Regional Assessment of the Seagrass *Ruppia mexicana* den Hartog. and van Tussenbroek in the Tropical Atlantic Seagrass Bioregion (Bioregion 2) for the IUCN Red List [1,2]

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PLANTAE - TRACHEOPHYTA - LILIOPSIDA - ALISMATALES - RUPPIACEAE - *Ruppia - mexicana*

Common Names:

Synonyms: *Ruppia maritima* L. (misapplied).

Taxonomic Note:

This species was split from *Ruppia maritima* based on chromosome counts and morphological evidence (den Hartog et al., 2016), and is supported by recent microsatellite and chloroplast haplotype data (Triest et al., 2018). Though the species has so far only been confirmed from Mexico, some records of *Ruppia maritima* elsewhere on the American continent may refer to this species instead (den Hartog et al., 2016). *Ruppia mexicana* differs from *R. maritima* in being tetraploid, in releasing the pollen at the water surface, and in having obliquely ovoid fruits instead of asymmetric ones (den Hartog et al., 2016; Triest et al., 2018).

Red List Status
LC Least Concern, (IUCN version 16)
B2ab(i,ii,iii,iv)
Extent of Occurrence (EOO)= 279928 km²; Area of occupancy (AOO) = >2,000km²

Red List Assessment

[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 Information

Assessor(s): Duarte G. Frade, Ester A. Serrão, Brigitta van Tussenbroek

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Time period assessed: up to 2020

Assessment Rationale

Ruppia mexicana is a recently discovered species, described in 2016 based on differences in morphology and ploidy levels (den Hartog et al, 2016), with more recent microsatellite and haplotype data supporting its status (Triest et al, 2018). The species is currently known only from the Yucatan Peninsula and adjoining parts of México but is likely to occur more widely. The known EOO (ca. 279928 km2) exceeds the threshold for Vulnerable, even if only the confirmed occurrence sites are considered. The current AOO is unknown, but unlikely to be under 2000 km2 considering the area of the wetlands where it occurs. *Ruppia mexicana* occupies a wide range of habitats and appears to persist in eutrophic locations. The species is therefore assessed as Least Concern. Nonetheless, declines in submerged aquatic vegetation coverage have been reported from several sites due to eutrophication, coastal development, fishing, and touristic activities but no specific population trends are available for *Ruppia mexicana*. Further research is needed to assess the distribution, ecology, and conservation needs of this species..

Distribution

Geographic Range

Ruppia mexicana is a recently discovered species and has been described from the Yucatan Peninsula . The species has so far only been recorded from México (den Hartog et al., 2016), where it has been collected in the states of Quintana Roo (Bacalar, Chetumal Bay, Sian Ka'an Reserve, Boca Paila, and Nichupte Lagoon System), Yucatan (Ria Lagartos and Celestun Lagoon), Campeche (Terminos and Pom Lagoons), Puebla (Crater Lakes Alchichica and Tecuillapa), and the Federal District (Lake Texcoco). The known EOO is estimated at approximately 279928 km2, although the species is likely to occur in a wider area, as *Ruppia* plants with similar morphology have been observed in San Pedro, Belize and the Pacific coast of México (Loreto) (Brigitta I. van Tussenbroek, personal observation), and reported in literature from the Atlantic coast of the USA (den Hartog et al., 2016). The AOO is unclear as the distribution of the species in the habitats where it occurs has not been mapped in detail, but is unlikely to be under 2000 km2 considering the area of the wetlands where it occurs.

Extent of Occurrence (EOO)

Estimated extent of occurrence (EOO)- in km2: 279928

Continuing decline in extent of occurrence (EOO): (Not specified)

Extreme fluctuations in extent of occurrence (EOO): No.

Area of Occupancy (AOO)

Estimated area of occupancy (AOO) - in km2: estimated over 2000 km²

Continuing decline in area of occupancy (AOO)	Qualifier	Justification
-	-	-

Extreme fluctuations in area of occupancy (AOO): No

Biogeographic Realms

Biogeographic Realm:

Tropical W Atlantic & Tropical E Pacific (in: Mid-Atlantic, Pacific and Indian Oceans, including coastal tropics and warm temperate areas)

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): 2300

Elevation Upper Limit (in metres above sea level): 0

Depth Lower Limit (in metres below sea level): 2

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Occurrence

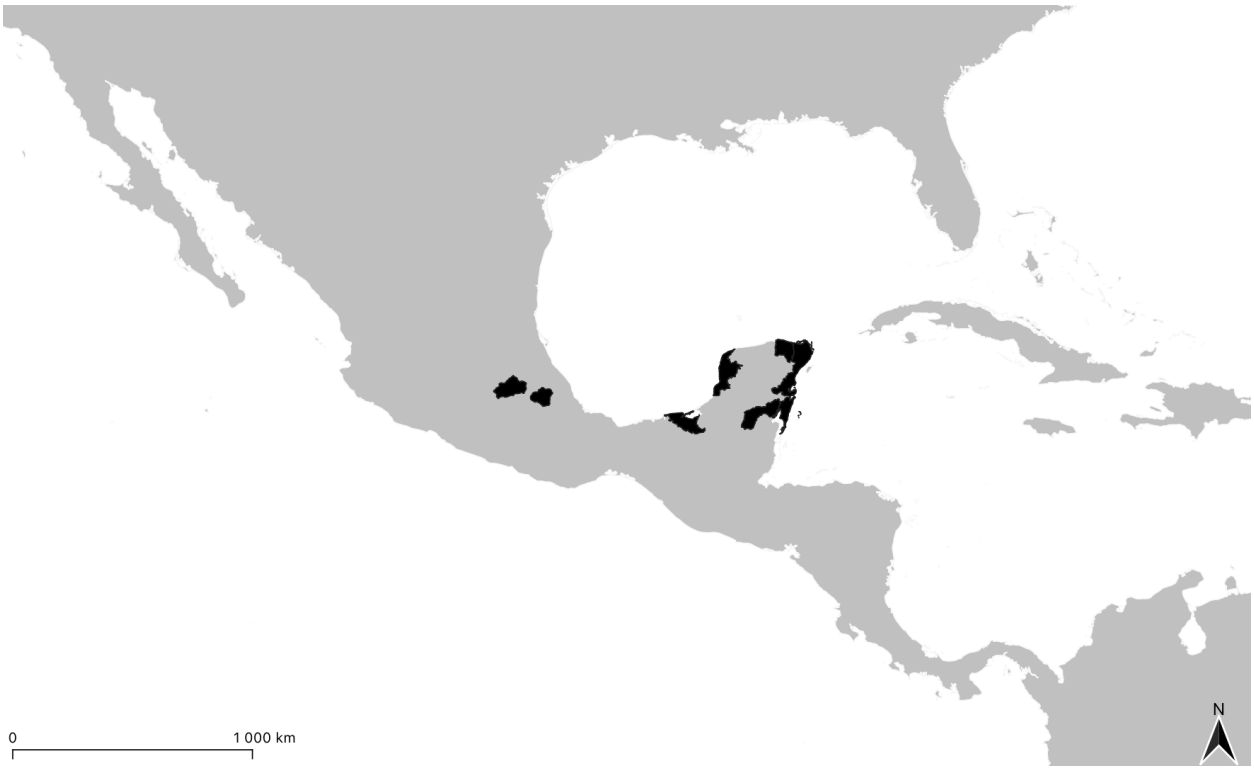
Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Mexico	Extant	Native	-	Resident
United States	Possible	-		
Belize	Possible	-	-	Resident

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:
Complete	The maps are based on HydroBASINS polygons, following IUCN recommendations for species from inland waters (including coastal lagoons). We used HydroBASIN polygons that overlapped with the points reported in den Hartog et al (2016)	-	-	-	Global (species is endemic to Bioregion 2).	-

Regional Assessment Map



Population

Ruppia mexicana can form extensive, sometimes single-species meadows and grow under annual or perennial cycles (den Hartog et al, 2016), although the biomass and extent of the meadows varies seasonally even where *Ruppia* spp (identified as R. maritima, but possibly *R. mexicana*) can be found year-round (Ramírez-Ramírez et al., 2015). Declines of approximately 20 to 40% in submerged aquatic vegetation coverage have been reported between 2001 and 2008 in several lagoons throughout its known range (Herrera-Silveira & Morales-Ojeda, 2010), but no information is specifically available for *Ruppia mexicana* and the global population trend is unknown.

Continuing Decline in Habitat

Continuing decline in area, extent and/or quality of habitat?	Qualifier	Justification
Yes	Suspected	Drainage of Guánica Lagoon in Puerto Rico. Degradation of mangroves and coastal wetlands throughout the Caribbean.

Habitats and Ecology

Ruppia mexicana tolerates a wide salinity range and occurs in coastal lagoons, mangrove channels, and inland crater lakes. It has been reported from marine, brackish, and carbonate-rich low salinity environments. It can grow as monospecific beds in brackish water or co-occur with marine seagrasses (*Thalassia testudinum* and *Halodule wrightii*) and green algae (*Acetabularia* spp., *Batophora oerstedii*, *Halimeda* spp. and *Penicillus capitatus*), or with freshwater plants (*Najas* sp., *Vallisneria* sp.) in low salinity (den Hartog et al., 2016).

Sexual reproduction in *Ruppia mexicana* happens mostly at the water surface. Flowers are hermaphroditic and inflorescences rise to the surface to release their pollen, although some also self-fertilize underwater (den Hartog et al., 2016). Each inflorescence can produce up to 8 seeds, though usually less, and generation length is estimated to be 1 year as *Ruppia mexicana* can grow as either annual or perennial (den Hartog et al., 2016). In hypersaline lagoons, Yucatan Peninsula, Mexico, seeds can survive in the seed bank and remain viable in habitats that become seasonally dry (Van Tussenbroek, unpublished data).

IUCN Habitats Classification Scheme

Habitat	Season	Suitability	Major Importance?
5.14. Wetlands (inland) -> Wetlands (inland) - Permanent Saline, Brackish or Alkaline Lakes	-	Suitable	-

5.15. Wetlands (inland) -> Wetlands (inland) - Seasonal/Intermittent Saline, Brackish or Alkaline Lakes and Flats	-	Suitable	-
5.16. Wetlands (inland) -> Wetlands (inland) - Permanent Saline, Brackish or Alkaline Marshes/Pools	-	Suitable	-
5.17. Wetlands (inland) -> Wetlands (inland) - Seasonal/Intermittent Saline, Brackish or Alkaline Marshes/Pools	-	Suitable	-
9.5. Marine Neritic -> Marine Neritic - Subtidal Sandy-Mud	-	Suitable	-
9.6. Marine Neritic -> Marine Neritic - Subtidal Muddy	-	Suitable	-
9.9. Marine Neritic -> Marine Neritic - Seagrass (Submerged)	-	Suitable	-
9.10. Marine Neritic -> Marine Neritic - Estuaries	-	Suitable	-
12.7. Marine Intertidal -> Marine Intertidal - Mangrove Submerged Roots	-	Suitable	-
13.4. Marine Coastal/Supratidal -> Marine Coastal/Supratidal - Coastal Brackish/Saline Lagoons/Marine Lakes	-	Suitable	-
13.5. Marine Coastal/Supratidal -> Marine Coastal/Supratidal - Coastal Freshwater Lakes	-	Suitable	-
15.9. Artificial/Aquatic & Marine -> Artificial/Aquatic - Canals and Drainage Channels, Ditches	-	Suitable	-

Life History

Generation Length	Justification	Data Quality
1 (minimal estimate)	The species can grow as an annual.	-

Systems

System: Freshwater (=Inland waters), Marine

Use and Trade

General Use and Trade Information

No uses known for the species.

Threats

No specific threats have been reported for *Ruppia mexicana*. Submerged aquatic vegetation coverage in its habitat has declined between 2001 and 2008 due to coastal development, eutrophication, dredging, trawling, and damage by touristic boats (Herrera-Silveira & Morales-Ojeda, 2010). However, *Ruppia* species are fast colonizers and are generally capable of fast recovery after disturbance (Kilminster et al., 2015; O'Brien et al., 2018). *Ruppia* meadows appear to have replaced the climax *Thalassia testudinum* community in eutrophic parts of the Nichupté Lagoon System (Merino et al., 1992; Reyes & Merino, 1991).

Conservation

Ruppia didyma is not directly protected but occurs within several protected areas throughout its range.

Conservation Actions In- Place

Occur in at least one PA	Note
Yes	Migrated from Conservation Measures 4.4 Habitat and Site-based actions -> Protected Areas: in-place

Research Needed

Research	Note
1.1. Research -> Taxonomy 1.2. Research -> Population size, distribution & Trends 1.3. Research -> Life history & ecology 1.5. Research -> Threats 3.1. Monitoring -> Population trends 3.4. Monitoring -> Habitat Trends	

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