

## Action Plan in Developing Sea Turtle Conservation as Ecotourism Attraction in Sukamade, Meru Betiri National Park

Jehan Ramdani Haryati<sup>1\*</sup>, Jayarani Fatimah Putri<sup>2</sup>, Nurul Chairiyah<sup>3</sup>, Ali Harris<sup>4</sup>,  
Helen Aulia Putri<sup>5</sup>, Ratih Nila Pamungkas<sup>5</sup>

<sup>1</sup>Graduate School of Environmental Sciences, University of Brawijaya, Malang, Indonesia

<sup>2</sup>Graduate School of Life and Environmental Sciences, University of Tsukuba, Ibaraki, Japan

<sup>3</sup>State Senior High School 10, Samarinda, Indonesia

<sup>4</sup>Faculty of Fishery, Mataram '45 University, Mataram, Indonesia

<sup>5</sup>Master Program of Biology, University of Brawijaya, Malang, Indonesia

### Abstract

Sukamade Coastal Area located in Meru Betiri National Park has particular object as ecotourism attraction, i.e. Sea Turtle. On the other hand, national park management use the cross subsidy from ecotourism activities to promote the conservation action plans for the survival of sea turtle. This study was aimed to formulate action plans to develop the sea turtle conservation as ecotourism attraction in Sukamade Coastal Area. Field observation was conducted to evaluate the current activities of the sea turtle conservation and ecotourism activities in Sukamade. Semi-structured interview and secondary data collection was also conducted to support the formulation of the action plan. Data was analyzed by SWOT method to be developed into action plan. Results showed that the management of sea turtle conservation and ecotourism activities in Sukamade Coastal Area has been attempted to meet the conservation concept for sea turtle but also beneficial for the ecotourism implementation. However, we recommend a long term and short term action plan for the sustainability of the sea turtle conservation and ecotourism activities in Sukamade Coastal area. It includes the mangrove restoration, sea turtle feed development, mapping of sea turtle distribution and migration, the use of up to date biotechnology, workshop on conservation management, and the development of research facility in the area. Additional to the current policy on sea turtle conservation and ecotourism activities, the action plan that we recommended were expected to improve the sustainability management in Sukamade Coastal Area.

**Keywords:** Action Plan, conservation, ecotourism, Sea Turtle.

### INTRODUCTION

Tourism has major contribution in the economic development in Indonesia. Ecotourism as advanced concept of tourism deploy the sustainable tourism development which aimed to support efforts on environment conservation (nature and culture). Ecotourism also improve the community participation in its management implementation [1]. The ecotourism activities were attempted to direct economy motif towards the conservation of natural resources and create value added for community. It concerns the continuity of the natural resources as the tourism attraction and also considers the economic necessity [2].

Sukamade Coastal Area located administratively in the Regency of Banyuwangi, East Java and included in the area of Meru Betiri National Park (MB NP) [3]. Available tourism attractions are beaches, fauna, and famously sea turtle's egg laying. Sukamade Coastal Area has become one

of conservation area for sea turtle in Indonesia [4]. Several sea turtle species commonly found laying their eggs in the coast. MB NP and local community keep trying to optimize the sea turtle conservation. However, many obstacles whether natural or managerial is lead to less performance for the sea turtle conservation activities, thus also affecting the ecotourism in Sukamade.

Sea turtle in that found in the world these days is consisted of seven species, which six of them considered as threatened with extinction by IUCN Red List of Threatened Species [5]. It means that four species of sea turtle that found in the area of Sukamade Coast are also threatened by extinction. The species are green sea turtle (*Chelonia mydas*), grey sea turtle (*Lepidochelys olivaceae*), Hawksbill sea turtle (*Eretmochelys imbricata*), and leather back sea turtle (*Dermochelys coriacea*). Major hazards that threaten the sea turtle are poaching to get sea turtle's meat and their eggs (consumptive recreation/tourism). Thus, the most population of sea turtle was decreased.

Non consumptive wildlife recreation is recently popularized due to the growth of eco-

\* Correspondence address:

Jehan Ramdani Haryati

Email : [jeahanramdani@ub.ac.id](mailto:jeahanramdani@ub.ac.id)

Address : Jl. MT Haryono No. 169, 65145, Malang.

tourism [6]; an alternative tourism that preserves the condition of nature. An example of this non-consumptive recreation was also developed in the efforts of sea turtle conservation in Sukamade. Meru Betiri National Park develops the sea turtle conservation as ecotourism attraction in Sukamade Coastal Area. The conservation activities towards the sea turtle, such as egg patrol, hatchery, and hatchling release are become the non consumptive uses for sea turtles [7]. Thus, the conservation activities of sea turtle itself become potential tourism attraction for Sukamade Coastal Area.

Therefore, this study was aimed to formulate action plans to develop the sea turtle conservation as ecotourism attraction in Sukamade Coastal Area. The output of this study is expected to improve the sustainability management for sea turtle conservation and ecotourism activities in Sukamade Coastal Area.

## MATERIALS AND METHODS

### Study area

Coastal Area/Resort of Sukamade is area of sea turtle conservation in the sub-village of Sukamade, Village of Sarongan, District of Pesanggaran, Regency of Banyuwangi and include in the management area of Meru Betiri National Park. Sukamade coastal area located at 113°48'42" - 113°56'22" East and 8°27'08" - 8°34'40" South with 10,417 ha area. The management of sea turtle conservation is under the supervision of UPKP (Unit Management of Sea Turtle Conservation) which established in 2010. It is a special unit which formed to implement the sea turtle management in the coastal area of Sukamade. The length of coastal area as the sea turtle's egg laying was about 3 km. Activities in this unit includes all attempt to conserve the sea turtle, e.g. tracking, semi-natural egg hatching, hatchling release, monitoring, the improvement of sea turtle habitat for the egg laying [8].

Acoording to the forest rangers and national park technician, there are 4 species of sea turtle that found in the area of Sukamade Coast (Fig. 1), i.e. green sea turtle (*Chelonia mydas*), grey sea turtle (*Lepidochelys olivaceae*), Hawksbill sea turtle (*Eretmochelys imbricata*), and leather back sea turtle (*Dermochelys coriacea*). The most frequent sea turtle that landed in the Sukamade coastal area is green sea turtle (*Chelonia mydas*) with total landing percentage 96%. Green sea turtle in coastal area of Sukamade lay their egg 5 times in a season, with 2-3 years interval [9].

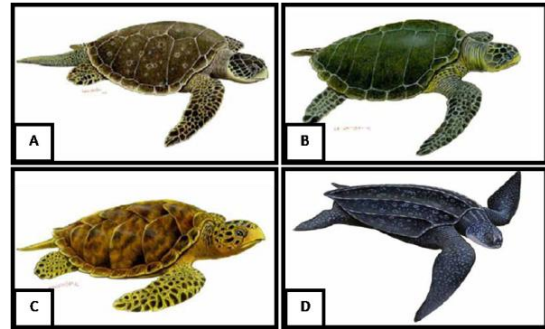


Figure 1. Sea Turtle that found landed in Sukamade Coastal Area [5,10]

Description:

- (A). Green Sea Turtle (*Chelonia mydas*),
- (B). Slengkrah/Grey Sea Turtle (*Lepidochelys olivaceae*),
- (C). Hawksbill Sea turtle (*Eretmochelys imbricata*),
- (D). Leatherback sea turtle (*Dermochelys coriacea*)

## Data Collection and Analysis

Field observation was conducted to evaluate the current activities of the sea turtle conservation and ecotourism activities in Sukamade. Semi-structured interview was performed to obtain primary data on ecotourism activities related to sea turtle conservation in Sukamade (e.g. egg patrol, egg hatchery, hatchling release). Secondary data collection was also conducted to support the formulation of the action plan. Data was analyzed by SWOT (Strength, Weakness, Opportunity, and Threat) method to be developed into action plan.

## RESULT AND DISCUSSION

### Potential Tourism Attraction and Progress

The activities of sea turtle conservation that primarily offered to the tourist are patrol on sea turtle's egg laying, observation on the semi-natural hatchery, and hatchling release. Sea turtle commonly lay their eggs in the sand of Sukamade Coast at 6 pm to 6 am. A sea turtle will lay their egg 3-4 times in a season, with interval 14-30 days and 2-4 years seasonal interval. Sea turtle will initially observe the coast area from the surface of the sea, to determine the safety of the area for their eggs, from tidal wave or predators. After convinced with the area safety, sea turtle land and dig a body size hole in the sand with the hind flippers and a hole to lay the eggs with the back flippers. After the eggs lied, sea turtle will cover the hole and camouflage it before turning to the sea (Fig. 2). The times for this egg laying are about 2.5 hours [9].

The hatchery for the sea turtle's egg is semi natural, because the sand media was obtained from the coastal area with no additional treatments. Semi-natural egg hatchery of sea

turtle in Sukamade Resort is in a building with size  $\pm 4 \times 8$  m with substrate of coast sand (Fig. 3). Semi-natural hatchery was implemented to reduce the risk of hatching failure in its natural hatchery and prevent the predatory by wild pig, rats, lizard, etc. The eggs were obtained from the natural hatchery in the coast. The eggs will hatch in about 2 months. Each hatchery holes was marked by information board about the species, date of eggs taken, and the number of eggs. Succeeded hatched eggs and the mortality was recorded. The management also maintains the cleanliness of the hatchery. After hatched, hatchling should be incubated for 7-20 days before released (Fig. 4). Only 1% of hatchling will grow and develop into adult sea turtle [6]. The hatchlings was taken care in small tub with diameter  $\pm 30 - 50$  cm. Several hatchlings died from fungal or bacterial infection, ants' predation, and stress from water maintenance, density, temperature, or it secretes.



**Figure 2.** *Lepidochelys olivacea* land to lay the eggs in Sukamade Coastal Area (Personal documentation)



**Figure 3.** Semi-natural hatchery of sea turtle's eggs in Sukamade Resort (Personal documentation)



**Figure 4.** Hatchling release in Sukamade Coastal Area (Personal documentation)

### Problems of Sea Turtle Conservation in Sukamade Resort

Many obstacles whether natural or managerial are lead to less performance for the sea turtle conservation activities, thus also affecting the ecotourism in Sukamade. Natural or environmental causes include the parasites and disease in sea turtle (Fig. 5), anthropogenic disturbances in the visitation (Fig. 6), and continuous irresponsible acts such as sea turtle's meat and/or egg consumption and handicrafts from sea turtle's body parts.

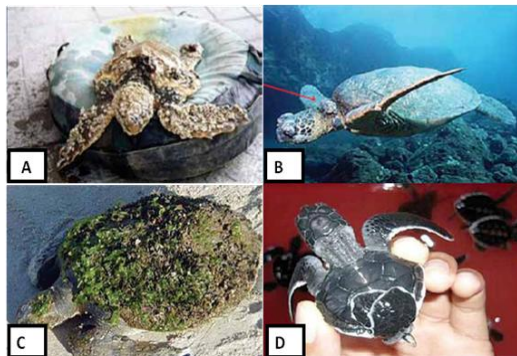


Figure 5. Parasites and disease in sea turtle [10]

Description:

- (A). Teritip parasites (Barnacle, *Sacculina*, etc.)
- (B). Tumor in sea turtle's body
- (C). Moss or algae covered sea turtle
- (D). Abnormal hatchlings



Figure 6. Cautions to anthropogenic disturbance during visitation (personal documentation)

Otherwise, the managerial problems are including following items. **Sea turtle's egg stealing** becomes the most found problem in the process of managing sea turtle conservation in Sukamade. The thieves conduct its crime especially at night, inadvertence of egg collector field officer. The management was also **lack of field officer** to collect the eggs and move it to the safe hatchery site. Egg hatching in the coast area has major predatory threat and thieves. Currently,

the field officer on the area was 6 personal, while the area of Sukamade Resort ranges for 10,000 ha has to be monitored and 2-3 person patrol in shift at night during the eggs laying seasons for 3 km ranges. Thus, the tourists that participate in the patrol help the officer a lot in collecting and transport the eggs. The process from the sea turtle gets to the seashore to laying their eggs is about 2 hours. The patrol officer competes with the natural predator such as wild pig and *Manis javanica* in getting the eggs.

**Wide monitoring area** in the coast of Sukamade extends about 3 km in length, with point of eggs laying changes. It becomes particular problem in collecting and found the eggs to be moved to the semi-natural hatchery site. **Predator** that consume or damage the eggs of sea turtle that commonly found in Sukamade Coast Area are rats, wild pig, *Manis javanica*, and Biawak (Varanidae). Although the field officer has already being caution, sometimes the predator gets to consume the eggs.

**Hatching ability** of the sea turtle's egg is fluctuating. Previous study mentioned that in April 2007, the hatching ability reached 87.5% while on March it only reached 77.1% [11]. This hatching ability has been ideal for the sustainability of sea turtle. Real condition of ideal hatching ability is up to 100%. The lower hatching ability of sea turtle eggs in Sukamade resort was assumed due to the process of collection, transportation to semi-natural hatchery, and hatching process itself.

**Hatchling viability** also problem faced after the hatching. Hatchling of sea turtle was taken care for one week and or for longer period for further caring procedure. Container for these hatchlings are small tubs with diameter  $\pm 30$ –50cm. several hatchling dead due to fungal disease in their eyes area, ants' attack, and stress from water replacement, density, temperature or pollution from their own excretion. Some death did not show any changes in their morphology.

**Absence of sea turtle conservation expert in Sukamade.** Sea turtle is a rare species in the world and the life of sea turtle in wild nature has not got certainty to be survived. Thus the efforts in conserving the sea turtle should involve the expert on sea turtle conservation to ensure its sustainability. The absence of expert on sea turtle conservation will lead to ineffective conservation management, e.g. none particular operational standard and activities not get any clear and appropriate evaluation for its development.

### Monitoring on Sea Turtle Conservation

Monitoring activities on the sea turtle conservation includes the activity of egg laying, tagging, parasites removal and body measurement. The aims of the monitoring are to ensure the sea turtle existence refer to the attached tag and attaching the tag to the sea turtle which has no tag, examine the health of the sea turtle by removing the parasites, observing the egg laying process and save the eggs to the hatchery. From this monitoring, we obtained the data base on the number of eggs from each sea turtle, sea turtle distribution, egg laying frequency, and egg laying behavior of sea turtle. Monitoring was conducted regularly every night by the patrol officer.

### SWOT Analysis

Strength, weakness, opportunity, and threat of the sea turtle hatchery conservation management were used to arrange the SWOT matrix (Table 1). Analysis of SWOT was used to determine strategy and formulate the action plan for development of sea turtle conservation efforts along with a better ecotourism destination.

### Recommended Action Plan

From the SWOT analysis, we obtain several root cause in the sea turtle conservation program in Sukamade. The root causes are natural predator and egg and/or hatchling stealing, pathogenic microbes which lead to decrease hatchling viability, and lack number of officer and experts in sea turtle conservation. Regarding this, thus we aimed to optimize the conservation efforts in MB NP. The action plan was expected to give outputs on optimum performance for sea turtle conservation to support the ecotourism in Sukamade.

Inputs for the action plan are all hatched sea turtle in Sukamade Coastal Area would be well covered, high percentage of egg hatching and hatchling viability, and field officer and competent expert on sea turtle conservation. Whereas the expected outcomes are efficient natural, human, and funding resources; qualified sea turtle hatchling to survive their life; and create habitat for egg hatchery with better and more stable environment condition.

**Table 1.** SWOT analysis on the sea turtle conservation in Sukamade Resort

	Internal Factors	External Factors	
		Opportunity	Threat
		<ul style="list-style-type: none"> <li>✓ Governmental funding</li> <li>✓ Potential ecotourism trend</li> <li>✓ High interesting from international and local tourists</li> </ul>	<ul style="list-style-type: none"> <li>✓ Natural predator</li> <li>✓ Egg or sea turtle stealing</li> <li>✓ Inappropriate semi-natural hatchery</li> <li>✓ Disease, parasites, stress affect the hatchling viability</li> <li>✓ Wide area for the egg laying incomparable with the number of field officer</li> </ul>
Strength	SO strategy		ST strategy
<ul style="list-style-type: none"> <li>✓ Natural multi strata forest vegetation</li> <li>✓ It has 4 species of sea turtle that frequently come for egg laying (inter nesting area) hibernacula</li> <li>✓ MB NP monitoring on inter nesting area, tagging, sea turtle caring from parasites and disease, sea turtle population, size, and feed sources</li> <li>✓ Semi-natural hatchery to help the conservation efforts</li> </ul>	<ol style="list-style-type: none"> <li>1. Cooperation with universities on research about sea turtle conservation</li> <li>2. Applied up to date biotechnology to optimize the sea turtle conservation</li> </ol>		<ol style="list-style-type: none"> <li>1. Add the number of national park rangers</li> <li>2. Design appropriate condition for sea turtle's semi-natural hatchery</li> <li>3. Monitoring the area that vulnerable to predator and stealing</li> </ol>
Weakness	WO strategy		WT strategy
<ul style="list-style-type: none"> <li>✓ Lack number of field officers</li> <li>✓ No conservationist expert for the sea turtle conservation</li> <li>✓ Less knowledge on up to date technology in sea turtle conservation</li> </ul>	<ol style="list-style-type: none"> <li>1. Open recruitment for field officer for infrastructure and facilities in the area</li> <li>2. Dissemination/training about sea turtle conservation</li> </ol>		The recruitment of new officer or expert for monitoring the activities of sea turtle conservation

Action plan that we promoted for the conservation of sea turtle in Sukamade is consisted a long term and short term program. It includes the mangrove restoration, sea turtle feed development, mapping of sea turtle distribution and migration, the use of up to date biotechnology, workshop on conservation management, and the development of research facility in the area. The mechanism and design of the action plan described in following Table 2. Resources required to implement the action plan are Dept. of Culture and Tourism Banyuwangi, officers in the sea turtle hatchery of MB NP, higher education institution, research center of sea invertebrate, the area of MB NP and sea turtle hatchery, and references on the development of sea turtle hatchery and conservation along with ecotourism [12,13,14]. As for the performance indicator (Table 3), we compare the initial condition to the final condition that we expected from the action plan.

For the sustainability of the action plan, we also recommend several activities related to the sea turtle conservation. The seedling and planting of mangrove surround the coastal area of Sukamade should be done to provide habitat for sponges, bivalves, mollusk, shrimp, seaweed, and alga as the food for sea turtle. This feed diversity should be assessed for further decision making for the development of the sea turtle conservation. In addition, it also necessary to assess the distribution of the sea turtle feed around Sukamade coastal area, e.g. by using GIS apps. For the feeding in the hatchery, we encourage to develop more micro and/or macro zooplankton culture.

It is also essential for the MB NP to build research center of sea turtle conservation in Sukamade. The funding proposal could be proposed to the regional and central government to develop the infrastructure of MB NP and research development about sea turtle in MB NP.

**Table 2.** Mechanism and Design of the Action Plan for the Sea Turtle Conservation Activities in Sukamade

Mechanism and design	Short Term	Long Term
Preparation	Literature Study, Discussion (e.g. FGD) and expertise consultation with higher education institution (universities) and related stakeholder, and research related to the sea turtle conservation.	
Initiation	<ul style="list-style-type: none"> <li>- Planning workshop for the field officer</li> <li>- Recruitment of expert field officer</li> <li>- Proposal for research and development for the area</li> <li>- Planning sustainable monitoring schedule</li> </ul>	<ul style="list-style-type: none"> <li>- Recommend available field officer for further study on the conservation , especially on sea turtle</li> <li>- Proposal for cooperated research</li> <li>- Planning design for hatchling incubation to support its viability</li> </ul>
Implementation	<ul style="list-style-type: none"> <li>- <i>Workshop</i> for the field officer</li> <li>- FGD with local community</li> <li>- Selection and appointment for field officer</li> <li>- Research on sea turtle conservation</li> <li>- Sustainable monitoring</li> </ul>	<ul style="list-style-type: none"> <li>- Appointment of field officer for further study on the conservation , especially on sea turtle</li> <li>- Conducting cooperated research, e.g. recovery method for ill hatchling</li> <li>- Manufacture of hatchling incubation and maintain the condition</li> </ul>
Monitoring & evaluation	<ul style="list-style-type: none"> <li>- Evaluate the performance of the officer after the workshop and selection</li> <li>- Record the egg or hatchling stealing</li> <li>- Test the results of the research</li> <li>- Record the data of monitoring</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring the study process of the officer's study</li> <li>- Sustainable application of research results</li> <li>- Evaluate the effectiveness of incubation container</li> </ul>
Action to improve	<ul style="list-style-type: none"> <li>- Provide reward to the officer with good performance</li> <li>- Persuade local community to modified the handicrafts with conservation theme, NOT with using the sea turtle body parts</li> <li>- Applied the research results on the area</li> <li>- Data should be processed with statistic standard</li> </ul>	<ul style="list-style-type: none"> <li>- Officer implement the obtained knowledge from the study</li> <li>- Develop and improve the research (e.g. molecular, genetic)</li> </ul>
Progress report	<ul style="list-style-type: none"> <li>- Egg hatching in Sukamade coastal area is well covered</li> <li>- Community has awareness on the importance of sea turtle conservation</li> <li>- Increased percentage of hatched egg and viable hatchling</li> </ul>	<ul style="list-style-type: none"> <li>- Increased research on sea turtle conservation</li> <li>- Complete and valid data base</li> </ul>

**Table 3.** Performance Indicators of the Action Plan for the Sea Turtle Conservation Activities in Sukamade

Orientation of the action plan	Before	After
Short Term	<ul style="list-style-type: none"> <li>- Patrol officer 2-3 persons with irregular shift</li> <li>- No expert officer for sea turtle conservation</li> <li>- Percentage of hatched egg 70%</li> <li>- Hatchling monthly mortality 25%</li> <li>- No efforts in handling the ill hatchling</li> <li>- Many eggs and hatchling were stolen</li> </ul>	<ul style="list-style-type: none"> <li>- Patrol officer 6-7 persons with regular shift</li> <li>- expert officer for sea turtle conservation available</li> <li>- Percentage of hatched egg 90%</li> <li>- Hatchling monthly mortality &lt; 5%.</li> <li>- Innovation to handle the ill hatchling</li> <li>- Less (and/or none) stolen eggs or hatchling</li> </ul>
Long Term	<ul style="list-style-type: none"> <li>- Officer has not applied biotechnology for the conservation efforts</li> <li>- Officer only take care the hatchling</li> <li>- Level of Sanitation quality 50%.</li> <li>- No specific vaccine/medicine for the ill hatchling</li> </ul>	<ul style="list-style-type: none"> <li>- Officer applied the biotechnology for the conservation efforts</li> <li>- Officer also able to formulate action plan on existing problems</li> <li>- Level of sanitation quality 100%</li> <li>- Specific vaccine/medicine for ill hatchling</li> </ul>

The results of the research on sea turtle conservation also need national and international dissemination to be recognized by the world, thus increase the awareness for sea turtle conservation and attract tourist to be involved in the conservation efforts as well as ecotourism in Sukamade coastal area.

## CONCLUSION

Action Plan consisted of a long term and short term for the sustainability of the sea turtle conservation and ecotourism activities in Sukamade Coastal area. It includes the mangrove restoration, sea turtle feed development, mapping of sea turtle distribution and migration, the use of up to date biotechnology, workshop on conservation management, and development of research facility in the area. Additional to the current policy on sea turtle conservation and ecotourism activities, the action plan that we recommended were expected to improve the sustainability management in Sukamade Coastal Area.

## REFERENCES

- [1] Atmoko, W. D. 2008, Studi prospek pengembangan ekowisata pada kawasan sekitar Kars Gombang Selatan dalam mendukung keberlanjutan wilayah. Thesis. Dipenegoro University. Semarang. [eprints.undip.ac.id/4363/1/Wisnu\\_Dwi\\_Atoko.pdf](http://eprints.undip.ac.id/4363/1/Wisnu_Dwi_Atoko.pdf).
- [2] Hedrick, L. W. 2008. Ecotourism sustainability. Available at: <http://digitalscholarship.unlv.edu/thesesdissertation/483>.
- [3] Diantoro, W. 2008. Pantai Sukamade. Available at: <http://www.wisatanesia.com/2010/05/pantai-sukamade.html>.
- [4] Nusantara. 2011. Pantai Sukamade. Available at: <http://nusantara.asia/jawa/jawatimur/pantai-sukamade/>.
- [5] IUCN. 2012. IUCN SSC marine turtle specialist group: about Marine turtles. International Union for Conservation of Nature. Available at: <https://iucn-mtsg.org/about-turtles/>.
- [6] Wilson, C. and C. Tisdell. 2001. Sea turtles as a non-consumptive tourism resource especially in Australia. *Tourism Management* 22, 279-288.
- [7] Hakim, L and N. Nakagoshi. 2006. Sea Turtles and its non consumptive uses in East Java. 3<sup>rd</sup> Coastal Zone Asia Pacific Conference, August, 29 – September 2, Batam, Indonesia.
- [8] Meru Betiri National Park. 2012. Information on Meru Betiri National Park. Office of Meru Betiri National Park. Banyuwangi.
- [9] Officer of Sukamade Resort. 2012. Sea turtle Conservation. Personal communication. Office of Meru Betiri National Park.
- [10] Dermawan, A., I.N.S. Naitja, D. Soedharma, M.H. Halim, M.D. Kusri, S.B. Lubis, R. Alhanif, M. Khazali, M. Murdiah, P.L. Wahjuhardini, Setiabudiningsih, A. Mashar. 2009. Pedoman teknis pengelolaan konservasi penyu. Directorate of Conservation and Sea National Park, Directorate General of Marines, Coastal and Small Islands, Department of Marine and Fisheries, Republic of Indonesia. Jakarta. 19-68.
- [11] Prihanta, W. 2007. Problematika kegiatan konservasi penyu di Taman Nasional Meru Betiri. Research Report. Faculty of Teaching and Education Sciences. Malang Muhammadiyah University.

- [12] James, M. C., Ottensmeyer C. A. and Myers R. A. 2005. Identification of high-use habitat and threats to Leatherback Sea Turtles in Northern Waters: new directions for conservation. *Ecology Letter* 8, 195–201.
- [13] Tisdell, C. and C. Wilson. 2000. Developing of Ecotourism for the survival of Sea Turtles. Working Papers on Economics, Ecology, and the Environment, No. 45. University of Queensland. Australia.
- [14] Tisdell, C. and C. Wilson. 2003. Does Ecotourism Contribute to Sea Turtle Conservation? Is the Flagship Status of Turtles Advantageous?. Working Papers on Economics, Ecology, and the Environment, No: 90. University of Queensland.