

CORAL REEF REHABILITATION IN MARINE TOURISM PARK OF PIEH ISLAND AND ITS SURROUNDING WATERS

by:

Darmawan¹, Semeidi Husrin², Muhammad Alrizky¹

¹Loka Kawasan Konservasi Perairan Nasional (LKKPN) Pekanbaru, Riau

²Loka Penelitian Sumber Daya dan Kerentanan Pesisir (LPSDKP) Padang, Sumatera Barat

Abstract

Pieh island and its surrounding waters in West Sumatera Province has been recently declared as a marine tourism park. Covering a total area of 39,900 ha, this park is rich by coral reef ecosystem, especially in five dedicated small islands: Pieh, Bando, Air, Pandan and Toran. Based on the identification and monitoring efforts carried out in 2010, more than 50 % of coral reef in this area was damaged. The objective of this paper is to describe the rehabilitation measures that have been carried out by LKKPN since 2010 to improve the conditions of coral reef ecosystem. The measures consisting of legal aspects (e.g. regulations and local rules), technical aspects (e.g. monitoring and transplantations), and other supporting measures have shown some improvement on the quantity of living coral reefs. Moreover, in order to boost the economy of locals, future plan to manage this marine tourism park will also be discussed.

Keywords: Pieh islands, coral reefs, marine tourism park, rehabilitation

1. INTRODUCING

Marine Protected Area (MPA) Pieh island and surrounding waters in West Sumatera determined by decree of Marine and Fisheries Minister No. KEP.70/MEN/2009 on September 3, 2009. This Area is one of the eight Nature Conservation Area and Natural Reserve Area were handed over from Ministry of forestry to Ministry of Marine and Fisheries through official handover No. BA.01/Menhut-IV/2009 and No. BA.108/Men.KP/III/2009 on March 4, 2009. The handover of this area is the result of alignment between Ministry of Forestry and Ministry of Marine and Fisheries.

In the establishment as Marine Protected Area that the area is designated as a Marine Tourism Park (TWP) Pieh island and surrounding water with area approximately 39.900 ha. In this area there are small islands stretching from north to south, consist of five islands, namely Bando Island, Air Island, Pieh Island, Pandan Island and Toran Island. Based on the geographic these island, this area entered in administrative of Pariaman, Padang Pariaman and Padang.

The establishment as Marine Tourism Park based (or TWP) on the potential that support for tourism activities, such as existence the coral reef and small islands with white sand beaches and clear water surrounding. This is cause of previous area function, which when administered by the Ministry of Forestry is the function of Natural Conservation Area as a Natural Tourism Park.

When the management still under the ministry of forestry, management of this area was mandated to Natural Resources Conservation Centre (BKSDA) West Sumatera. While the current management is mandated to Loka KKKPN Pekanbaru, Directorate general of Marine, Coastal and Small Islands, the Ministry of Marine and Fisheries.



In the early establishment of the area as a conservation area in 1994, coral cover in this area, especially around the Pieh Island reached 76%, but in 1997 coral cover dropped to 35%. Based on observation, there are few things cause decrease the coral cover percent example is *red tide* that cause coral bleaching.

Based on the review of potential study carried out in 2010 by LKKPN Pekanbaru, showed that the coverage on living coral reef in Pieh island and surrounding waters taht include 5 islands in it only 24,1%. Generally, coral reef ecosystem in the area is in damaged condition, even in many location are in severely damaged condition. Judging from the shape of damage in the form of rubble, it can be concluded that the cause of the damage is due to fishing activities using tools and material that are not enviromentally friendly. Damaged to coral reef that are fish habitat cause fish migration to other areas which have a better ecosystem which is actually a better ecosystem is located in farther location so fishermen have to travel longer distance to catcing fish, this cause to increase fishermen operational cost to purchase fuel. furthermore, damaged to coral reef ecosystem will result in vulnerabilities to the islands in the area due to lack of barrier wave as a function of coral reef ecosystem.

2.METHODOLOGY

1. Interview with Local Community

Interview with local community is conducted in post, home or shop where ordinary fishermen gather. These place are usually located not far from the fishing boat rests, therefore the interview can also be done when fishermen do their activities.

2. Monitoring

Obsevation and data collection of corals is done by *Rapid Reef Resources Inventory* (RRI) and *Line Intercept Transect* (LIT). RRI method was used to calculate the coverage presentage of living corals, dead corals, number of coral species, fish/nonfish biotics and the conditions of the habitats such as: sandy, coral fragments, algae, or seagrass. This method is practical to estiamate the presentage of any species in a short periode of observations. Meanwhile, LIT has been used to determine the community of benthos in the corals based on the growth in presentage and to count the number of benthics along the transecs line (LIPI, 2006).

Technic to do LIT is doing the stretches along 70 m roll meter, then the first transect was calculate from the 0 (zero) to the point 10. Then, gives a distance of 20 m. Teh seond transect is staring at point 30 to point 40, then again spaced 20 m. The third transect starting from point 60 to point 70.

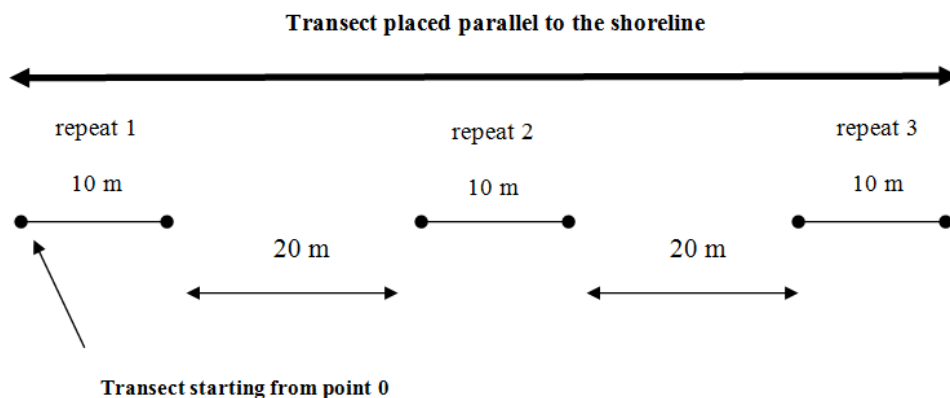


Fig. 1. LIT laid schemes

Field measurements were carried out in two different water depths, 3 – 5 m and 7- 10 m deep, in case corals are still present. Identifications and data collections were carried out by SCUBA where each component of biotic and abiotic along the transecs were carefully identified and measured based on their category. To support the monitoring efforts on the future, LKKPN has deployed permanent transecs in several different locations. With these permanent transecs, monitoring activities can be carried out to compare the growth and latest conditions in similar locations for different time durations.

3. Rehabilitation

Rehabilitation was done is to use coral transplantation method. The method is base off methode that use Polyethylene webbing straps. This method is suitable for sheltered waters and save from big waves. How to make it also very easy and the cost are cheaper than using an iron rack.

The substrate was made of cement with diameter 8,5 cm and a thickness of 2 cm. At each substrate is made 6 cm tall pole as media laying coral seeds. Rack that used are sized 100 x 100 x 50 cm and made of PVC pipe with diameter 1,5 inch. At the centre of rack attached to the nets with 1 inch mesh size. Next is mounting substrate to the net that has been installed in the rack. Installation substrate arranged with a distance of 25 cm between each substrate, so each one rack can be installed 16 substrate.

Coral seeds was taken around the site coral transplantation. Coral seeds were cut measuring 5-7 cm, this piece attached to the substrate by using cable tie. After all seeds attached to the substrate, the rack is lowered into the sea composed by divers.

4. Surveillance

The surveillance method that used is involving the local community, so by this method are expected local community will be more aware of the importance of coral reef ecosystems.

3. RESULT

The result obtained in this study are based on the following three aspect:

1. Legal Aspect

Currently in West Sumatera there are already Local Regulation (Peraturan Daerah/Perda) West Sumatera Province No. 3 of 2009 about management of coral reef. Prior to the publication of this regulation are still many people who do coral mining to be sold as an ornament coral but after the regulation is published, no more people do mining coral reef.

2. Technical Aspect

The technical aspect are done monitoring and transplantation. Coral reef monitoring in Pieh Islands and its surrounding water begin in 2010 and will be conducted annually.

Based on review of natural potential carried out in 2010 by LKKPN, the coverage on living coral reef was only 24,1. Later in 2011 LKKPN monitoring at the same place, the result show an increase in percentage of live coral cover to 32,2%. To support monitoring in subsequent years, LKKPN has installed permanent transect of monitoring sites. With the permanent transect, the monitoring activities can be conducted to compare the growth and the latest condition in similar location for different time location.

To support the rehabilitation in TWP Pieh island and its surrounding water, on June 2012 LKKPN have done reef transplantation where located at Gosong Air dan Pulau



Air. Transplantation were performed as much as 84 sets with the detail is 57 sets in Gosong Air and 27 sets in the east of Air Island.

3. Public Awareness Aspect

Basically, the local people mostly aware the important of coral reef conservation. However, they are still disturbed by some fisherman who still using potassium cyanide and explosive to catch fish. Therefore, LKKPN should continuously provide education and increase the awareness about the importance of coral reef conservation.

4. DISCUSSION

Based on the review of natural resources potentials in 2010 carried out by LKKPN Pekanbaru and stakeholder in West Sumatera province, the averaged coverage of living corals in TWP Pieh Island and Its Surrounding Waters is 24.1%. In 2011, field survey carried out by LKKPN revealed an increase of living coral coverage up to 32.2%.

The increase of living coral coverage is mainly due to the increase of local awareness to the environment. The awareness of the locals to the environment has reduced the negative pressure to the coral reef ecosystem so that the recovery processes have gone faster.

These days, TWP Pieh islands and its surrounding waters has not been supervised intensively. In the future, intensive supervision is greatly needed by involving the locals. Moreover, coordination and communication with other related institutions should also be developed to optimize supervision efforts. Lack of law enforcement is one of the main problems triggering illegal activities in the area. This also made environmental problems occurring all the times and repeatedly. The supervision program from LKPPN has an objective to overcome these problems especially for those who are using explosives to catch fish.

One of the effort in rehabilitation of coral reefs in TWP Pieh islands and it surrounding waters is with with the zoning determination. Zonation in conservation area is the division into several zones based on functional boundaries related to natural resources potentials, carrying capacity and ecological processes as an ecosystem unity. Based on the decree of the Ministry of Marine and Fisheries Affairs No. PER.30/ MEN/2010 about Master Plan of Management and Zonation of Marine Conservation Area, it is mentioned that the zonation should consist of core zones, sustainable fisheries zones, exploited zones, and other zones. For the case of TWP Pieh Island and Its Surrounding Waters, zonation was determined by interview and consultations with the locals and fishermen, coordination with related stakeholders and identification of natural resources potentials.

Interviews and fishing together with fishermen were carried out to identify exactly the location of fishing ground. This also very useful to determine the sustainable fisheries zones and to avoid conflict with fishermen especially for the determination of core zones. The core zones are the zones where any fishing activities are not allowed.

Coordination with related stakeholders was initiated to synchronize any activities in managing TWP Pieh Island and Its Surrounding Waters. Identification of natural resources potentials was carried out by field surveys to monitor the ecosystem conditions for the islands and their marine environment. All these stages are hopefully resulted on optimum zonation determination in TWP Pieh Island and Its Surrounding Waters.

Determination of zoning is expected to restrict human activity in certain areas, especially in the core zones is absolutely protected areas, the zones where should be no human activity except for the purpose of science, education and research, rehabilitation and environmental conservation. Up to now, the concept of zonation for TWP Pieh Island and Its Surrounding Waters has not been implemented yet. By implementing the zonation, the area will be the source of plasma supporting sustainable marine environment of TWP Pieh Island and Its Surrounding Waters.

For the rehabilitation, LKKPN have done transplantation at Gosong Air dan Air Island as much as 84 unit of rack with 1.344 pieces of coral seed. The benefit of transplantation are accelerating recovery of coral reef have been damaged, so it can support the availability of coral population in the wild, creating new communities, and as the conservation of genetic resources (plasma nutfah).

Conclusion

The average of living coral in TWP Pieh Island and its Surrounding Water increase from 24,1% in 2010 to 32,2% in 2011. With the effort of rehabilitation, the average of living coral coverage will continue to grow.

Suggestion

Need for more integrated surveillance and increasing public awareness to reduce pressure on coral reef ecosystem. It will have a positive impact on the recovery of the coral reef that are habitat for many marine biota.

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