

Distribution of Seagrass in North Sulawesi: A Review

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ABSTRACT

Seagrasses are crucial coastal ecosystems that provide a multitude of ecological and economic benefits. The distribution of seagrass meadows plays a pivotal role in maintaining marine biodiversity, supporting fisheries, and contributing to carbon sequestration. Seagrass meadow ecosystems are important in the coastal environment. This ecosystem functions ecologically in the water as a habitat for various species of marine life, and has the ability to bind soil and sediment and dampen waves so that it helps protect the coast from erosion and storms. Seagrass ecosystems play a role in nutrient circulation, carbon storage, and play an important role in climate change mitigation. In addition, these ecosystems can potentially serve as a source of antioxidant compounds and bioindicators of aquatic environmental health. The coast of North Sulawesi has the potential for the existence of this ecosystem so it is necessary to assess the potential of seagrasses that are important in the coast of North Sulawesi Province. There are reportedly 10 seagrass species that have been identified in coastal North Sulawesi, consisting of Hydrocharitaceae and Cymodoceaceae families, namely *Enhalus acoroides*, *Thalassia hemprichii*, *Halophila ovalis*, *Syringodium isoetifolium*, *Halodule uninervis*, *Cymodocea serrulata*, *Cymodocea rotundata*, *Thalassodendron ciliatum*, *Halophila spinulosa*, and *Halodule Pinifolia*.

Keywords: Seagrass, North Sulawesi, Bioindicator, ecosystem

INTRODUCTION

Situated within the Coral Triangle, North Sulawesi boasts a unique and biodiverse marine environment. The seagrass meadows that flourish in its coastal waters are not only picturesque but also hold intricate ecological roles. These submerged flowering plants form intricate habitats for various marine organisms, from microscopic invertebrates to commercially valuable fish species. ⁽¹⁾ The dynamic interplay between seagrasses, marine life, and coastal processes makes comprehending their distribution a matter of both scientific inquiry and conservation urgency. ^(2,3)

Seagrasses are an integral and fascinating component of coastal ecosystems, offering a wide array of ecological and socio-economic benefits. Their distribution is a crucial aspect that shapes the marine landscape, influencing the biodiversity, productivity, and overall health of coastal waters. ^(4,5) In the context of North Sulawesi, a region renowned for its diverse marine life and vibrant coral reefs, understanding the distribution of seagrass meadows holds particular significance.

Seagrass beds are called buffer ecosystems with respect to their function in coastal areas. Ecologically, it is home to various species of marine life such as fish, crustaceans, mollusks, and other marine invertebrates, thus supporting high biodiversity in the sea to support complex food chains. It is a nursery area, providing a

safe haven for larvae and juveniles before they are ready to be released into open habitats. ^(6,7) The intertwined roots of seagrasses make them sturdy, able to bind soil and sediment, and dampen waves, helping to protect the coast from erosion and storms. Seagrass meadows help maintain the balance of marine ecosystems and biological productivity in nutrient circulation as well as carbon storage, and play an important role in climate change mitigation. ⁽⁸⁾ All the functions and benefits of seagrass can make it a bioindicator that shows the health level of coastal ecosystems.

North Sulawesi has potential in the coastal area, making it an attraction for researchers and tourists both domestic and foreign. This area has also become a tourism area. Seagrasses that are scattered in several coastal areas of this area have not even been recorded entirely, so it is important to make a record to find out which areas have not been inventoried. Given the important role of seagrass ecosystems as a buffer ecosystem and the many threats from various human activities, it is necessary to protect and preserve in the context of seagrass ecosystem conservation, namely by understanding seagrass ecology such as species distribution, density, percent cover and types of biota associated with seagrass. ^(9,10) This study aims to assess the potential of seagrasses that are important on the coast of North Sulawesi.

DISTRIBUTION OF SEAGRASS IN NORTH SULAWESI, INDONESIA

The distribution of seagrass in North Sulawesi is a result of intricate interactions between environmental factors that shape the suitability of habitats for these underwater plants. The region's varied coastline, water quality, substrate composition, and hydrodynamic conditions collectively influence the presence and abundance of seagrass meadows. ^(11,12)

Seagrasses are the only flowering aquatic plants (angiosperms) that are one-seeded

(monocots) which have rhizome roots, leaves, flowers, and fruit, which are able to live fully submerged in seawater. In general, seagrass has the same characteristics as its relatives that grow on land, namely grass but seagrass can be distinguished by the roots, stems, and leaves, as well as tissues coated with lignin as a distributor of food, water, and gas. ⁽¹³⁻¹⁵⁾ Seagrasses can reproduce in two ways, namely generatively to produce seeds and vegetatively through rhizomes so that seagrasses can grow and occupy a wider area and form a seagrass meadow. ⁽¹⁶⁻¹⁹⁾ People do not know seagrass well, especially its function in coastal areas compared to algae, mangroves, or coral reefs. ^(20,21) In North Sulawesi Province, coastal communities generally refer to seagrasses as "Gusumi" or "Samo", while the people of Sangihe Islands Regency and Talaud Islands Regency, seagrasses are known as "Hilamun", while in Sitaro, the name of this aquatic plant becomes "Galamu" or "Gilamu". ⁽²²⁾

The results of research conducted in the coastal areas of North Sulawesi Province identified 10 seagrass species out of 60 species found in the world and 14 species recorded in other parts of Indonesia. The seagrass species come from two families, namely Hydrocharitaceae and Cymodoceaceae, namely *Enhalus acoroides* (Linnaeus f) Royle, *Thalassia hemprichii* (Ehrenberg) Ascherson, *Halophila ovalis* (R. Brown) Hooker f, *Syringodium isoetifolium* (Ascherson) Dandy, *Halodule uninervis* (Forsskål) Ascherson, *Cymodocea serrulata* (R. Brown) Ascherson, *Cymodocea rotundata* Ehrenberg & Hemprich ex Ascherson, *Thalassodendron ciliatum*, *Halophila spinulosa* and *Halodule Pinifolia* (Miki) den Hartog can be seen in Table 1. Seagrass beds found on the coast of North Sulawesi are generally composed of more than one type of seagrass. This is in accordance with the study that the composition of seagrass species in Indonesia has a mixed vegetation type. ⁽²³⁾

Tabel 1. Distribution of Seagrass Species in North Sulawesi, Indonesia

No.	Seagrass Species	Location											
		Lembbeh Island ⁽²⁴⁾	East Melonguane ⁽²⁵⁾	Merass Beach ⁽²⁶⁾	Mokupa Beach ⁽²⁷⁾	Lihunu Beach ⁽²⁸⁾	Tongkaina Beach ⁽²⁹⁾	Bulo Rerer Beach ⁽³⁰⁾	Talise Island ⁽³¹⁾	Bahoi ⁽³²⁾	Kora-kora ⁽³³⁾	South Tabukan ⁽³⁴⁾	Mantehage ⁽³⁵⁾
1	<i>Enhalus acoroides</i> (Linnaeus f) Royle	√		√	√	√	√	√	√	√	√	√	
2	<i>Thalassia hemprichii</i> (Ehrenberg) Ascherson	√		√	√	√	√	√	√	√	√		√
3	<i>Halophila ovalis</i> (R. Brown) Hooker f	√	√	√	√	√	√		√	√		√	
4	<i>Syringodium isoetifolium</i> (Ascherson) Dandy	√	√	√		√	√	√	√	√	√	√	√
5	<i>Halodule uninervis</i> (Forsskål) Ascherson	√	√						√	√		√	
6	<i>Cymodocea serrulata</i> (R. Brown) Ascherson,	√				√	√	√			√	√	
7	<i>Cymodocea rotundata</i> Ehrenberg & Hemprich ex Ascherson,	√	√	√	√	√	√	√	√	√	√	√	√
8	<i>Halodule pinifolia</i> (Miki) den Hartog				√	√	√	√	√		√		√
9	<i>Thalassodendron ciliatum</i>											√	
10	<i>Halophila spinulosa</i>												√

The presence of seagrasses growing on the coast of North Sulawesi is recorded as a bioindicator of environmental health, important for stabilizing sediments and protecting coastal areas from erosion.⁽²⁴⁾ Seagrass beds are nursery areas, feeding grounds, and refuge areas for marine organisms such as fish, mollusks, sea turtles, dugongs, and crustaceans.^(36–39) Many metabolites from seagrasses have been known to be biologically active are of biomedical importance and can be utilized as potential drugs.^(40–45)

CONCLUSION

Seagrass ecosystems are important ecosystems that need to be maintained and preserved as well as mangrove and coral reef ecosystems, given their important functions in coastal waters, especially in North Sulawesi. Eight out of 13 seagrass species found in coastal areas of North Sulawesi show that this region has a high number of species compared to other regions in Indonesia. High community activities on the coast need to be followed by conservation and management measures for the sustainable conservation of seagrass ecosystems. There is a need for regular monitoring of coastal conditions, as well as assertiveness in enforcing the rules that have

been regulated in protecting coastal ecosystems by relevant agencies.

Declaration by Authors

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