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DENSITY AND VEGETATION COVERAGE OF PERANCAK ESTUARY MANGROVE

Tingkat Kerapatan Dan Tutupan Vegetasi Mangrove Estuari Perancak

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ABSTRACT

Mangrove forests are forests found in coastal areas that function to hold back sea water or wave speed during the highest tides. The purpose of this study was to determine the level of density and cover of mangrove vegetation in Perancak. The method used was field survey and satellite image analysis. The results obtained were mangrove density in 2024 was 0.040-1 and in 2025 0.040-1 with the dominant vegetation types being Bruguiera and Rhizopora. The water quality at the research location was a temperature of 30.4˚C, pH 8.4 and water salinity was 32. The substrate at the research location was coarse textured (sand and sandy clay).

Keywords: Mangrove, Perancak, Satellite Imagery

ABSTRAK

Hutan mangrove merupakan hutan yang terdapat di kawasan pesisir pantai yang fungsinya menahan air laut atau laju gelombang pada saat terjadinya pasang tertinggi. Tujuan dari penelitian ini adalah untuk mengetahui tingkat kerapatan dan tutupan vegetasi mangrove di perancak. Metode yang digunakan adalah dengan survei lapangan dan analisis citra satelit. Hasil yang diperolej yaitu Kerapatan mangrove pada tahun 2024 adalah 0,040-1 dan pada tahun 2025 0,040-1 dengan jenis vegetasi yang mendominasi adalah Bruguiera dan Rhizopora. Kualitas air di Lokasi penelitian Adalah suhu sebesar 30,4˚C, Ph 8,4 dan Salitas perairan Adalah 32. Substrat yang ada dilokasi penelitian Adalah tekstur kasar (pasir dan lempung berpasir).

Kata kunci: Mangrove, Perancak, Citra Satelit

INTRODUCTION

Indonesia is an archipelagic nation. Its vast coastline has the potential to form diverse ecosystems. An ecosystem is a unity between a community and its environment. Mangrove

ecosystems are found in coastal areas, affected by tides, and dominated by unique tree and shrub species that can grow in salty/brackish waters (Santoso, 2000).

Mangrove forest ecosystems are vegetation communities that grow in shallow coastal lagoons and tropical and subtropical estuaries, dominated by several mangrove tree species that can grow and thrive in tidal muddy coastal areas. Mangroves are trees or plant communities that live between the sea and land, influenced by tides (Romimohtarto and Juwana, 2001).

Mangrove forests are forests found in coastal areas that function to hold back seawater or wave activity during peak tides. Mangrove forests are a very important ecosystem for coastal areas, in addition to having a process of form, composition of elements or substances and conditions of plants that play a role in maintaining the balance of mangroves, and are very valuable such as providing nutrients for living creatures in the sea, as a place to grow and a place to nurture for various organisms, as preventing soil erosion on the coast, to withstand the wind, to withstand large sea waves, absorbing waste in the production process, preventing sea water penetration, as a provider of wood, leaves as raw materials for medicines, having economic value, and others (Haris et al., 2013).

Mangrove forest ecosystems are vegetation communities that grow in shallow coastal lagoons and tropical and subtropical estuaries, dominated by several species of mangrove trees that thrive in tidal muddy coastal areas. The species diversity of mangrove vegetation is highly dependent on physical environmental factors, namely substrate type, wave velocity, and tidal inundation. Furthermore, the diversity of mangrove vegetation is also based on the location where the plants grow and consists of several zones (Arief, 2003). Environmental parameters of mangroves, such as freshwater supply, salt content, soil balance, and nutrient availability, are essential for the survival of mangrove forests (Dahuri, 2003).

Jembrana is a regency in Bali with significant tourism potential. According to the Indonesian Tourism Village Network (JADESTA) website of the Ministry of Tourism and Creative Economy, Jembrana has nine leading tourism villages, one of which is Perancak Village. Tourism in Perancak Village deserves stakeholder attention to develop and impact sectors that impact the community, such as the economy, environment, and education. Community participation, especially in Jembrana Regency, is highly anticipated in tourism development (Sulasmini et al., 2023).

Perancak Village is a village in Jembrana District, Jembrana Regency, located on the coast, 98 km west of Denpasar city center. Perancak Village covers an area of 339.9 hectares, with an average elevation of 9 meters above sea level. Geographically, Perancak Village is located on the coast, and its residents primarily earn their living in fishing. (Perancak Village, 2024)

RESEARCH METHODS

Place and Time

This research was conducted for 3 months, namely June 2025 to August 2025. Field research included taking photos of mangrove plants to see the types of mangrove vegetation species.

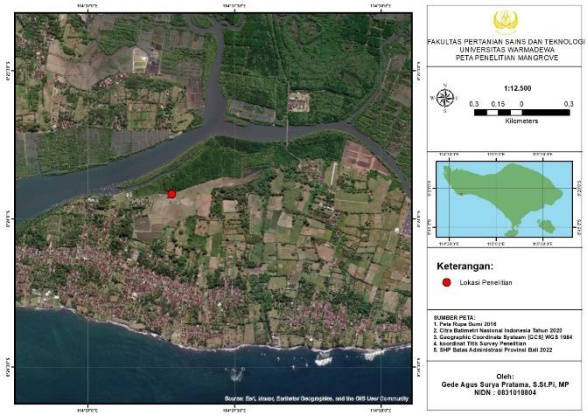

Figure 1. Research Location Personal Data Source

Water quality analysis was conducted at the observation site by measuring salinity, pH, and temperature. Substrate analysis was conducted in the laboratory.

Mangrove cover analysis used the Monmang application, which serves for data collection and measurement or analysis during on-site mangrove monitoring activities. Monmang was also used to interpret mangrove health conditions and document survey implementation (Wayan and Andrata, 2020).

This application also provides tools for community structure parameters, such as density, morphological size, frequency, dominance, and mangrove health index, thereby reducing errors in data processing (Wayan and Andrata, 2020).

Simply put, the concept of this application is to combine the functions of paper and writing instruments, a voice recorder, a global positioning system (GPS), a camera, a protractor, and pixel analysis in one hand. Monmang is offline, allowing it to be used in areas without internet access. Ultimately, this application makes it easier for surveyors or researchers, eliminating the need to copy data after monitoring mangroves on-site. Mangrove health analysis can also be carried out more quickly, effectively, and efficiently (Wayan and Andrata, 2020).

RESULT AND DISCUSSION

Water quality analysis was carried out at the observation location by measuring salinity, pH and temperature observed at the research location as follows:

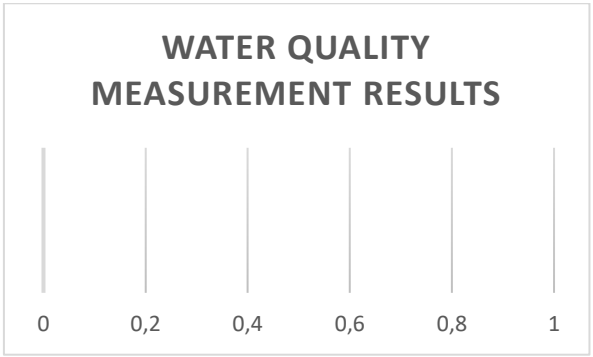

Figure 2. Water Quality Measurement Results

Temperature is a measure of the degree of hotness or coldness of an object, and the instrument used to measure temperature is a thermometer. The most common unit of temperature measurement in Indonesia is degrees Celsius (°C), and abroad, degrees Fahrenheit (Mahardika et al., 2023). According to Field (1995), most mangroves worldwide will experience increasing air temperatures, changes in hydrological regimes, rising sea levels, and increases in the magnitude and frequency of tropical storms. Mangrove species have varying

tolerances to increasing air temperatures. Photosynthesis and several ecophysiological variables, such as leaf production, are maximized at certain optimal temperatures; below and above these temperatures, photosynthesis and leaf production decline (Hogarth, 1999). Research by Hutchings and Saenger (1987) reported that Australian mangrove species generally exhibit maximum photosynthetic rates at temperatures of 21-28 °C.

Acidity (pH) is a term used to describe the intensity of the acidity or alkalinity of a solution and is an important parameter in analyzing water quality (Trimurti, 2022). Water pH is typically used to determine the pollution index by examining the acidity or alkalinity of the water being studied, particularly the oxidation of sulfur and nitrogen during acidification and the oxidation of calcium during alkalinization. A pH of 7 is neutral, while a pH greater than 7 indicates that the water is alkaline, occurring when there is a high content of carbon ions. A pH lower than 7 indicates that the water is acidic (Sarman, 2015).

Salts refer to various ions dissolved in water, including table salt (NaCl). Salinity is generally caused by seven main ions: sodium (Na+), potassium (K+), calcium (Ca++), magnesium (Mg++), chloride (Cl-), sulfate (SO4=), and bicarbonate (HCO3-). Salinity is expressed in grams/kg or promil (‰) (Yulvia et al., 2012).

The results of the collected articles and the author's analysis showed that the Perancak village area in Jembrana, Bali, is dominated by Bruguiera and Rhizopora. The vegetation or mangrove species at the research location are as follows:

Based on the results of observations and analysis of soil samples, the characteristics of the soil at the research location in Perancak village are that it has a coarse texture (sand and sandy clay). This soil texture is found along the coast of the Jembrana Regency area. This is in accordance with the opinion of (Bapenda, 2013) which states that the characteristics of soil in Jembrana Regency are as follows:

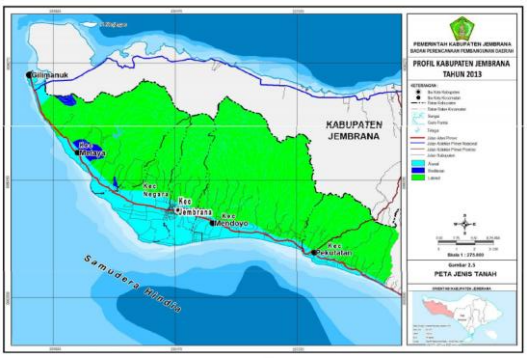

Figure 3. Soil Type Map in Jembrana Regency Source: Bapenda, 2013

The soil type map of Bali Province in Jembrana Regency consists of several types of soil, namely:

1. Brown Latosol and Litosol (Inceptisol) Soil
   This soil type is spread across five areas of Jembrana Regency, with the largest areas being found in Mendoyo District (25,985 ha), Melaya District (16,319 ha), Negara and Jembrana District (14,130 ha), and Pekutatan District (12,169 ha). This soil type is formed from intermediate volcanic ash parent material with a low to moderate organic content and a pH ranging from 4.5 to 5.5.
2. Grey Brown Alluvial Soil
   This land is river sediment with an area of approximately 10,750 Ha, most of which is located in Negara District and Jembrana District (5,725 ha).
3. Grey Brown Alluvial Soil
   This type of soil is formed from limestone parent material with a wavy to hilly morphology. This type of soil dominates the Melaya District area (1,878 ha).
4. Grey Brown Regosol Soil
   This type of soil is found primarily in Negara and Jembrana Districts, covering 772 hectares, and in Mendoyo District, covering 648 hectares. This soil is formed by intermediate volcanic parent material, with gently sloping to undulating terrain.
5. Tanah Alluvial Hidromorf
   This type of soil is found in Negara and Jembrana Districts, particularly along the southern coast and around Pengambengan and Cupel Villages. This soil covers approximately 1,420 hectares. It is a mixture of terrestrial and marine sediments formed by sand plates and coral fragments.

Each of the soil types mentioned above has a different texture. Generally, the texture in Jembrana Regency is classified as fine texture (very high clay content). Meanwhile, coarse texture (sand and sandy loam) is the soil texture found along the coast of Jembrana Regency (Bapenda, 2013).

Satellite imagery results show the following mangrove density:

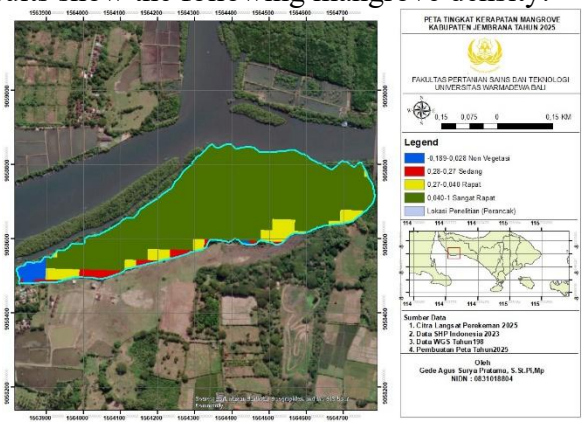

Figure 4. Mangrove Density in 2024

CONCLUSION

The mangrove density in 2024 was 0.040-1 and in 2025 0.040-1 with the dominant vegetation types being Bruguiera and Rhizopora. The water quality at the research location was a temperature of 30.4˚C, pH 8.4 and water salinity of 32. The substrate at the research location was coarse textured (sand and sandy clay).

REFERENCES

Amrillah, K., Adi, W., & Kurniawan. (2019). Pemetaan Sebaran Terumbu Karang di Perairan Pulau Kelapan, Kabupaten Bangka Selatan Berdasarkan Data Satelit Sentinel 2A. *Journal of Tropical Marine Science, 2*(2), 59– 70.

Arief, A. (2003). *Hutan Mangrove Fungsi dan Manfaatnya*. Yogyakarta.

BAPENDA Kab Jembrana. (2013). Profil Kabupaten Jembrana.

Bengen, D. G. (2000). Pedoman Teknis Pengenalan dan Pengelolaan Ekosistem Mangrove. Pusat Kajian Sumberdaya Pesisir dan Lautan. *Institut Pertanian Bogor*. Bogor, Indonesia.

Dahuri R. 2003. *Keanekaragaman Hayati Laut*: Aset Pembangunan Berkelanjutan Indonesia. Gramedia Pustaka Utama. Jakarta.

Desa Prancak. Profil Desa Perancak. Diakses 30/5/2024, pada pukul 10.21, dari http://perancak.desa.id/about-us.

Dharmawan, I. W. E., & Khoir, A. F. (2020). *MonMang untuk Monitoring Mangrove*. Makassar: Nas Media Pustaka.

Field, C. D. (1995). Impact of Expected Climate Change on Mangroves. *Hydrobiologia, 29*(5), 75-81.

Hogarth, P. J. (1999). *The Biology of Mangroves*. Oxford University Press. New York.

Kementerian Kehutanan. (2013). Peraturan Direktur Jenderal Bina Pengelolaan Daerah Aliran Sungai dan Perhutanan Sosial Nomor: P. 4/V-Set/2013 Tentang Petunjuk Teknis Penyusunan Data Spasial Lahan Kritis. Jakarta: Kemenhut.

Mahardika, I. K., Bektiarso, S., Santoso, R. A., Novit, A., Saiylendra, R. B., & Dewi, R. K. (2023). Analisis Peran Suhu pada Pertumbuhan dan Perkembangan Tanaman Stroberi. *Phydagogic: Jurnal Fisika Dan Pembelajarannya, 5*(2), 86- 91

Nybakken, J. W. (1993). *Biologi Laut Suatu Pendekatan Ekologis*. PT Gramedia. Jakarta.

Romimohtarto, K., & Juwana, S. (2001). *Biologi Laut: Ilmu Pengetahuan Tentang Biota Laut*. Jakarta: Djambatan.

Santoso, N. (2000). *Pola Pengawasan Ekosistem Mangrove. Jakarta: Makalah disampaikan pada Lokakarya Nasional Pengembangan Sistem Pengawasan Ekosistem Laut Tahun 2000*. Jakarta, Indonesia.

Şarman, A. H. (2015). Correlation Between Master Curves Obtained from Rheology and Mechanical Testing (*Master's thesis*, Middle East Technical University).

Syomin, V., Zimina, O., (2020). Distribution of Polychaetes in the Laptev Sea and New Siberian Shoal and its Relation with Environmental Factors. *Oceanology*, *60*, 316–330

Trimurti, F. (2022). Sebaran Spasial dan Struktur Komunitas Fitoplankton yang Berpotensi Menyebabkan Harmful Algae Blooms (HABs) di Perairan Teluk Laikang, Sulawesi Selatan (*Doctoral dissertation*, Universitas Hasanuddin). Makasar.

Yulvia, D., Yusuf, M., & Sugianto, D. N. (2012). Karakteristik Arus, Suhu dan Salinitas di Kepulauan Karimunjawa. *Journal of Oceanography, 1*(2), 186- 196.