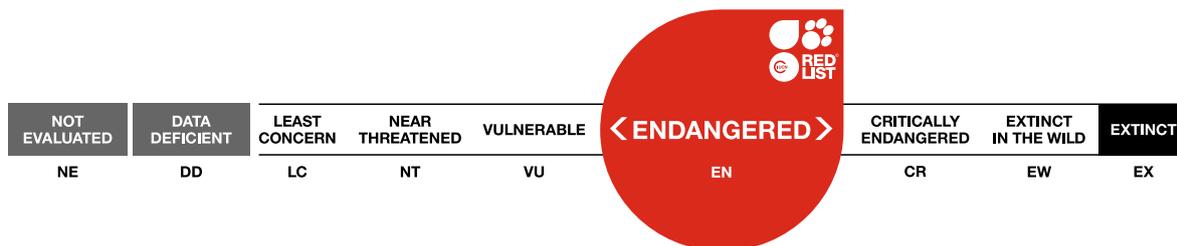


## *Dugong dugon* New Caledonia subpopulation, Dugong

Assessment by: Hamel, M.A., Marsh, H., Cleguer, C., Garrigue, C. & Oremus, M.



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## Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Sirenia	Dugongidae

**Scientific Name:** *Dugong dugon New Caledonia subpopulation* (Müller, 1776)

**Parent Species:** See [Dugong dugon](#)

### Common Name(s):

- English: Dugong, Sea Cow
  - French: Dugong, Vache Marine
  - Austronesian: Kawin, Modap, Mudep, Mudip, Pokanéra
- (Other):

## Assessment Information

**Red List Category & Criteria:** Endangered C2a(ii) [ver 3.1](#)

**Year Published:** 2022

**Date Assessed:** August 17, 2022

### Justification:

The New Caledonian Dugong subpopulation (*Dugong dugon*) is geographically and genetically isolated from other subpopulations within the Dugong's large range. The number of mature individuals in the subpopulation was estimated to range between 149 and 896 individuals (well under 2,500 and possibly fewer than 250) based on aerial surveys of New Caledonia from 2003 to 2012. Illegal hunting, boat strikes, and incidental capture in gillnets, likely the main anthropogenic pressures on this subpopulation, were not sufficiently addressed by current conservation and management actions during the time of surveys and continue to threaten New Caledonian Dugongs and their population, of which is believed to be continuing to decline. Moreover, genetic studies suggest that the New Caledonian Dugongs comprise one homogenous subpopulation throughout their entire New Caledonian range, thus harbouring 100% of the mature individuals and confirming their isolation. As a result, repopulation after a catastrophic event such as a disease or widespread seagrass die-off, which would adversely affect the entire subpopulation, is unlikely. Based on available evidence, we consider this population as Endangered under criterion C (EN C2a(ii)).

### Red List Category & Criteria

The full range of Red List categories this subpopulation qualifies for are:

- Criterion A: Insufficient data to determine eligibility.
- Criterion B: Vulnerable B2ab(v).
- Criterion C: Endangered C2a(ii).
- Criterion D: Vulnerable D1.
- Criterion E: Insufficient data to determine eligibility.

## Geographic Range

## Range Description:

The Dugong is listed as Vulnerable at a global scale (Marsh and Soltzick 2019). Dugongs are found in coastal and island waters from East Africa to Vanuatu between approximately 27°N and 27°S (Marsh and Soltzick 2019). The Dugong's regional status is heterogeneous across its large range (Marsh *et al.* 2011). New Caledonia, a French archipelago, is located at the south-eastern edge of the Dugong's range in the southwest Pacific and supports a globally important Dugong population (Cleguer *et al.* 2017, Garrigue *et al.* 2008).

Dugongs in New Caledonia are mainly found inside the barrier reef lagoons, around Grande Terre, the main island of New Caledonia. Grande Terre stretches over 400 km from the south-east to the north-west. The lagoons, covering over 23,400 km<sup>2</sup>, are surrounded by a barrier reef of more than 1,600 km (Testau and Conand 1983), and extend from ~18.5°N to ~23°S. This range does not include the Entrecasteaux reefs, further north outside the lagoons, nor the Chesterfield Islands to the West, where Dugongs have not been recorded to date. Two vagrant individuals were recently recorded in the Loyalty Islands, to the East of Grande Terre. A model of Dugong distribution and relative density in New Caledonia based on a 10-year time series of aerial surveys (Cleguer *et al.* 2015) indicated that Dugongs are mostly found on the west and north-east coast of Grande Terre and that their distribution is heterogeneous and clustered within the lagoons. The highest densities of Dugongs have been found in the Cap Goulvain region on the central-west coast, across the jurisdictions of province Sud and province Nord (see Figure 1 in the Supplementary Material). High Dugong densities were also observed at various locations on the west coast and on the north-east coast between Pouebo and Touho (see Figure 1 in the Supplementary Material).

The extent of occurrence (EOO) of Dugongs in New Caledonia was calculated as approximately 11,268 km<sup>2</sup>. Their area of occupancy (AOO) in New Caledonia was calculated as approximately 874 km<sup>2</sup>. Both EOO and AOO were calculated based on 344 Dugong sightings during dedicated, standardised aerial surveys between 2003 and 2012 (Cleguer *et al.* 2017, Garrigue *et al.* 2009, Garrigue *et al.* 2008), using the standard IUCN techniques. Most New Caledonian Dugongs exist in one location, as defined by the scale of operation of the threat that would have the greatest impact on the subpopulation. Large-scale habitat loss from storms and flooding due to climate change and severe weather (see Threats section) such as a single cyclone event could highly likely and rapidly affect the majority of the subpopulation. Indeed, resulting feeding habitat degradation could overlap with most of the subpopulation's geographic range. Given that the AOO is < 2,000 km<sup>2</sup>, that more than 90% of the region's mature individuals occur at a single location, and the evidence for continuing decline in the number of mature individuals (see the 'Population' section), the New Caledonia subpopulation of the Dugong is eligible for listing as Vulnerable under criterion B (VU B2ab(v)).

The likelihood of Dugongs moving between New Caledonia and other areas within the Dugong's range is extremely low. First, the lagoons around Grande Terre are separated from the closest neighbouring island in Vanuatu by ~350 km of open water and the New Hebrides oceanic Trench extending up to 7.6 km deep, and from the large Australian Dugong populations by ~1,330 km of deep oceanic waters to the west. Although Dugongs have been recorded travelling long distances up to several hundreds of kilometres (Deutsch *et al.* 2022, Sheppard *et al.* 2006), movements across deep ocean trenches are rare and attributed to vagrant animals. Oceanographic currents in the vicinity of New Caledonia indicate the possibility of facilitated travel between Vanuatu and the east coast of Australia (Cravatte *et al.* 2015). Nonetheless, genetic studies indicate that the Dugongs in New Caledonia are genetically differentiated

from all genetically documented populations (Garrigue *et al.* 2022; Oremus 2011, 2015). In addition, neighbouring regions harbour small fragmented Dugong populations (e.g., Vanuatu; Chambers *et al.* 1989, Marsh *et al.* 2011) or occasional vagrant individuals (e.g., Fiji; Hill-Lewenilovo *et al.* 2019).

For further information about this species, see [Supplementary Material](#).

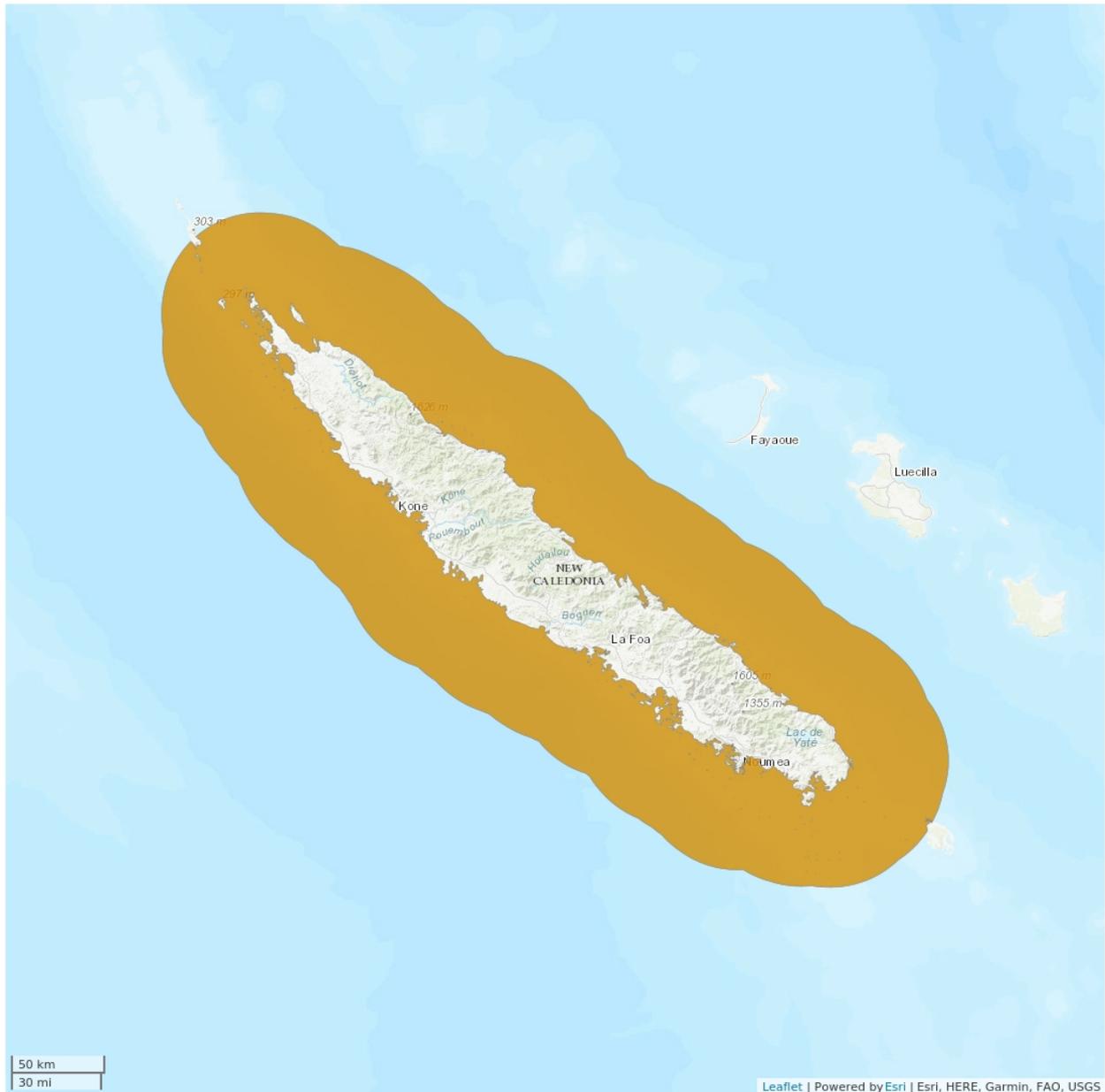
**Country Occurrence:**

**Native, Extant (resident):** New Caledonia

**FAO Marine Fishing Areas:**

**Native:** Pacific - western central

# Distribution Map



## Legend

EXTANT (RESIDENT)

Compiled by:

IUCN (International Union for Conservation of Nature) 2022



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

## Population

The most recent systematic aerial surveys of the lagoons around Grande Terre yielded abundance estimates of  $1,166 \pm \text{SE } 293$  (cool season) and  $792 \pm \text{SE } 212$  (warm season) for the New Caledonian Dugong population (Cleguer *et al.* 2017, Hagihara *et al.* 2018). The Loyalty Islands have never been surveyed because there were no reports of Dugong sightings in this area at the time of the surveys. However, two Dugong sightings have recently been reported in 2015 in Lifou and, a month later, in Ouvéa by local residents (Cleguer and Garrigue 2018, Unknown 2015). Acknowledging that future surveys should probably cover the Loyalty Islands, we conclude that Dugong numbers in the Loyalty Islands are almost certainly very low and unlikely to make a substantive difference to this assessment of the status of the Dugong in New Caledonia.

### Proportion of mature individuals

Accounting for the range of abundance estimates from the 2003–2012 time series described above, from  $426 \pm \text{SE } 134$  to  $1,588 \pm \text{SE } 407$  individuals in total, we conclude that there are less than 2,500 mature individuals in New Caledonia. This conclusion is robust to sensitivity analysis using a range of values for percentage of mature individuals (see Table 1 in the Supplementary Material). Deutsch (2008) estimated from population modelling and carcass recovery that  $\sim 45\text{--}70\%$  of a Florida manatee, *T. manatus manatus*, population were mature. Other authors had previously estimated 54% (Marsh 1980), and 60% (Bertram and Bertram 1973) mature individuals for Dugong populations using different methods. Assuming a similar range of proportions of mature individuals in the New Caledonian Dugong subpopulation, we estimated that there are between 149 and 896 mature individuals in New Caledonia waters (Table 1 in the Supplementary Material). Indeed, our estimate of the proportion of mature individuals may be too high, as manatees reach sexual maturity at a younger age than Dugongs (Marsh *et al.* 2011). We conclude that more than 95% of New Caledonian mature individuals are found in the New Caledonian lagoons around Grande Terre based on the following lines of evidence: (1) the susceptibility of the coastal waters of the whole Grande Terre region to impacts such as high intensity cyclones or disease outbreak; (2) the absence of evidence for distinct subpopulations within the New Caledonian Dugong population (Garrigue *et al.* 2022; Oremus 2011, 2015); and the extremely low occurrence of individuals in more remote sites such as Loyalty islands. Catastrophic events such as a disease or widespread seagrass die-off would adversely affect the entire subpopulation.

The subpopulation is eligible for listing as Endangered under criterion C (EN C2a(ii)) because the number of mature individuals is less than 2,500 (see Table 1 in the Supplementary Material), a continuing decline is inferred, and the proportion of mature individuals in the subpopulation is greater than 95%; and Vulnerable under criterion D (VU D1) because the number of mature individuals is less than 1,000 (Table 1 in the Supplementary Material). The data are insufficient to determine the eligibility of this subpopulation of Dugongs under criteria A or E.

### Population trend

The historical record of Dugongs in New Caledonia is based on the traditional knowledge of local elders and fishermen, who often state that they have witnessed a sharp decline in abundance (Cleguer pers. comm. 2022).

Six systematic aerial surveys of the waters of Grande Terre using trained human observers in light aircraft were conducted in June 2003 (Garrigue *et al.* 2008); January 2008 (Garrigue *et al.* 2009); June

and November 2011; June and November 2012 (Cleguer *et al.* 2017). The 2003 cool season surveys yielded a population estimate of  $1,588 \pm \text{SE } 407$  (mean  $\pm$  SE) Dugongs (Garrigue *et al.* 2008; Hagihara *et al.* 2018). Results obtained from this single baseline survey suggested that New Caledonia supports one of the most important Dugong populations globally. However, a second survey conducted during the warm season of 2008 using the same survey design and methodology resulted in a population estimate of  $426 \pm \text{SE } 134$  Dugongs (Garrigue *et al.* 2009, Hagihara *et al.* 2018), prompting local concerns and suggesting a seasonal effect. Subsequent surveys were thus conducted during the warm and cool season between 2011 and 2012, producing estimates ranging between  $545 \pm \text{SE } 157$  and  $1,166 \pm \text{SE } 293$  individuals (Cleguer *et al.* 2017, Hagihara *et al.* 2018). The large differences in estimates between 2003 and the five subsequent surveys could be due to: (1) an actual decline in the population; and/or (2) confounding effects of variations in environmental conditions, animal behaviour and sampling biases (Cleguer *et al.* 2017). While the population appeared stable between 2008 and 2012 (Cleguer *et al.* 2017), new estimates are needed to evaluate the current abundance of Dugongs. A more recent survey was conducted in November 2018 using an occupied aerial imagery survey approach (i.e., using digital imagery with no human observers) and using a different survey transect design than previous surveys (Duclos *et al.* 2019). The data collected in this survey are still being analysed and thus not considered in this assessment.

Trends in the Dugong population of New Caledonia are currently difficult to assess due to changes in methodologies between surveys, limiting comparisons between estimates. Nonetheless, given the current threats to Dugongs in New Caledonia, continuing decline is highly likely. Illegal hunting and high vessel traffic, two major threats to this population, are ongoing and current statutory protection appears insufficient. The number of Dugongs killed illegally is unknown, but local knowledge (Cleguer 2010, Resource managers of the province Sud and province Nord, pers. comm.), stranding data available for Dugongs in New Caledonia (Opération Cétacés and Institut de Recherche pour le Développement n.d.) and socio-economic studies suggest that current levels of removal due to anthropogenic pressures are unsustainable (Cleguer *et al.* 2017, Garrigue *et al.* 2022). We conclude that a population decline can be strongly inferred.

### **Population structure**

The New Caledonian Dugong population is located at the periphery of the species' range and thus is assumed to face a greater risk of genetic isolation and low level of diversity than populations located centrally within the range (Eckert *et al.* 2008). Not only is the New Caledonia isolated geographically from large neighbouring populations, studies on Dugong movements also suggest that Dugongs mostly remain within the lagoons (Cleguer 2015, Cleguer *et al.* 2020, Derville *et al.* 2022). The subpopulation was recently found to have a low potential for resilience through incoming gene flow, confirming its vulnerability to anthropogenic threats and diseases. New Caledonian Dugongs were also found to have a strong genetic differentiation from all other genetically documented populations, including Australian populations (Garrigue *et al.* 2022, Oremus 2011, 2015). These studies provided no evidence of separate subpopulations within New Caledonia.

For further information about this species, see [Supplementary Material](#).

**Current Population Trend:** Decreasing

## **Habitat and Ecology (see Appendix for additional information)**

Some differences have been observed between Dugong habitat and ecology in the New Caledonian subpopulation and populations studied elsewhere (Marsh and Soltzick 2019). In New Caledonia, small groups of Dugongs often use narrow coral reef lagoons ranging in width from a few to tens of kilometres. Cleguer *et al.* (2020) found that New Caledonian Dugongs spend most of their time within the lagoons, using the lagoon's full width from close to shore to the back reef. Where the New Caledonian lagoon is narrow, Dugongs sometimes use the fore reef shelf outside the barrier reef in the open ocean to commute between bays (Derville *et al.* 2022). This behaviour differs from other populations such as in Australia (Zeh *et al.* 2016), known to only travel within lagoon boundaries or following coastline features to travel between locations. Deeper water may provide a safer alternative to minimise exposure to shark predation within New Caledonia's shallow reticulated reefs (Heithaus *et al.* 2002, Hodgson 2004, Wirsing *et al.* 2007a,b). New Caledonian Dugongs may also use the fore reef shelf for thermoregulation during the cool season when inshore intertidal seagrass resources are inaccessible because of the tide (Cleguer 2015), as also observed in Australia (Zeh *et al.* 2018).

Like other Dugong populations, New Caledonian Dugongs are found in a wide range of depths, and the activity space use of individual Dugongs varies greatly with their location. Dugongs tracked with GPS-satellite trackers used very shallow areas intensively at night and high tide (Derville *et al.* 2022).

Dugongs are seagrass community specialists (Marsh *et al.* 2018). Eleven species of seagrass, in 6 genera on which Dugongs are known to feed (Johnstone and Hudson 1981, Marsh *et al.* 1982, Masini *et al.* 2001, Nietschmann 1984, Preen 1992, Sheppard *et al.* 2010), occur in New Caledonia (Payri 2007). However, the basis for food selection by New Caledonian Dugongs is currently unknown.

New Caledonian Dugongs intensively frequent shallow areas with known seagrass patches, but also deeper areas where the presence of seagrass has not yet been verified (Cleguer *et al.* 2020). Although the marine vegetation of New Caledonia in areas shallower than 5 m has been mapped using optical remote sensing (Andréfouët *et al.* 2021), data on deeper seagrass meadows are patchy and limited. However, given the evidence of Dugongs' use of areas deeper than 5 m in New Caledonia, it is highly likely that extensive deep-water seagrass occurs there. A complete map of species distribution and types of seagrass beds is needed. A theoretical framework using a combination of field data and habitat maps derived from remote sensing (including deep-water seagrass) was recently developed to enhance the quality, resolution, and coverage of spatial information on seagrass in New Caledonia (Andréfouët *et al.* 2021) as a basis for future mapping efforts. An ongoing participatory program ("Science en Herbe") is using citizen science to provide critical information on unmapped Dugong habitats, based on Dugong distribution and movement data (from aerial survey, and tracking studies, respectively) (Brisset *et al.* 2022).

**Systems:** Marine

## Use and Trade

The Dugong is culturally very important to New Caledonian people. It is an emblem of respect for and care of marine wildlife in the territory and, as a result, its conservation is of considerable societal value (Cleguer 2010, Dupont 2015, Garrigue *et al.* 2008). Dugong hunting has been conducted for centuries in New Caledonia to meet the needs of traditional ceremonies for the Kanak people (the indigenous Melanesian inhabitants of New Caledonia) (Leblic 2008), including the ceremony of the New Yam, weddings, bereavements and leaders' inductions. The Dugong is associated with kanak chieftaincy

because it is a prestige food, the "meat of the leaders" (Dupont 2015). Dugongs were also hunted by New Caledonians of European origin (Dupont 2015).

Dugong hunting is now restricted in New Caledonia by legislation, which prohibits hunting in the province Sud and requires permits in the province Nord and province des Iles Loyauté (Resolution 68 dated 25 June 1963; Province Nord 2008; Province Sud 2009). Nonetheless, people continue to hunt Dugongs illegally (Garrigue *et al.* 2009; Institut TNS 2005; Louis-Harris 2005) and poaching activities are occasionally reported from Grande Terre locations (see [www.rescue.ird.nc](http://www.rescue.ird.nc)).

## **Threats (see Appendix for additional information)**

Marsh *et al.* (2011) and Marsh and Sobtzick (2019) concluded that threats to Dugong differ with location. In New Caledonia, the major threats in order of importance include:

- Hunting: historically legal, currently illegal with exceptions in province Nord (Cleguer 2010; Garrigue *et al.* 2022; Garrigue *et al.* 2009; Institut TNS 2005; Louis-Harris 2005; Opération Cétacés and Institut de Recherche pour le Développement n.d.).
- Boat strikes and boating activities (e.g., acoustic pollution) (Bordin 2009, Cleguer 2010, Cleguer *et al.* 2015, ESCAL and A2EP 2011, Opération Cétacés and Institut de Recherche pour le Développement n.d.).
- Incidental capture in fishing gear (e.g., gill nets) (Cleguer *et al.* 2015, Opération Cétacés and Institut de Recherche pour le Développement n.d.).
- Degradation of seagrass habitats (in particular from: urban development, mining and aquaculture (David *et al.* 2010, Hily *et al.* 2010)).
- Climate change impacts on seagrass communities (extreme weather events, marine heatwaves) (Hily *et al.* 2010, Marsh *et al.* 2022).

Stranding data from 65 events in New Caledonia (Opération Cétacés and Institut de Recherche pour le Développement n.d.) indicated that of the 52% of Dugong deaths for which the cause could be confidently identified, 15% were due to natural causes, against 37% for anthropogenic causes. In deaths caused by human factors, 67% were due to illegal hunting, 25% to boat collisions, and 8% to fishing nets (Garrigue *et al.* 2022).

Despite the ban on hunting, evidence (stranding data [www.rescue.ird.nc](http://www.rescue.ird.nc), and recent individual reports such as Gallo (2021)) suggests that poaching continues in New Caledonia.

Collisions between Dugongs and vessels also occur (Opération Cétacés and Institut de Recherche pour le Développement n.d.) but are difficult to quantify.

Bycatch is an ongoing issue in New Caledonia, based on reports from local fishermen and traditional owners (Cleguer, pers. comm. 2022). Dugong are caught in fishnets deployed near the shore and left unattended overnight. However, the number of Dugong caught and the fate of the captured animals are unknown.

Seagrasses are one of the most seriously endangered ecosystems globally (Waycott *et al.* 2009), and their status in the Pacific Islands Countries and Territories, including New Caledonia, is becoming compromised under increasing threats from anthropogenic activities, further exacerbated by pressures related to climate change (Waycott *et al.* 2011). The current state of seagrass in New Caledonia is not currently monitored, but McKenzie *et al.* (2021) found no particular trend in their regional analysis (one

site in New Caledonia). In New Caledonia, a workshop led by the French Initiative for Coral Reefs (IFRECOR) was held in May 2022 to develop indicators for future seagrass monitoring.

The genetically and geographically isolated New Caledonian Dugong population is at great risk in the case of rare but catastrophic events such as a disease, direct and indirect climate change effects including high intensity cyclones, or causes of seagrass die-off such as extreme weather events, disease and harmful algal blooms (Marsh *et al.* 2022).

A project to limit the presence of large sharks in Baie des Citrons using a rigid shark barrier was recently announced by the Nouméa City Council (Cateau 2022). Although the possible negative impacts of such devices on the Dugong population are poorly known (but see Gribble *et al.* 1998 for baited drumlines and shark nets), it is likely going to affect the resident Dugong population by preventing them to access this area.

Except for bycatch in gill-nets and poaching, the anthropogenic threats to Dugongs and their seagrass habitats occur primarily on the west coast of New Caledonia, especially around the capital-city of Nouméa and in the Voh-Kone-Pouembout region (Bordin 2009). A spatial assessment of the risks to Dugongs from anthropogenic activities is lacking.

## **Conservation Actions (see Appendix for additional information)**

Despite national (Garrigue *et al.* 2008, Raghunathan *et al.* 2012, Seddon *et al.* 2014, Marshall *et al.* 2018) and international (CITES 1983, CMS Secretariat 2007) legislative protection, Dugong populations have declined, or their status is unknown in many parts of the species range (Marsh and Sobtzick 2019).

In New Caledonia, Dugongs are legally protected at a national level. Dugong hunting is now restricted in New Caledonia by strict legislation rules which prohibit hunting in the province Sud and require special permits in the province Nord and province des Iles Loyauté (Resolution 68 dated 25 June 1963; province Nord 2008, province Sud 2009). The province Sud, the province Nord and the Province des Iles were all granting exemptions to the hunting ban prior to the total ban in the province Sud in 2009. However, the number of exemptions granted was low (15 between 1995 and 2004 only for the province Nord and Sud) and none has been granted since 2004. Nonetheless, people continue to hunt Dugongs illegally in New Caledonia (Garrigue *et al.* 2009, Institut TNS 2005, Louis-Harris 2005) and poaching activities are reported from time to time around Grande Terre.

There are 33 MPAs in New Caledonia: seven in the province Nord and 26 in Province Sud. These areas are divided into five types, all corresponding to different levels of restrictions ranging from highly restricted-no access areas to areas with very few limitations on human activities: Integral reserves (IUCN Ia), wilderness reserves (IUCN Ib), natural reserves (IUCN IV), sustainable management reserves (IUCN VI) and Province parks (IUCN II). Each Province is responsible for managing the MPAs within its administrative boundaries. The extent to which the regulations benefit Dugongs and their seagrass habitats varies among each type of MPA. New Caledonia's MPAs were not originally designed to protect Dugongs and their habitat (Service de l'environnement de la Province Sud, pers. comm.; David *et al.* 2010). Cleguer *et al.* (2015) found the system of MPAs in New Caledonia to be inadequate to protect important Dugong areas: MPAs with restrictions on anthropogenic activities were located outside most higher Dugong density areas. Despite a change in MPA design objectives in the early 2000s to target the protection of biodiversity supported by scientific information, newly available data on Dugong relative

abundance and distribution (Garrigue et al. 2008) has not been used in subsequent MPA design. Some important seagrass habitats fall within those MPAs and best practice is regularly communicated to the community to contribute to their conservation.

The Lagoons of New Caledonia were listed on the World Heritage List in 2008. The World Heritage Statement of Outstanding Universal Value explicitly mention Dugongs: “They [the Lagoons of New Caledonia] provide habitat to a number of emblematic or threatened marine species such as turtles, whales or dugongs, whose population here is the third largest in the world.” (UNESCO 2009). “New Caledonian Lagoons and Shelf Waters” were declared an Important Marine Mammal Areas (IMMA) in 2008 based on three species including the Dugong (IUCN-Marine Mammal Protected Areas Task Force 2021). IMMAs are not legal entities. Instead, they highlight important zones (habitats) for marine mammal species that have the potential to be delineated and managed for conservation.

New Caledonia has had a dedicated national action plan for the conservation of Dugongs since 2010. In 2010, a technical group administered by the French Marine Protected Area Agency (now Office Français de la Biodiversité or French Office for Biodiversity) and involving the three provincial authorities, the government of New Caledonia, the customary senate, the French Government, WWF-NC and the association Opération cétacés, launched the first five-year Dugong action plan (Plan d'Actions Dugong 2010–2015). The plan focused on undertaking baseline research on several aspects of New Caledonian Dugong ecology (Cleguer 2015) and societal importance (Dupont 2015). Two additional research projects assessed genetic diversity of the subpopulation and connectivity with neighbouring populations (Oremus 2011, 2015). Results from the different 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. The first action plan also focused on raising awareness of the Dugongs’ conservation value, and adapting local governance as well as developing international collaborations to mitigate threats to the New Caledonian sub-population. The second action plan (2016–2021) led by the Conservatory for natural landscapes (CEN, Conservatoire d'Espaces Naturels) aimed to improve governance to tackle major issues such as Dugong poaching and bycatch (Conservatoire d'Espaces Naturels de Nouvelle-Calédonie n.d.). The plan was also dedicated to continue studying Dugong ecology to improve protection actions, evaluate the status of the Dugong population, and monitor the effectiveness of conservation actions. Communication and awareness campaigns were sustained. This plan is yet to be reviewed and a third action plan to be launched for 2022–2027.

## Credits

**Assessor(s):** Hamel, M.A., Marsh, H., Cleguer, C., Garrigue, C. & Oremus, M.

**Reviewer(s):** Lawler, I.

**Partner(s) and Institution(s):** IUCN SSC Sirenia Specialist Group (dugongs and manatees)

**Authority/Authorities:** IUCN SSC Sirenia Specialist Group (dugongs and manatees)

## Bibliography

- Andréfouët, S., Derville, S., Buttin, J., Dirberg, G., Wabnitz, C.C.C., Garrigue, C. and Payri, C.E. 2021. Nation-wide hierarchical and spatially-explicit framework to characterize seagrass meadows in New-Caledonia, and its potential application to the Indo-Pacific. *Marine Pollution Bulletin* 173: 113036.
- Bertram, G.C.L. and Bertram, C.K.R. 1973. The modern Sirenia: their distribution and status. *Biological Journal of the Linnean Society* 5: 297-338.
- Bordin, A. 2009. Identification d'aires de conservation prioritaires pour la population de dugongs qui utilise les lagons de Nouvelle-Calédonie . Université de La Rochelle & Opération Cétacés.
- Brisset, M., Derville, S., Andréfouët, S., Cleguer, C., Buttin, J., Garrigue, C., 2022. Science en herbe: Raising awareness about the importance of dugongs and their habitat in New Caledonia. Final report. French National Research Institute for Sustainable Development, Nouméa, New Caledonia.
- Chambers, M.R., Bani, E. and Barker-Hudson, B.E.T. 1989. The status of dugong (*Dugong dugon*) in Vanuatu.
- CITES. 1983. *Convention on International Trade in Endangered Species of Wild Fauna and Flora.*
- Cleguer, C. 2010. Le dugong (*Dugong dugon*), monographie de l'espèce, état des lieux des connaissances et des méthodologies d'études. Propositions d'actions en vue d'améliorer les connaissances relatives au dugong en Nouvelle-Calédonie. Agence des Aires Marines Protégées, Nouméa, Nouvelle-Calédonie.
- Cleguer, C. 2015. Informing dugong conservation at several spatial and temporal scales in New Caledonia. James Cook University.
- Cleguer, C. Garrigue, C. 2018. Chapitre 41. Le dugong, sirène du lagon en danger. In: Payri, C. E. (ed.), *Nouvelle-Calédonie: Archipel de corail.*, IRD Éditions.
- Cleguer, C., Garrigue, C. and Marsh, H. 2020. Dugong (*Dugong dugon*) movements and habitat use in a coral reef lagoonal ecosystem. *Endangered Species Research* 43: 167-181.
- Cleguer, C., Garrigue, C., Fuentes, M.M.P.B., Everingham, Y., Hagihara, R., Hamann, M., Payri, C. and Marsh, H. 2017. Drivers of change in the relative abundance of dugongs in New Caledonia. *Wildlife Research* 44(4): 365-376.
- Cleguer, C., Grech, A., Garrigue, C. and Marsh, H. 2015. Spatial mismatch between marine protected areas and dugongs in New Caledonia. *Biological Conservation* 184: 154-162.
- CMS Secretariat. 2007. *Memorandum of Understanding on the Conservation and Management of Dugongs (*Dugong dugon*) and their Habitats throughout their Range.*
- Conservatoire d'Espaces Naturels de Nouvelle-Calédonie. n.d.. Plan d'Actions Dugong: Actions pour la protection - PAD phases 1 & 2. Available at: <https://www.cen.nc/protection-dugong>. (Accessed: 18/04/2022).
- Cravatte, S., Kestenare, E., Eldin, G., Ganachaud, A., Lefèvre, J., Marin, F., Menkes, C. and Aucan, J. 2015. Regional circulation around New Caledonia from two decades of observations. *Journal of Marine Systems* 148: 249-271.
- David, G., Leopold, M., Dumas, P.S., Ferraris, J., Herrenschmidt, J.B. and Fontenelle, G. 2010. Integrated coastal zone management perspectives to ensure the sustainability of coral reefs in New Caledonia. *Marine Pollution Bulletin* 61(7–12): 323-334.

Derville, S., Cleguer, C., and Garrigue, C. 2022. Ecoregional and temporal dynamics of dugong habitat use in a complex coral reef lagoon ecosystem. *Scientific Reports* 12(1): 552.

Deutsch, C.J., Castelblanco-Martínez, D.N., Groom, R. and Cleguer, C. 2022. Chapter 5. Movement Behavior of Manatees and Dugongs: I. Environmental Challenges Drive Diversity in Migratory Patterns and other Largescale Movements. In: Helene Marsh (ed.), *Ethology and Behavioral Ecology of Sirenia*.

Deutsch, C.J., Self-Sullivan, C. and Mignucci-Giannoni, A. 2008. *Trichechus manatus*. The IUCN Red List of Threatened Species 2008: e.T22103A9356917. .

Duclos, G., Aubert, C., Dambreville, R., Le Moguedec, G. and Roux, B. 2019. Étude de la distribution de la population de dugongs de Nouvelle-Calédonie par survol aérien. Rapport d'analyse des données de la campagne de novembre 2018.

Dupont, A. 2015. La conservation du dugong en Nouvelle-Calédonie: la mobilisation et la confrontation de savoirs et pratiques pour la protection d'une espèce "emblématique" menacée. Département d'Anthropologie, Université Aix-Marseille.

ESCAL, A2EP. 2011. Enquête sur les pressions exercées par les activités nautiques sur la population de dugongs en Nouvelle Calédonie. Agence des Aires Marine Protegees.

Gallo, J.-F. 2021. Un dugong tué par des braconniers à la plage de Gouaro. *Les Nouvelles Calédoniennes*.

Garrigue, C., Bonneville, C.D., Cleguer, C. and Oremus, M. 2022. Extremely Low mtDNA Diversity and High Genetic Differentiation Reveal the Precarious Genetic Status of Dugongs in New Caledonia, South Pacific. *Journal of Heredity*.

Garrigue, C., Oremus, M., Schaffar, A. and Patenaude, N. 2009. Etude du statut de la population de dugongs en provinces Nord et Sud 2008. Zoneco, Nouméa, Nouvelle-Calédonie.

Garrigue, C., Patenaude, N. and Marsh, H. 2008. Distribution and abundance of the dugong in New Caledonia, southwest Pacific. *Marine Mammal Science* 24(1): 81-90.

Gribble, N.A., McPherson, G. and Lane, B. 1998. Effect of the Queensland Shark Control Program on non-target species: whale, dugong, turtle and dolphin: a review. *Marine and Freshwater Research* 49(7): 645-651.

Hagihara, R., Jones, R.E., Soltzick, S., Cleguer, C., Garrigue, C. and Marsh, H. 2018. Compensating for geographic variation in detection probability with water depth improves abundance estimates of coastal marine megafauna. *PLOS ONE* 13(1): e0191476.

Heithaus, M., Frid, A. and Dill, L. 2002. Shark-inflicted injury frequencies, escape ability, and habitat use of green and loggerhead turtles. *Marine Biology* 140(2): 229-236.

Hill-Lewenilovo, R., Vuiyasawa, R. and Piovano, S. 2019. First record of a dugong (*Dugong dugon* Müller, 1776) in Fiji. *Pacific Conservation Biology* 25(3): 324-325.

Hily, C., Duchêne, J., Bouchon, C., Bouchon-Navaro, Y., Gigou, A., Payri, C. and Védie, F. 2010. *Les herbiers de phanérogames marines de l'outre-mer français*. IFRECOR, Conservatoire du littoral.

Hodgson, A.J. 2004. Dugong behaviour and responses to human influences. School of Tropical Environment Studies and Geography, James Cook University.

Institut Louis-Harris. 2005. Etude de la consommation des tortues et dugong en province Nord.

Institut TNS. 2005. Enquête sur la consommation des dugongs en province Sud.

IUCN. 2022. The IUCN Red List of Threatened Species. Version 2022-2. Available at: [www.iucnredlist.org](http://www.iucnredlist.org). (Accessed: 08 December 2022).

IUCN-Marine Mammal Protected Areas Task Force. 2021. New Caledonian Lagoons and Shelf Waters IMMA Factsheet. Available at: <https://www.marinemammalhabitat.org/wpcontent/uploads/imma-factsheets/PacificIslands/newcaledonian-main-island-lagoons-and-shelf-PacificIslands.pdf>.

Johnstone, I.M. and Hudson, B.E.T. 1981. The Dugong Diet: Mouth Sample Analysis. *Bulletin of Marine Science* 31(3): 681-690.

Julie Cateau. 2022. Une barrière anti-requins à la baie des Citrons pour la fin de l'année? *Les Nouvelles Calédoniennes*.

Leblic, I. 2008. *Vivre de la mer, vivre avec la terre... en pays kanak*. Société des Océanistes.

Marshall, C.D., Al Ansi, M., Dupont, J., Warren, C., Al Shaikh, I. and Cullen, J. 2018. Large dugong (Dugong dugon) aggregations persist in coastal Qatar. *Marine Mammal Science* 34(4): 1154-1163.

Marsh, H. 1980. Age Determination of the Dugong (Dugong dugon (Müller)) in Northern Australia and its Biological Implications. Report to the International Whaling Commission (Special Issue 3).

Marsh, H., Albouy, C., Arraut, E., Castelblanco-Martínez, D.N., Collier, C., Edwards, H., James, C. and Keith-Diagne, L. 2022. Chapter 8. How Might Climate Change Affect the Ethology and Behavioral Ecology of Dugongs and Manatees? In: Helene Marsh (ed.), *Ethology and Behavioral Ecology of Sirenia*.

Marsh, H. and Sobtzick, S. 2019. Dugong dugon (amended version of 2015 assessment). The IUCN Red List of Threatened Species 2019: e.T6909A160756767.

Marsh, H., Channells, P.W., Heinsohn, G.E. and Morrissey, J. 1982. Analysis of Stomach Contents of Dugongs From Queensland. *Wildlife Research* 9(1): 55-67.

Marsh, H., Grech, A. and McMahon, K. 2018. Dugongs: Seagrass Community Specialists. In: Larkum, Anthony W. D. Kendrick, Gary A. Ralph, Peter J. (ed.), *Seagrasses of Australia: Structure, Ecology and Conservation*, pp. 629-661. Springer International Publishing, Cham.

Marsh, H., O'Shea, T.J. and Reynolds Iii, J.E. 2011. *Ecology and Conservation of the Sirenia: Dugongs and Manatees*. Cambridge University Press, Cambridge.

Masini, R.J., Anderson, P.K. and McComb, A.J. 2001. A Halodule-dominated community in a subtropical embayment: physical environment, productivity, biomass, and impact of dugong grazing. *Aquatic Botany* 71(3): 179-197.

McKenzie, L.J., Yoshida, R.L., Aini, J.W., Andréfouet, S., Colin, P.L., Cullen-Unsworth, L.C., Hughes, A.T., Payri, C.E., Rota, M., Shaw, C., Skelton, P.A., Tsuda, R.T., Vuki, V.C. and Unsworth, R.K.F. 2021. Seagrass ecosystems of the Pacific Island Countries and Territories: A global bright spot. *Marine Pollution Bulletin* 167: 112308.

Nietschmann, B. 1984. Hunting and ecology of dugongs and green turtles, Torres Strait, Australia. *National Geographic Society Research Report* 17: 625-651.

Opération Cétacés, Institut de Recherche pour le Développement, n.d.. RESCUE : Signalement d'échouage de cétacés en Nouvelle-Calédonie. Available at: <https://rescue.ird.nc/index.php>. (Accessed: 13/04/2022).

Oremus, M., Garrigue, C. and Cleguer, C. 2011. Isolement et diversité génétique des dugongs de Nouvelle-Calédonie. Rapport final. Unpublished report. Province Sud, Nouvelle-Calédonie.

Oremus, M., Garrigue, C. and Cleguer, C. 2015. Etude génétique complémentaire sur le statut de la population de dugong de Nouvelle-Calédonie. Unpublished report. Agence des Aires Marines Protégées., Nouvelle-Calédonie.

Payri, C. 2007. Revised checklist of marine algae (Chlorophyta, Rhodophyta and Ochrophyta) and seagrasses (Marine Angiosperma) of New Caledonia. In: Payri, C.E., Richer de Forges, B. (ed.), *Compendium of Marine Species of New Caledonia, Documents Scientifiques et Techniques. 117.*, pp. 95–112. IRD, Noumea.

Preen, A.R. 1992. Interactions between dugongs and seagrasses in a subtropical environment. Department of Zoology, James Cook University.

Province Nord. 2008. *Code de l'environnement de la province Nord.*

Province Sud. 2009. *Code de l'environnement de la province Sud.*

Raghunathan, C., Venkataraman, K. and Rajan, P.T. 2012. Status of Sea Cow, Dugong (*Dugong dugon*) in Andaman and Nicobar Islands. *Nature, Environment and Pollution Technology* 11(1): 105-112.

Seddon, J.M., Ovenden, J.R., Sneath, H.L., Broderick, D., Dudgeon, C.L. and Lanyon, J.M. 2014. Fine scale population structure of dugongs (*Dugong dugon*) implies low gene flow along the southern Queensland coastline. *Conservation Genetics* 15(6): 1381-1392.

Sheppard, J.K., Marsh, H., Jones, R.E. and Lawler, I.R. 2010. Dugong habitat use in relation to seagrass nutrients, tides, and diel cycles. *Marine mammal science* 26(4): 855-879.

Sheppard, J.K., Preen, A.R., Marsh, H., Lawler, I.R., Whiting, S.D. and Jones, R.E. 2006. Movement heterogeneity of dugongs, *Dugong dugon* (Müller), over large spatial scales. *Journal of Experimental Marine Biology and Ecology* 334(1): 64-83.

Testau, J.-L. and Conand, F. 1983. *Estimation des surfaces des différentes zones des lagons de Nouvelle-Calédonie.* ORSTOM, Nouméa.

UNESCO. 2011. *Decision 35 COM 7B.22. Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems (France) (N 1115).* UNESCO World Heritage Centre.

Unknown. 2015. Le retour du dugong. *Les Nouvelles Calédoniennes.*

Wade, P.R. 1998. Calculating Limits to the Allowable Human-Caused Mortality of the Cetaceans and Pinnipeds. *Marine Mammal Science* 14(1): 1-37.

Waycott, M., Duarte, C.M., Carruthers, T.J.B., Orth, R.J., Dennison, W.C., Olyarnik, S., Calladine, A., Fourqurean, J.W., Heck, K.L., Hughes, A.R., Kendrick, G.A., Kenworthy, W.J., Short, F.T. and Williams, S.L. 2009. Accelerating loss of seagrasses across the globe threatens coastal ecosystems. *Proceedings of the National Academy of Sciences* 106(30): 12377-12381.

Waycott, M., McKenzie, L.J., Mellors, J.E., Ellison, J.C., Sheaves, M.T., Collier, C., Schwarz, A.-M., Webb, A., Johnson, J.E. and Payri, C. 2011. Vulnerability of mangroves, seagrasses and intertidal flats in the tropical Pacific to climate change. In: JD Bell, JE Johnson and AJ Hobday (eds), *Vulnerability of Tropical Pacific Fisheries and Aquaculture to Climate Change.*, Secretariat of the Pacific Community, Noumea, New Caledonia.

Wirsing, A.J., Heithaus, M.R. and Dill, L.M. 2007. Fear factor: do dugongs (*Dugong dugon*) trade food for safety from tiger sharks (*Galeocerdo cuvier*)? *Oecologia* 153(4): 1031-1040.

Wirsing, A.J., Heithaus, M.R. and Dill, L.M. 2007. Living on the edge: dugongs prefer to forage in microhabitats that allow escape from rather than avoidance of predators. *Animal Behaviour* 74(1): 93-

101.

Zeh, D.R., Heupel, M.R., Hamann, M., Jones, R., Limpus, C.J. and Marsh, H. 2018. Evidence of behavioural thermoregulation by dugongs at the high latitude limit to their range in eastern Australia. *Journal of Experimental Marine Biology and Ecology* 508: 27-34.

Zeh, D.R., Heupel, M.R., Hamann, M., Limpus, C.J. and Marsh, H. 2016. Quick Fix GPS technology highlights risk to dugongs moving between protected areas. *Endangered Species Research* 30: 37-44.

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## External Resources

For [Supplementary Material](#), and for [Images and External Links to Additional Information](#), please see the Red List website.

## Appendix

### Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Habitat	Season	Suitability	Major Importance?
9. Marine Neritic -> 9.1. Marine Neritic - Pelagic	Resident	Suitable	Yes
9. Marine Neritic -> 9.4. Marine Neritic - Subtidal Sandy	Resident	Suitable	Yes
9. Marine Neritic -> 9.5. Marine Neritic - Subtidal Sandy-Mud	Resident	Suitable	Yes
9. Marine Neritic -> 9.6. Marine Neritic - Subtidal Muddy	Resident	Suitable	Yes
9. Marine Neritic -> 9.8. Marine Neritic - Coral Reef	Resident	Suitable	Yes
9. Marine Neritic -> 9.9. Marine Neritic - Seagrass (Submerged)	Resident	Suitable	Yes
9. Marine Neritic -> 9.10. Marine Neritic - Estuaries	Resident	Suitable	Yes
12. Marine Intertidal -> 12.2. Marine Intertidal - Sandy Shoreline and/or Beaches, Sand Bars, Spits, Etc	Resident	Marginal	-
12. Marine Intertidal -> 12.7. Marine Intertidal - Mangrove Submerged Roots	Resident	Marginal	-

### Use and Trade

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

End Use	Local	National	International
1. Food - human	No	No	No

### Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	Minority (<50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
4. Transportation & service corridors -> 4.3. Shipping lanes	Ongoing	Minority (<50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.1. Intentional use: (subsistence/small scale) [harvest]	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	2. Species Stresses -> 2.1. Species mortality		

5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.3. Unintentional effects: (subsistence/small scale) [harvest]	Ongoing	Minority (<50%)	Slow, significant declines	Low impact: 5
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
6. Human intrusions & disturbance -> 6.1. Recreational activities	Ongoing	Minority (<50%)	Slow, significant declines	Low impact: 5
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
8. Invasive and other problematic species, genes & diseases -> 8.6. Diseases of unknown cause	Ongoing	Unknown	Unknown	Unknown
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.4. Type Unknown/Unrecorded	Ongoing	Minority (<50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
11. Climate change & severe weather -> 11.4. Storms & flooding	Ongoing	Whole (>90%)	Rapid declines	High impact: 8
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		

## Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

<b>Conservation Action in Place</b>
In-place land/water protection
Conservation sites identified: Yes, over entire range
Occurs in at least one protected area: Yes
In-place species management
Harvest management plan: Yes
In-place education
Subject to recent education and awareness programmes: Yes
Included in international legislation: Yes
Subject to any international management / trade controls: Yes

## Conservation Actions Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

<b>Conservation Action Needed</b>
1. Land/water protection -> 1.1. Site/area protection
2. Land/water management -> 2.1. Site/area management
4. Education & awareness -> 4.1. Formal education
4. Education & awareness -> 4.2. Training

<b>Conservation Action Needed</b>
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.1. International level
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.2. National level
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.3. Sub-national level
6. Livelihood, economic & other incentives -> 6.1. Linked enterprises & livelihood alternatives

## Research Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

<b>Research Needed</b>
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
1. Research -> 1.4. Harvest, use & livelihoods
1. Research -> 1.5. Threats
1. Research -> 1.6. Actions
2. Conservation Planning -> 2.1. Species Action/Recovery Plan
2. Conservation Planning -> 2.2. Area-based Management Plan
2. Conservation Planning -> 2.3. Harvest & Trade Management Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.2. Harvest level trends
3. Monitoring -> 3.4. Habitat trends

## Additional Data Fields

<b>Distribution</b>
Estimated area of occupancy (AOO) (km <sup>2</sup> ): 874
Estimated extent of occurrence (EOO) (km <sup>2</sup> ): 11268
Number of Locations: 1
<b>Population</b>
Number of mature individuals: 896
Continuing decline of mature individuals: Yes
Population severely fragmented: No
No. of subpopulations: 1

<b>Population</b>
All individuals in one subpopulation: Yes
No. of individuals in largest subpopulation: 896
<b>Habitats and Ecology</b>
Continuing decline in area, extent and/or quality of habitat: Unknown
Generation Length (years): 22-25
Movement patterns: Nomadic

## The IUCN Red List Partnership



The IUCN Red List of Threatened Species™ is produced and managed by the [IUCN Global Species Programme](#), the [IUCN Species Survival Commission \(SSC\)](#) and [The IUCN Red List Partnership](#).

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