



# Management effectiveness of the Bunaken National Park, Indonesia

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**Abstract.** Conservation area management includes all systematic efforts, deliberate or not, undertaken by stakeholders in the management of coastal areas in a conservation area. The most useful way to assess management effectiveness is evaluation based on the achievement of objectives set by policies at the national, regional and site levels. The research objective was to evaluate the Bunaken National Park management effectiveness level based on the Management Effectiveness Tracking Tool (METT) and the Indonesian Management Effectiveness of Marine, Coastal and Small Islands Conservation Areas (E-KKP3K) criteria. This research was conducted from October 2019 to March 2020 in the Bunaken National Park. Data collection employed a triangulation technique with qualitative methods. Based on the METT and E-KKP3K analysis results, in 2019 the Bunaken National Park Agency had a METT score of 77% (good category), and was in the E-KKP3K Gold (independent) category. Community empowerment and engagement is important from ecological and economic aspects, especially as the communities were already living in and around the area before it was declared a marine conservation area. These communities should be seen as an asset whose presence can support the effective management of Bunaken National Park.

**Key Words:** marine protected area, management effectiveness tracking tool, E-KKP3K analysis, community engagement, marine conservation.

**Introduction.** Marine Protected Areas (MPAs) are widely considered as a solution to the problem of degradation of the aquatic environment (Abelson et al 2016; Brander et al 2020). To fulfil this role, they need to balance many ecological, economic and socio-cultural aspects in order to accommodate the desired improvements without substantial losses in any of these aspects (Hicks et al 2013; Berdej & Armitage 2016). This can be seen from studies such as that by Hastuty et al (2015), which show that conservation areas are useful in maintaining fish stocks and ecosystems, but there is also a need to improve the quality of life and the livelihoods of local people. There is frequently a dilemma in the management of marine conservation areas in balancing the conflicting interests of maintaining ecological integrity and the socio-economic effects on the community; this can lead to suboptimal performance in terms of management effectiveness and a lack of community support for the conservation area. In Indonesia it can be very difficult to protect areas that are used as fishing grounds, generally requiring the strict exertion of authority in order to maintain ecological condition and ensure compliance with conservation area regulations (Wiadnya et al 2011).

One of the best known marine conservation areas in Indonesia is the world-famous Bunaken National Park (BNP). This MPA includes several islands within the municipal area of Manado City, in particular Bunaken, Manado Tua, and Siladen Islands. The natural riches of the BNP include terrestrial, mangrove and seagrass habitats, sandy beaches, coral reefs and other marine habitats (Newman & LeDrew 2005). Many MPA management models have been applied, e.g. community-based management, integrated management, or top-down management, but none of these has provided a universal solution for MPA implementation and management. Ecotourism has also been proposed to support MPAs, and can be defined as nature-based tourism that makes a worthwhile

contribution to environmental sustainability, as well as generating economic and social benefits for local communities (Hoyt 2005; Krüger 2005; Aciksoz et al 2016).

Assessment of management effectiveness is important in order to improve the management of conservation areas. In order to evaluate MPA management effectiveness, several assessment stages are needed to measure the extent to which management has applied the agreed framework and to measure achievements with reference to the stated management objectives. Many methods have been developed for assessing the management effectiveness of conservation areas based on the International Union for Conservation of Nature (IUCN) criteria, in many parts of the world and for various purposes (Leverington et al 2010; Adimu et al 2018). These methods include the Management Effectiveness Tracking Tool (METT), the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM), the Enhancing our Heritage Toolkit (EoH), the Programa Ambiental Regional para Centroamérica (PROARCA)/Central American Protected Areas System (CAPAS) (PROARCA/CAPAS), and so on. While these methods adopt different approaches, they all aim to provide the same benefit, i.e. improve the management of conservation areas worldwide, including those in Indonesia (Leverington et al 2010; Widiyanto et al 2015). The research objective was to evaluate the management effectiveness level of the BNP based on analyses using two methodologies: the METT and the Indonesian Management Effectiveness of Marine, Coastal and Small Islands Conservation Areas (E-KKP3K).

## Material and Method

**Description of the study sites.** This research was conducted from October 2019 to March 2020. The analysis focused on the management authority of BNP, namely the Balai Taman Nasional Bunaken (BTNB). Balai is a term which does not translate readily into English, but this park authority is an operational unit reporting directly to the Ministry of the Environment and Forestry (MEF, Indonesian acronym KLHK). Data collection employed a triangulation technique based on qualitative methodologies. Two data analysis tools were used: the Management Effectiveness Tracking Tool (METT) developed by WWF (Stolton et al 2007) and adapted for Indonesia by the Ministry for the Environment and Forestry (Widiyanto et al 2015); and the Indonesian Management Effectiveness of Marine, Coastal and Small Islands Conservation Areas (E-KKP3K) methodology developed for and adopted by the Ministry for Marine Affairs and Fisheries (DKKJI-KKP 2012). The first step in both the METT and E-KKP3K analyses was to fill in the standardised data sheets with important information about the site, its characteristics and the management objectives. The second step was to fill in the assessment forms, which covered several sections of the METT and E-KKP3K indicators.

The BNP management effectiveness METT assessment assigned a category based on the scale in Leverington et al (2010) which defines three categories of management effectiveness: score < 33%: clearly inadequate; score 33-67%: basic (with major deficiencies if score < 50%); score > 67%: sound. The E-KKP3K management effectiveness comprises five colour-coded levels or ratings based on the scores for 17 criteria with 74 questions. From lowest to highest these are: Level 1 (Red), Level 2 (Yellow), Level 3 (Green), Level 4 (Blue) and Level 5 (Gold). A red rating means the conservation area has been initiated; a yellow rating means the conservation area has been established; a green rating means the area is managed at a minimal level; a blue rating means the area is optimally managed; and a gold rating means that the conservation area is independent.

## Results

**Management effectiveness tracking tools (METT) analysis.** The BNP is a priority area for the Indonesian National Park Office and is under the direct command of the Ministry of Environment and Forestry (MEF). The Park management authority (BTNB) has an obligation to perform an annual assessment of the management performance of the MPA using an analysis method determined by the MEF, i.e. the Indonesian version of the

Management Effectiveness Tracking Tool (METT) (Widiyanto et al 2015). In 2019, the assessment carried out by the BTNB resulted in an overall score of 77%, an increase compared to the 2017 score of 71%, in the Sound category (> 67%).

The score for each of the six components assessed in the 2019 METT analysis is the result of a comprehensive analysis looking at the strengths and weaknesses of the managing body as well as addressing and examining strategic issues arising with respect to the Bunaken National Park with respect to that component. Each of the six components assessed under the METT analysis was in the Sound category (Figure 1), indicating that management could be considered effective, if not optimal, in each of these dimensions.



Figure 1. METT component scores for the Bunaken National Park in 2019.

The Context component emphasizes the sound legal status of the MPA (Figure 2). The score of 81% for the Context component of the management effectiveness of Bunaken National Park is supported by the full legal status as a conservation area under Minister of Forestry Decree No. 730/KPpts-II/1991 dated 15 October 1991. In addition, the BNP has a zoning map which regulates land use, which was revised through Zoning Decree No. 126/KSDAE/SET/KSA.0/4/2019 dated 15 April 2019.

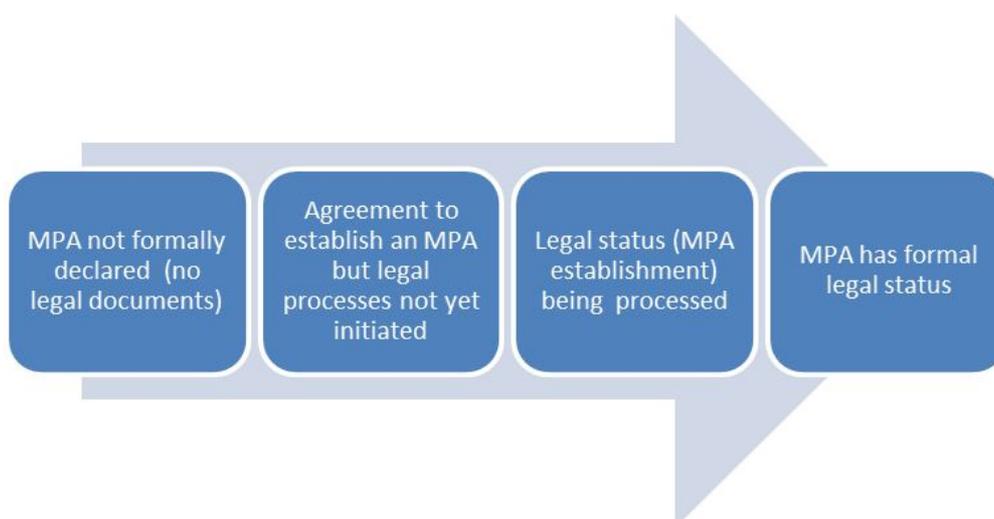


Figure 2. Assessment flowchart for the Context Indicator.

The maximum score for this component (100%) had not yet been achieved because there is an unresolved context-related problem regarding the demarcation of BNP

boundaries on the land areas of Bunaken Island and Manado Tua Island which is impeding the definitive determination of the BNP. In addition, there are issues regarding the gazettement of the MPA, with conflicts remaining over the Park boundaries between local communities, fishermen, local governments and the private sector.

The indicators for each of the other five components are shown in Figure 3. The Planning component had the highest total score (93%). This was supported by the goals/objectives agreed upon by BNP stakeholders; 2019 was the first year of implementing these management objectives. The BNP management plan also contains a Long-Term Development Plan (Indonesian acronym RPJP) for 2019-2028 in which the monitoring section pays attention to socio-cultural aspects, community and stakeholder representation, as well as a schedule for periodic monitoring and evaluation.

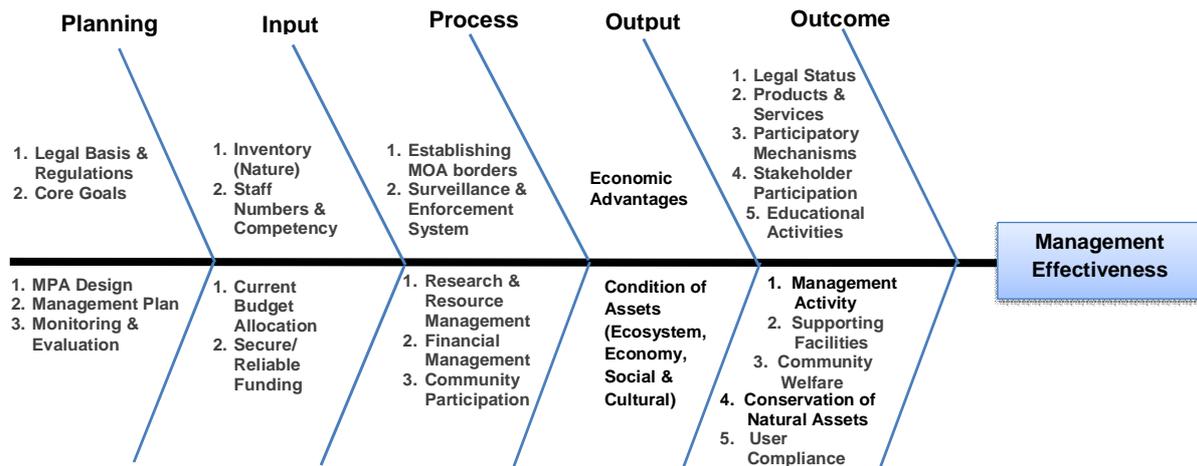


Figure 3. Assessment of planning, input, process, output and outcome indicators.

The Input component achieved a score of 71% which is considered to be sub-optimal. This relatively low value is one of the factors affected by the limited availability of human resources to cover the entire conservation area. Furthermore, the staff members were not well supported in carrying out management activities, as the equipment and facilities available were considered barely adequate or inadequate. In addition, the BTNB did not have up-to-date data on the condition of ecosystems and species or on the socio-economic and cultural conditions of coastal communities in the conservation area.

The Process component scored quite highly (80%), reflecting considerable management activity in this area. The score was based on evidence of co-operative agreements and activities such as the memorandum of understanding between the managers of BNP and the North Sulawesi Regional Government regarding support for the function of managing nature conservation areas, as well as a joint agreement between the BTNB and the Rector of Sam Ratulangi University to support academics conducting research and community service in the BNP. In addition, there were several partnerships with the private sector to support the development of nature-based tourism in the BNP.

The Output component achieved the same score (71%) as the Input component. Achievements due to implementation of elements of the BNP Master Plan included the improved legal status of the MPA, as boundaries had been fixed for two islands. There had also been a revision of zonation maps to accommodate the needs of park management and the interests of various stakeholders in terms of land use and activities within the MPA.

The Outcome component had the lowest score (70%), but was still in the Sound category. This score was based on the outcomes related to the BNP/BTNB management objectives mandated in the 2019-2028 Master Plan. In addition, the welfare of the communities living within the BNP had increased due to tourism activities in the park.

**Evaluation of management effectiveness of marine, coastal and small islands conservation areas (E-KKP3K).** The second method used to assess the MPA management effectiveness was that developed by the Indonesian Ministry of Marine Affairs and Fisheries, namely the Evaluation of Management Effectiveness of Marine, Coastal and Small Islands Conservation Areas (E-KKP3K) (DKKJI-KKP 2012). The E-KKP3K evaluation system is based on the principle of building blocks, which means that the next level cannot be achieved if the activities required at the previous level have not been completed (100% score). With this system, even though some criteria may get high scores, they cannot be used to determine the management status rating until the basic requirements for the lower levels have been met (Magfiroh et al 2020).

The E-KKP3K analysis for BNP was based on the answers to 74 questions and 17 indicators for which documentary evidence was available at the BTNB office in North Sulawesi. Management activities in the BNP have been going on for a long time, based on a Decree of the Minister of Forestry in 1991, and the management effectiveness of this MPA has now achieved Level 5 (gold), the highest level in the E-KKP3K assessment system (Table 1). This is because the BNP has been able to source independent funds in a sustainable manner from tourism activities in the conservation area.

Table 1

Block table assessment of the E-KKP3K level of Bunaken National Park

| <i>Level</i> | <i>Number of "Yes" replies</i> | <i>Number of questions</i> | <i>Percentage (%)</i> |
|--------------|--------------------------------|----------------------------|-----------------------|
| Red          | 8                              | 8                          | 100                   |
| Yellow       | 11                             | 11                         | 100                   |
| Green        | 21                             | 21                         | 100                   |
| Blue         | 29                             | 29                         | 100                   |
| Gold         | 6                              | 6                          | 100                   |

Source: Primary data, 2020 (after analysis).

Since the Bunaken National Park was established around three decades ago, it has become a prime tourist centre which is not only a prima donna for local and national tourists but also attracts many foreign tourists. One reason for this is the optimization of conservation activities. The BNP visitor data show that more than 10,000 overseas tourists visit the park every year. The ability of the BTNB to implement a system to obtain payment for the ecosystem services provided by the BNP to the tourism sector has had a positive impact on the management.

**Discussion.** The management effectiveness evaluation of the BNP using METT and the E-KKP3K analyses have similar objectives and indicators, covering management activities based on the managing body's annual performance report and other periodic reports. Analyses of MPA management effectiveness should be completed regularly in order to report and evaluate progress in conservation area management at regular intervals (Stolton et al 2007; Leverington et al 2010).

The METT and E-KKP3K categories achieved were Sound and independent status (Gold) respectively. These scores are a measure of the activities of the BTNB as the managing body. The METT and E-KKP3K have similar assessment indicators with respect to inputs, comprising everything needed during the management process to help achieve management objectives. Assessment of the conservation area management effectiveness using METT and E-KKP3K analyses does not comprehensively describe or take into account some cross-cutting priority management issues. Important considerations in assessing conservation area management include three key aspects: ecological, social and economic (Pelletier et al 2005). However, the concentration of the two methods on the management system and the legal basis does not enable the assessments to present a holistic and representative picture reflecting the ecological, social and economic aspects.

Similarities between the assessments of BNP using the METT and E-KKP3K analyses include assessment patterns which emphasize the performance of the managing body, in this case the BTNB. A visual representation of the relationship between the assessments (Figure 4) highlights the way in which the conservation area management effectiveness assessment using both METT and EKKP3K analyses only focuses on the performance of the National Park Office as the main object of the assessment. The objectives of both METT and EKKP3K analyses both relate to conservation area status, suitability in terms of compliance with existing regulations, the availability of human resources, program efficiency and appropriateness. Thus, the management effectiveness evaluations only reflect the role of conservation area managers and their ability to meet performance criteria (outputs) without measuring the ecological and social aspects, in particular the economic welfare of the local communities.

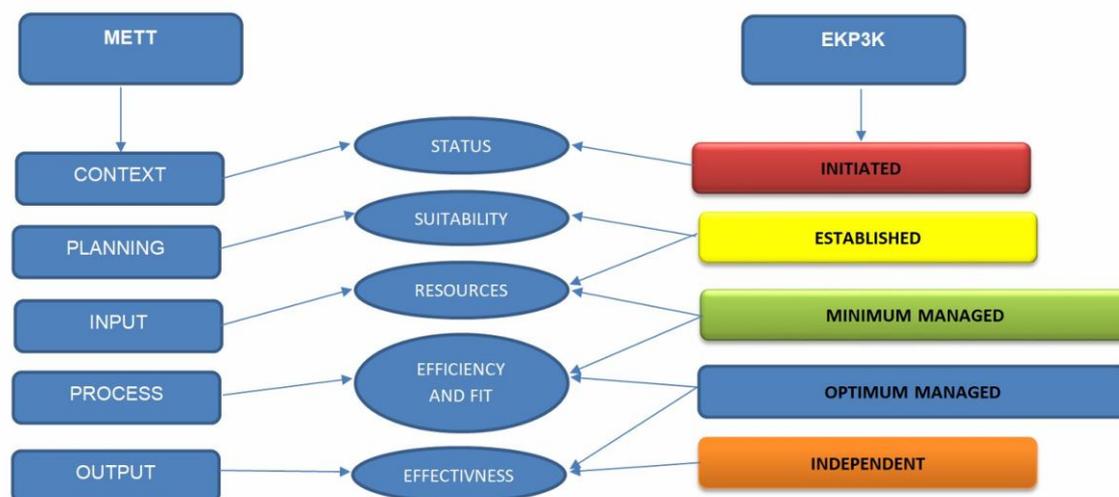


Figure 4. Conceptual relationship between the METT and E-KKP3K analyses.

Hockings et al (2006) describe conservation area management as a cycle and identify six key elements of the management process. An assessment of these six key elements is necessary to understand the effectiveness of management as actually implemented. Design of a conservation area includes the size and shape of the area, buffer zones and corridors, ecological representation, and the suitability of the area for the anticipated MPA functions. Feasibility of the management system and processes includes the ways in which management activities are carried out and how the system responds to challenges which arise; important aspects include planning, training and capacity building, community relations and management implementation. Meanwhile, services from the conservation area reflect the achievement of predetermined goals, from both biological and social aspects (McLeod et al 2009).

There are four assessment component groups of concern in assessing the strength of “inputs” in conservation area management, namely: staff, communications, infrastructure, and finance. Assessment of management performance must be complete and comprehensive, starting from the status of the natural assets being managed, planning, resources, processes, outputs, and outcomes. The criteria chosen for each component are key factors for the component in question. Simplified indicators of assessment can be compiled from an indicator that can describe the efforts that have been made; for example, starting from under consideration to planned, being implemented, to the outcomes achieved.

Management priorities must be implemented with reference to the importance of biological and socio-economic issues, as well as the pressures and threats experienced by each conservation area. Setting these priorities is very complex because the status of each conservation area is different from many aspects, such as socio-economic conditions, biological importance, threats and pressures, and management effectiveness.

Current policies and laws affecting marine protected areas should be described in terms of their relation to management and outcomes in the field (Agardy 2000; Kenchington et al 2003; Arceo & Granados-Barba 2010).

Magfiroh et al (2020) studied the effectiveness of the Karimunjawa conservation area using not only METT and E-KKP3K analyses but also a management effectiveness analysis following the COREMAP II LIPI guidelines on assessment indicators for ecological aspects and an Analytic Network Process (ANP) analysis with assessment indicators on economic, social and institutional issues. Hockings et al (2006) describe managing a conservation area in an adaptive management cycle, identifying six key elements in the management process which need to be assessed in order to understand the effectiveness of management implementation. The design of the conservation area includes the size and shape of the area, management of the buffer zone and corridors, ecological representation, and the fitness of the area for carrying out its designated functions. The viability of the management system and processes includes how management is carried out and responds to challenges which occur, from the aspects of planning, training and capacity building, public relations and management implementation. Meanwhile, the provision of services by the conservation area refers to the extent to which the biological and social goals that have been set are achieved (McLeod et al 2009).

Community involvement using an empowerment approach is important considering that human communities have lived in and around the BNP since long before the conservation area was established. Therefore, it is impossible to ignore the presence of these communities in conservation area management, given their high level of interaction with, understanding of and dependence on the seas and marine resources within the conservation area. The presence of these communities can be an asset, supporting the effective management of BNP Bunaken. These small communities with a strong sense of ownership need to be assessed and to have a high level of participation in decision-making processes (Rodríguez-Martínez 2008; Barnes-Mauthe et al 2015).

**Conclusions.** The management effectiveness of the Bunaken National Park (BNP) as a conservation area scored 77% in 2019 based on an analysis using the Management Effectiveness Tracking Tool (METT) criteria. The management component with the lowest score was Outcome (70%), followed by Input and Output (both 71%), while Planning had the highest score (93%) followed by Context (81%). Planning The Indonesian Management Effectiveness of Marine, Coastal and Small Islands Conservation Areas (E-KKP3K) category was Gold (independent status). The intensity of fisheries sector development in the BNP conservation area is putting heavy pressure on coastal and marine resources, potentially jeopardising sustainability. However, the results of the management effectiveness analysis seem to justify hope with respect to the future of the BNP, both in terms of the survival of the bioecological environment and the provision of long-term benefits for the human communities in and around the MPA.

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## References

- Abelson A., Nelson P. A., Edgar G. J., Shashar N., Reed D. C., Belmaker J., Krause G., Beck M. W., Brokovich E., France R., Gaines S. D., 2016 Expanding marine protected areas to include degraded coral reefs. *Conservation Biology* 30(6):1182-1191.
- Aciksoz S., Bollukcu P., Celik D., 2016 Ecotourism and ethics in protected areas: Bartin-Sogutlu village. *Oxidation Communications* 9:3621-3636.
- Adimu H. E., Boer M., Yulianda F., Damar A., 2018 Review management policy marine conservation area of Wakatobi National Park. *IOP Conference Series: Earth and Environmental Science* 176:012035.

- Agardy T., 2000 Information needs for marine protected areas: scientific and societal. *Bulletin of Marine Science* 66(3):875-888.
- Arceo P., Granados-Barba A., 2010 Evaluating sustainability criteria for a marine protected area in Veracruz, Mexico. *Ocean and Coastal Management* 53(9):535-543.
- Barnes-Mauthe M., Oleson K. L. L., Brander L. M., Zafindrasilivonona B., Oliver T. A., van Beukering P., 2015 Social capital as an ecosystem service: evidence from a locally managed marine area. *Ecosystem Services* 16:283-293.
- Berdej S., Armitage D., 2016 Bridging for better conservation fit in Indonesia's coastal-marine systems. *Frontiers in Marine Science* 3:00101.
- Brander L. M., van Beukering P., Nijsten L., Mcvittie A., Baulcomb C., Eppink F. V., van der Lelij J. A. C., 2020 The global costs and benefits of expanding marine protected areas. *Marine Policy* 116:103953
- DKKJI-KKP, 2012 Pedoman Teknis Evaluasi Efektivitas Pengelolaan Kawasan Konservasi Perairan, Pesisir dan Pulau-Pulau Kecil (E-KKP3K). Direktorat Konservasi Kawasan dan Jenis Ikan, Direktorat Jenderal Kelautan, Pesisir dan Pulau-Pulau Kecil, Kementerian Kelautan dan Perikanan, Jakarta. 82 pp. [in Indonesian]
- Hastuty R., Adrianto L., Yonvitner, 2015 Kajian Manfaat Kawasan Konservasi Bagi Perikanan Yang Berkelanjutan di Pesisir Timur Pulau Weh. *Jurnal Teknologi Perikanan dan kelautan* 6(1):105-116. [in Indonesian]
- Hicks C. C., Graham N. A. J., Cinner J. E., 2013 Synergies and tradeoffs in how managers, scientists, and fishers value coral reef ecosystem services. *Global Environmental Change* 23(6):1444-1453.
- Hockings M., Stolton S., Leverington F., Dudley N., Courrau J., 2006 Evaluating effectiveness: a framework for assessing management effectiveness of protected areas. 2<sup>nd</sup> edition. IUCN, Gland, Switzerland and Cambridge, UK. xiv + 105 pp.
- Hoyt E., 2005 Sustainable ecotourism on Atlantic islands, with special reference to whale watching, marine protected areas and sanctuaries for cetaceans. *Biology and Environment: Proceedings of the Royal Irish Academy* 105B(3):141-154.
- Kenchington R., Ward T., Hegerl E., 2003 The benefits of marine protected areas. Commonwealth of Australia, Department of Environment and Heritage, Kingstone, Australia, 24 pp.
- Krüger O., 2005 The role of ecotourism in conservation: panacea or Pandora's box? *Biodiversity and Conservation* 14:579-600.
- Leverington F., Costa K. L., Courrau J., Pavese H., Nolte C., Marr M., Coad L., Burgess N., Bomhard B., Hockings M., 2010 Management effectiveness evaluation in protected areas - a global study. Second edition, The University of Queensland, Brisbane, Australia, 87 pp.
- Magfiroh A. N., Zairion, Fahrudin A., 2020 Strategi peningkatan efektivitas pengelolaan Kawasan Konservasi Taman Nasional Karimunjawa. *Jurnal Ilmu dan Teknologi Kelautan Tropis* 12(2):369-383. [in Indonesian]
- McLeod E., Salm R., Green A., Almany J., 2009 Designing marine protected area networks to address the impacts of climate change. *Frontiers in Ecology and the Environment* 7(7):362-370.
- Newman C. M., LeDrew E., 2005 Towards community- and scientific-based information integration in marine resource management in Indonesia: Bunaken National Park case study. *Environments Journal* 33(1):5-24.
- Pelletier D., García-Charton J. A., Ferraris J., David G., Thébaud O., Letourneur Y., Claudet J., Amand M., Kulbicki M., Galzin R., 2005 Designing indicators for assessing the effects of marine protected areas on coral reef ecosystems: a multidisciplinary standpoint. *Aquatic Living Resources* 18:15-33.
- Rodríguez-Martínez R. E., 2008 Community involvement in marine protected areas: the case of Puerto Morelos reef, México. *Journal of Environmental Management* 88(4):1151-1160.
- Stolton S., Hockings M., Dudley N., MacKinnon K., Whitten T., Leverington F., 2007 Management effectiveness tracking tool: reporting progress at protected area sites. Second edition, Gland: WWF International, 22 pp.

- Wiadnya D. G. R., Syafaat R., Susilo E., Setyohadi D., Arifin Z., Wiryawan B., 2011 Recent development of marine protected areas (MPAs) in Indonesia: policies and governance. *Journal of Applied Environmental and Biological Sciences* 1:608-613
- Widiyanto A., Sutito A. B., Abidah, Yasin A., et al., 2015 Pedoman penilaian efektivitas pengelolaan kawasan konservasi di Indonesia: management effectiveness tracking tool. Direktorat Jenderal Konservasi Sumber Daya Alam dan Ekosistem Kontributor, 98 pp. [in Indonesian]

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