

Evaluation of Zonation of The Mangrove Conservation Areas in Pamurbaya

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Abstract— This study was conducted to evaluate the zonation of MCA in Pamurbaya. The methods are field survey, GIS methods using satellite imagery in 2012, 2014, and 2015. The results showed that the zoning of MCA has no less effective. It can be seen from the conditions, i.e.: the buffer zones have been partly used for settlements (+ 13.35 Ha) and the core zone has been used for ponds (+ 462.30 Ha). The areas of ponds in the core zone were reduced by 18.39 ha in 2012 to 2014 but increased by 4.09 ha in 2014 to 2015.

Key words — Evaluation, zonation, Mangrove Conservation Areas.

INTRODUCTION

Management of coastal areas always exposed to various utilization as a multi-use coastal zone. This happened also on the East Coast of Surabaya (Pamurbaya) because Pamurbaya is areas of strategic development and conservation / protected mangrove.

The development activities in coastal areas of Pamurbaya, among others: real estate development, utilization of the fishery and tourism development. The coastal development activities were strongly associated with the utilization of coastal resources that exist, such as: coastal land, mangroves, fish resources.

Several legislation have been enacted in Pamurbaya, among others: Surabaya City Regulation No. 3 of 2007 on Spatial Planning (RTRW) in Surabaya were subsequently adapted into Surabaya City Regulation No. 12 Year 2014 on RTRW Surabaya Year 2014-2034. In addition, in the region imposed Surabaya Mayor Regulation No. 4 of 2016 on Spatial Planning Map Details of Surabaya.

With these regulations have been established zoning Pamurbaya be the primary protection zone, buffer zone, and limited use zone. The Main Protection Zone is a zone whose activities are directed to the conservation of biological resources of coastal, mangrove and coastal border protection. Restricted Use Zone is a zone can still be used on a limited basis. Buffer Zone is a zone outside the Protection Zone and the Limited Use Zone. The zoning regulations in the field has not been implemented well.

Based on the above background, the research problems can be formulated as follows: (1) How is the implementation of mangrove conservation area zoning Pamurbaya (2) The work done in the implementation of mangrove conservation area zoning Pamurbaya?. The purpose of this study is (1) Evaluation of the implementation of mangrove conservation area zoning Pamurbaya, (2) Efforts have been made in the implementation of mangrove conservation area zoning Pamurbaya. (3) Provide recommendations to the government in the implementation of the zoning area of Surabaya.

METHODS

This study was conducted in March-June 2015. The research location is Pamurbaya mangrove conservation area in East Java in position 7°12'LS - 112°36'BT and 7°21'LS - 127°54'BT.

This study uses data topographical map scale of 1: 25,000, google earth satellite images in 2012, 2014, and 2015. The tools used in this research are the Garmin GPS MAP 78s for surveys and computer data processing and software ARCVIEW 3.3 for satellite image processing. Flowchart of this study are set in Fig. 1 below.

The methodology used was a survey, visual interpretation of satellite imagery and GIS methods. Survey method was used to check the position of the location of some boundary conservation areas mangrove with GPS and see the boundary conditions of Mangrove Protected Areas (MPA) that while the visual interpretation to see the condition of MPA macro

changes that occurred during the last three years using the software ArcView 3.3 with satellite images google earth. GIS methods that tactic in the study include: (1) digitization, (2) calculating the polygon area, (3) the editing of polygons, and (4) the map layout.

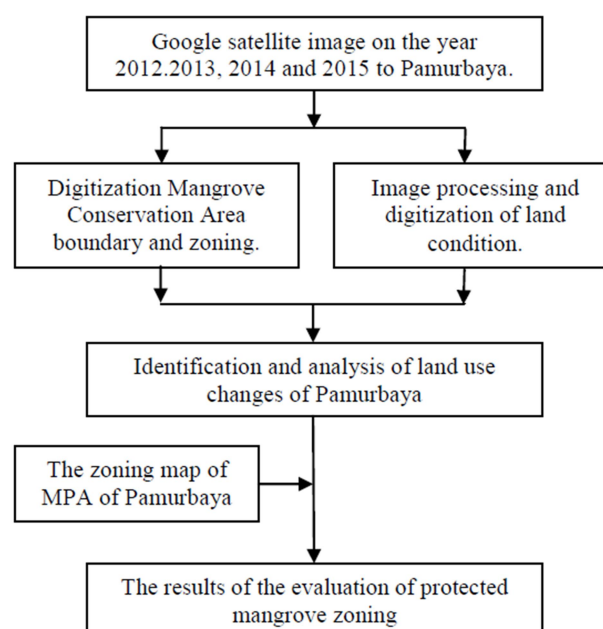


Fig. 1. Flowchart of the research

RESULT AND DISCUSSION

a. Overview of Mangrove Conservation Area of Pamurbaya

Mangrove conservation area (MCA) is determined by Regulation No. 3 of 2007. According to the rules in Article 27 and Article 28, determined conservation areas because these areas provide protection on a local scale in the surrounding area or the scale of the city and serves as a water catchment area, flood prevention, erosion, and to protect the ecosystem in the region. Determination of the region aimed at preserving the potential and natural resources, prevent environmental damage, as well as avoiding variety of businesses and / or activities in the area of land that could result in environmental damage.

Conservation area in the eastern city of Surabaya, in the area of Development Unit (UP) I Rungkut covering most of the territory and the Mount Anyar District Rungkut and UP II Kertajaya, covering most Sukolilo District and Mulyorejo. According to Samsul Arifin [1], Mangrove Conservation Area area of + 2503.9 ha. By 2012, the region has changed its restriction, but the extent remains. It has been studied in [4, 5].

The Pamurbaya mangrove conservation area set back by the Surabaya City Regulation No. 12 2014. Under these regulations (RTRW Surabaya), Pamurbaya region are: (1) The coastal border area, (2) The coastal area of mangrove forest, (3) strategic areas for the sake of saving the environment that be detailed with the spatial planning department strategic East Coast Surabaya. The area is said to be the Mangrove Protected Area Pamurbaya.

Based on the Map Details Spatial Plan Surabaya City (Mayor Regulation No. 4 Year 2016) planning area

designation is a green open space. Based Strategic Area Plan Surabaya East Coast Pamurbaya area is planned into three major zones, among others: Main Protected Zones, Restricted Use Zones, and Buffer Zones, as in Fig. 2.

Top Protected Zone is a zone whose activities are directed to the conservation of biological resources of coastal, mangrove and coastal border protection. Restricted Use Zone is a zone can still be used on a limited basis, among other aquaculture activities, nursery land and for the development of science. Zone Support / Buffer is a zone outside the protection zone and the main zone of limited use that could be developed for natural tourism, artificial / recreation, green open space (RTH) and non-green open space (RTNH), as well as other supporting facilities.

Within these regulations stated that efforts to increase and rehabilitation in the form of replanting mangroves in the area of coastal border wooded mangrove in the District Mulyorejo, Sukolilo, Rungkut and Gununganyar with a width of at least 130 (one hundred thirty) times the value of the average difference highest tide and yearly lows, measured from the low tide line landward.

Some mangroves found in the study area are *Acanthus ilicifolius*, *Avicenia marina*, *Avicenia alba*, *Avicenia lanata*, *Aegiceras corniculatum*, *Excoecaria agallocha*, *Rhizophora mucronata*, *Sonneratia caseolaris*, *Sonneratia alba*, *Xylocarpus molluccesi*.

b. Evaluation of Mangrove Conservation Area Zones

Since the implementation of regional regulations Surabaya No. 12 of 2014, there are zoning Pamurbaya Protected Areas, namely the Main zone, a buffer zone and a zone of limited use[1, 2]. At the time of the adoption of legislation, in accordance with the conditions of the zone has not been specified zone, in the main zone are still a lot of pond used by as many as 403 people with an average area of 1.14 ha pond. The total area of the pond in the Main zone around 462.30 ha (calculated with ArcView 3.3 software).



Fig. 2. Mangrove Protected Areas of Pamurbaya

From the Year 2012 to the Year 2014, several ponds in the protected area has been restored its main functions into mangrove forests, as many as 10 plots with an average area of 2.25 ha. However, in 2014 up to now, there are two ponds that originally had enabled the mangrove forest (shown in the red box), as in Fig. 3. This occurs because the monitoring functions spatially and in the field has not been implemented systematically. Communities most do not know the limits of zoning in the field.

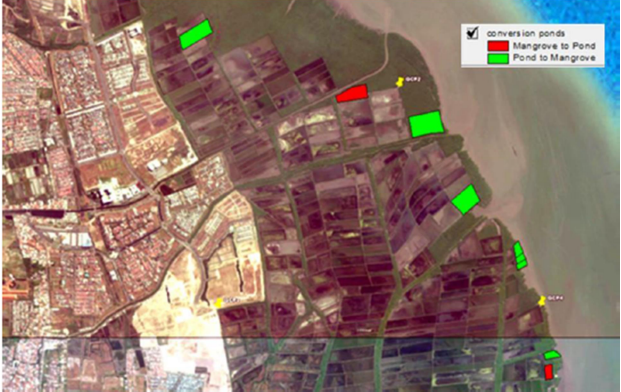


Fig. 3. Mangrove Protected Areas of Pamurbaya

The detail of the changes can be shown in Fig.4. The red oval shows the changes from ponds in September 2012 into mangrove in June 2014.

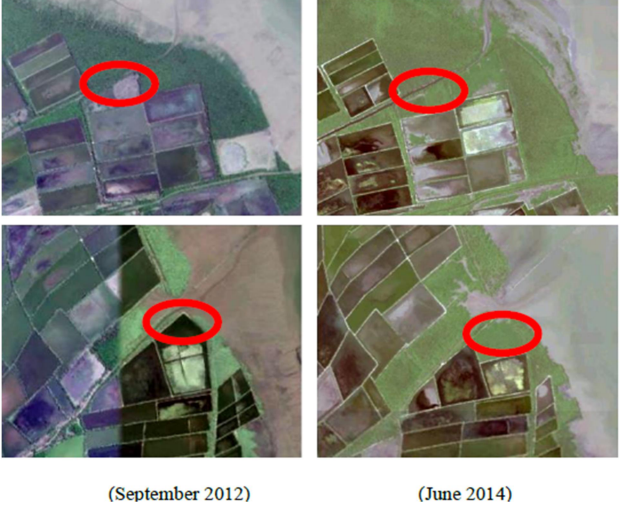


Fig. 4. Details of Changes ponds into mangrove and vice versa in 2012-2014

The details of changes ponds into mangrove and vice versa in 2014-2015 has shown in Fig.5. The above picture in Fig. 5 shows changes from mangrove area into pond and its below picture shows changes from pond into mangrove area.

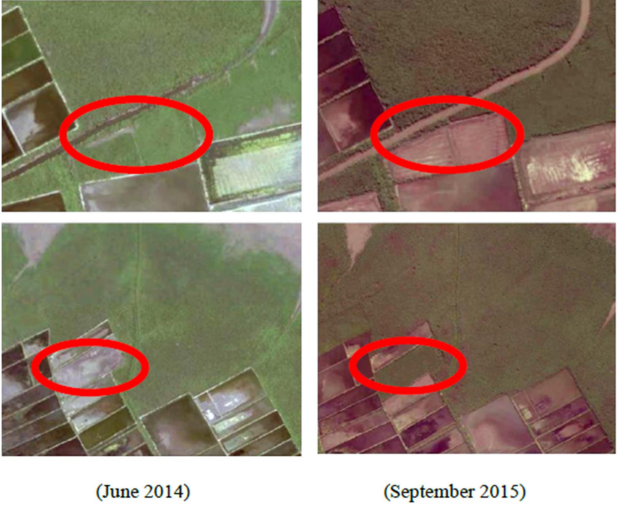


Fig. 5. Details of Changes ponds into mangrove and vice versa in 2014-2015

c. Area Changes of the MPA Zones

In the MPA zones of Pamurbaya, there are abrasion and acresion phenomena. They make changes of the

coastal lines so that the area of the MAP zones are changed.

The calculation result of shoreline changes in [6]. Accretion of coastal land and abrasion of coastal land for 12 years from 2002 to 2014 found 44 areas of shoreline changes along the coast of Pamurbaya. Total area of the coast which are increased are 287.16 hectares and the abraded areas of the coast are 11.02 hectares.

So in the MPA zones of Pamurbaya, the accretion areas are greather than abrasion areas. That is why, the land in the MPA of Pamurbaya always increase. These condition used by the surrounding community. Some people try to make parcels in the sea area before becoming mainland.

CONCLUSION and SUGGESTIONS

From this research can be summarized as follows: (1). Zoning regulations have been there since the Regional Regulation No. 12 of 2014 applies, but the implementation of zoning in the Mangrove Protected Area Pamurbaya not appropriate because there are still about 403 ponds (+ 462.30 Ha) are located in the Main Zone of Mangrove Protected Area (MPA). (2). City Government has restored main functions according to reforestation mangrove zone, however, there are still people trying to return to the ponds, (3) it needs socialization and marking boundaries and limits of MPA and its zoning as well as monitoring them more rigorously, (4) The MPA areas of Pamurbaya are always increase and used by the surrounding community.

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