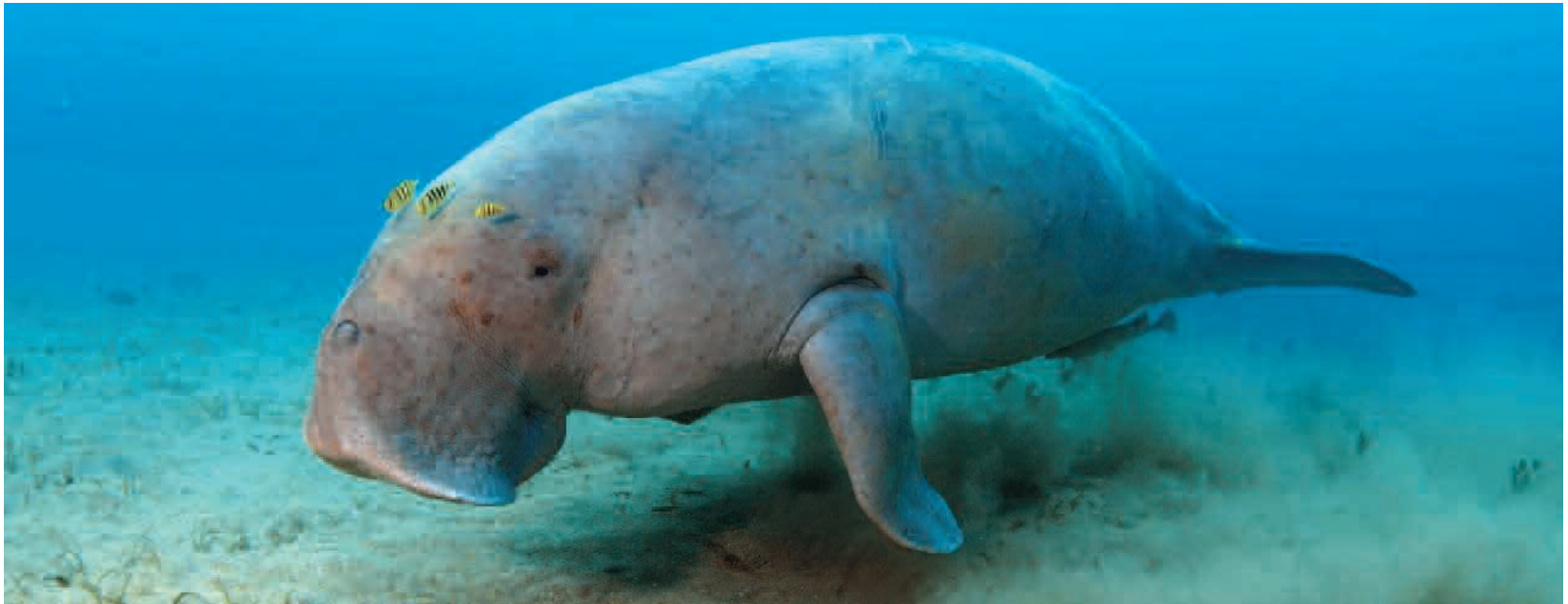


## Chapter 41

# Dugongs: endangered lagoon mermaids

Christophe Cleguer and Claire Garrigue



A dugong (*Dugong dugon*) swimming above a diffuse seagrass bed in search of food. © M. Juncker

### On the identification of dugongs

With its massive, 3 m long, fusiform and bronze body, its small eyes and broad smile, its lack of dorsal fin, its paddle-shaped pectoral fins and its flattened tail resembling that of cetaceans, dugongs do not go unnoticed in the lagoons of New Caledonia. Also called a "sea cow", the dugong is the only herbivorous mammal that is exclusively marine. From the end of the 18<sup>th</sup> century, it became the only representative of the Dugongidae family since his cousin the Steller's sea cow was hunted to extinction by humans.

The dugong can be found in shallow coastal areas from East Africa to Vanuatu, through the Middle East and Southeast Asia. In these waters, dugongs find their main larder: the seagrass meadows.

Often found in protected bays, mangrove channels or the leeward coasts of islands, the dugong appears to be a very sedentary animal. However, it makes daily, seasonal, and even random movements of a few dozen to a few hundred kilometers. In New Caledonia, satellite monitoring of a dozen dugongs revealed that they used both the lagoons and the outer zones of the barrier reefs of Grande Terre. Some of them even covered about a hundred kilometers and crossed the administrative borders of New Caledonia's provinces (CLEGUER, 2015).

The dugong reaches its sexual maturity relatively late - between six and 17 years of age. Its gestation and breastfeeding periods are long, between 13 and 15 months and 14 and 18 months, respectively. Its reproductive rate is low (only one young every two to seven years) and is largely influenced by the availability of food resources. As a result of all these characteristics, the dugong is a species that is highly vulnerable to the natural and anthropogenic disturbances of its environment.

Protected by several international laws and listed as a "vulnerable" species on the International Union for Conservation of Nature (IUCN) red list, the dugong has already disappeared from many countries such as Mauritius, the Maldives and Cambodia, and its conservation status remains unknown throughout half of its distribution range. The causes of such vulnerability are multiple and they vary geographically. The most prominent threats include the degradation of seagrass habitats, hunting, accidental capture in fishing nets and collisions with boats. To address these pressures, multiple and diverse conservation and management initiatives are being implemented at the international, regional and local scales.

## Dugongs of the New Caledonian reefs

In New Caledonia, aerial surveys have increased knowledge of the abundance and distribution of dugongs around Grande Terre. Dugongs are mainly distributed on the west and northeast coast of Grande Terre (Fig. 1) and areas of high dugong density are heterogeneously distributed. These hotspots are located in the regions of Nouméa, Ouano, Bourail-Poya, Koumac and Pouébo (Fig. 2). Dugongs are rare in the center of the east coast, as well as in the northern and southern lagoons, probably due to unsuitable habitat.

No aerial surveys have been carried out in the Loyalty Islands, but there are indications that only very few dugongs live there. The most recent observations of dugongs in the Loyalty Islands date back to 2015, when one individual was observed in Lifou and then in Ouvéa, one month apart.

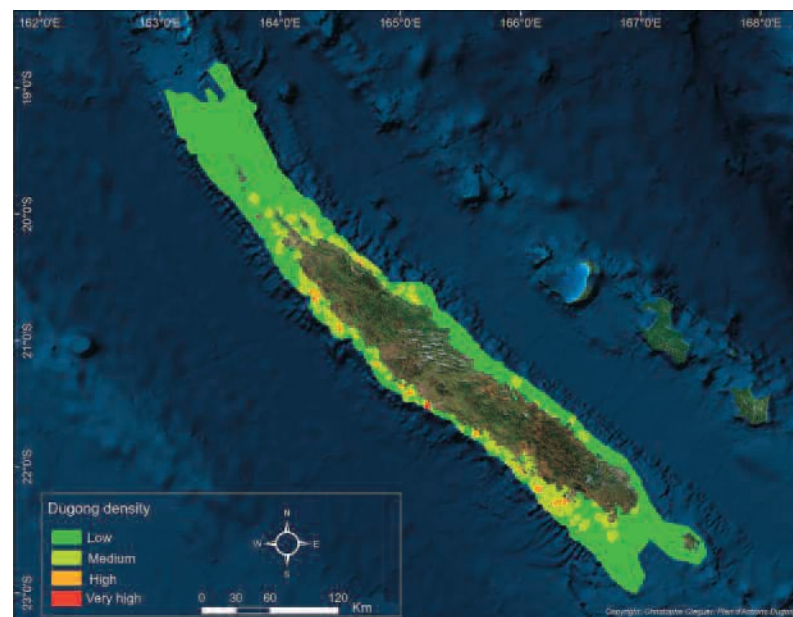


Figure 1: Distribution and density of dugongs around Grande Terre, based on aerial surveys conducted between 2003 and 2012. Adapted from CLEGUER, 2015

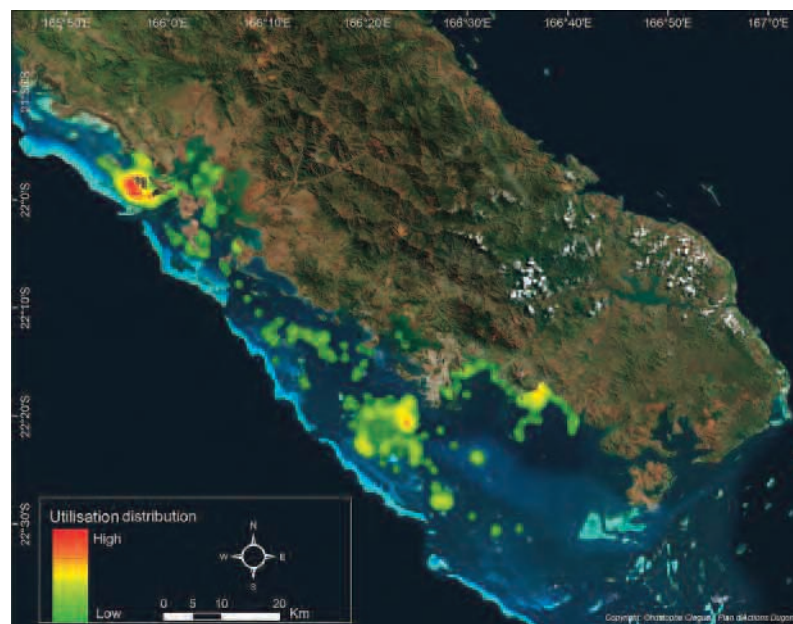


Figure 2: Trajectories of three dugongs equipped with satellite tags in the southwestern region of Grande Terre. Adapted from CLEGUER, 2015. Map © ESRI

## Dugong: a highly protected species



A dugong in midwater. Several scars from old wounds are visible on the surface of the body and indicate collisions with boats or other watercrafts. © M. Juncker

The dugong is protected by several international laws. The Convention on International Trade in Endangered Species (CITES) of 1973 lists dugongs in its Appendix I, which includes the most threatened species and prohibits "international trade in their specimens". Dugongs are also listed in Annex II of the 1979 Bonn Convention on migratory species of wild animals (CMS), which lists species with "an unfavorable conservation status as well as those that can significantly benefit from international cooperation" (CMS, 2009). A Memorandum of Understanding (MOU) was signed in 2007 on "the conservation and management of dugongs and their

habitat throughout their distribution range". The species is also listed as vulnerable to extinction on the red list of the International Union for Conservation of Nature (IUCN).

In New Caledonia, dugong hunting has been banned throughout the territory since 1963. Since 2004, the South Province authorities have completely banned hunting, even for customary events. In the North Province, exemptions may still be granted for specific customary celebrations. However, the number of exemptions granted is low (15 between 1995 and 2004, none since 2004).



The latest population size estimates in 2012 suggest that less than 1,000 individuals are left in the New Caledonian lagoons. This is much lower than the initial estimate of 2,000 dugongs which was made in 2003. Although it is impossible to confirm a decrease in the population, we now know that every individual counts for the survival of the population. This precarious status, confirmed by genetic analyses, results in the fragility and probably low resilience of the dugong population. In other words, each animal removed from the population is a direct threat to the survival of dugongs in New Caledonia.

However, the causes of dugong mortality in New Caledonia are still poorly studied. The recorded strandings and various studies conducted on New Caledonian dugongs over the past decades suggest that poaching, accidental capture in fishing nets and collisions with boats are the main threats.

## Conservation

Aware of the urgent need to preserve dugong populations, a technical group involving the three provincial authorities, the government of New Caledonia, the customary senate, the State, WWF-NC and the association Opération cétacés, launched a five-year dugong action plan (PAD, Plan d'actions dugong) led by the French Agency for Biodiversity (AFB) in 2010. One of the first actions taken by the technical group was to launch research projects in order to improve knowledge of the local dugong population. A PhD project was dedicated to studying the temporal variability of dugong abundance and distribution, and their use of the reefs at different spatial and temporal scales in New Caledonia (CLEGUER, 2015). This study also provided inputs for discussions on the conservation strategies for dugong in the territory. An anthropological study combining traditional knowledge and current practices, and focusing on the importance of dugong in New Caledonian society was then undertaken (DUPONT, 2015). In addition, two studies on the population genetics of dugongs were conducted to assess genetic diversity and explore the connectivity between the dugong populations of New Caledonia and neighboring countries (OREMUS *et al.*, 2015).

Results of these scientific studies confirmed the fragility of the New Caledonian dugong population and highlighted the areas where conservation and management measures must be implemented to improve the protection of the species. Some awareness-raising actions have already been taken, such as informing local sea users of the risk of collisions between dugongs and boats or other watercrafts.

A second ongoing action plan (2015-2020) led by the Conservatory for natural landscapes (CEN, Conservatoire des Espaces Naturels) will help to maintain this momentum and tackle other major issues such as dugong poaching and catches in fishing nets. Other actions will follow, such as monitoring the conservation status of the species in New Caledonia, acquiring new knowledge, and maintaining the preservation of the dugongs by awareness-raising, and informing and engaging New Caledonians.

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