian Fur Seal (*Arctocephalus pusillus*), in plastic strapping, Pedra Branca Island 1990
- Australian Fur Seal, orange-roughy trawl net, Pedra Branca Island 1991.

Five foreign items were found. Four were Japanese (plastic buoys, saki bottle, tin) and one was French (food container).

DISCUSSION

Although featuring some of the most remote and unspoilt coastlines in the southern hemisphere, a closer look reveals the WHA coastline to be littered with a large amount of potentially harmful and enduring plastic debris. Similar findings have been made in debris surveys elsewhere, with plastic always dominating (Slip 1991; Debenham and Younger 1991; Ryan 1989). Most of the WHA debris seems to be derived from oceanic sources, indicating significant pollution occurring from activities like fishing, boating and shipping. For example, the large ball of packing twine probably came from a factory ship. Land-based recreational debris, e.g. drink cans and bottles were mainly found at popular campsites and anchorages (e.g. Louisa Island, Noyhemer Bay, New harbour) highlighting the need for more public education about camping and boating habits.

The main commercial fishing operations in the WHA region are trawling, longlining and cray fishing. Most gear now used is plastic. In this and other Tasmanian studies (Kirkwood *et al.* 1992) it has been found that debris from these operations, such as fishing line, net, rope and strapping bands, are the major causes of entanglement of marine animals in this region. For example, strapping bands in our waters can be confidently sourced to both local and international fishing where they are used to secure cardboard cartons of fishbait (2-3 straps/

carton). This material is a hazard to both birds and marine mammals by causing entanglement. It is estimated that the Japanese longline fleet, in Tasmanian waters from April-August, remove 4,900-6000 straps a week from bait boxes and many are discarded overboard. The findings of this study have since been used to support the development of a new bait box for fishermen without the strapping (Slater 1991).

The amount and variety of nets recorded reflect the intensity of commercial trawling and recreational netting occurring off the WHA. For example, the orange-roughy trawl fishery is presently concentrated off the WHA coast, south of Pedra Branca and Maatsuyker islands. The nets average 60m and are of distinctive braided bright green nylon. Over six thousand net tows are deployed annually in the WHA region to a depth of 1500m over rugged seamounts where the fish form spawning aggregations. Nets are regularly 'hooked up' or lost on this rugged bottom, contributing to the growing debris problem from this fishery (see Dec.1990 issue of *Fishing Today*). Marine mammals such as sperm whales and elephant seals risk entanglement in these snared nets when deep diving in the region. Nets are also repaired at sea accounting for the large amount of offcuts washed ashore. The large piece of nylon longline found at Louisa bay could have come from local or Japanese longline fishing in the region.

Rope, the most frequently occurring debris item for both the WHA and the State, is also sourced to many types of fishing and is responsible for the penguin entanglement recorded. Australasian gannets breeding in the WHA have been observed lining their nests with rope, mistaken for traditional nesting material (seaweed) (Mooney pers. comm.). This results in entanglement of chicks and adults.

The interplay of oceanic and local currents means our debris problem is also part of the global garbage. Two major currents meet in the WHA region: the Antarctic circumpolar currents from the west, sweeping debris across the South Atlantic and Indian oceans and the Eastern Australian current from the Pacific. Experiments with ocean driftcards deposited in the Atlantic show that the Antarctic circumpolar current carries debris to Australia's southern beaches (Wace 1990). In summer, both currents merge just near Pedra Branca island, where any debris is likely to accumulate until washed ashore by local winds and swells. It is ironic that such an isolated place is suffering the effects of such global and local pollution. A fact reflected in the entanglement of its wildlife.

The information collected during this study has already been of use to wildlife, fisheries and WHA managers in identifying and targetting groups for education programs, such as the recently launched Department of Parks, Wildlife and Heritage Environmentally Friendly Fishing and Boating Education Program and the WHA track rangers program. It also assists managers in identifying pollution hot spots along the coast so that costly cleanups can be better targetted.

For example, in Tasmania's WHA the collection of only 20 bags of coastal debris cost the DPW&H approximately \$4000 to remove and ship back to Hobart.

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