

# Jurnal Segara



Marine Research Center  
Agency for Research & Human Resources Development  
Ministry of Marine Affairs and Fisheries

ISSN 1907-0659



Study area

## COASTAL VULNERABILITY ASSESSMENT ALONG THE NORTH JAVA COASTLINES-INDONESIA

Dian N. Handiani, Aida Heriati, & Fitri Suciati

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# Jurnal Segara

## VOLUME 18 NUMBER 1 APRIL 2022

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Acreditation Number: 158/E/KPT/2021  
(Period April 2019 - Agustus 2023)

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SEGARA Journal is a journal that is managed by the Marine Research Center, Agency for Research & Human Resources Development - Ministry of Marine Affairs and Fisheries (MMAF), that aims to disseminate information about scientific developments of the marine sector in Indonesia, such as: oceanography, acoustics and instrumentation, remote sensing, territorial non-biological resources, energy, underwater and environmental archeology. The manuscripts published mainly come from the results of research and conceptual studies related to Indonesian maritime affairs, which are carried out by researchers, academics, students, and observers of marine issues both from within and outside the country. First published in 2005 and releases three publications annually.

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Jurnal Segara Volume 18, Number 1, April 2022 published by Marine Research Center Fiscal Year 2022

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Jurnal Segara Volume 18, Number 1, April 2022 published by Marine Research Center Fiscal Year 2022

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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 Research & Human Resources, Indonesian Ministry of Marine Affairs & Fisheries.

Jurnal Segara Volume 18, Number 1, April 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 around the world.

In this edition, the journal features five scientific research articles on: Coastal Vulnerability Assessment Along The North Java Coastlines-Indonesia; Determining The Capacity of Temporary Evacuation Shelter in Carita and Labuan District Pandeglang Regency; Economic Benefits of Marine Protected Areas: Case of Anambas Islands; Biodiversity and Aquatic Vegetation Succession In Biawak Island Marine Protected Area, Indramayu-West Java; Seagrass Connectivity Based on Oceanographic Condition in The Marine Protected Area of Biawak Islands, Indramayu.

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.

EDITORIAL

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# COASTAL VULNERABILITY ASSESSMENT ALONG THE NORTH JAVA COASTLINES-INDONESIA

**Dian N Handiani, Aida Heriati, & Fitry Suciaty**

## ABSTRACT

The north coast of Java is an area with very diverse maritime activities. These high activities threaten the ecosystem and environmental sustainability. Several areas already experience environmental degradation and most of the threats come from ocean pollution, coastal erosion, continuous tidal flood (rob), and coastal land subsidence. Furthermore, the coastal degradation is worsened by climate change which may cause the area more vulnerable to disaster. This study aims at evaluating the coastal vulnerability using weighted coastal vulnerability index (CVI<sub>w</sub>). The method calculates coastal vulnerability by weighting physical coastal parameters using Analytical Hierarchy Process (AHP). CVI<sub>w</sub> calculation result shows that the vulnerability is dominant at high (39%) and very high (51%) classes. The high vulnerability occurs in Tangerang, Bekasi, Brebes, Demak, Jepara, Pati, and Rembang Regencies. Meanwhile, very high vulnerability takes place in several regencies: Serang, Karawang, Subang, Indramayu, Cirebon, Tegal, Kendal, Semarang, and Gresik. The parameters of relief, coastal features, tidal range and shoreline give contribution more in coastal vulnerability besides lithology, sea level change, and wave height. Identifying vulnerability in these areas might help local governments to prioritize their action plan in coastal disasters mitigation.

**Keywords:** Disaster, mitigation, coastal vulnerability, North Java.

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## DETERMINING THE CAPACITY OF TEMPORARY EVACUATION SHELTER IN CARITA AND LABUAN DISTRICT PANDEGLANG REGENCY

**Dini Purbani, Muhammad Ramdhan, Hadiwijaya Lesmana, August Daulat, Aida Heriati, Budianto Ontowirjo, & Ardiansyah**

## ABSTRACT

A tsunami due to the GAK flank collapse occurred along the Sunda Strait Coast on December 22, 2018, with areas severely hit including Labuan and Carita Districts on the coast of Pandeglang Regency. The disaster resulted in the death of 431 people, more than 7200 injured and 46,646 people lost their homes. To anticipate the number of disaster casualties, disaster mitigation efforts are carried out using network analysis applications from GIS (Geographical Information Systems) software. The data used in the network analysis process is road data obtained from the Open Street Map in 2019 and supported by wave propagation and speed time to TES. This study used a walking speed of 0.751 m/second for elderly people. The results of the network analysis process showed the best route to the proposed Temporary Evacuation Shelter (TES). There are eight proposed TES in Carita District from which seven are located on Raya Anyer Sirih Street and another one is located on Perintis Kemerdekaan. The number of residents in each area segment in the proposed TES is between 179 and 2,677 people. Yet, there are four existing TES units in Carita District located on Perintis Kemerdekaan Street. In Labuan District, one TES unit is proposed, which has the capacity of up to 4,376 people. Meanwhile, its existing TES is in the form of a Tsunami Shelter Building with a capacity of 23,635 people.

**Keywords:** GAK Tsunami, NetWork Analysis, Temporary Evacuation Places, Segment Area Capacity.

## **ECONOMIC BENEFITS OF MARINE PROTECTED AREAS: CASE OF ANAMBAS ISLANDS**

**Leny Dwiastuty, Supriyadi, Umi Muawanah, & Muhammad H. Jayawiguna**

### **ABSTRACT**

This study aims to evaluate the economic benefits derived from conservation areas using the case of National Marine Protected Areas (MPA) in Anambas Islands. The study evaluated the top four reef-associated fish with high economic values, namely grouper, red snapper, threadfin bream, and trevally fish. The employed bioeconomic hybrid model to estimate the Maximum Economic Yield (MEY) for those fish under the sustainable conservation policies. We found positive economic benefits from conservation in Anambas Islands. The MPA has shown both biological and economic benefits, namely the spill over impact and total economic value of harvest at amount of IDR 301,481,685,170/year. We found that the 50% MSY policy on fisheries TAC in MPA site will still sustain the fisheries resource but fishers are less profitable. Some strategies to augment the outcome of Anambas Islands MPA include affirmation policies both from national and local government to increase fishing capacity and skills such as operating larger vessels, eg 10 GT and provide programs and assistance on providing alternative livelihoods for fishermen.

**Keywords: Bio Economic, marine conservation, reef fisheries, Anambas Islands-Indonesia, Marine Protected Areas (MPA).**

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## **BIODIVERSITY AND AQUATIC VEGETATION SUCCESSION IN BIAWAK ISLAND MARINE PROTECTED AREA, INDRAMAYU-WEST JAVA**

**Andreas A. Hutahaean, Agustin Rustam, August Daulat, Yusmiana P. Rahayu, Devi D. Suryono, Hadiwijaya L. Salim, & Mariska A. Kusumaningtyas**

### **ABSTRACT**

The existence of aquatic vegetation in the coastal waters is correlated with the water quality parameters. Seagrass and macroalgae are aquatic plants often found to form a coastal ecosystem that depends on water quality, both physically and chemically. Research on the existence of aquatic plants in Biawak Island, Indramayu, West Java, was conducted in 2016 and 2019 by combining in situ data and secondary data. The purpose of this study was to observe the dynamics of seagrass ecosystems as aquatic plants on Biawak Island and their correlation with the succession that occurred in the aquatic environment in Biawak Island as part of the Biawak Archipelago Marine Protected Area (MPA). The research method integrates a descriptive analysis and its correlation between the submerged aquatic plants and their environment. The results showed that seagrasses in Biawak Island tend to disappear and be replaced by macroalgae. The type of seagrass found in 2016 was *Enhalus Acoroides* covered by epiphytes perished in 2019. The abundance of macroalgae, especially *Halimeda macroloba*, indicates the existence of nutrient enrichment and high turbidity, causing the seagrass to be replaced by macroalgae. Another biodiversity found in the region was clams and sea cucumber, while branching coral conditions experienced bleaching and degradation. An environmental condition contains high nutrients strengthening the nutrient enrichment for a particular time. Therefore, integrated management regarding terrestrial and shipping lines track needs to be addressed to maintain the sustainability of the natural resources in the Biawak archipelago.

**Keywords: Aquatic vegetation succession, biodiversity, Biawak Islands.**



# SEAGRASS CONNECTIVITY BASED ON OCEANOGRAPHIC CONDITION IN THE MARINE PROTECTED AREA OF BIAWAK ISLANDS, INDRAMAYU

Aditya Ramadhan, Noir P. Purba, Sunarto, Udhi E. Hernawan, & Ibnu Faizal

## ABSTRACT

Seagrasses are an essential component of the coastal environment with provide many ecosystem services beneficial to humans. Understanding the pattern of dispersal of seagrasses is important for conservation management. The aimed of this research was to analyze the seed dispersal of the seagrass *Enhalus acoroides* in the Marine Protected Area of Biawak Islands, Indramayu, based on hydrodynamic modelling. Oceanographic data were downloaded from several open acces website and location of seagrasses based one insitu observation. Then, oceanographic parameters and seed traits were used to develop the particle trajectory model. Our analysis showed that the seafloor's depth around the islands varied, ranging from 8 m to 48 m. The seed dispersal was strongly influenced by alternating tidal currents (reversing current). The particle trajectory showed that most of the seeds would be transported outward away from each source in the islands, and they settled in deeper areas further from the coast of the islands. This result indicates that the seagrass population in Biawak Islands might depend predominantly on vegetative recruitment, which is slow. This may be related to the low seagrass canopy cover in Biawak Islands.

**Keywords:** Seagrass seeds, bathymetry, tides, atoll, Java seas.

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