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Map of Research Locations in the Mangunharjo Coastal Area

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INTRODUCTION OF EDITORIAL

Jurnal Segara is scientific journal published and funded by the Marine Research Center, The Agency for Marine & Fisheries Reseach& Human Resources, Indonesian Ministry of Marine Affairs & Fisheries.

Jurnal Segara Volume 18, Number 3, December 2022 is the third edition of Fiscal Year 2022. The articles contained in Jurnal Segara are the results from research and conceptual studies related to the marine and fisheries issues, conducted by researchers, academics, students, and observers from Indonesia and arround the world.

In this edition, the journal features five scientific research articles on: Bioconcentration of Lead at Avicennia Marina in Mangunharjo, Semarang Coastal Area; Study of Carrying Capacity and Development Strategy of Coral Garden Based Ecoedutourism in Cemara Besar Island, Karimunjawa National Park, Jepara, Central Java; Acoustic Wave Propagation Patterns in the Ocean Column; Opak and Bogowonto Coastal Inlet Sand Spit Morphodynamics using Landsat and Sentinel Satellite Images; & Abundance and Diversity of Phytoplankton and Zooplankton in Waters of Youtefa Bay Tourism Area.

It is hoped that this scientific journal can contribute to the development of Indonesia marine science and technology. Finally, the Editor would like to thank the infinite participation of the researchers scientific for contributors this journal.

EDITORY

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BIOCONCENTRATION OF LEAD AT AVICENNIA MARINA IN MANGUNHARJO, SEMARANG COASTAL AREA

Zallva Arsyta Hartanto, Agus Hartoko, & Haeruddin

ABSTRACT

This study aims to determine the bioconcentration of heavy metal Lead Pb in seawater, sediment, and mangrove plants of Avicennia marina and to determine the bioconcentration factor of heavy metal Lead Pb in mangrove which was conducted in January 2022 in Mangunharjo coastal area. The method used in this research was a survey method with quantitative analysis. The samples of A. marina mangroves were divided into three categories of stem diameter, namely small (3 – 8 cm), medium (6 – 15 cm), and large (11 – 23 cm). Measurement of heavy metal concentrations using AAS (Atomic Absroption Spectrophotometry). Heavy metal bioconsentration in Mangunharjo is classified as high exceeding quality standards. The study revealed that the concentration of heavy metal Lead Pb in the seawater ranged from 0.672 - 0.867 mg/L, in sediments it ranged from 56.50 – 65.96 mg/kg, and in the roots and leaves of mangroves A. marina ranged from 6.209 – 24,883 mg/kg. The bioconcentration factor of heavy metal Lead Pb ranges from 0.185 to 0.227, so that the mangrove A. marina in Mangunharjo Water Area can be classified as an excluder species.

Keywords: Avicennia marina, Bioconcentration, Mangrove, Mangunharjo, Lead.

STUDY OF CARRYING CAPACITY AND DEVELOPMENT STRATEGY OF CORAL GARDEN BASED ECOEDUTOURISM IN CEMARA BESAR ISLAND, KARIMUNJAWA NATIONAL PARK, JEPARA, CENTRAL JAVA

Yeremia Edgar Aprilio, Muhammad Arif Asadi, & Yulius

ABSTRACT

Cemara Besar Island, Karimunjawa National Park, is an important tourist destination in the province of Central Java due to its beautiful beaches and coral reefs. The purpose of this study was to see the area carrying capacity for ecoedutourism based on coral gardens in Cemara Besar Island, analyze development strategies, and find out the recommended spots. The carrying capacity of the area is calculated using three considerations: Physical Carrying Capacity (PCC), Real Carrying Capacity (RCC) and Effective Carrying Capacity (ECC). The results, in PCC>RCC>ECC format, are 2472>97>42 people per day in the utilization zone while 670 > 30 > 15 people per day in the protection zone. Using SWOT analysis, the analysis of tourism development strategies produced 15 alternative regional development strategies, with the top strategic priority being “the development of the concept of coral garden tourism”. Observations on five recommended spots were carried out using a time swimming method, by snorkeling for 10 minutes in an area of 10 m × 10 m per point. The two recommended points in the northern east side of the island, points B and D, are designated as the highly recommended points to apply the concept of ecoedutourism based on coral garden because in these two points the condition of coral reefs is not too good and requires restoration.

Keywords: Cemara Besar Island, Tourism Development, Coral Reefs, PCC, RCC, ECC, SWOT Analysis.

ACOUSTIC WAVE PROPAGATION PATTERNS IN THE OCEAN COLUMN

Fachri Ali Badihi, Sri Pujiyati, Ayi Rahmat, Steven Solikin, & Muhammad Hisyam

ABSTRACT

Temperature and salinity play a role in the speed of sound and the process of sound propagation of acoustic waves in the water. Research on the propagation of sound waves in the ocean is a very interesting topic to do because it has many applications, including in underwater wireless communication systems and maritime security. This study aimed to analyze the propagation of acoustic waves in different water depths. The modeling was carried out with flat wave characteristics, in which the bathymetry characteristics of the seawater were ignored. In this ray path simulation, the frequency of 5.3Hz was used at 3 stations with different seawater depths in the Makassar Strait using temperature and salinity data downloaded from marine.copernicus.eu data. The movement pattern of the acoustic waves was simulated using the Bellhop method. The ray tracing simulation results showed significant differences at the three locations. This was influenced by several factors, including the condition of the seawater environment, the placement of the transducer, the speed of sound, and the depth. Shallow seawater would show a more complicated ray path than deep seawater. The greater the angle of the half beam used, the greater the distance of the range of each beam of light will be so that the reflection of the resulting beam of light covers each column of seawater. The closer the distance between the resulting ray paths, the smaller the energy lost.

Keywords: Acoustic Wave, Temperature, Salinity, Ocean Column, Raypath, Makassar Strait.

OPAK AND BOGOWONTO COASTAL INLET SAND SPIT MORPHODYNAMICS USING LANDSAT AND SENTINEL SATELLITE IMAGES

Rizal Fadlan Abida, Totok Suprijo, & Budhy Soeksmantono

ABSTRACT

Sand spits are elongated sand deposits on the beach that often form at the inlet or the headland's tip. The hydrodynamics of the river flow, waves, storm surge, and tide affect the sand spit formation, which was created by the longshore transport along the coast. Bogowonto and Opak inlets are located in southern coastal Java facing directly to the Indian ocean where micro-tidal, waves, and river flow affecting both inlets, are chosen for this case study. Morphodynamics analysis of sand spit using Landsat 7 and 8, Sentinel 2 image from 2000 to 2020, coastline identification using Modified Normalized Different Water Index (mNDWI). In November 2007 and October 2013, Opak Inlet migratory routes were detected, and closures related to the east season occurred at both of them. Inlet tend to close occur on east season during July until November.

Keywords: sand spit, mNDWI, Opak, Bogowonto, closure, inlet.

ABUNDANCE AND DIVERSITY OF PHYTOPLANKTON AND ZOOPLANKTON IN WATERS OF YOUTEFA BAY TOURISM AREA

Annita Sari, Ambo Tuwo, Chair Rani, Amran Saru, & Yudi Prayitno

ABSTRACT

The waters in Youtefa Bay have degradation due to the transition from mangrove areas to industrial sites, housing, bridge construction and household waste disposal. Water degradation has indirectly affected the growth of plankton. Plankton consists of phytoplankton which is the primary producer of the food chain so that it is utilized by zooplankton as the first consumer. The aim of this study was to determine the abundance and diversity of phytoplankton and zooplankton. This research was conducted during June-August 2019, the method used purposive sampling. Samples were obtained from 6 observation stations. The results showed there is 28 species of phytoplankton (∑160,000 ind/L) and 15 species of Zooplankton (∑ 84,200 ind/L). The diversity index of Phytoplankton is ranging from 1-2.21; Dominance (D) 0.17-0.4 and similarity (E) 0.59-1, while for zooplankton diversity (H') ranges from 0.97-1.39; Domination (D) 0.07-0.42 and similarity (E) 0.59-1. The Diversity Index shows that the waters of Youtefa Bay have moderate diversity. The similarity between genera is relatively same. The Dominance index value during the observation was seen <0.5 or close to 0, this means that in the community that there was no genus that was extremely dominating the other genera.

Key words: Abundance, Diversity, Phytoplankton, Zooplankton, Youtefa Bay.