

Rehabilitation As a Tool for Marine Wildlife Conservation: Insights from Southern Brazil

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Abstract

The Marine Animal Recovery Centre (CRAM-FURG), housed within the "Prof. Eliézer de C. Rios" Oceanographic Museum of the Federal University of Rio Grande (FURG), has spent five decades dedicated to the rescue and rehabilitation of marine fauna along the southern coast of Brazil. Sea turtles, seabirds, pinnipeds, and small cetaceans in southern Brazil face cumulative threats from bycatch, plastic ingestion, pollution, and climate events. This mini review summarizes the labour of CRAM-FURG in rehabilitating these marine animals and tackling key human and environmental challenges. Rehabilitation efforts, supported by multidisciplinary expertise and institutional research, not only enhance individual survival but also provide insights into broader conservation challenges, underscoring the role of rehabilitation as a strategic tool for ecosystem integrity and human responsibility.

Keywords: Marine Wildlife Rehabilitation; Conservation; Sea Turtles; Seabirds; Marine Mammals; Bycatch; Marine Pollution; Southern Brazil.

Abbreviations: CRAM-FURG: Marine Animal Recovery Centre; FURG: Federal University of Rio Grande

Introduction

The Marine Animal Recovery Centre (CRAM-FURG), housed within the "Prof. Eliézer de C. Rios" Oceanographic Museum of the Federal University of Rio Grande (FURG), has dedicated five decades to the rehabilitation of marine fauna along the southern coast of Rio Grande do Sul, Brazil. Recognized nationally for its expertise in the treatment of oiled and debilitated wildlife, CRAM-FURG plays a central role in marine conservation and animal welfare, with activities focused on the rescue and rehabilitation of sea turtles, seabirds, and marine mammals in a biologically diverse region. Each year, numerous debilitated animals are recorded along this coastline and admitted for clinical care and rehabilitation. The primary drivers of strandings include incidental interactions with fishing gear, prey depletion, exposure to petroleum, ingestion of anthropogenic debris, extreme weather events, and cold-induced dormancy during winter months. This mini review presents the efforts of CRAM-FURG in rehabilitating marine wildlife in the face of major anthropogenic and environmental threats affecting these species in southern Brazil.

Discussion

Sea turtles inhabiting this region are subjected to a suite of anthropogenic and environmental pressures that compromise their survival. Among the most critical are incidental entanglements in gillnet fisheries, which frequently result in drowning and mortality [1], and the ingestion of marine debris, particularly plastics, that may cause gastrointestinal obstruction, malnutrition, internal injury, and death [2]. Seasonal environmental drivers further exacerbate vulnerability, notably brumation (winter dormancy), a physiological state induced by reduced water temperatures that limits locomotor activity and feeding capacity, thereby increasing susceptibility to stranding and predation [3]. Live strandings predominantly involve the green turtle (*Chelonia mydas*), the loggerhead turtle (*Caretta caretta*), and the leatherback turtle (*Dermochelys coriacea*), all of which are regularly admitted to CRAM-FURG for clinical intervention.

Likewise, seabirds along the Brazilian coast, including both resident and migratory species, are exposed to a wide range of

anthropogenic pressures that compromise their population viability and ecological roles. During the austral autumn and winter, Magellanic penguins (*Spheniscus magellanicus*) migrating in search of food are particularly vulnerable, with many individuals found stranded either dead or in a debilitated condition. This species faces multiple human-induced threats, including reduced prey availability caused by overfishing, exposure to petroleum and its derivatives, ingestion of plastic debris resulting from widespread marine pollution, and incidental mortality from interactions with industrial fisheries [4-5]. In southern Brazil, numerous debilitated penguins are admitted to CRAM-FURG, where they undergo rehabilitation before being released back into the wild.

In addition, the intensification of extreme weather events driven by climate change represents an imminent threat to pelagic birds, such as albatrosses (Diomedidae) and petrels (Procellariidae), which forage in offshore areas overlapping the trajectories of extratropical cyclones, often leading to mass strandings along the coast or displacement inland. Moreover, monitoring efforts are hindered by flooding associated with strong southerly winds during such events, which can compromise the rescue and recovery of live Procellariiformes [6]. Although large numbers of stranded albatrosses are rarely reported, Procellariiformes in southern Brazil occasionally experience mass stranding events and are admitted to CRAM-FURG for rehabilitation. In such cases, prompt and effective intervention is critical to achieving successful outcomes, as these events may significantly affect the populations involved, particularly when endangered species are concerned [7-8].

Furthermore, pinniped conservation along the southern coast of Brazil is challenged by multiple anthropogenic pressures, including entanglement in gillnets and other fishing gear, depletion of fish and crustacean stocks due to overfishing, and the degradation of marine ecosystems through pollution by solid waste, hydrocarbons, and heavy metals [9]. Additionally, South American fur seals (*Arctocephalus* sp.) pups are particularly vulnerable to interactions with domestic dogs when stranded on the coast, which can result in injury or mortality [10]. Individuals entangled in gillnets, debilitated, or injured by dog attacks are admitted to CRAM-FURG for rehabilitation. Lastly, the franciscanas dolphin (*Pontoporia blainvillei*), a small odontocete endemic to the southwestern Atlantic Ocean, is exposed to severe conservation challenges in this area [11]. Incidental bycatch in gillnet fisheries represents the primary cause of mortality and has been identified as a key driver of population decline. On occasion, dependent calves orphaned by net entanglement are received at CRAM-FURG for supportive care and rehabilitation.

Conclusion

These threats highlight the need to strengthen existing integrated conservation strategies and develop new approaches

to mitigate human impacts and ensure the persistence of marine fauna in southern Brazil. With adequate facilities, updated rehabilitation protocols, and a multidisciplinary team, CRAM-FURG provides high-quality clinical care for marine fauna and solid training opportunities for future professionals in the field. Institutional support from FURG fosters applied research, improving treatment methodologies and supporting evidence-based decision-making. By bridging conservation, science, and community engagement, CRAM-FURG demonstrates that wildlife rehabilitation transcends individual care, serving as a strategic tool for conservation by reinforcing the interdependence of animal health, ecosystem integrity, and human responsibility.

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