Regional Assessment of the Seagrass *Halodule emarginata* den Hartog in the Tropical Atlantic Seagrass Bioregion (Bioregion 2) for the IUCN Red List [1,2]

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PLANTAE - TRACHEOPHYTA - LILIOPSIDA - ALISMATALES - CYMODOCEACEAE - *Halodule - emarginata*

Common Names: Species code: Hg (English)

Synonyms: *Halodule lilianeae*

Taxonomic Note: This species was first described by den Hartog (1970) from material collected in 1969 in São Paulo, Brazil, based on leaf-tip morphology ("a distinctly emarginate leaf-tip with faint development or absence of the lateral teeth" which is highly variable in the genus *Halodule*). The taxonomy of this species is therefore questionable and it may eventually be found as conspecific with *Halodule wrightii* (Phillips 1992; Larkum et al. 2006).

Red List Status
Near Threatened, (NT, IUCN version 14)
Near Threatened reason: EOO = 1,190,884km²; AOO = 72km². The taxon meets the area requirements under criterion B2 for endangered (AOO <500 km²) and is severely fragmented (B2a), but the population is not declining, occurs at more than 10 locations, and there are no extreme fluctuations. While new populations have been identified since the last assessment, presently this species is found in 10 fragmented subpopulations.

Red List Assessment

Assessment Information

Assessor(s): Creed, J.C., Samper-Villarreal, J. & van Tussenbroek, B.I.

Publication date: 15th May 2025

Time period assessed: 2007-2020

Assessment Rationale

Plants with leaf tips corresponding to *Halodule emarginata* have only been reported in Brazil. As it is a highly variable characteristic, the taxonomy of this species based on leaf tip morphology is questionable (Phillips 1992), and it may be considered conspecific with *Halodule wrightii* in the future. The taxon meets the area requirements under criterion B for threatened (EOO <20,000 km² and/or AOO <2,000 km²) and is severely fragmented, but the population is not declining, occurs at many more than 10 locations, and there are no extreme fluctuations. While new populations have been identified since the last assessment, presently this species is found in a few fragmented populations and it is therefore classified as NT (Near Threatened). Lack of reports of this species at other locations may be because of limited efforts to specifically search for this species or confusion with *H. wrightii*. More research is needed on the phylogeny of the genus *Halodule* and studies which combine examination of type material, descriptions of leaf tip morphology and genetic analyses in order to determine this species taxonomic and population status.

Distribution

Geographic Range

Halodule emarginata is endemic to Brazil and previously ranged from São Paulo to Bahia. For the 2007-2020 time period, new populations were identified in Alagoas, Ceará and Piauí, about 1,500 km North of its previously known distribution (Barros et al, 2016; 2017; Silva et al 2018). This extends the known range for this species at this time to 3300km of coastline. New records which have increased its range are probably due to better distribution information than true range expansion of the species.

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[1] This regional assessment also constitutes the global assessment for this species, given that its global distribution is limited to the Tropical Atlantic Seagrass Bioregion.

[2] **Citation:** Creed, J.C., Samper-Villarreal, J. & van Tussenbroek, B.I. (2025). Regional Assessment of the Seagrass *Halodule emarginata* den Hartog in the Tropical Atlantic Seagrass Bioregion (Bioregion 2) for the IUCN Red List. https://doi.org/10.5281/zenodo.15427564

Elevation / Depth / Depth Zones

Depth Zone: Shallow photic (0-50m)

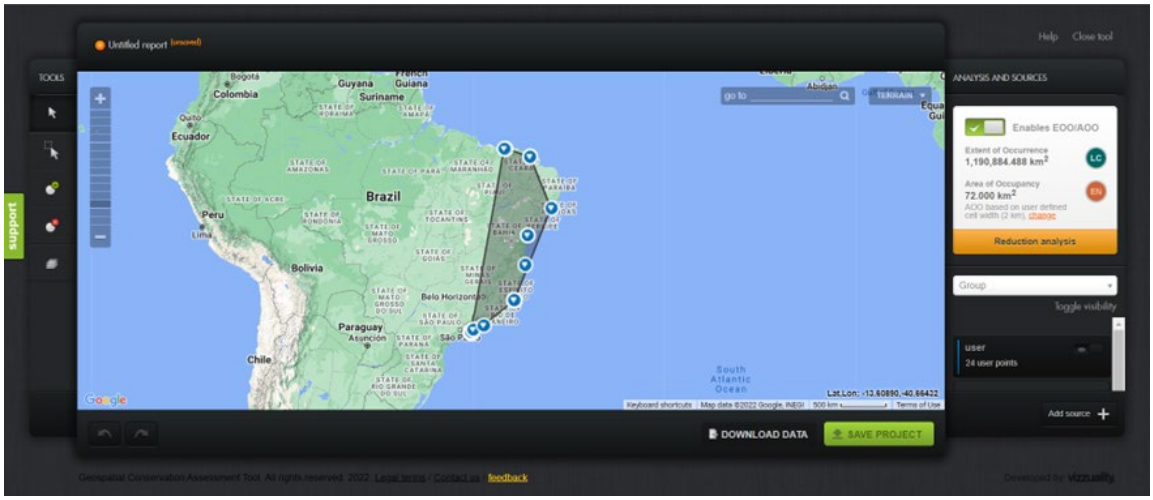
Map Status

Map Status	How the map was created, including data sources/methods used:	Please state reason for map not available:	Data Sensitive?	Justification	Geographic range this applies to:	Date restriction imposed:
Provided	From coordinates taken from publications by the assessors	-	-	-	Brazil	Assessment period

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Brazil	Extant	Native	-	Resident



FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
41. Atlantic - southwest	Extant	Native	-	Resident

Population

There is now more population information available for *Halodule emarginata*, which remains endemic to Brazil. Twenty discrete sites of present occurrence are known for this species which fall into 10 subpopulations. Median site area of occupation is estimated as 0.98 ha. Subpopulations are isolated from one another by between 160 km (min) and 470 km (max) km of coastline.

In Ceará (Pactoti River) shoot density ranges from 127 to 10446 shoots m^{-2}, averaging 2090 shoots m^{-2}. The belowground biomass ranged from 0.4 g dw m^{-2} to 78.2 g dw m^{-2} and the aboveground biomass from 0.25 g dw m^{-2} to 21.65 g dw m^{-2}, with average of 15.4g dw m^{-2} and 5.3g dw m^{-2}, respectively (Barros et al. 2016). In Espírito Santo (Vitória and Vila Velha) mean shoot density was 2270 and 603 shoots m^{-2} respectively. Aboveground biomass was 8.8 and 0.6 g dw m^{-2}, belowground biomass 13.4 and 7.6 g dw m^{-2} and total biomass 22.2 and 8.6 g dw m^{-2}, respectively (Howard et al. 2018).

This seagrass has disappeared from one of the known sites in Rio de Janeiro (Short et al 2010), yet other populations have remained stable for decades, even in highly urbanized settings (such as over 44 years at São Paulo, type locality, Soares et al. 2018; 34 years at Espírito Santo, Howard et al. 2018). At their northern distributional limit populations are denser in the wet season (Barros et al. 2017).

Population Information

Continuing decline in mature individuals?	Qualifier	Justification
-		-

Continuing decline in number of subpopulations	Qualifier	Justification
-		-

Habitats and Ecology

Halodule emarginata is found on sheltered shores, in fine-sediment substrate and salinities around 35 ppt (Oliveira et al. 1983). It is a perennial species that produces staminate flowers with 1.0--2.5 mm long stalk; anthers slender, the lower one ca. 3.5 mm, the upper one ca. 4.0 mm long, colored by numerous tannin cells. Carpellate flowers with an ovoid or globose ovary, ca. 1.7 mm long, with a lateral style up to 3 cm long (Oliveria et al. 1983). As other seagrasses it forms discrete meadows and beds which form habitat for other species. *H. emarginata* and *H. wrightii* have been found cohabiting distinct patches at the same site, as well as other *Halodule* spp. (Barros et al. 2016). Mollusca, Polychaeta and Crustacea co-occur with *H. emarginata* (Barros et al. 2016) and the sea urchin *Lytechinus variegatus* feeds on the leaves of this species (Oliveira et al. 1991).

IUCN Habitats Classification Scheme

Habitat	Season	Suitability	Major Importance?
9.4. Marine Neritic -> Marine Neritic - Subtidal Sandy	-	Suitable	-
9.9. Marine Neritic -> Marine Neritic - Seagrass (Submerged)	-	Suitable	-
12.2. Marine Intertidal -> Marine Intertidal - Sandy Shoreline and/or Beaches, Sand Bars, Spits, Etc	-	Suitable	-

Life History

Breeding Strategy

Does the species lay eggs?
No

Does the species give birth to live young
No

Does the species exhibit parthenogenesis
No

Does the species have a free-living larval stage?
No

Does the species require water for breeding?
No

Systems

System: Marine

Threats

Specific threats to *Halodule emarginata* so far reported are an extensive oil spill in 2019 (325 km² of seagrasses impacted, including *H. emarginata*, Magalhães et al. 2020) and river damming, which has led to the formation of islands and replacement by mangrove forest as well as increased salinity stress (northernmost populations, Barros et al. 2016). Another threat to *Halodule emarginata* is its substitution by other seagrasses (i.e. *Halophila decipiens*) due to their range expansion as a result of global warming (southernmost populations, Pavone et al 2020). Localized coastal development is most likely a threat.

Conservation

Conservation measures for *Halodule emarginata* are unknown. More research is needed on this species' taxonomy, population status, and potential threats (Short et al. 2011; Barros et al. 2016). The subpopulation at Ceará is within the Environmental Protection Area of the Pacoti River (Barros et al. 2016).

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