

Status and Conservation Strategy of Mangrove Ecosystem In Indonesia

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Study Case: Mangrove Ecosystems in Balikpapan Bay East Kalimantan

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Indonesia

STATUS AND CONSERVATION STRATEGY OF MANGROVE ECOSYSTEM IN INDONESIA

Case Study: Mangrove Ecosystem in Balikpapan Bay East Kalimantan

National Policy for Mangrove Ecosystem Management

Mangroves are an ecosystem that occupies the coastal area and small islands in Indonesia. It has a prominent role in mitigating global climate change, and its existence needs to be protected. So far, governance for the mangrove ecosystem has not been handled properly, not well planned, and not involving the cross-sectoral government. No wonder mangrove has not been a central issue of the environment in national-sub national development plans, even though mangroves contribute almost a quarter of the world's mangrove area (Murdiyarso et.al 2015). In 2017, the government released information that said the mangrove area in Indonesia is 3.49 million hectares in Indonesia and 1.82 million hectares of which are damaged ecosystems and need to be restored (Table 1).

Table 1. Target area for mangrove ecosystem restoration in Indonesia¹

No	Year	The area for mangrove in good condition (Millions Ha)
1.	2017	1.69
2.	2019	1.75
3.	2024	1.95
4.	2029	2.27
5.	2034	2.69
6.	2039	3.15
7	2044	3.47
8.	2045	3.49

Source: MoEF 2017

¹ MoEF Data on the Coordinating Ministry for Economic Affairs Ministerial Decree No. 4/2017 on Policy, Strategy, Programs, and Performance Indicators of National Mangrove Management

In 2012 a policy on mangrove ecosystem management was set by President Susilo Bambang Yudhoyono through the Presidential Decree No. 73/2012 on National Strategy of Mangrove Ecosystem (SNPEM). SNPEM was set as a government effort through policies and programs to achieve sustainable mangrove management and prosperous community based on available resources. This policy is an integral part that is interrelated and cannot be separated from the national and sub-national development planning systems. As well as a breakthrough for the weak support of development so far towards the protection of mangrove ecosystems in Indonesia.

The importance of mangrove ecosystem roles becomes a major consideration for mangrove ecosystem management in Indonesia to be managed sustainably and has a positive impact for the community, therefore, mangrove ecosystems can improve the community welfare in coastal areas and small islands in Indonesia. Sustainable mangrove ecosystem management itself is defined as all efforts to protect, preserve and sustainably use them through an integrated process to achieve sustainable mangrove ecosystem functions for community welfare.

The purpose of the SNPEM as the effort to synergize mangrove ecosystem management policies and programs covering the fields of ecology, socio-economy, institutions, and laws and regulations to ensure the function and benefits of the mangrove ecosystem managed sustainably for community welfare. The management of mangrove ecosystems must be integrated (upstream-downstream, seascape-landscape) so that coordination, integration, synchronization and synergy between sectors, agencies and institutions is required. The key to the successful implementation of SNPEM is closely related to the authorities and relations of the Central Government, Local Government, society in a broad sense (upstream-downstream) and entrepreneurs, to policies and programs that have the potential to impact the existence of mangrove ecosystems in Indonesia. Implementation of SNPEM refers to a). The National Long-Term Development Plan (RPJPN) and the National Medium-Term Development Plan (RPJMN); b). Regional Spatial Planning (RTRW); c). National Level Forestry Plan (RKTN); and d). Coastal Zone and Small Islands Management Plan (RPWP3K).

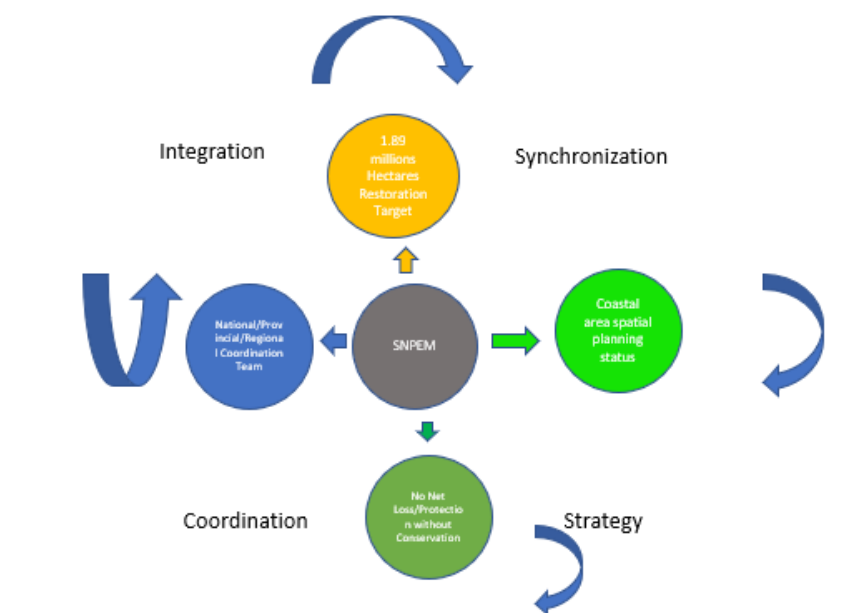


Figure 1. Infographic overview of SNPEM in Indonesia

President has determined the direction of SNPEM policy as stipulated in Presidential Decree No. 73/2012 as follows:

1. Control of the use and conversion of mangrove ecosystems with the principle of sustainability (no net loss).
2. Increasing the function of mangrove ecosystems in protecting biodiversity, protecting coastlines and coastal resources and increasing the products produced as a source for state and community income.
3. Mangrove ecosystem management as an integral part of integrated coastal area management and integrated watershed management.
4. Political commitment and strong support from the National Government, Sub-national Government, and parties.
5. Vertical and horizontal coordination and cooperation between agencies and related parties to ensure the implementation of the national strategic policy for mangrove ecosystem management.
6. Community-based management of mangrove ecosystems to enhance and conserve important ecological, economic and socio-cultural values, to increase community income and support sustainable development.
7. Increasing the capacity of Sub-national Governments in exercising their authority and obligations for mangrove ecosystem management under local conditions and aspirations.
8. Development of research, science and technology and information systems needed to strengthen sustainable management of mangrove ecosystems.
9. Mangrove ecosystem management through a partnership pattern between the government, sub-national governments, businesses and communities with the support of international institutions and communities, as part of an effort to achieve the global environmental commitment.

SNPEM stipulated in this Presidential Regulation, should be the direction for derivative technical policy products and mandatory as an effort to integrate planning systems at the national and sub-national levels. And Ministers, Governors and Regents / Mayors must translate them into planning and programs that do not conflict with or damage the existing ecosystem (no net loss). So that the implementation of development planning at the sub-national. field level is expected to be able to minimize the bad impact on the existence of the mangrove ecosystem. Further explanation regarding the SNPEM policy can be seen in Annex 1.

In order to implement SNPEM in Indonesia, a National Coordination Team for Mangrove Ecosystem Management was established. This Coordination Team consists of Mangrove Ecosystem Steering and Implementer. The tasks of the Steering Team are (a) provide direction of policy formulation, strategies, programs and performance indicators for mangrove management; (b) establish policies, strategies, programs and performance indicators for mangrove management. Meanwhile, the tasks of the Implementation Team are (a) formulating policies, strategies, programs, and performance indicators for mangrove management; (b) coordinate the implementation of SNPEM which involves planning, management, guidance, control, supervision, reporting and outreach; and (c) coordinate the preparation of financial / budget support for the implementation of SNPEM.

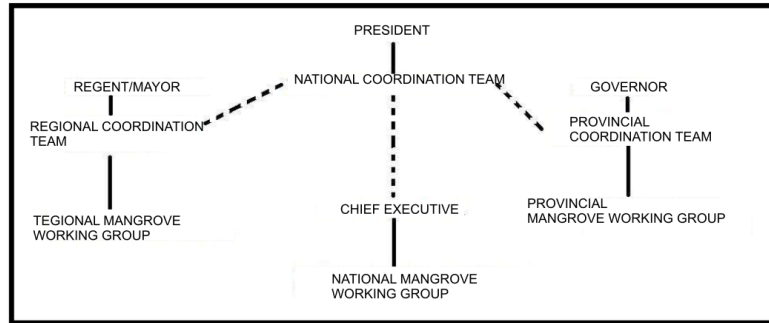


Figure 2. SNPEM working structure in Indonesia

To see the reality of the implementation of SNPEM policies in the regions, then FWI digs up data and information as well as facts in the field by conducting a case study on the mangrove ecosystem of Balikpapan Bay in East Kalimantan Province. There are several things to consider when choosing the Balikpapan Bay mangrove ecosystem as the study area. First, Balikpapan Bay is a landscape that has a large mangrove ecosystem cover. This ecosystem is an important habitat for protected terrestrial and aquatic animals in Indonesia which are under threat due to spatial planning and misallocation of functions. Second, since 2016, FWI and regional partners have had social modalities with several achievements, as an effort to protect coastal areas and small islands in Balikpapan Bay. One of them initiated Jangkar Mangrove as a community network for mangrove monitoring. Then the protection efforts initiated by this CSO became even more real, with the recommendation of the Mayor of Balikpapan who proposed Balikpapan Bay as a conservation area. Third, the current position of Balikpapan Bay has become the binding point and environmental center for the development of the new capital city, which is located in 3 administrative regions at once, namely Penajam Paser Utara Regency, Kutai Kartanegara Regency and Balikpapan City.

The current management of the mangrove ecosystem in Balikpapan Bay has not yet reflected the implementation and compliance of SNPEM in the regions. Mangrove ecosystems are not managed, without planning and institutions and tend to be destroyed for the sake of development. Massive conversion of mangrove ecosystems into developed land has been and is taking place. It is feared that this situation will diminish the important functions of the mangrove ecosystem (ecological, social, economic). The socio-economic life of the coastal community is being threatened and it keeps them away from the prosperity they aspire to. And therefore, SNPEM is important to be implemented through strong coordination, integration, synchronization and synergy between the Government and the Provincial Government of East Kalimantan in managing coastal ecosystems, small islands, marine waters, especially for the mangrove ecosystem in Balikpapan Bay.

Status and Condition of Balikpapan Bay Mangrove Ecosystem

The Overview of Balikpapan Bay

East Kalimantan is one of the provinces that stores forest resources and diversity of flora and fauna including marine biodiversity. Balikpapan Bay is one of the important seascapes in East Kalimantan Province. Ecologically, Balikpapan Bay has high biodiversity because it is the estuary of several rivers from 3 regencies/cities, i.e. Penajam Paser Utara Regency, Kutai Kartanegara Regency, and Balikpapan City which still have rich mangrove ecosystems. Located in the southern part of the Mahakam Delta, the Balikpapan Bay mangrove ecosystem is a habitat for several protected species such as proboscis monkeys (*Nasalis larvatus*) (Toulec 2018), irrawaddy dolphin (*Orcaella brevirostris*) (Prayoga 2014), and Dugong (Dugong dugon) (RASI 2003). Several other important wildlife species such as the Green Turtle (*Chelonia mydas*) and Crocodile (*Crocodylus* sp.). It makes Balikpapan Bay a feeding ground. The role of the mangrove ecosystem is as habitat for various important protected wildlife because it provides a healthy environment and an abundant source of food. No wonder the mangrove ecosystem is also an important area for fishermen to catch fish (fishing ground) so that it becomes a space for coastal communities' livelihood. The mangrove ecosystem in Balikpapan Bay is an important area not only for its ecological function but also as a source of livelihood for coastal communities.

Based on the results of the analysis results conducted by FWI in 2018, the area of natural forest cover in the mangrove ecosystem in Balikpapan Bay is around 16,831 hectares, which are spread along the downstream side of the river. The mangrove ecosystem in Balikpapan Bay is under threat due to the spatial allocation on the regional planning and the massive expansion of forest and land-based company concessions. Almost 100 per cent of the mangrove ecosystem area is for a cultivation function. And in the future, it can be ascertained that Balikpapan Bay will lose its mangrove ecosystem if the planning is carried out. Therefore, it is urgent to increase the protection status of the mangrove ecosystem in Balikpapan Bay. On the other hand, it is necessary to integrate SNPEM into regional planning such as the East Kalimantan Provincial Regulations for Spatial Planning and Territory (*Rencana Tata Ruang Wilayah*, RTRW), Provincial and District Medium-Term Development Plans and regional agency plans to be in line with national policy. Concerning the SNPEM policy as a direction in the management of the mangrove ecosystem in Balikpapan Bay, its implementation is confronted by the strong sectoral ego of the Sub-national Government in preparing and planning the regional development. Since the SNPEM was issued, the Sub-national Government has not responded to this policy direction. The Sub-national Government did not take the initiative to form a Mangrove Working Group as part of the National Coordinating Team for mangrove ecosystem management to contain the increasing rate of damage as more land was built.

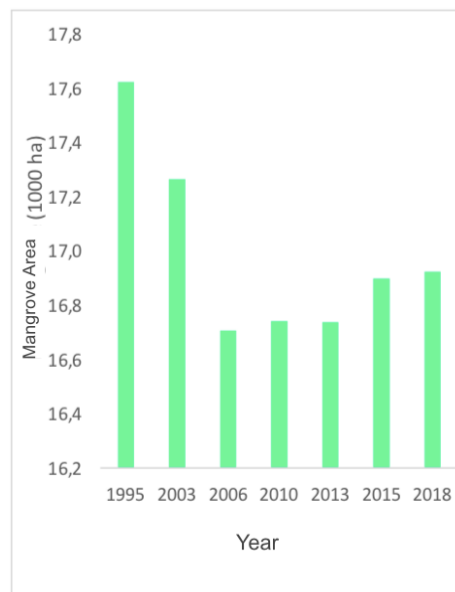
Changes in Balikpapan Bay Mangrove Ecosystem Cover

The availability of data and information is important as a baseline of the mangrove ecosystem condition monitoring to see the changes of mangrove cover. Data on the area of mangrove ecosystem cover in Balikpapan Bay can be recorded as a starting point (t₀) through the availability of satellite imagery data in 1995, which is also the easiest to analyze visually. The results of the analysis conducted by FWI in 1995, the area of the mangrove ecosystem in Balikpapan Bay was

17,620 hectares, then it continued to decline in 2006 up to 16,706 hectares or lost nearly 1,000 hectares of the mangrove ecosystem in 11 years. Until 2018, the remaining mangrove ecosystem was 16,831 hectares (Figure 4).

The available mangrove ecosystem cover area data is a result of the incidence of addition and reduction of mangrove cover area values during the analysis period (Figure 5). The reduction in the area of the mangrove ecosystem has been identified as part of anthropogenic (human-made) factors such as industrial development along the coast of the bay which is carried out by changing the color of the mangrove ecosystem into built-up lands such as industrial ports (power plants, coal, loading and unloading of goods), port of people, and palm oil processing plants. The conversion is permanent, so it is not possible to restore it.

Meanwhile, the increase of the mangrove ecosystem is more due to natural factors. Naturally, the increasing of the mangrove ecosystem area is highly dependent on the sea level that supplies sediment as a growing medium for mangroves, so that mangroves can adapt to rising water levels by moving or growing towards the land and occupying the remaining wetlands (Feller et.al. 2019)².



Source: FWI Analysis in 2018

Figure 3. Fluctuation graph for the increasing and losing of mangrove ecosystem in Balikpapan Bay

² Analysis conducted in Florida and Mexico Bay

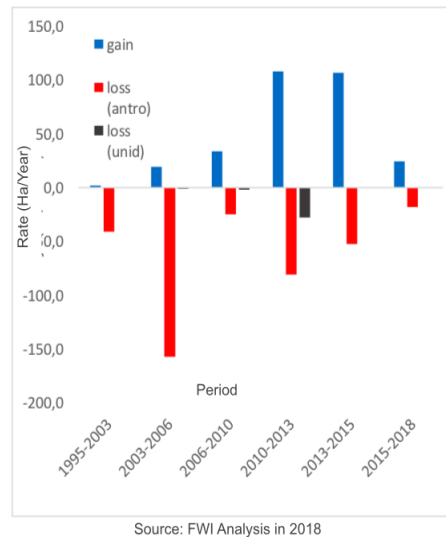


Figure 4. Graph of the rate of addition and loss of mangrove ecosystems during the 1995-2018 period

Spatial Planning for Mangrove Ecosystem in Balikpapan Bay

Spatial planning as described in Law Number 26/2007 for Spatial Planning is a system of spatial planning, space utilization and control for spatial utilization. One of the goals of spatial planning is the realization of spatial function protection and prevention of negative impacts on the environment due to spatial utilization. The Regional Government of East Kalimantan Province as an institution that has the authority to carry out spatial planning has issued East Kalimantan RTRW Regulation No.1 of 2016 and divides functions in its administrative areas into cultivation areas and protected areas.

FWI analyzed the Balikpapan Bay mangrove ecosystem in the spatial pattern of East Kalimantan Province to see the existence of the mangrove ecosystem and its spatial change plan. The result of overlaying between the mangrove ecosystem area in Balikpapan Bay with the spatial pattern of East Kalimantan Province RTRW shows that the spatial designation in the mangrove ecosystem area in Balikpapan Bay is divided into Protected Forests, Convertible Production Forests, Permanent Production Forests, Industrial Areas, Inland Tourism Areas, Fisheries Areas, 12 mile Sea Area, Plantations, Settlements, and Food Crops and Horticulture. Almost 100 per cent of the space allocated for the mangrove ecosystem is for cultivation functions.

From a total area of 16,831 hectares of mangrove ecosystems in the surrounding Bay of Balikpapan, almost all of them are for cultivation areas. The largest mangrove area in Balikpapan Bay is designated for plantation areas of around 6,470 hectares, fishery areas covering 4,012 hectares, permanent production forests of around 3,474 hectares, and 1,619 hectares of industrial areas (see Appendix 2).

This illustrates the threat status of the mangrove ecosystem in Balikpapan Bay. The spatial planning of the Balikpapan Bay mangrove ecosystem as stipulated in the 2016 East Kalimantan RTRW Provincial Regulation shall allocate as much as possible for cultivation activities. This

means that the support for the protection of the mangrove ecosystem in Balikpapan Bay is very low.

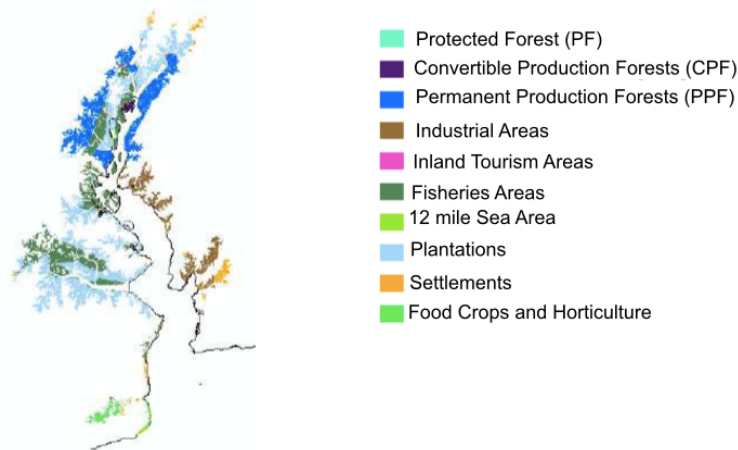


Figure 5. The distribution of mangrove ecosystems in Balikpapan Bay in the 2016 RTRW of East Kalimantan Province for Spatial Pattern

Spatial Planning for Disaster Situation in Balikpapan Bay

The Provincial Government of East Kalimantan Province has carried out spatial planning for the coastal area in line with the Provincial Regulation issued in 2016 concerning the RTRW of East Kalimantan Province. Spatial planning itself as described in Law Number 26/2007 on Spatial Planning, is prepared with the intention of considering disaster situations to improve efforts for safety, life and community livelihoods. Therefore, existing spatial planning should be designated for disaster mitigation. As well as the function of protected areas, to reduce the impact of natural disasters. Unfortunately, this does not apply to Balikpapan Bay. The existing spatial planning attempts to change the existence and function of the mangrove ecosystem as protection from tidal waves and flood into exploitative spaces.

The results from the FWI analysis in 2018 of the East Kalimantan Province RTRW map with a flood hazard index for the Balikpapan Bay coastal area reached an index value of 0.75. Spatial allocations that in this category include the areas that are designated for plantation, permanent production forests, convertible production forests, settlements, fishery areas, industrial areas, and food crops and horticultural areas. An index value above 0.5 can be categorized as a high flood hazard zone. The flood hazard index shows the probability of flooding in Balikpapan Bay based on the high frequency of flood events in the past. This means that the coastal area of Balikpapan Bay has often been exposed to floods in the past time.

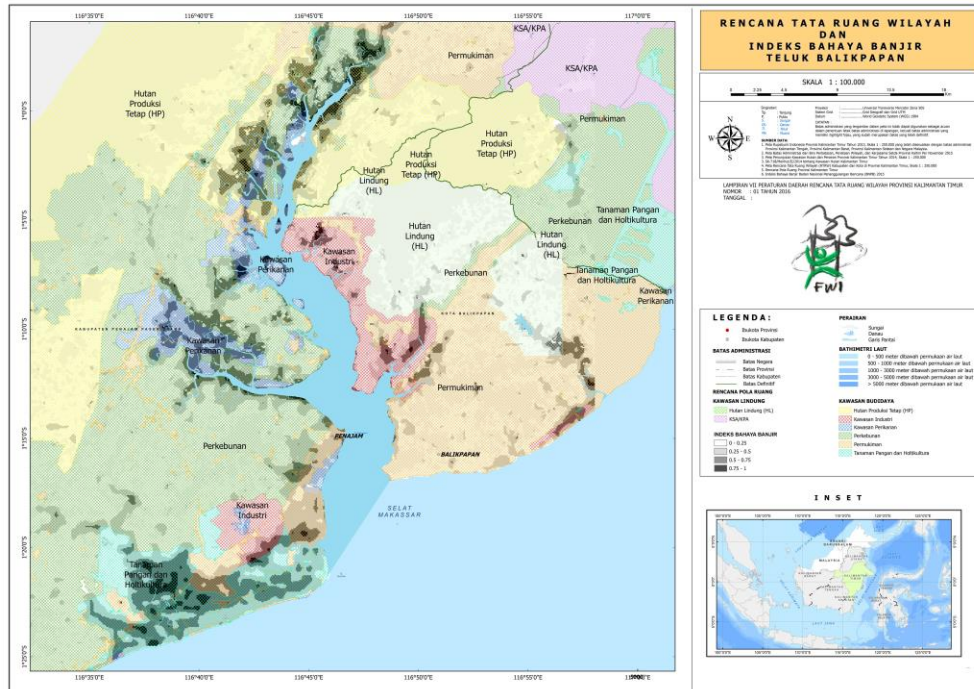


Figure 6. East Kalimantan Province RTRW map with flood hazard index

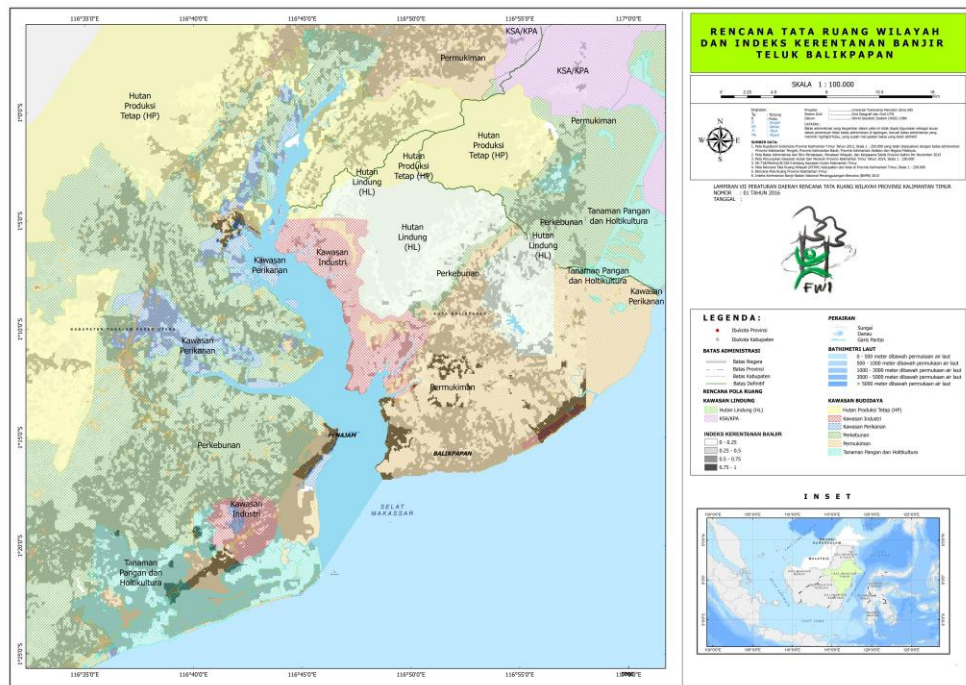


Figure 7. East Kalimantan Province RTRW Map with Flood Vulnerability Index

In addition, FWI also analyzed the relationship between the East Kalimantan Province RTRW and the flood vulnerability index to get an overview of information about the spatial allocation and the level of flood possibility. The results show that the flood vulnerability index

values with a value 0.25 to 0.75 (Figure 7) are scattered on the coast of Balikpapan Bay with spatial allocations for plantation areas, fisheries areas, limited production forests, convertible production forests, and industrial areas. Index values above 0.5 for the category of high flood vulnerability zones. Which means, there is a high probability that the area will be flooded if the rainfall exceeds the normal conditions.

In analyzing disasters, the results of the analysis on the flood hazard index value and the flood vulnerability index value cannot be separated. The occurrence of a disaster can be identified by multiplying the two indexes. Disasters are most likely to occur when the flood hazard index value and the flood vulnerability index value show high values. This means that historically this area is a flood-prone area (high hazard index) and the physical condition of the area is currently very likely to occur flood (high vulnerability index).

The results of the analysis between the flood hazard index and the flood vulnerability index with the East Kalimantan RTRW map show that Balikpapan Bay is one of the areas most likely to have flood occurrence. Unfortunately, when the direction of the spatial planning on the East Kalimantan Provincial RTRW Regulations tend to convert almost all of the mangrove ecosystem in Balikpapan areas into cultivation areas.

The existing spatial planning makes it possible to ignore the ecological role and function of mangroves as protection from sea waves and tides. Mangrove conversion as planned in the RTRW of East Kalimantan Province in the coastal area of Balikpapan Bay also allows to expand and enlarge the value of the flood vulnerability index. Based on those two analyzes so the implementation of SNPEM, especially in the conservation and restoration of mangrove ecosystems, must be carried out as an effort to mitigate flood disasters by taking into account the important values of ecology, socio-economy, institutions, laws, and regulations. The Sub-national Government of East Kalimantan Province has the obligation and authority to implement SNPEM in Balikpapan Bay.

The Oil Spill Tragedy

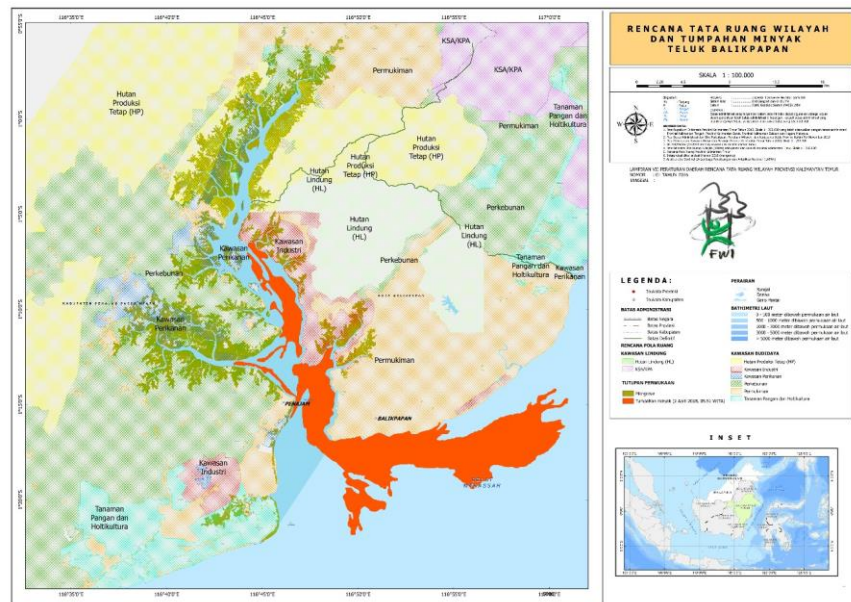


Figure 8. The mapping of the oil spill at Balikpapan Bay on April 2018

The oil spill case which happened in early April 2018 had an important impact on human life and marine environment. Categorised as a socio-ecological disaster the oil spill was caused by leakage on the Refinery Unit V pipe owned by PT Pertamina. The oil which later developed into PAH (Polycyclic Aromatic Hydrocarbons), which is toxic and carcinogenic (having a potential to cause cancer) when it reaches the water. This condition accumulated and then threatened human life and marine biotas³. The oil spill data was a result of the publication done by The Indonesian National Institute of Aeronautics and Space (LAPAN) in 2018. The data was obtained from the interpretation imaging result of the Sentinel-1A satellite on April 2, 05.51 AM WITA (Central Indonesian Time). The result of this research done by Koto and Putrawidjaja (2018) stated that the oil spill area was up to 14.643 hectares that covers the surface of the sea, and it possibly would extend. Some of the oil flow that followed the currents towards the beach was held up at a mangrove ecosystem and the majority of them followed the currents towards the Makassar Strait.

Mangroves possess a function of protecting the coastal area and the people's village from the impact of the oil spill in Balikpapan. This fact strengthens the importance of the mangrove ecosystem protection status in Balikpapan.

Witnessing the spilt-oil calamity that occurred in the early April of 2018, the Sub-national Government supposed to perform a proper consideration regarding spatial layouts and integrate it into the SNPEM for the Balikpapan Bay. Spatial lay-outing is deemed to be the realisation of the mitigation implementation of the spilt-oil case, in addition to improving the management of safety by PT Pertamina and correcting the activity of industrial shipping on the waters of the Balikpapan Bay.

The CSO's Attempt Of Mangrove Ecosystem Protection At Balikpapan Bay

The effort to preserve the Mangrove ecosystem at Balikpapan Bay emerged due to the people's concern of how massive the Mangrove ecosystem conversions were back then. There were numerous port constructions which shifted the coastal area of the Balikpapan Bay into industrial ports to support the operational activity of the mining sectors, palm oil plantations, cement industries, and even electric steam power plants (PLTU). These altered the bay of fishing ground for fishers into a harbouring spot for industrial ships. The residents of Penajam Paser Utara district were the most affected by these modifications. Most of the people who live in the shoreline of the particular district were *one-day fishing* fishers who then established the act of mangrove ecosystem surveillance to stop further mangrove destructions.

1. Monitoring the Mangrove Ecosystem

³ The Head of Marine & Coastal Data Laboratory Ministry of Marine Affairs & Fisheries of The Republic of Indonesia (KKP) Widodo Pranowo on <https://www.mongabay.co.id/2018/04/09/ternyata-teluk-balikpapan-sudah-sering-tercemar-minyak-kok-bisa/>. Accessed on August 26, 2019

The monitoring was done voluntarily by the fishermen of Penajam Paser Utara district. The surveillance act became more extensive and massive along with the plan of expanding the Kariangu Industrial Site in the modifications of the Balikpapan city RTRW from 2,189 hectares (Balikpapan City Regional Regulation No. 5/2006 on RTRW of Balikpapan City of 2005-2015) to 3,565 hectares (Balikpapan City Regional Regulation No.12/2012 on RTRW of Balikpapan City). The movement of Balikpapan Bay preservations kept on developing. Which later developed into an initiation by a forum consisting of academme, students, fishers, CSO, citizens, environmentalists, and journalists of Balikpapan City and Penajam Paser Utara district. Who actively contributed to the monitoring of the situation of the mangroves and to ensure there is no potential construction activity that will harm the mangroves. Later on, this forum was called Forum Peduli Teluk Balikpapan (FPTB). Right until now, this forum establishes a surveillance act by monitoring the upstream, middle section, and downstream of Balikpapan Bay and also follows down the estuary from the upstream to the downstream. They also monitored the faunas that were found dead or stranded at the waters or the coastline of the Balikpapan Bay. In a more extensive effort, the FPTB in 2016 established the Mangrove Anchor's Knot (Riau, Kalimantan Barat, Kalimantan Timur, Sulawesi Selatan, Gorontalo, Sumatera Selatan) as a vessel for the national CSOs in the scope of mangrove monitoring operations in Indonesia.

2. Law Enforcement

As a follow up of the observation attempts of the mangroves ecosystems at Balikpapan Bay, there was law enforcement involved to control the infrastructure developments that potentially will damage the mangroves. There were increasing numbers of constructions that set aside the impact it had on the environment. By destroying the mangrove ecosystems, clogging the river stream, reclaiming the shore, polluting the waters, and cramped the waters with industrial ships which caused various animals to lose their habitats such as dolphins, dugongs, turtles, and crocodiles. This law enforcement attempt was done by reporting some of the companies which are responsible for the cases to the authorities and related agencies.

- PT Asia Aditama Shipyard was alleged to do constructions by destroying mangroves without an environment permit document (AMDAL or UKL-UPL) from the Government Agency of Balikpapan City, the Environmental Agency Number: 660/886/BLH-PPLH of the year 2015⁴. The company was reported with a criminal report and environmental dispute to the Environmental Agency of Balikpapan City and the local Police Department of East Kalimantan by the CSO in 2017.
- PT Kaltim Kariangau Terminal was allegedly performing mangrove land clearing on a green area (Protected Area-Regional Regulation No. 12/2012 on Balikpapan City RTRW). These activities were causing the blockage of the Pudak River and land clearance on a river border section which was also in a green area (protected area). The company was

⁴ Quoted from the letter of environmental dispute from the Environment Advocacy Network to the Environmental Agency of Balikpapan City on November 14, 2017.

reported with a criminal report and environmental dispute to the Environmental Agency of Balikpapan City and the local Police Department of East Kalimantan by the CSO in 2017⁵.

3. Preservation Advocacy

The initiation of mangrove ecosystem protection in Balikpapan Bay was one of the attempts to save the coastal area and the waters of Balikpapan Bay. The area still had the remaining mangroves vegetation, important fauna's habitats, and coastal ecosystem (seagrass and coral reefs) as a living area for the coastal communities. The massive infrastructure developments that occurred in Balikpapan Bay had grown to be a concern as it would destroy all ecosystems and animal habitats which had been fragmented without the proper environmental control and management. The pressure to preserve mangrove ecosystems kept on rising along with the constructions of a new industrial site in Penajam Paser Utara region, which was the Kawasan Industri Buluminung (KIB). This region was a primary mangrove ecosystem, fishing grounds for fishermen, and nursery grounds for dolphins. Based on the reports, the recorded preservation efforts in Balikpapan Bay are namely:

- RASI Technical Reports regarding the Identification and Inventory of Prospective Conservation Areas in Balikpapan Bay by the Department of Maritime Affairs and Fisheries of East Kalimantan Province in 2011, by recommending the upstream part of Balikpapan Bay to become a Conservation Zone.
- Initiation proposal for the Proposed Reserved Area of the Balikpapan Bay Waters in 2017 by the FWI, FPTB, Fishermen Community, Tourism-Aware Community, RASI, Stabil, and JAL. The proposed size of the area was up to 32000 hectares covering the upstream, middle area, and downstream of the bay (figure). The proposal was submitted to the Marine and Fisheries Agency of East Kalimantan on behalf of the Coalition of the Proposing Society of Conservation Area of Balikpapan Bay (Nomor .01/Koalisi MP-KKLD/Teluk Bpn/XI/2017). By following the regulations made by the Ministry of Marine and Fisheries No. 2/2009 Regarding Designation Procedures of Water Conservation Area.
- The letter from the Mayor of Balikpapan, East Kalimantan Province Number 660/0117/DLH to the Governor of East Kalimantan dated January 31, 2019, regarding the Recommendation of Support for the Initiative Proposal of Marine Protected Areas in Balikpapan Bay (Appendix 3).
- The personal letter from Emil Salim, former Indonesian Minister of The Environment to the Governor of East Kalimantan. Claiming support for some of the Marine Protected Areas in Balikpapan Bay, dated May 13, 2019.

⁵ Quoted from the Report of initiation proposal for the Proposed Reserved Area of the Balikpapan Bay as A Conservation Zone, 2017.

Closing

According to the Presidential Decree of the Republic of Indonesia No. 73/2012 about National Strategy of Mangrove Ecosystem Management (SNPEM), mangrove ecosystem belongs to the preserved ecosystem or the *no net loss* supervision. Unfortunately, the strategy of managing mangroves could not be executed thoroughly. Case studies carried out by depicting the mangrove ecosystem condition in the RTRW of Balikpapan Bay showed a status of threatened because almost all of the mangrove ecosystem areas are located at Cultivation Spaces. Balikpapan Bay is at the top of the Flood Hazard Index and the Flood Vulnerability Index. Moreover, the oil-spill incident in April 2018 also strengthens the threatening status and socio-ecological condition of Balikpapan Bay.

Analysis results also showed that mangrove ecosystems are the most suitable cover or space allocation for Balikpapan Bay due to its function to protect from the tidal waves of the ocean. The conversion plan run by the RTRW of East Kalimantan would potentially banish the function of the mangroves itself which is for protection and act as a barrier from the impact of disasters such as ROB floods and oil-spill incidents. The integration result between the Flood Hazard Index and the Flood Vulnerability Index with the map of the RTRW of East Kalimantan province can be considered as an evaluation, for the spatial structure, spatial pattern, and even for determining potential strategic areas in the future.

There are some evaluations needed regarding the existing system and the systems that need to be restructured by taking into account disaster situations in Balikpapan Bay. Coordination, integration, synchronization, and synergy across sectors, agencies, and institutions, in maintaining mangrove ecosystems also needs to be done following the policy directions of SNPEM. One of them being conserving and restoring the mangrove ecosystems which are located inside Cultivation Areas.

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Appendix

Appendix 1. Explanation about President's Regulation No. 73/2012 about Mangrove Ecosystem Management National Strategy (*Strategi Nasional Pengelolaan Ekosistem Mangrove*, SNPEM)

Vision and Mission on Mangrove Ecosystem Management Strategy

Vision Mission is derived and translated from policy which determined in President's Regulation No. 73 /2012 about Mangrove Ecosystem Management National Strategy (*Strategi Nasional Pengelolaan Ekosistem Mangrove*, SNPEM). Vision mission is close related to the goal to implement mangrove ecosystem management in Indonesia, also no time limitation from the government as an organizer. The government has decided the vision mission to conduct mangrove ecosystem management which consist of:

- Vision: Realization the sustainability of mangrove ecosystem management for community warfare
- Mission:
 1. Do conservation and rehabilitation on mangrove ecosystem in protection and cultivation areas
 2. Increase community care on mangrove ecosystem management
 3. Increase community welfare through increasing value of the function of mangrove resources and mangrove ecosystem utilization wisely
 4. Increase the institutional capacity and community ability on mangrove ecosystem management
 5. Implement the legislative regulation on mangrove ecosystem management

Work Structure of Mangrove Ecosystem Management Strategy

A director of National Coordination Team is led by Coordinating Ministry of Economic Affairs with 4 members from 4 ministries, i.e., Ministry of Home Affairs, Ministry of Finance, Ministry of Environment and Forestry, Ministry of Public Work, and Ministry of National Development Planning or Head of National Development Planning Agency. Temporarily, the organizer for National Coordination Team is led by Ministry of Environment and Forestry, the alternate leader is Ministry of Marine and Fishery, the secretary is General Director of Watershed Management Development and Social Forest, and the vice secretary is General Director of Marine, Coast, and Small Islands.

To implement SNPEM at the Provincial level, the governor establishes Mangrove Ecosystem Management Strategy and create Coordination Team for mangrove Ecosystem Management Strategy both in the Province level. It is similar in the District/ City, local government

establish Mangrove Ecosystem Management Strategy in the District/ City level and create Coordination Team for mangrove Ecosystem Management Strategy both in the District/ City level. Work relationship between National Coordination Team in National level, Province level, and District/ City level is coordinative and consultative. Each team leader has rights to create a mangrove working group in each level of National, Province, and District/ City according to authority to support SNPEM implementation in National, Province, and District.

The publication of Coordinating Ministry of Economic Affairs No. 4 /2017 about Policy, Strategy, Program, and Performance Indicator Mangrove Ecosystem Management in National level as derived from President's Regulation No. 73 /2012 about SNPEM, which in details explains a mangrove ecosystem management strategy which is used as a base policy mangrove ecosystem management from central until local government levels. In synergizing the policy and program mangrove ecosystem management in Indonesia, government has divided SNPEM into 4 sections, i.e., ecology, social economy, institutional, and legislative regulation. Regulation from Coordinating Ministry of Economic Affairs becomes a platform and guidelines for national government, local government, businessman, and societies to implement SNPEM.

Important Value of the Ecology

- Mission: Do mangrove ecosystem conservation in the conservation and cultivation areas
- Objectives: Maintain the existence and the function of mangrove ecosystem, also recovery a damage area both in conservation and cultivation areas

- ❖ Strategy 1: Determine that mangrove ecosystem as a protected area
Chief Coordinator: Ministry of Environment and Forestry (MoEF)
Coordinator: KKP, Ministry of Agrarian Affairs and Spatial Planning/ National Land Agency (Kemen ATR/BPN), Ministry of Domestic Affairs (Kemendagri), Geospatial Information Agency (BIG)
- ❖ Strategy 2: Mangrove ecosystem conversion control
Chief Coordinator: MoEF
Coordinator: KKP, Ministry of National Development Planning/National Development Planning Agency (PPN/Bappenas), sub-national government, Kemendagri
- ❖ Strategy 3: Increase the mangrove ecosystem recovery effort
Chief Coordinator: KKP⁶, MoEF⁷
Coordinator: MoEF, KKP, Ministry of Villages, Development of Disadvantaged Regions, and Transmigration (Kemendesa PDTT), Indonesian Institutes of Sciences (LIPI), Kemendagri, Ministry of PPN/ Bappenas
- ❖ Strategy 4: Prioritizing the mangrove ecosystem on coastal protection effort, climate changes, and disaster risk reduction

⁶ Main institution in charge on a program of mangrove ecosystem restoration guidelines preparation, program of Research and IPTEK development, mangrove nursery and planting, and program of national and international support-raising to implement mangrove ecosystem conservation and restoration

⁷ Main institution in charge on program natural and artificial mangrove ecosystem restoration, also program on incentive giving to institution/ individual that successful on conservation and restoration program

Chief Coordinator: LIPI⁸, KKP⁹

Coordinator: MoEF, KKP, Kemendagri, Ministry of PPN/Bappenas, BIG, Kemen ATR/BN, Ministry of Village and Underdeveloped Village (PDPT), LIPI, The National Agency for Disaster Countermeasure (officially National Disaster Management Agency (BNPB))

- ❖ Strategy 5: Develop Science and Technology (IPTEK) on mangrove ecosystem mapping sections

Chief Coordinator: BIG¹⁰, MoEF¹¹

- ❖ Strategy 6: Build a database and information system for mangrove management for conservation and restoration purposes

Chief Coordinator: MoEF

Coordinator: BIG, KKP, (PPN/Bappenas), Ministry of Agrarian Affairs and (KemenATR/BPN), (Kemendesa PDPT), (LIPI), and National Institute of Aeronautics and Space (LAPAN)

The Important Value of Social-Economy

Mission: To increase public awareness in mangrove ecosystem management and improve community welfare through increasing the benefits of mangrove resources and wise utilization of mangrove ecosystems.

Objectives: Increase community understanding of the existence, status, function and benefits of ecosystems, (2) increase the role of local communities in mangrove ecosystem management, (3) develop models (conservation and cultivation) of environmentally friendly and community-based mangrove ecosystem management, (4) developing the mangrove ecosystems utilization based on science and technology and or local wisdom.

- ❖ Strategy 1: Developing a dialogue forum on mangrove ecosystem management

Chief Coordinator: Coordinating Ministry for Economic Affairs¹² (Kemenko Perekonomian), MoEF¹³, KKP¹⁴

Coordinator: Coordinating Ministry of Maritime Affairs (Kemenko Maritim), KKP, Ministry of Home Affairs (Kemendagri), Sub-national Government, PPN/Bappenas/, MoEF

⁸ Main institution in charge on program research and IPTEK to conserve the coastal area, adapt to climate change, and disaster risk reduction

⁹ Dissemination program and applications of the research result on coastal protection, adapt to climate change, and disaster risk reduction

¹⁰ Main institution in charge on program of determination of standardization on mapping method and mangrove inventory standardization

¹¹ The main institution in charge on the Establishing the Work Network Program (national, international) in the development of Science and Technology for mangrove ecosystems mapping and the dissemination of the application of the Science and Technology for mangrove ecosystems mapping

¹² The main institution in charge on the strengthening the role of the Coordination Team for the Management of the Mangrove Ecosystem

¹³ The main institution in charge on the Program of Empowerment the National/Provincial Mangrove Working Group, the program is conducting the socialization of the SNPEM, conducting the national and international meeting related to mangrove ecosystems management

¹⁴ The main institution in charge on the Love for Mangrove (*Cinta Mangrove*) Movement

- ❖ Strategy 2: Carry out extension, education, training on mangrove ecosystem management

Chief Coordinator: MoEF

Coordinator: KKP, Kemendagri, Kemendesa PDTT

- ❖ Strategy 3: Community Empowerment on Mangrove Ecosystem Management

Chief Coordinator: MoE¹⁵, KKP¹⁶, Kemendagri¹⁷

Coordinator: MoEF, KKP, Kemendagri, Kemendesa PDTT, Kementerian ATR/BPN

- ❖ Strategy 4: Model Development for Community-Based Mangrove Ecosystem Management

Chief Coordinator: KKP¹⁸, MoEF¹⁹

Coordinator: KKP, KLHK, Kemendagri, Kemendesa PDTT, Kemenkeu

Strategy 5: Sustainable mangrove ecosystems utilisations through science, technology, and local wisdom.

Chief Coordinator: KLHK

Coordinator: KKP, Kemendagri, BIG, Ministry of Villages, Development of Disadvantaged Regions (Kementrian Desa dan PDDT), LIPI, Higher Education Institutions

Institutional Importance

Mission: Increasing institutional capacity and society's capability of maintaining mangrove ecosystems.

Objective: (1) Improving both management authority and scientific authority's role in the mangrove ecosystem management, (2) Developing synergy across parties in the mangrove ecosystem management, (3) Attempting coordination and programs' integrity between related parties in the mangrove ecosystem management, (4) Improving national, sub-national institution, and society's capacity in managing mangrove ecosystems.

- ❖ Strategy 1: Developing a synergic collaboration across parties.

Chief Coordinator: KLHK

¹⁵ The main institution in charge on the Program in composing the guidelines for facilitating community empowerment in managing mangrove ecosystems, program to increase the role of women in mangrove ecosystem management activities

¹⁶ The main institution in charge on the community facilitation and mentoring program in managing mangrove ecosystems, program for strengthening and enhancing the role and function of local community to be involved in mangrove ecosystem management activities, and program for increasing community livelihoods

¹⁷ The main institution in charge on the coordinator for facilitating the establishment of Mangrove Group

¹⁸ The main institution in charge on the program to compile community-based management models of environmentally friendly mangrove ecosystems, the pilot program of mangrove friendly aquaculture models, the pilot program of aquaculture models in damaged mangrove ecosystems

¹⁹ The main institution in charge on the program Preparation of general guidelines for the utilization of mangrove ecosystem resources, the pilot program for community-based sustainable mangrove ecosystem management, the pilot program for mangrove ecosystem management models for climate change adaptation and disaster mitigation, the program to formulate guidelines for managing mangrove ecosystems based on FMUs, and the mobilization program national and international support in the development of a mangrove ecosystem management model.

Coordinator: KKP, Kemendagri, Ministry of Public Works and Public Housing (Kementerian PUPR), KemenristekDIKTI

- ❖ Strategy 2: Promoting communication's openness and transparency in integrating programs between parties.

Chief Coordinator: Coordinating Ministry for Economic Affairs (Kemenko Perekonomian)

Coordinator: Coordinating Ministry of Maritime Affairs (Kemenko Kemaritiman), Ministry of National Development Planning (Kementerian PPN/Bappenas), Kemendagri, BIG, KKP, MoEF, Kementerian PUPR, Kementerian Desa dan PDTT, (Kementerian ATR/BPN)

- ❖ Strategy 3: Improving national, sub-national institutions, and society's capacity in managing mangrove ecosystems.

Chief Coordinator: Kemenko Perekonomian²⁰, MoEF²¹, LIPI²², Kementerian PPN/Bappenas²³

Coordinator: Kemenko Kemaritiman, KLHK, Kemendagri, KKP, Kementerian Desa dan PDTT, LAPAN, Kemenristek DIKTI, Kementerian PPN/Bappenas, Kementerian ATR/BPN, Kemenkeu, BIG, Sub-national Government (PEMDA)

Constitutional Regulations Importance

Mission: Enforcing constitutional regulations regarding mangrove ecosystem management

Objectives:

1. Actualising centralised policy in terms of mangrove ecosystem management
2. Improving mangrove ecosystems' status in the coastal area layout
3. Actualising legal arrangement and law enforcement regarding mangrove ecosystem management

- Strategy 1: Synergizing the unified mangrove ecosystem management

Chief Coordinator: MoEF

Coordinator: KKP, kemendagri, BIG, Kementerian PPN/Bappenas, Kementerian ATR/BPN, Kementerian Desa dan PDTT, Sub-national Government

- Strategy 2: Integrating mangrove ecosystems' status into the regional layout or the zonation plan of the coastal areas and small islands.

Chief Coordinator: Kementerian PPN/Bappenas²⁴, MoEF²⁵

²⁰ The role improvement program of central and regional institutions regarding national and international mangrove ecosystem management

²¹ The training and comparative studies program regarding mangrove management, the improvement of collaborative coordination and communication's efficacy program of the National Coordination Team and KKMTN/Province, the synchronisation and harmonisation of work mechanisms, methods, and relations program across units inside KKMTN and Provincial KKMT, the improvement of work facilities and infrastructures program according to the task's demands and needs, the preparation and implementation of Standard Operating Procedures (SOP) program in handling problems regarding mangrove ecosystems management

²² The role enhancement program of research agencies (Universities, NGOs, expertises) regarding mangrove ecosystems management

²³ The improvement of participation and donor agencies' role program regarding mangrove ecosystems management

²⁴ The program of integrating the mangrove ecosystem management strategy into the document of area layout plan and or RZWP3K

²⁵ The program of facilitating the creation of mangrove ecosystem management strategy in the provincial scope

Coordinator: Kementerian ATR/BPN, Kemendagri, KKP, MoEF, Kementerian PUPR, PEMDA, Kementerian PPN/Bappenas, Kementerian Desa dan PDTT, BIG, LIPI

- Strategy 3: Law enforcement in mangrove ecosystem management

Chief Coordinator: MoEF

Coordinator: KKP, Kemendagri, POLRI, Attorney General of Indonesia (Kejagung), Kementerian Desa dan PDTT, BIG, Kementerian PPN/Bappenas, Kementerian ATR/BPN.

Appendix 2.

Table of mangrove ecosystems' area size at Balikpapan Bay in the spatial pattern of RTRW in East Kalimantan Province, 2016

Description	Area (ha)
Protected Forest	0,81
Convertible Production Forest	79,97
Permanent Production Forest	3.474,04
Industrial Site	1.619,15
Inland Tourism Areas	0,02
Fisheries Site	4.012,74
12 Miles Sea	168,73
Plantations	6.470,08
Settlements	586,51
Food crops and horticultures	419,61
Total mangrove area	16.831,66

Appendix 3. Recommendation Letter from the Mayor of Balikpapan

**Mayor of Balikpapan
East Kalimantan Province**

Balikpapan, January 31 2019

Number: 600/01117/DLH

Attachment: 1 file

Subject: Recommendation of Support for the Initiative Proposal of Marine Protected Areas in Balikpapan Bay

To
The Honourable Governor of East Kalimantan
in Samarinda

Following up the letter by the Coalition of the Proposing Society of Conservation Area of Balikpapan Bay number: 12 / Koalisi MP-KKLD / Teluk Bpn / XII / 2018 dated December 28, 2018, regarding asking for positive support and recommendations for the Initiative Proposal of Marine Protected Areas in Balikpapan Bay, East Kalimantan, The Government of Balikpapan City is supporting this initiative. According to the Law No. 23/2014 on Sub-national Government, stated on the Y attachment, the distribution of Marine and Fisheries Affairs, that the proposed waters area is in the authorized territory of the Provincial Government, in this case is East Kalimantan Province.

Thank you for your consideration and attention.

Mayor of Balikpapan
(signed, stamped)
H. M. Rizal Effendi, S. E.

Copies are sent to the honourable:

1. Regional Secretary of Balikpapan City (as a report);
2. Head of The Marine and Fisheries Agency of East Kalimantan Province;
3. Head of The Food, Agriculture, and Livestock Agency of Balikpapan City;
4. Head of the Coalition of the Proposing Society of Conservation Area of Balikpapan Bay