Regional Assessment of the Seagrass *Halophila engelmannii* Asch. in the Tropical Atlantic Seagrass Bioregion (Bioregion 2) for the IUCN Red List [1]

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PLANTAE - TRACHEOPHYTA - LILIOPSIDA - ALISMATALES - HYDROCHARITACEAE - *Halophila - engelmannii*

Common Names: Stargrass (English), Species code: He (English)

Synonyms: *Halophila engelmanni* (original species epithet [Von Neumayer & Ascherson 1875, p. 368], corrected to *Halophila engelmannii* following Turland et al. [2018])

Taxonomic Note:
Halophila engelmannii has been variously confused with *Halophila baillonii*, possibly due to lack of available identification keys (Creed & Samper-Villarreal 2019). However, there is no taxonomic uncertainty regarding the identity of either one of these species (Kuo 2020). Both species have erect shoots with two scales at the base and two more approximately halfway the stem, with two (*H. baillonii*) or 3-4 (*H. engelmannii*) pairs of leaves in a pseudo-whorl at the top. Leaf size and morphology differ perceptibly between the species (Den Hartog, 1970).

Red List Status
NT – Near Threatened, (IUCN version 3.1)
Extent of Occurrence (EOO) in Bioregion 2= 1,770,670 km²
Area of occupancy (AOO) in Bioregion 2= 480 km²

Red List Assessment

Assessment Information

Assessor(s): Brigitta I. van Tussenbroek, Bradley T. Furman

Publication date: 3rd June 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.
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Assessment Rationale

Throughout its range, in the Gulf of Mexico (GoM), the Atlantic coast of Florida, western Cuba and the Bahamas, *Halophila engelmannii* exhibits large (seasonal and interannual) fluctuations in abundance. In general, it is a patchily distributed, opportunistic, ephemeral species found in marginal shallow and deeper (10 to >20m depth) habitats. In shallow coastal and estuarine ecosystems, its overall population size appears to be decreasing, although it is not known to what extent. Most mapping programs tend to focus on meadow extension and coverage characteristics of major canopy-forming species, and therefore are not designed to detect variations in smaller more opportunistic species such as *H. engelmannii*.

The observed AOO is 480 km^2; however, it is possible that poorly mapped offshore areas represent sizeable *H. engelmannii* populations (Buesa 1975, CSA 1985). The GoM has a total surface area of approximately 1.6 x 10^6 km^2, and almost half of this area is shallow continental shelf, with extensive continental platforms in front of Florida and Yucatan. Large sections of these platforms, at depths of ≤ 20m, are potential habitat for *H. engelmannii*. Much of the area remains understudied or unstudied, and populations of this species there could rival or surpass the extent of known inshore subpopulations. Therefore, the AOO of this species may increase upon exploration of deeper potential habitats. The lack of knowledge concerning the true occupancy of this species, does not sustain a change of conservation status, and therefore, this species remains Near Threatened (NT), meeting the threshold of Vulnerable.

In shallow nearshore waters, the major threats remain increasing turbidity or sedimentation, as well as direct and indirect effects of trawling and coastal development. Because of its unknown population extension in deeper waters, and reported population decline in shallow near-shore waters (in the past and at present), this species is considered Near Threatened (NT, A2ace + 3ce). More attention on status and trends for this diminutive, patchily distributed species will be required in the coming years to better understand its extinction risk, including renewed efforts to map and understand the role of deeper, offshore populations in the GoM and the Caribbean.

Distribution

Geographic Range

Small populations of *Halophila engelmannii* have been reported throughout the GoM (Arrellano-Méndez et al. 2019; Bradley & Houser 2009, Choice et al. 2014, Congdon & Dunton 2016, CSA 1985, Espinoza-Avalos 1996, Fourqurean et al. 2002, Kenworthy et al. 2017, Pham et al. 2014, Yarbro & Carlson 2016), the Atlantic coast of Florida (Yarbro & Carlson 2016), and western Cuba (Martínez-Daranas et al. 2013). It was also collected in the Bahamas, at New Providence Island, Nassau by A.E. Wright (1905; specimen in Florida Plant Atlas, https://florida.plantatlas.usf.edu/plant/species/2323), Eleuthera by M.E. Hay (1981; in Smithsonian Collections, http://n2t.net/ark:/65665/3c1a682e6-f1ee-4972-906a-2fc39000e729) and Grand Bahama Island by V. Paul (1981; in Smithsonian Collections, http://n2t.net/ark:/65665/351378526-8709-4ace-9de8-6ebfe5419ff5). Field observation and confirmation will be needed to update its presence in the Bahama archipelago.

Previous reports from elsewhere in the bioregion (Trinidad, Puerto Rico, Venezuela and Costa Rica) were most likely mis-identified *Halophila baillonii* or *Halophila decipiens*, and are not supported by photographs or herbarium specimens (see below).

Correction of geographical distribution data:
Various historical accounts have confused other *Halophila* species (mainly *H. baillonii*) for *H. engelmannii*.
A record of this species in Chaca Chacare, Trinidad (wrongly identified herbarium specimen) has been corrected by Kelly Kingdon of University of Trinidad and Tobago and is now recognized as *Halophila baillonii* (confirmed by photographic material). Previous reports of the species in Guayanilla, Puerto Rico (Vicente 1992) have been rectified by Hector Ruiz and are now recognized as *H. baillonii* (confirmed by photographic material). Similarly, in Venezuela, Velazquez (1994) appears to have confused *H. engelmannii* with *H. baillonii*, as the excellent drawing Velazquez identified as *H. engelmannii* is without much doubt *H. baillonii*. In Sierpe, on the Pacific coast of Costa Rica, a previous report of *H. engelmannii* has since been corrected, as is identified as *H. baillonii* from the herbarium sample (Samper-Villarreal et al. 2018).

Elevation / Depth / Depth Zones

Depth Lower Limit (in metres below sea level): > 20 m
Depth Upper Limit (in metres below sea level): 0
Depth Zone: Shallow photic (0-50m); Deep Photic (51-200m)

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:
Done	From estimated coordinates of sites in the following studies Arrellano-Méndez et al (2019), Bradley & Houser (2009), Choice et al (2014), Congdon & Dunton (2016), CSA (1985), Espinoza-Avalos (1996), Fourqurean et al. (2002), Kenworthy et al. (2017), inaturalist (2019), Martínez-Daranas et al. (2013), Morris et al. (2021), Pham et al. (2014), Yarbro & Carlson (2016), and herbarium specimen collected in the Bahamas.	-	-	-	-	-

Occurrence

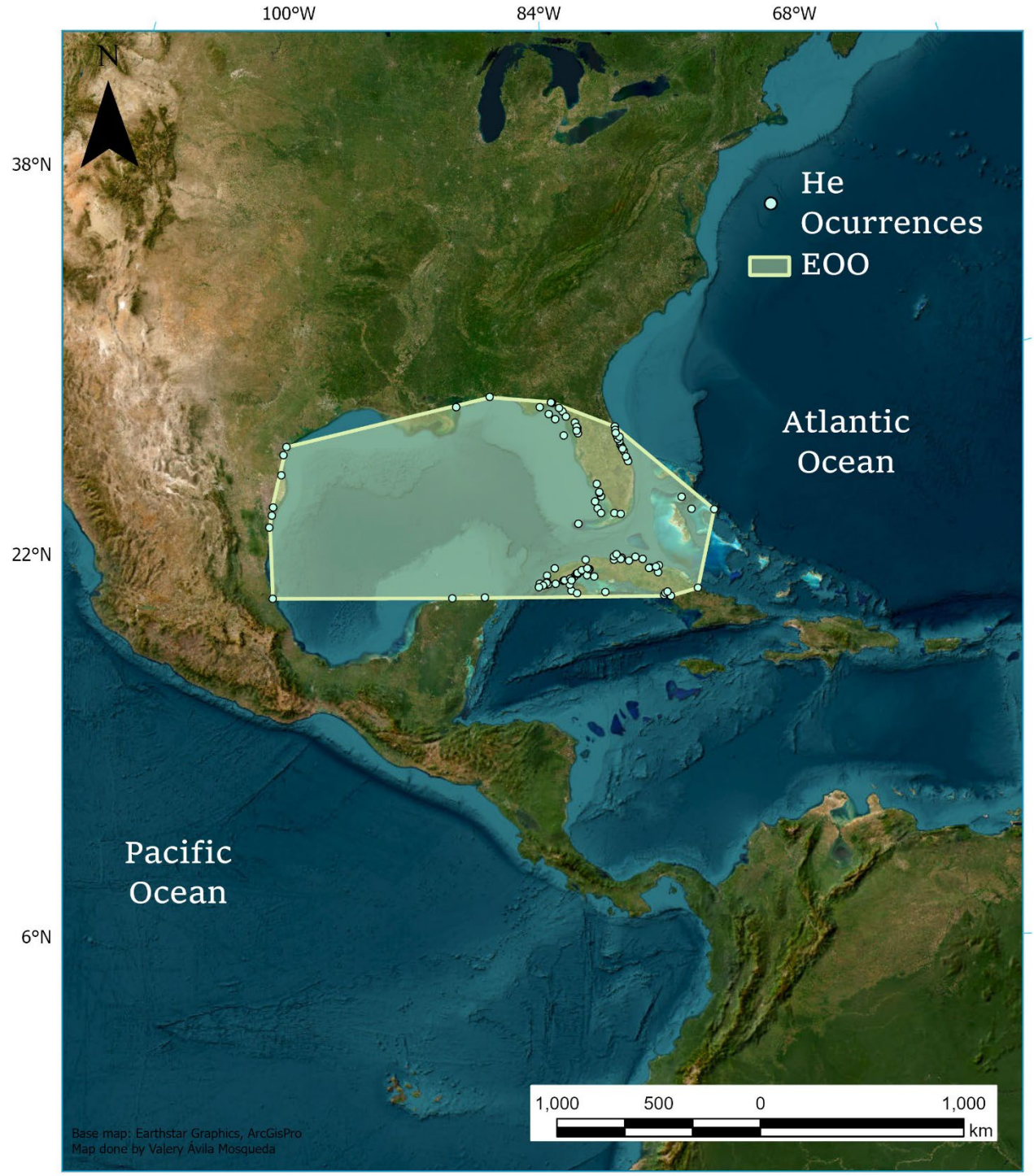
Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Bahamas	Extant	Native	-	Resident
Cuba	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
United States of America	Extant	Native	-	Resident

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
31. Atlantic - western central	Extant	Native	-	Resident

Regional Assessment Map [2]



[2] This map includes reports all confirmed records for this species for the 2007-2020 time period and before. EOO was obtained using minimum bounding geometry/convex hull from ArcGIS Pro, giving the smallest polygon enclosing all points of occurrence.

Population

Halophila engelmannii tends to occur in marginal habitats, such as deeper waters, at the edges of meadows of other seagrass species, patches in otherwise bare areas, or as an understory of canopy-forming species like *Thalassia testudinum*, *Syringodium filiforme* or *Halodule wrightii*. However, not much is known concerning its dynamics or its biological interactions (e.g., competitive ability, response to grazing by manatees; see Kenworthy et al. 2017).
The lack of *H. engelmannii*-focused monitoring data precludes a detailed assessment of its long-term trajectory even in regions with otherwise robust seagrass monitoring programs because sampling methodologies rarely capture the spatiotemporal dynamics of this species. *Halophila* species are poorly censused by aerial photography, so areas with well-developed mapping programs likely under-report the occurrence and by consequence the coverage of *Halophila* spp. For areas with transect-based monitoring, the occurrence of *H. engelmannii* is generally restricted to patches that can be missed by the transect (even if observed in the area) and at the deep edge of bed, where the species often continue as small patches or single runners. *H. engelmannii* can also be abundant in navigation channels that are almost never routinely monitored. So, while typical Tier 1 and 2 type monitoring methods can offer insight into presence absence, which might offer clues to population dynamics, they generally do not provide enough information on coverage and condition to inform a true, focused assessment of trajectory – not in the same way that they do for the focal, canopy-forming seagrass species. Tier 3 programs that often include targeted, high resolution measurements of seagrass condition (percent cover, canopy height, total and reproductive shoot density, biomass, and seagrass depth limit) and can address focused research questions at representative index sites (Neckles et al. 2012) may be more suited to resolving the spatiotemporal dynamics of *H. engelmannii*, but these are less common than typical Tier 1 (mapping) and Tier 2 (monitoring) efforts. Thus, much of the monitoring data available for *H. engelmannii* allow for presence-absence determinations but are insufficient for detailed population trend assessments.
No effort has been made to document its more continuous coverage in the deeper West Florida Shelf since the CSA-led surveys of the 1980s and 1990s, or the NW Cuban continental shelf since the 1972-3 (Buesa 1975), evidenced by the lack of publications on the area with regards to *H. engelmannii* population status/trends.

Population information 2007-2020

Since 2007, the literature has confirmed presence of the species in the Mexican Laguna Madre (Arellano Mendez et al. 2019), US Laguna Madre (Bittner et al. 2020; Congdon & Dunton 2016), NW Florida (Panhandle; Bradley & Houser 2009), West coast of Florida (Choice et al. 2014), the entire Florida coast (Yarbro & Carlson 2016), Chandeleur islands (Pham & Biber 2013), Veracruz (https://mexico.inaturalist.org/observations/53288717), northern Yucatan Peninsula (van Tussenbroek et al. 2010) and at some sites along the Cuban coastline (Martinez-Daranas et al. 2013). Yarbro & Carlson (2016) in a recent report of the Seagrass Integrated Mapping and Monitoring Program reported occurrence of sparse or patchy populations of *H. engelmannii* along the entire Florida coast from the panhandle to the Indian River Lagoon. In this report the species was found in St. Andrews Bay (frequency ~ 1% of all stations in 2009-2011, but none in 2014), Franklin County coastal water shore (frequency 0.1-0.4%), northern Big Bend (frequency between 7-41% from 2002-2012, reduced to < 5% in 2013-14), Southern Big Bend (with very low and variable frequency), Springs Coast (frequency >1 -7%), Tampa Bay (frequency ~ 1%), Estero Bay (frequency < 5%), Rookery Bay (mostly infrequent but dominant at two sites), 10,000 Islands region (very sparse), and Florida Keys (uncommon throughout the platform), Florida Bay (sporadic), northern Indian River Lagoon (frequency unknown). In the Indian River Lagoon, Florida, the species is widely distributed, but has suffered from unprecedented phytoplankton blooms since 2011, during which all seagrass species have lost 58% of their areal extent and up to 98% loss in cover (Morris et al. 2021).

Previous reports of on presence of *H. engelmanni* in various areas have not been confirmed during the present assessment period, despite ongoing seagrass research in these areas. It was reported at Chiquila, Mexico by Espinoza-Avalos (1996), but not found again in 2007-2008 (unpublished, Van Tussenbroek). It was reported from the SW Florida Shelf, but absent in 1991 (CSA 1991). The species disappeared from the Mississippi Sound in 1972 due to decreased water quality (US Department of the Interior 1990), with no reported recovery to date.

There are still large areas of unmapped seagrass on the continental shelf of southwest Florida, the Big Bend region of Florida, the Cuban Shelf and the continental shelf north of Yucatan, Mexico. Seagrass beds in such areas are difficult or impossible to map by traditional methods because they are deep, sparse, and the diminutive *Halophila* species are difficult to detect.

Population Information

Continuing decline in mature individuals?	Qualifier	Justification
-	Suspected	-

Continuing decline in number of subpopulations	Qualifier	Justification
-	Suspected	-

Habitats and Ecology

Halophila engelmannii is a small seagrass species and its canopies rarely exceed 10 cm in height. Its habitat is generally sandy and muddy substrates, but it can also be found in graveled areas.

Its depth range in Florida is typically 1.4 to 18.3-25 m (Fourqurean *et al.* 2002, CSA 1985, 1991) with a report from the Dry Tortugas at 90 m (Zieman 1982). In Cuba, it is found at a depth of 14.4 m with biomass of 0.25 g/m² (Buesa 1975). Light requirements ranged from 8% to 10% of surface irradiance (Choice et al. 2014). Photosynthesis in this species saturates at ~ 500 µE m^{-2} s^{-1}, with photoinhibition occurring at higher light intensities. This species has broader photosynthetic tolerances in oceanic compared to estuarine conditions (Dawes et al. 1987).

H. engelmannii is a likely food source for the manatee, *Trichechus manatus (*Hartman 1979, Alves-Stanley et al. 2010)

IUCN Habitats Classification Scheme

Habitat	Season	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic – Subtidal Rock and Rocky Reefs	-	Marginal	-
9.4. Marine Neritic -> Marine Neritic - Subtidal Sandy	-	Suitable	-
9.5. Marine Neritic -> Marine Neritic - Subtidal Sandy-Mud	-	Suitable	-
9.6. Marine Neritic -> Marine Neritic - Subtidal Muddy	-	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	-	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	-	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	-	Suitable	-
9.9. Marine Neritic -> Marine Neritic - Seagrass (Submerged)	-	Suitable	-
9.10. Marine Neritic -> Marine Neritic - Estuaries	-	Suitable	-
12.2. Marine Intertidal -> Marine Intertidal - Sandy Shoreline and/or Beaches, Sand Bars, Spits, Etc	-	Suitable	-

Life History

Generation Length	Justification	Data Quality
1	McMillan (1988) found rapid seed germination and full vegetative development within months.	-

As many seagrass species, *Halophila engelmannii* is dioecious with male and female flowers on separate plants (McMillan 1976). Average seed reserves in seed banks in Redfish Bay, Texas were estimated to be 74 seeds m^{-2} (McMillan 1988). Nothing is known about *in situ* seedbank recruitment, but in aquaria, seed dormancy for this species lasts up to 24 months (McMillan 1991). McMillan (1988) found rapid seed germination and full vegetative development within months under aquarium conditions.

Breeding Strategy

Does the species lay eggs?
NA

Does the species give birth to live young
NA

Does the species exhibit parthenogenesis
NA

Does the species have a free-living larval stage?
NA

Does the species require water for breeding?
NA

Systems

System: Marine

Threats

Halophila engelmannii is thought to be negatively impacted by increasing turbidity and sedimentation. It is also locally threatened by anthropogenic activities such as coastal development, trawling, eutrophication and pollution.

Increased hurricane activity and sediment transport may affect populations in deeper shelf waters (CSA 1991).

Conservation

Halophila engelmannii is found in some Marine Protected Areas (MPAs). It is worth noting that this species is incidentally protected by the moratorium on oil and gas exploration in the eastern GoM, specifically the West Florida Shelf (https://www.boem.gov/oil-gas-energy/leasing/areas-under-restriction). In Mexico, this species is protected under NOM-059 (Norma Oficial Mexicana; https://www.dof.gob.mx/nota_detalle_popup.php?codigo=5578808).

Research is recommended to gain insight into its general biology, seed dispersal capacity, interaction with manatee, and population dynamics.

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