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

Creed, J.C.[a], Samper-Villarreal, J.[b], van Tussenbroek, B.I.[c] & Furman, B.T.[d]

[a]. Departamento de Ecologia, Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier 524, 20550-900, Rio de Janeiro, RJ, Brazil ORCID ID 0000-0002-1722-0806
[b]. Centro de Investigación en Ciencias del Mar y Limnología (CIMAR), Universidad de Costa Rica, 11501-2060 San José, Costa Rica. ORCID: 0000-0002-7513-7293.
[c]. Unidad Académica de Sistemas Arrecifales-Puerto Morelos, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Prolongación Avenida Niños Héroes S/N, Puerto Morelos, Quintana Roo 77580, Mexico. ORCID: 0000-0002-6447-7479
[d] Florida Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, 100 Eighth Avenue S.E., St. Petersburg, Florida 33701, USA ORCID: 0000-0002-9284-8388

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

Common Names: Shoal Grass (English), Species code: Hy (English)
Synonyms: No Synonyms

Taxonomic Note:
The current taxonomic status is unclear. The taxonomic validity of this species has been questioned and it has been suggested as a synonym of *Halodule wrightii* (Eiseman, 1980; Rivera-Guzmán et al. 2016; Wheeler et al. 2020). Its species status is based on leaf-tip morphology which is highly variable (den Hartog, 1964; Larkum *et al.* 2006). According to Rivera-Guzmán et al (2016) in the United States *H. beaudettei* has been traditionally referred to as *H. wrightii*.. Taxonomic uncertainty will remain until phylogeographic studies that combine re-examination of type material, descriptions of leaf tip morphology and genetic analyses are conducted over sufficiently broad (i.e., range wide) spatial scales.

Red List Status	
Least Concern (LC, IUCN version14)	
Least Concern reason: EOO = 10,827,677km²; AOO = 224km². The taxon meets the area requirements under criterion B2 for endangered (AOO <500 km²) but is not severely fragmented, populations are not declining, it occurs at more than 10 locations, and there are no extreme fluctuations. It also has a large EOO.	
.	

Red List Assessment

Assessment Information

Assessors: Creed, J.C., Samper-Villarreal, J., van Tussenbroek, B.I. & Furman, B.T.

Publication date: 15th May 2025

Time period assessed: 2007-2020

[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. & Furman, B.T (2025). Regional Assessment of the Seagrass *Halodule beaudettei* - (den Hartog) den Hartog in the Tropical Atlantic Seagrass Bioregion (Bioregion 2) for the IUCN Red List. https://doi.org/10.5281/zenodo.15426843

Assessment Rationale

The taxonomic status of *Halodule beaudettei* is unclear and this species was listed as Data Deficient in the previous assessment (Short et al. 2010). Since then, the known range of the species has been expanded based on recent and previously published records, many correcting past misidentifications thus not a true species range expansion, but illustrative of current taxonomic uncertainty. Research on the distribution, taxonomy and population status are recommended. Major threats to the species are unknown, although there are some localized impacts from coastal development (Short et al. 2010). As this species has a wider distribution than reported in the previous assessment period (Short et al. 2010) it is now listed as Least Concern.

Distribution

Geographic Range

The geographic range of *Halodule beaudettei* corresponds roughly with that of *H. wrightii* in the Western Atlantic and Pacific. *Halodule beaudettei* is found sporadically throughout the Caribbean in Mexico (Yucatan), Belize, Guatemala, Venezuela, Trinidad and Tobago, Barbados, Martinique, St. Martin, St. Croix, the Virgin Islands, Puerto Rico, Haiti, Turks and Caicos, Jamaica and Cuba (den Hartog, 1964; Short et al., 2010), the Bahamas (Murchie et al. 2015), the Atlantic coast of the USA (Florida and North Carolina), the Gulf of Mexico (Florida, Texas and Mexico), the South Atlantic in Northeast Brazil (Barros et al. 2016), as well as the Pacific coasts of Nicaragua, Costa Rica and Panama (den Hartog, 1964; Samper-Villarreal et al., 2018; Samper-Villarreal and Cortés, 2020). Historical records from the Indian Ocean (the northeast coast of Madagascar by Eiseman (1980) included in the previous assessment (Short et al. 2010), are not considered taxonomically valid by experts (personal communication – Salomão Bandeira). Its occurrence in the continental United States is also debated by practitioners there (Phillips 1967; Eiseman, 1980; Rivera-Guzmán et al. 2016; Wheeler et al. 2020).

Elevation / Depth / Depth Zones

Depth Lower Limit (in metres below sea level): 15
Depth Upper Limit (in metres below sea level): 0.2
Depth Zone: Shallow photic (0-50m)

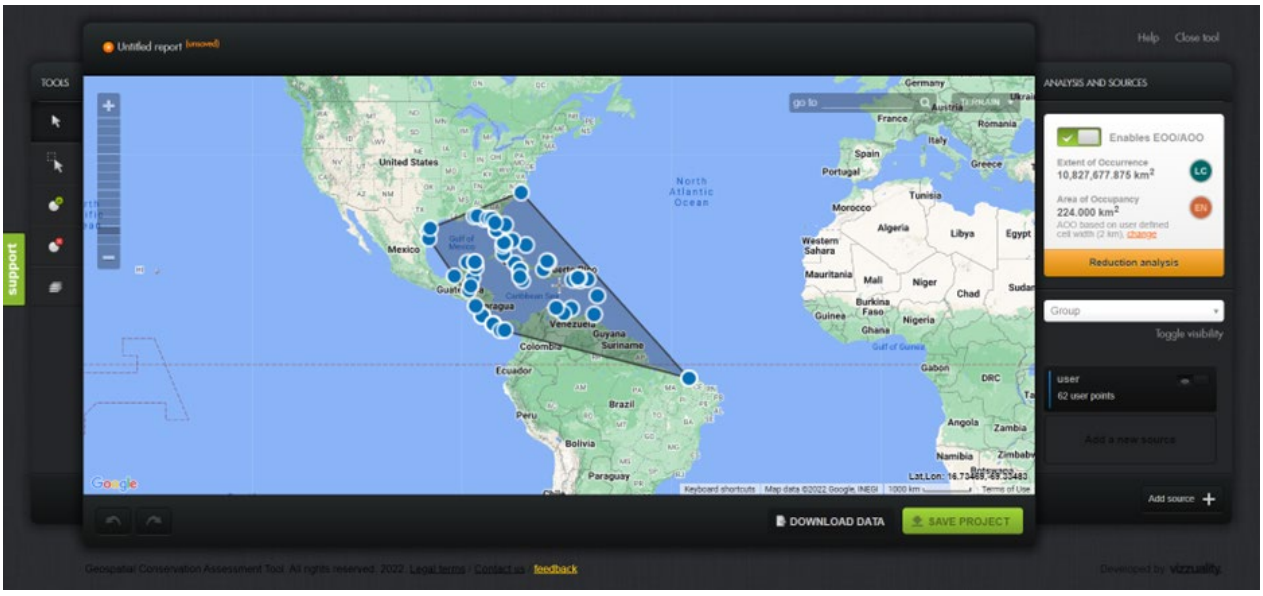
Map Status

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	-	-	-	Tropical Atlantic Seagrass Bioregion (Bioregion 2)	Assessment period

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Barbados	Extant	Native	-	Resident
Belize	Extant	Native	-	Resident
Bahamas	Extant	Native	-	Resident
Brazil	Extant	Native	-	Resident
Costa Rica (Pacific coast)	Extant	Native	-	Resident
Cuba	Extant	Native	-	Resident
Guatemala (Caribbean coast)	Extant	Native	-	Resident
Haiti	Extant	Native	-	Resident
Jamaica	Extant	Native	-	Resident
Martinique	Extant	Native	-	Resident
Mexico (Gulf of Mexico)	Extant	Native	-	Resident
Mexico -> Yucatán Peninsula	Extant	Native	-	Resident
Nicaragua (Pacific coast)	Extant	Native	-	Resident
Panama (Pacific coast)	Extant	Native	-	Resident
Puerto Rico	Extant	Native	-	Resident
St Croix	Extant	Native	-	Resident
St. Martin	Extant	Native	-	Resident
South Caicos	Extant	Native	-	Resident
Trinidad and Tobago	Extant	Native	-	Resident
Turks and Caicos	Extant	Native	-	Resident
USA (Atlantic coast)	Extant	Native	-	Resident
USA (Gulf of Mexico)	Extant	Native	-	Resident
Venezuela	Extant	Native	-	Resident
Virgin Islands	Extant	Native	-	Resident



FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
31. Atlantic - western central	Extant	Native	-	Resident
41. Atlantic - southwest	Extant	Native	-	Resident
77. Pacific – eastern central	Extant	Native	-	Resident

Population

Although more sites are listed here than in the previous assessment (Short et al. 2010) the population status of *Halodule beaudettei* is currently unknown. There we no reports of population decline in the time periods assessed.

Population Information

Continuing decline in mature individuals?	Qualifier	Justification
No	-	There are more records than from the previous assessment (Short et al. 2010) but these are due to more literature references rather than true range expansion.

Continuing decline in number of subpopulations	Qualifier	Justification
No	-	-

Habitats and Ecology

Halodule beaudettei is found on a wide variety of substrata, from silty mud to coarse sand with varying amounts of mud (Phillips 1960). It is a pioneering species with an ability to establish productive stands in nutrient-poor sediments and waters, such as in tidal creeks in the Bahamas where it is habitat for fish (Murchie et al 2015). In Mexico this species occurs to 2 m depth in mixed beds with turtlegrass *Thalassia testudinum* and manatee grass *Syringodium filiforme* (May-Kú et al. 2010). The species was also reported to occur in meadows mixed with *Halophila baillonii* on the Pacific coast of Panama (den Hartog 1960), and Costa Rica, where salinity varied from ~ 30 to 35 ppt and a water temperature of ~ 30 °C. Sexual reproductive structures of *H. beaudettei* have not been reported to date (Samper-Villarreal et al. 2018; Samper-Villarreal and Cortés 2020). In Costa Rica, mean shoot density of *Halodule beaudettei* is up to 2400 shoots m^{-2} and total mean biomass from 14.8 to 21.3 g dw m^{-2} (Samper-Villarreal and Cortés 2020). In Brazil, this species has been reported growing in estuaries together with *Halodule wrightii* and *Halophila baillonii* or in monospecific beds where shoot density reached 5600 shoots.m^{-2} (mean = 1955 shoots.m^{-2}) with biomass of up to 73.4 g dw.m^{-2} (mean 37.7 g dw.m^{-2}) (Magalhaes and Barros (2017).

IUCN Habitats Classification Scheme

Habitat	Season	Suitability	Major Importance?
9.4. Marine Neritic -> Marine Neritic - Subtidal Sandy	-	Suitable	-
9.5. Marine Neritic -> Marine Neritic - Subtidal Sandy-	-	Suitable	-

Mud			
9.6. Marine Neritic -> Marine Neritic - Subtidal Muddy	-	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	-
12.4. Marine Intertidal -> Marine Intertidal - Mud Flats and Salt Flats	-	Suitable	-
12.6. Marine Intertidal -> Marine Intertidal - Tidepools	-	Suitable	-

Life History

Generation Length	Justification	Data Quality
2	Although flowers or seeds have never been seen this is assumed based on genets of similar species	-

Age at maturity: female or unspecified
1 (Not specified)

Age at Maturity: Male
1 (Not specified)

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

As for other seagrasses there are threats to this species from urban/industrial runoff, urban/port infrastructure development, agricultural runoff and dredging (Grech et al. 2012). Despite eutrophication, relatively healthy beds of *Halodule beaudettei* have been reported for Pensacola Bay, FL, USA (Caffrey and Murrell, 2016, but see Taxonomic Note).

Conservation

Halodule beaudettei has been successfully transplanted for restoration purposes in Pensacola Bay, FL, USA (Hester et al, 2016, but see Taxonomic Note). There are no other known specific conservation measures for this species. Research on the distribution, taxonomy and population status is recommended.

Acknowledgements

We thank Fredrick T. Short and Brooke K. Sullivan for their comments on the assessment.

Bibliography

Barros K, Rocha-Barreira C, Magalhães K (2016) Seagrass meadows on the northeast coast of Brazil: habitat influence on the spatial and seasonal variations. Aquatic Ecosystems: Influences, Interactions and Impact on the Environment Nova Science Publishers, New Jersey: 1-29

Caffrey JM, Murrell MC (2016) A historical perspective on eutrophication in the Pensacola Bay estuary, FL, USA Aquatic microbial ecology and biogeochemistry: A dual perspective. Springer, pp 199-213

den Hartog, C (1960) New seagrasses from Pacific Central America. Pac. Nat. 1, 1–8.

den Hartog, C (1964) An approach to the taxonomy of the sea-grass genus *Halodule* Endl. (Potamogetonaceae). Blumea 12: 289-312

Eiseman, N.J. 1980. *An Illustrated Guide to the Sea-Grasses of the Indian River Region of Florida*. Harbor Branch Foundation, Florida.

Grech A, Chartrand-Miller K, Erftemeijer P, Fonseca M, McKenzie L, Rasheed M, Taylor H, Coles R (2012) A comparison of threats, vulnerabilities and management approaches in global seagrass bioregions. Environmental Research Letters 7: 024006 doi 10.1088/1748-9326/7/2/024006

Hester CM, Smith HM, Head ME, Langsten H, Linder S, Manor E, Norman J, Sartory L, Caffrey JM (2016) Comparing Productivity and Biogeochemistry of Native and Transplanted *Thalassia testudinum* and *Halodule beaudettei* in Big Lagoon, Florida, USA. Gulf of Mexico Science 33: 2

Larkum AWD, Orth RJ, Duarte CM (2006) Seagrasses: Biology, Ecology and Conservation. Springer, Dordrecht: 691 p.

Magalhaes KM, Barros KVD (2017) *Halodule* genus in Brazil: A new growth form. Aquat Bot 140: 38-43 doi 10.1016/j.aquabot.2016.12.004

May-Kú MA, Ardisson P-L, Ordóñez-López U (2010) Morphological variation of *Thalassia testudinum* in two shallow coastal environments from the southeastern Gulf of Mexico. Botanica Marina 53: 449-455 doi doi:10.1515/bot.2010.049

Murchie KJ, Danylchuk SC, Danylchuk AJ, Cooke SJ (2015) Fish community and habitat assessments of three adjacent tidal creeks on Cape Eleuthera, The Bahamas American Fisheries Society Symposium, pp 67-80

Phillips RC (1967) On species of the seagrass, *Halodule*, in Florida. Bulletin of Marine Science 17: 672-676

Rivera-Guzmán NE, Moreno-Casasola P, Espinosa EC, Ruiz AEL, Vega CM, Peralta-Peláez LA, Higueredo LES, Medina KPAR, Aguayo KVS (2016) The Biological Flora of Coastal Dunes and Wetlands: *Halodule wrightii* Ascherson. Journal of Coastal Research 33: 938-948

Samper-Villarreal J, Rojas-Ortega G, Vega-Alpízar JL, Cortés J (2018). New sighting of seagrasses in the Eastern Tropical Pacific (Bahía Potrero, Costa Rica). Aquat. Bot. 151: 25-29.

Samper-Villarreal, J, and Cortés, J (2020). Seagrass characterization on the southern Pacific coast of Costa Rica: history, vegetation, and environment. Botanica Marina 63(5): 429-438.

Short FT, Carruthers TJR, van Tussenbroek B Zieman J (2010). *Halodule beaudettei*. The IUCN Red List of Threatened Species 2010: e.T173329A6992218. https://dx.doi.org/10.2305/IUCN.UK.2010-3.RLTS.T173329A6992218.en. Downloaded on 04 February 2021

Wheeler M E, Furman B T, Hall MO (2020). Leaf-tip morphology does not support species status for the seagrass *Halodule beaudettei* in Florida, USA. Gulf and Caribbean Research 31 (1): SC31-SC35