Protection of Catalina Wreck Site in Biak Water and Rehabilitation of the Surrounding Marine Environment

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Abstract

Over more than a decade ago a United States of America's (USA) Air Force aircraft was found underwater off the coast of Biak in West Papua. The aircraft is believed to be Pby Catalina, a WWII amphibious bomber aircraft.

When the Papua Ministry of Marine Affairs and Fisheries operated regular monitoring for marine ecosystems in Biak waters the team recorded severe problems with marine life directly associated to the waters surrounding the Catalina Wreck Site. National and Local government have been working together since 2010 to manage the underwater heritage and the marine environment in an integrated way. It is aimed that integrated management of the site will preserve the historical value of the WWII remains and rehabilitate the surrounding marine environment. Rehabilitation involves the establishment of coral gardens surrounding the wreckage of the aircraft.

My intention in this paper is to present the plans of the Ministry of Marine Affairs and Fisheries to recover the coral reef to a healthy condition, to protect the underwater cultural heritage (UCH) and to manage the area for reasonable use.

Introduction

Nowadays, the site popularly known as Catalina Wreck Site (CWS) has become one of the biggest attractions to tourists in the West Papua area. It was probably shot down by the Japanese during WWII when the islands of Biak were used as a base by both the USA and Japanese forces. The USA Air Force was based on Owi Island which is less than 10 nautical miles from the Island of Biak where the Japanese were stationed. The sunken aircraft is located between these two islands and is still intact because it is lying in relatively calm water which is only less than 30 meters deep.

In addition to the presence of the WWII remains, Biak waters have a variety of marine biodiversity. However, when the team from the Ministry of Marine Affairs and Fisheries conducted regular monitoring of the marine ecosystem they found severe problems with the underwater life and especially surrounding the CWS. It was assumed this was cased by destructive fishing activities including the use of dynamite. These activities have caused severe damage to the coral reefs, this has left only a remaining 20% healthy coral surrounding the entire Biak Island (Research Center for Maritime Territory and Non Living Resources 2006).

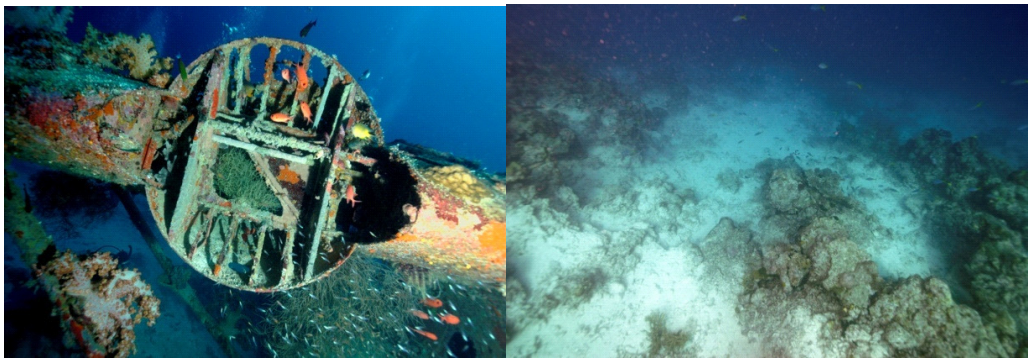

Figure 1. Catalina from the top part (left). General Condition of Coral Reefs Along the Site (right) (photographs taken by Cipto A.Gunawan, 2009)

Since 2010 the National and Local Government have attempted to manage the underwater resources in an integrated way. One long-term goal of the management is to set up the area as a Maritime Conservation Area within which the WWII remains and coral reefs would be managed and protected for reasonable use. The practical idea to remedy this particular marine ecosystem is to establish coral gardens. Other advantages of creating these artificial reefs are increasing local economic growth through creating a tourist attraction and raising the awareness of local people and to engender respect for their heritage as well as the marine environment.

On the other hand, based on regulations, extending some features surrounding cultural sites means changing the original landscape and this is prohibited. The Governmental Decree No.10/1993 chapter 29 on the Explanation of Law No.5/1992 of Cultural Protection Objects declared that the activities classified as damaging actions are reducing, extending, changing, moving and polluting a protected heritage, however, this policy is not set in stone, the other chapters (chapter 22 and 23) point out that in order to protect and maintain the cultural heritage, development is allowed with certain restrictions, taking consideration of the site and environmental boundaries. Moreover, this is reinforced by the new Law No.11/2010 on Cultural Protection, stating that in order to preserve its sustainability as well as to benefit the community; the development of cultural sites is permitted with strict terms and conditions.

Establishing a set of plans is a significant step in order to bridge the regulations, the protection of the CWS and the rehabilitation of the coral reefs. One of the plans is a zoning system. This is a spatial planning approach which divides areas into different zones based on their characteristics and functions. Jon Day (2002:141) pointed out that, “managing marine areas refers to the concept of ‘zoning’ to separate conflicting uses or to keep sensitive, ecologically valuable or recovering areas free from use”.

Examples of how to protect a cultural site can be found in the management of terrestrial heritage sites in Indonesia. For example, the Borobudur temple uses zoning plans and other policies on access to better control the impacts of humans or the environment on the site. This World Heritage Listed site is divided into the following five zones: Zone 1 is a strict protection zone at a radius of approximately 200m from the temple; Zone 2 is the

buffer zone established 500m from the core zone and open for visitors, facilities and the office; the other three zones, which are at a variety of radial, contain some protected cultural sites (Baiquni 2009).

In Indonesia zoning plans are popularly implemented for terrestrial archaeological sites, land and marine national parks, urban planning and other industries (such as mining). Implementation of this style of management to underwater cultural sites is indeed a new task to all parties, including the government. This country has a huge number of historical submerged sites which are supposed to be protected with the intention for long-lasting future existence and to be managed for its benefit to local communities. Therefore, establishing the plans for the site management is crucial to bring into an action. In this case the Catalina Wreck Site would be a pilot project.

"Zoning" is a popular term used for spatial planning. Act No.27/2007 on Management of Coastal Zone and Small Islands defined it as "a spatial engineering technique in dividing zones based on its resources and its "carrying capacity"", and zoning plan is a set of plans ruled whether the activities are allowed or not in the determined zones. Generally, it is divided into three areas: first, the core zone; and second, the protected area, aimed to preserve important objects or ecosystem; third, is a buffer or supporting zone. An example for Zone 2 is David.H. Williamson's (2004) Marine Park "no take" zone, it is a location allocated only for the preservation of marine biodiversity. In Borobudur Zoning Plans, this zone is multi-functional with particular restrictions located a half kilometer from the temple. It is almost the same as what Day (2002) pointed out about the buffer zone of the Great Barrier Reefs, in that it allows for commercial and recreational activities but restricts shipping, trawling, oil drilling and mining. The third zone is rehabilitation or development; according to the Ministerial Decree of Ministry of Forestry No.P.56/Menhut-II/2006, all rehabilitation activities such as recovering the devastated ecosystems are suggested for inclusion in this zone. Considering these regulations in managing the CWS and rehabilitating the marine ecosystem the following zoning model and coral reef recovering method is presented.

Zoning Plans

Zoning is a cornerstone of area management. The Great Barrier Reef is a remarkable example for its zoning plans. They are aimed to conserve, to regulate the use of the Marine Park while "allowing reasonable use, to regulate the activities that exploit the resources as well as to minimize the effect of those activities, to reserve the areas for public appreciation and enjoyment, and finally to preserve the resources in its pristine undisturbed condition except for the purposes of scientific research" (Kenchington 1990 in Day 2002). Zoning is also implemented to minimize conflict of use.

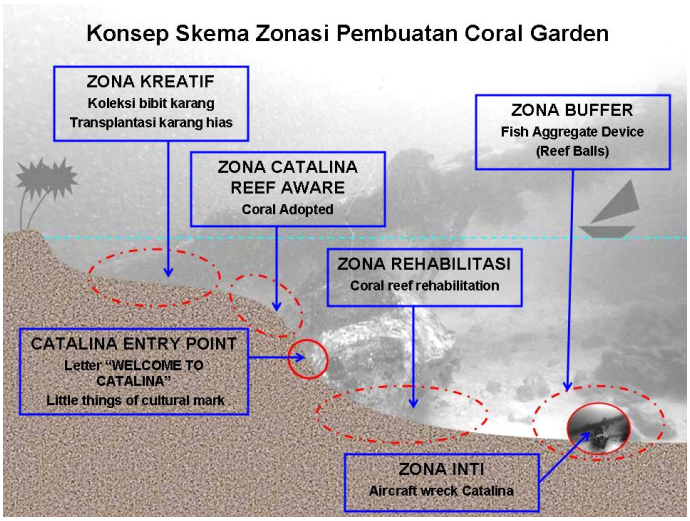

Figure 2. The sceme of coral garden (Designed by I Ketut Sudiarta)

There are three main objectives in the creation of zones in the CWS. Firstly, protect the underwater cultural heritage. Secondly, conserve the marine ecosystem. Thirdly, manage the reasonable use by visitors and local community. Table 1 (below) illustrates the zoning plans of CWS, divided into four major categories:

Table 1. Zoning Matrix of the CWS

Activities	Protection Zone	Buffer Zone	Rehabilitation Zone	Utilization Zone
Coral Transplantation	No	No	Yes	Yes
Diving	Yes	Yes	Yes	Yes
Coral Adopt	No	No	No	Yes
Memorial Stone	No	No	Yes	No

Notes:

- Protection Zone is the zone where the UCH "Catalina Wreck Site" is spotted. Strict entry for tourism is allowed in this area, however, fishing and all extensions such as establishing a coral garden are prohibited to a certain width. Strict entry means it is a "look but don't touch" zone, in which all forms of extraction (including fishing) are prohibited.
- Buffer Zone, in this area all activities are prohibited in the protection Zone. It provides support to the protection zone.
- Rehabilitation Zone is part of the area where the marine ecosystems are severely damaged and need to be recovered if it is to continue existence. In this area establishment of coral garden is part of the long-term plan.
- Utilization Zone. As it seen from the scheme above, this zone is divided into two parts, first is creative zone aimed at encouraging local communities to recruit and grow coral as an coral ornament for aquarium; the second is Catalina Reef Aware concerned in the persuation and introduction to tourists in the adoption of coral reefs.

Rehabilitation

William Precht (1998) mentioned two options of recovering coral reefs: first is rehabilitation, "enhancing natural recovery through substrate stabilization", and the second is restoration, which means, "reestablishing the structural, biological and aesthetical aspect of the reefs". Helen E. Fox, et.al (2005) suggested that rehabilitation is more practical and costs less than the restoration option.

Rehabilitation of the marine ecosystem is a recovery process of the damaged environment to revive its existence. However, restoring damaged coral reefs are complicated. Sometimes specific corals are unsuccessfully transplanted (Clark and Edwards 1995; Harriot and Fisk 1995; Edward and Clark 1998 in Fox, *et al.* 2005). There are some methods that have been implemented such as cultivation of coral gardens through transplantation (Harriot and Fisk 1995; Rinkevich 2000 in Fox, *et al.* 2005) and another different technique that accelerates the growth of recruited coral (Hilbertz 1992; Van Treeck and Schuhmacher 1997; Van Treeck and Schuhmacher 1999 in Fox, *et al.* 2005).

According to Mark Baine (2001) "rehabilitation" means creation of artificial coral reefs, protection of coastal areas, conservation of the sea life and providing new tourist attractions (which can generate market impacts to gain local economic growth). National Oceanic Atmospheric Administration (NOAA) (2007) guide states that,

> properly constructed, and strategically sited artificial reefs can enhance fish habitats, provide more access to quality fishing grounds, benefit fishermen and the economies of shore communities, increase total fish biomass within a given area, and provide managers with another option for the conservation and management of fishery resources.

The term rehabilitation can also be used in the sense to mitigate the loss of the habitats. James Spurgeon and Ulf Lindahl (2000) pointed out that "manipulation" of the coral habitat is a popular experimental option to manage and conserve coral reefs. Relocating and fixing it to the particular substrate is one of the methods to recover this habitat. However, policy of restoring or rehabilitating coral reefs should be standardized by the government. An example of which is what Ministry of Environment in Japan has done by arranging manual for restoration and remediation of coral reefs done by Japan Government (Ministry of Environment, 2004). In the USA, the government has developed an approach that considers biological and economic information to assess the significance of ecosystem restoration, known as Habitat Equivalency Analysis (HEA) (Unsworth and Bishop 1994; Milon and Dodge in press; Spurgeon and Lindahl 2000:132). NOAA's (2007) guideline established important aspects to consider in the success of artificial reefs "manipulation habitats" such as sitting, material and design, regulatory requirement, construction, management and liability.

In the CWS transplantation plans are based on the considerations of the ecosystem recovery, the opportunity to gain local economic growth and raising awareness of the local community, as well as protection of the UCH. The methods which are planned are divided into two major parts. **Firstly**, the Rehabilitation Base, which is located approximately at 15 to 20 meters depth.

This area has provided for a coral garden. The design is about block writing "CATALINA BIAK". This consists of two different parts and different material - block and writing. The block is formed by a hard structure, while the writing is from specific pipes (Term of Reference of Directorate of Coastal and Ocean Affairs 2010).

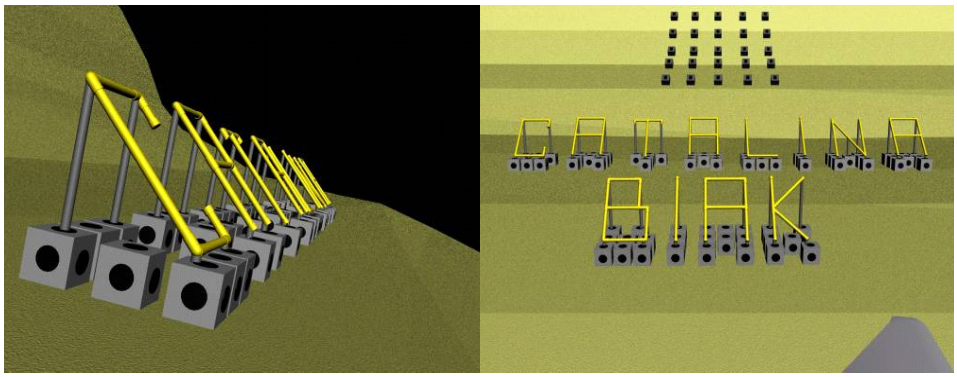

Figure 3. Models of the artificial reefs structure's block (designed by Dondy Arafat).

The transplant corals, which placed on the block, are taken from rare deep coral species that grow in Biak waters. The types of the species (*sp*) *(hard coral, soft coral dan googonian*) are *lobophytum strictum, Blastomussa sp*, *Caulastrea* sp, *Nepthea sp* (Research Center for Maritime Territory and Non Living Resources 2006). Secondly is the involvement of the community base which provides location of creative zone and adopt coral or Catalina Reef Aware to encourage people participating in planting corals. For example, in a creative area located in 3 – 5 m depth the local community is persuaded to grow various types of coral ornaments, which can be managed as an alternative livelihood. It also can generate an embryo or source of the next coral transplantation. However, in the Catalina Reef Aware Zone, located in 5 – 10 m, tourists are offered to buy recruited coral and tag their name in each as personal memories. This method was successfully implemented in Sanur – Bali (I Ketut Sudiarta, 2009). Additionally, as a tourist attraction, coral transplantation also reduces the strength of the coastal current in this area. It must be stated that remarkable achievement of coral rehabilitation could not be generalized due to the different conditions of each environment.

The coral reefs recovery program and the protection of the CWS have long-term targets to achieve. All above-mentioned plans are starting points in the recognition of the area as a Maritime Conservation Area.

Maritime Conservation Area

"Maritime Conservation Area" (MCA), is a title found in Ministerial Decree of Ministry of Marine Affairs and Fisheries No. 17/2008 concerning Conservation of Coastal Zone and Small Islands. It is defined as "certain area which legally stated to protect the existing traditional maritime custom and maritime archaeological

site which is closely related to the conservation of coastal and small islands". Basically, the concept is a similar to the Marine Protected Area (MPA) as a conservation tool in locations to limit public access in order to improve its sustainability. However, MPAs are mostly used to determine locations where fishing activities are socially and economically important (Sutton and Tobin 2004), while MCAs rely on the presence of the maritime heritage whether its tangible, such as coastal and underwater cultural sites, or intangible, for instance its traditional or local wisdom related to maritime aspects. According to the Ministerial Decree (2008), Maritime Conservation Area is classified into two categories; first is protected area of intangible maritime heritage, and the second is protected area of tangible maritime heritage. The CWS and the surrounding area's long term goals fall within the second category.

Establishing the MCA requires the following systematic stages (Figure 4):

- **collection of data** related to the biophysics of the area and the ecosystems, social economic and culture of the local community, local policies in order to support conservation program; collecting general data such as history, position and boundary of the site, providing thematic and bathymetric map of the site and the related area.
- **survey and significant assessment** aims to verify and collect data from the field, such as climate, coastal and oceanography, social economic of the community, infrastructures, cultural sites and urban development planning. Based on survey results and the available data, significance of the marine ecosystems, social economic and cultural aspects are assessed to measure the feasibility of the establishment of the MCA, as well as, the extent of coverage for the protected area;
- **public consultation** to obtain input from the local community, as well as to educate people about policy of the protection of the marine environment and UCH;
- **recommendation to the authority whether to endorse or not.**

All stages above are suggested be done or facilitated by local government who proposes the establishment of the maritime conservation area.

In the case of the long term five year program of the CSW, some stages such as collecting data were done in 2010 and the public consultation is planned in this year. However, the involvement of local community still needs to be refined.

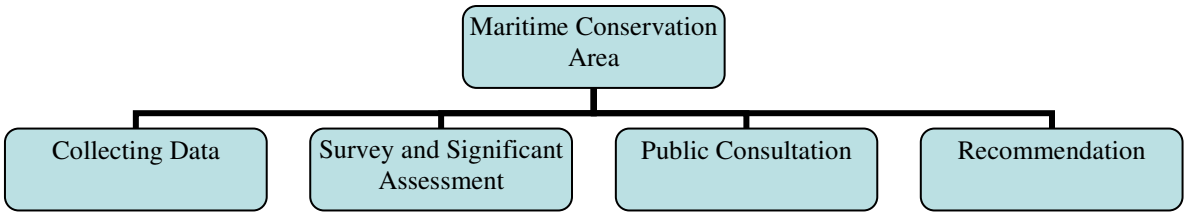

Figure 4. Diagram of the MCA systematic stages (Ministrial Decree 2008).

Conclusion

The purpose of the management of the CWS and its surrounding marine environment are to conserve its present state and to preserve its sustainability for future generations. Furthermore, the CWS is part of several significant sites in Biak Island related to the WWII. In consideration of the evidence provided in this paper one could conclude that regional protection is required in this area. However, the plan of this small project is expected more systematic than its current plan to provide an advanced management plan before establishing it as a MCA. Introducing the program to the local community and ensuring their involvement from the beginning should be integrated into part of the plans. Another concern is the arrangement of related guidelines such as artificial reef guidelines and diving in/on the UCH.

By managing WWII remains in Indonesia the country's officials can provide an opportunity for future WWII sites to establish mutual heritage center for WWII remains and conduct a heritage trail join-program between Asia Pacific countries to introduce the existences of the heritage, widely.

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