



Baseline

Anthropogenic litter on Brazilian beaches: Baseline, trends and recommendations for future approaches

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ABSTRACT

Beaches are fundamental habitats that regulate the functioning of several coastal processes and key areas contributing to national and local budgets. In this study we provide the first large-scale systematic survey of anthropogenic litter on Brazilian beaches, covering a total of 35 degrees of latitude, recording the litter type, its use and size. Plastic comprised the most abundant litter type, followed by cigarette butts and paper. Small pieces (< 5 cm) were dominant among litter size-classes and food-related use was associated to most litter recorded types. Generalized additive models showed that proximity to estuarine run-offs was the main driver to beach litter accumulation, reinforcing river drainages as the primary route of litter coastal pollution. Also, the Clean-Coast Index evidenced there was not a pattern of beach litter pollution among regions, which denotes that actions regarding marine pollution must be taken by all state governances of the country.

The idea that plastics would become one of the principal environmental problems of the 21st century is not new (Coleman and Wehle, 1984; Bergmann et al., 2015). It is already known that plastics are ubiquitous in the marine environment as they have been found in the most diverse habitats, from deepest oceans to intertidal areas (Mathalon and Hill, 2014; Chiba et al., 2018); and are pervading marine food chains, from tiny plankton communities to large shark predators (Sun et al., 2017; Barreto et al., 2019). Within this scenario, some habitats act as sinks for marine litter pollution. In oceanic waters, denser items tend to accumulate on the seabed (Woodall et al., 2014). Beaches on islands may also act as sinks for drifting litter in regions close to oceanic

gyres (Lavers and Bond, 2017; Andrades et al., 2018b; Thiel et al., 2018), while nearshore habitats, such as mangroves and beaches, may accumulate floating litter (Munari et al., 2017; Martin et al., 2019).

Beaches represent an important component of human society contributing to local and national economies through tourism and recreational activities (Silva et al., 2013), as well as providing ecological services such as erosion control and nutrient recycling, and habitats for commercial and threatened species (Schlacher et al., 2007; Defeo and McLachlan, 2018). The presence of litter on beaches can impact its natural features, as well as affect the local fauna and alter ecological processes, which can induce shifts in nutrient cycling across food chains

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