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NEMOS (Nearshore Modelling of Shoreline Change) Model for Abrasion Mitigation at the Northern Coast of Ambon Bay

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Abstract

The Northern coast of Ambon Bay was suffered degradation in the form of abrasion. The research aims to analyse factors that causing abrasion and mitigation prevention.The research was done to measurement of NEMOS modeling use of GENESIS (Generalized Model for Simulating Shoreline) with three scenarios i.e existing conditions without protection, with groin series, and groin and *seawall* combination protection. Results obtained that sediment transport in the areas is 89 227 843 m^3, it means that Northern coast had abrasion. NEMOS model with series of groins simulation will reduce to 60 259 673 m^3. Simulation with groins and *seawall*, transport sedimen will reduced to 49 361 749 m^3.

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Keywords: NEMOS; mitigate; model; Northern coast of Ambon Bay

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1. Introduction

Development of utilization and resources at the Northern coast of Ambon bay was multiple use. Coastal activity has included construction of sea transport, catch fisheries, market, agriculture, the conversion of mangrove forest, of industry, housing and tourism. Development faster as well as the opening and area utilization exploitative and uncontrolled, increase the use of natural resources beyond the limit of a balanced environment support impacted to coastal degradation. Northern coast degradation of Ambon bay in the form of abrasion and reducing natural resources capacity.

Hermanto and Suwartana (1986), reported the occurrence of shoreline change Ambon Island as erosion and accretion. Pelasula (2008) stated above land clearing for residential, office and making extractive C affects the degradation, erosion and sedimentation in coastal ecosystems of Ambon bay. The damage study of Ambon city coast by Berhitu Kakisina (2009), indicates that the cause of the damage in the form of beach erosion and sedimentation are the effect of waves from the northwest and the north was also due to transport sediment from the rivers that empties into Ambon Bay. Sahetapy (2010) in his research found that the existence of coral reefs in the Ambon Bay has degraded quite dramatically. Earlier LIPI monitoring report cited a decline in the quality of Ambon Bay neighborhood quite dramatically both in the form of erosion and sedimentation and pollution of the bay (LIPI, 2011).

Efforts to control the impact of development in the coastal areas of Ambon Bay has not yet fully resolved. Ambon City Government has set the Spatial Plan (Spatial) coastal city of Ambon in 2011 to 2031 as a reference of the use of resource in the coastal city of Ambon. Although, spatial planning has been implemented but the process of the degradation is ongoing. The cause of abrasion at northerm coast of Ambon bay needs to be assessed to find out the problem solving and alternative of mitigation. The purpose of the study are: (i) analyze the coastal change of northerm of Ambon bay and factors that cause it, and (ii) engage mitigation coastal abrasion at the northerm of Ambon bay. The results of the study is expected to provide a solution for a comprehensive Ambon bay management in the city of Ambon .

2. Material and methods

This study was conducted on the site of the northern coast of Ambon bay (Figure 1) . Activities of the visit from May to October 2014. Sample used in the form of non probability sample based on consideration of the location coastal areas through observation and the visibility of physically has experienced abrasion. Analysis abrasion done through simulation change the shoreline based on the hidrooceanografi condition. he data collection was done to technique simulation model and field of measurement. Data collection with measurement technique directly in the field covering data the speed and current, bathymetry, tidal , wind and wave speed .The measurement of the speed and direction of current was done with current meters owns the ALEC model , on the 6th to 7th July 2014. The measurement of carried on two the condition i.e high tide and–low water condition.

The waves data were obtained based on conversion wind data of ten years data from 2002 to 2012. The wind obtained from meteorology and geophysics airport Pattimura Ambon. The wind obtained converted into the waves uses software microsoft office excel , then processed uses software lake environmental version 7 to obtain model wind rose and wave rose. Modeling change the shoreline numerically use software GENESIS (Generalized model for simulating shoreline) in the NEMOS (Nearshore Evolution Modelling System) Cedas 2.01 .The simulation was done in two conditions at the existing condition and the protective coastal.The analysis was done through simulate on of several alternative of protective series of groins, seawall and combination of groin series and seawall .

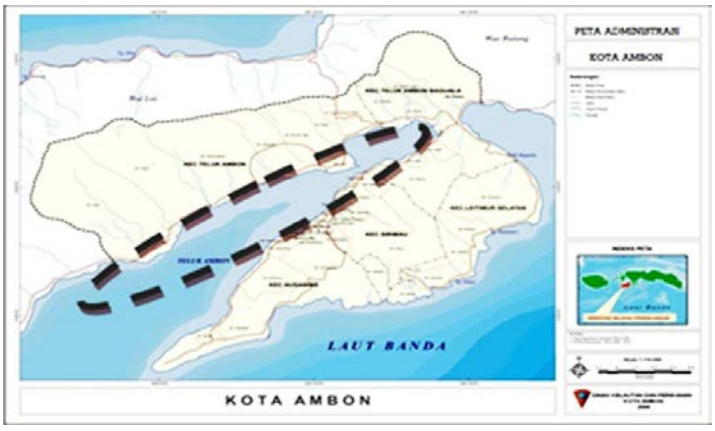

Figure 1. Map location Northern Coast of Ambon bay