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The Vulnerability of Coastal Abrasion in the Islands Area Case Studeis in Kodingareng Keke Island Makassar City

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ABSTRACT: *A study of the vulnerability of coastal erosion in the area Kodingareng Keke aims to analyze the data of hydrodynamics and morphodynamics in the response of damage of the coastal areas primarily to coral reef ecosystems, evaluate the vulnerability of abrasion and sedimentation around the island and assess methods of prevention of coastal abrasion in the area of research. The method used in the form of measurement and data acquisition directly in the field and and continued processing the data in the laboratory. Kodingareng Keke lapped by reefs as the core of the island and deposition of sand and gravel- san gravel that formed the sand island over the reef core. Activities of waves and currents influence on morphological changes of sand island from the west, south-west to north-east along the 5 meter / year. In October 2016, shown abrasion in the southern and eastern of the island and sedimentation in the northern part, so that the island tend to drift to the north. Natural phenomena mentioned above cause Kodingareng Keke is very vulnerable to the hazards of coastal abrasion.*

I. INTRODUCTION

Indonesia is a maritime country, it is supported of data submitted by the Ministry of Maritime Affairs and Fisheries (2011) that the island which owned by Indonesia is around 17,504 islands and about 70% of its territory is the sea with a coastline of 104,000 km or were fourth in the world after the United States , Canada and Russia. The objective condition of coastal areas are spacious and have a huge potential, such as aquaculture, industry, tourism and others. However, based on a survey conducted in 2007 by the Directorate General of Water Resources Ministry of Public Works, concluded that 20% of the Indonesian coastline have been damaged (Syafputri, 2012).

In recent years, the shoreline in several regions in Indonesia are narrowed quite apprehensive (Koddeng, 2011). Some basic assumptions says that the coastal region receives negative impacts caused by their various natural phenomena that are geographically has its own peculiarities. The natural factors such as erosion, sedimentation, rising sea levels, tsunamis and flooding, the overall impact on the coastal areas that suffered severe damage. In addition to some of the natural factors, other factors that cause damage in coastal areas is due to the behavior of people around. This illustrates that a coastal region is vulnerable to environmental changes.

Research on the vulnerability of coastal erosion on Kodingareng Keke is one effort in the prevention of damage to the beach. Analyzing the characteristics of the island is based on morphodynamics and hydrodynamic conditions of the coast, evaluate the vulnerability of the coast around the island area of research, determine the response to coastal erosion appropriate level of vulnerability.

II. RESEARCH METHODS

The research method implemented include :

- *Field Observation*

As for the collection of field data is divided into two, namely :

a. Primary Data Collection

The primary data is the data which collected directly in the field, includes:

1. Data of Hydrodinamic, consist of characteristic and physical properties of tidal, waves and current

2. Data of the beach, that is characteristic of beaches and coastal damage, includes determination of beach type, sediment texture composition, abrasion and sedimentation phenomenas

b. Secondary Data Collection

Secondary data which retrieval to support research, namely remote sensing data to describe changes in the shoreline, topographic maps that depict the contours of the study area and the data on wind speed and direction.

- Data Processing

The data processing is intended to determine the condition of the study area for both primary data and secondary data.

- Interpretation of Field Data

Interpretation of the field data is intended to connect the data from each measurement to produce a conclusion that summarizes the overall data. The end result at this stage of this research is the form of information about the vulnerability of coastal erosion either in the form of data, photos or in the form of a map.

III. RESULT AND DISCUSSION

Kodingareng Keke Island is one of coral island formed at Spermonde Archipelago with an area of approximately 8774 m^2, located in west side of Makassar City with a distance of 13,48 kilometers and included in the Ujung Tanah district. Geographically located in the 119°17′17" - 119°17′20" east longitude and 5°6'18" – 5°6′22" south latitude (Figure 1). The climate of Spermonde Archipelago is tropical, with an average temperature of 28°C and maximum temperature of 30°C.

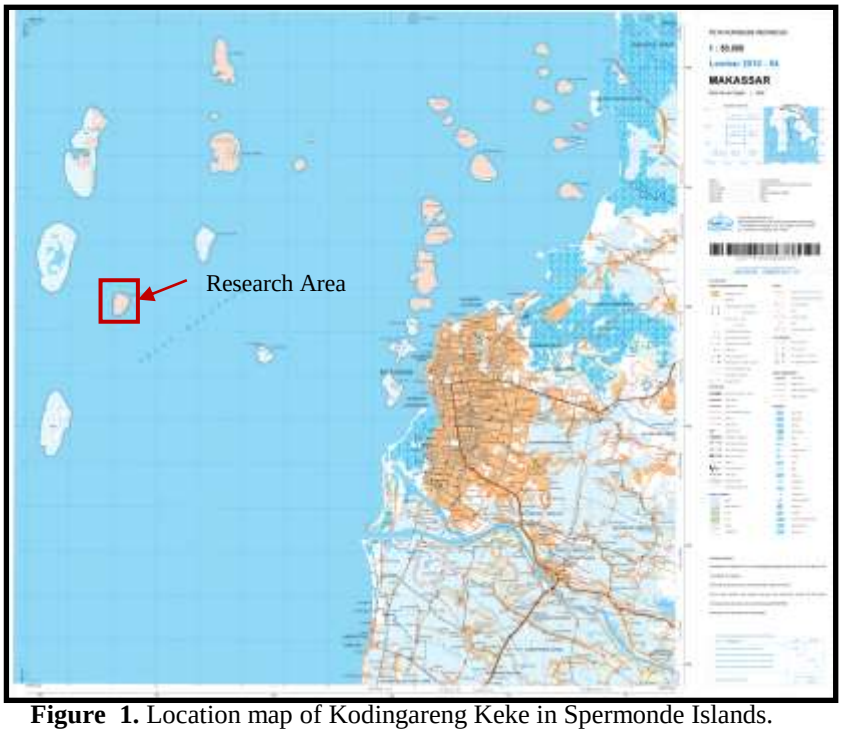

Figure 1. Location map of Kodingareng Keke in Spermonde Islands.

Kodingareng Keke Island, since it was formed 5000 years ago, underwent development and change of shape along history, and sand body which covered the island's core will undergo to change position caused by interaction of wave and current which worked throughout the year.

Kodingareng Keke Island consists of reef as the core of the island and sand sediment and coral gravel. Coral reef as the core of the island is a dead ancient reef exposed in seawater surface caused by shallowing, some covered by sand and gravel consists of coral debris.

At the core of this reef is always interacting with waves and currents (Figure 2) because of its position in the zone of maximum erosion due to silting and apparently part of the island is permanent.

The processes of coastal dynamics of the result of interaction between different hydrodynamic process in the spring and summer east west along the year, will have an impact on the vulnerability of abrasion, to the survival of the body of the sand island Kodingareng Keke. In general, in the west season (October to April), the energy of waves and currents much stronger than east monsoon (June to August). So that in the west of the season occurred in the western part of the island erosion and deposition in the eastern part.

From the results of literature review, satellite images and direct observations in the field shows that island regions most susceptible to abrasion that is south-west and south, where abrasion is very active in the west season (map vulnerability abrasion).

Based on field observations in October 2016, showed traces of erosion and sedimentation activity against the body of sand deposition. Former erosion was evident on the eastern and southern parts of the island (Figure 3). while the sedimentation occurred in the northern part of the island which showed growth of the sand tail (Figure 4). In the south began to sedimentation due to the change of seasons (transition). But in the western part of the island still looked calm, erosion and sedimentation relatively slow turns (Figure 5). In the southern part of the island was beginning to look a tail growing islands composed of coral gravel that extends from north to south (Figure 6 and 7). Within a period of 5 years (2011-2016), a shift occurred desert island from south to north along the ± 25 meters (Figure 8 and 4.9) and 4 meters to the northeast every year.

Figure 2. Coral reefs die as the core of the island Kodingareng Keke, eroding throughout the year by the activity waves and currents on the southern part of the island.

Figure 3 The appearance of homes threatened by abrasion in the eastern part of the island

Figure 4. Sand tail grows in the northern part

Figure 5. The western part of the island of relative calm, has begun to happen sedimentation

Figure 6. Southern tail of the island composed of coral gravel sediment.

Figure 7. Coral gravel deposition formed by erosion in the southern part of the island.

Figure 8. Ruins house that had been damaged by abrasion on the west season, in the southern part of the island.

Figure 9. The southern part of the island began to sedimentation, gravel deposition formed by erosion and fine sand deposition results.

The are different of wave energy and current in buth of these season to result occurrence of abration balance distarbance and sedimentation in whole year , to cause occurance of sand deposition body movement that cover the coral island. The present condition to cause abrasion susceptibility in island area include Kodingareng Keke island.

IV. CONCLUSIONS

1. Kodingareng Keke core composed by reefs and covered by sand deposits that appear as part of the island above sea level with a thickness from 0.5 to 1.75 meters.
2. The results of the study in October 2016 showed that the abrasion occurred in the south and east of the island, and instead sedimentation in the northern and western parts of the island.
3. Material constituent Kodingareng Keke composed of sand, except in the southern part of the island is composed of coarse sand, gravel and coral gravel.
4. The main factors affecting abrasion and shifting islands are waves and currents on the west season
5. Field observations show a shift from the southwest to the northeast of the island for 5 years of a 25-meter (5 meters / year)
6. Changes in the shape and position of the island were very active cause Kodingareng Keke extremely vulnerable to abrasion.

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