

Community Resource Assessment & Ground Validation of the Proposed Sasmuan Critical Habitat & Ecotourism

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I. BACKGROUND AND RATIONALE

a. History

The municipality is the only town in the Province of Pampanga engaged economically to fishing and aquaculture and no other agricultural products like livestock, poultry and high value crops. It is located in the midst of fishponds, rivers and streams and purely dependent on its fishery resources as the main source of livelihood of its residents. The fishery industry in Sasmuan is composed of three sectors: the capture fisheries (municipal fisheries); the culture (fishpond operation) and the marketing of fish products (people engaged in selling and trading of different fishery products be it fresh or processed). This employs more than 85% of the total population of the municipality (Local Government Unit of Sasmuan).

In old times, Sasmuan has been endowed with rich natural resources. The people derived their income from the bounties of its vast communal rivers, which are directly connected to Manila Bay. The teeming of schools of fish in nearby rivers was an easy access that the municipal fishery sector contributed a bigger share of its total fish production compared to the aquaculture. This could probably be the reason why fishermen in the municipality have not thought of engaging themselves to other economic activities aside from fishing. The aquaculture sector was left to investors

outside the municipality (leasing them to fishpond owners from the town). Although there are few figures from the municipality who made their name out of sugpo farming, it was proven to be a very lucrative business.

Over the years, a significant decline in fish production was observed due to vulnerability of the area to the effect of climate change resulting to massive flooding. Several typhoons have left most of the fishponds unattended, leading to the loss or decrease in fish production.

Moreover, the eruption of Mt. Pinatubo in 1991 brings enormous sand and silts leading to siltation of rivers, hence, dredging activities are currently being undertaken by the DPWH-Region 3. The Pasak River was one of the ecosystems heavily destroyed by such natural disaster.

b. Goal and Objectives

The activity aims to conduct community resource assessment and ground validation of the proposed Sasmuan Critical Habitat and Ecotourism Area. Specifically, its objectives are:

1. To identify key issues and concerns/interventions if any; and
2. To enhance the community's appreciation of the need for the management interventions to arrest if not reverse ongoing environmental decline.

c. Methodology

The area is being proposed as Critical Habitat which as enlisted in the Implementation of the Operational Plan for the Manila Bay Coastal Strategy (OPMBC) 2013-2017 due to its importance as flyway of wintering migratory birds from other parts of the world. Site assessment was conducted in 2012 by DENR CENTRO, reported the presence of threatened species by identifying the following indicators, namely: a) population threatened, b) wildlife resources present, 3) presence or absence of the informal settlers/occupants and 4) key issues and interventions. Hence, the conduct of 3-day activity was undertaken to update the status of biodiversity and management system in the area. The

team was composed of seven (7) participants from different Offices, namely; BMB - Manila Bay Rehabilitation Project(4), BMB - Caves, Wetland and other Ecosystems Division (1), PENRO- Pampanga (2) and the Local Government of Sasmuan (4).

Prior to the conduct of activity, the team coordinated with the DPWH Regional Office III, LGU Sasmuan and PENRO Pampanga to gather primary data and information.

The area – which is accessible by boats or small *bangka* through Pasac River, is the southernmost part of the Municipality of Sasmuan, Pampanga. The trashboat was requested to bring the team in the study area. While on board, validation of data gathered was done. Issues and concerns existing in the area were noted by the team including photo documentation. With the use of Global Positioning System (GPS) technology, the environmental set-up cited which include vegetation and anthropogenic activities such as proliferation of bon bon, dredging, quarrying, etc. will be mapped and geo-tagged.

Strategies such as key informant interview (KII) and focus group discussion (FGD) were conducted to collate data and information in support to ground assessment. Also, it was designed to get the local's view on their current environment as well as the sources of their livelihood in five (5) adjacent coastal *barangays* of the Municipality.

d. Significance of the Activity

The conduct of community resource assessment and ground validation of the proposed Sasmuan Critical Habitat and Ecotourism Area is deemed essential in ensuring the proper management and rehabilitation efforts of the concerned entities for sustaining the biodiversity, thus improving the economic and livelihood of the localities. The results of the activity will

educate and provide directions to the local government in the passage of ordinances and resolutions for effective and efficient management, conservation and enhancement of the area's critical habitat, thereby promoting it as potential ecotourism hub in the Province of Pampanga.

Also, the activity will generate data and information as basis for sustainable interventions needed in the area.

Lastly, it also supports the objectives of the Bureau enlisted in the Operational Plan for the Manila Bay Coastal Strategy (OPMBCS) with the urgency of rehabilitating the upstream condition of the Manila Bay.

II. COORDINATION

The coordination with the concerned offices was done for achieving the goals of the organization of conducting a community resource assessment and ground validation of Sasmuan and enhance the community's appreciation of the need for the management intervention to arrest if not reverse ongoing environmental decline. Coordination with DENR Regional Office, DPWH and LGU of Sasmuan gave proper direction, helps achieve objectives, makes optimum utilization of resources, quickly and leads to higher efficiency.

a. DENR REGIONAL OFFICE

The coordination with DERN Regional Office was spearheaded in the first day as to seek guide and background of the area such as gather some information, pointers and suggestions pertaining to the activity. Prior to the day, the team has already coordinated with focal person on the arrival and objectives of the activity.



Ms. Minerva Martinez (OIC-Chief, Conservation and Development Division) gave background of the Pasac River going to the proposed critical habitat of Sasmuan. She has mentioned that there are issues and challenges as to the anthropogenic activities in the area. As such to the activities she has observed were dredging, presence of fishponds, quarrying, and land conversion, improper solid and liquid waste management. She suggested to get the extent of the dredging activities and the responsible agencies (public or private) to

it, the mangrove plantation in the proposed critical habitat and ecotourism area and ways of this designation in helping the local communities.



b. DPWH



Upon gathering information, the team has coordinated with DPWH regarding the dredging activities under its Mt. Pinatubo Emergency for the Flood Control Management Cluster.

Engr. Arthur Santos (Planning Division, DPWH Region 3) , Engr. Arnold Ocampo (Construction Division, DPWH Region 3) , Engr. Jose Gabriel (PMOII, Mt Pinatubo Emergency, DPWH) and Engr. Tomas Edison Olia (Mt. Pinatubo Emergency, DPWH) have been source persons in the DPWH. Engr. Ocampo clearly illustrated the dredging activities from Gua-Gua River to Pasac River going to the proposed critical habitat of the Sasmuan Area. There are 4 dredging in the said area: Dredge PI-A, Dredge PDDP-II, Dredge PII-B and Dredge I-B. All of these dredging activities are operational maintaining by the

DPWH. He briefly gave background on the projects. He mentioned that during the Mt. Pinatubo eruption on June 15, 1991 which was the world's largest in more than half a century and probably second largest of the 20th Century, lahar generated by heavy rain falling on erodible pyroclastic flow deposits poses continuing and grave danger to human lives and property in the low-lying areas of the basin. Hereafter, the said river



have been impacted by the ashes and sand released by the volcano reasons for flooding the municipality.



Engr. Ocampo said that the dredging will excavate 6 meters for the dredging works and aim to remove 4 meters from the river. These dredging activities in the Gua-Gua and Pasac rivers are a continuing project that started last 2014. Dredging and

Channel excavation in the river channel downstream will increase channel capacity and reduce the probability of river avulsions.

Each of the dredging activity has its “spoil site” that 70% of it released water and 30% sand from the operation. They have also mentioned regarding the

Environmental Compliance

Certificate (ECC) of DENR, that they have ECC based on the previous studies last 2003 funded by JICA and contracted by China Water Electronics. However, as of the date, since the equipment used are public owned (DPWH), there are no updated ECC since it is maintained by the



administration, they believed. The project aims to reduce flooding along the Pasig-Potrero River Basin that for without project scenario, the municipalities affected by flooding from the Pasig-Potrero River are Bacolor, Guagua, Minalin, San Fernando, Sto. Thomas, Lubao, Macabebe, Masantol and Sasmuan.

They have also showed the study on the Pinatubo Hazard Urgent Mitigation Project. It was indicated the in the Short Term Measures that implemented between 1999 and 2000 intended to increase sediment retention capacity



within the dike system, reduce channel siltation and therefore, flooding in the

downstream areas. Hence, this measures include maintenance, repair and rasing of existing dikes and spillways in response to the topography developing from

sediment from sediment disposition such as the “Construction of a channel to lead the Pasig Potrero River downstream passed Sasmuan.

c. LOCAL GOVERNMENT UNIT OF SASMUAN

Lastly, the team has its courtesy call to the Local Chief Executive of the Municipality of Sasmuan, Nardo M. Velasco. Ms. Katrina L. Apaya briefly explain the objective of the



community resource assessment and ground validation in the proposed Sasmuan critical habitat and Ecotourism Area.

LCE Velasco, gave his gratitude to the DENR BMB who constantly supporting in the protection and management of the environment.

III. RESULTS AND DISCUSSION

a. RIVER AND COASTAL ECOLOGY

a.1 Natural Resources

The proposed Sasmuan Critical Habitat and Ecotourism Area is bounty with natural resources however due to some issues and misuse of the people it has been damaged/injured. Accordingly, participatory transects walks were done together with local community in identifying the natural resources. All participants were involved in asking and answering questions, listening and



observing the presence of resources in the area. Focus Group Discussion and Key Informant Interview (KII) participatory planning tools were used in the five (5) coastal barangays.

as “pingo or pingao”, tilapia and bangus, shrimp “sugpo”, crabs “alimango”. Also, there are presences of avifauna, “bayawak or barag” and mangrove species.

The natural resources identified in Barangay Malusac are (1) fishes such



Brgy. Batang 2nd has a presence of mangrove species; it is where the proposed critical habitat of Sasmuan located. Fishpond fishes such as “tilapia”, “bangus”, “sugpo”, and coastal fishes such as “tilapia bato”, “balanak”, “suluwe”, “balungenge” and “palos” were also identified through the key informant interview (KII) and during the focus group discussion (FGD). Fruit bearing trees were observed during the ground validation such as banana, camachili and santol. The local community also mentioned that there were ahas “sawa” in some part of the barangay.



Similarly, Brgy. Batang 1st has fishpond fishes such as “tilapia and bangus”, “sugpo” and crabs. Through the KII and observation, there is presence of mangrove in some part of the barangay. Also, bamboo “kawayan” has been observed located in the spoil site of the dredging activities.

Brgy Mabuanbuan, among the other coastal barangays has the most fishpond yield species during the visit such as blue crabs, crabs, oyster, mussels, lobster, “alupihan dagat”, tilapia, milk fish, sugpo and “talangka” or small crabs. Also, through the KII, there are mini sharks or they call “hingin”, “palos”, and snake “sawa” in the area. Mangrove ecosystem was still identified during the ground validation and crowds of avifauna species.



Lastly, Brgy. Sebitanan has still mangrove area but not as voluminous during the past years. Fishpond yields such as crabs, “tilapia”, milk fish, “ayungin” and mudfish was identified by the local community.

As the rural coastal barangays population surrounding the area continue to increase, the pressure on the natural resources extraction will be greater. The absence of necessary steps for the sustainable utilization of this natural resources base would threaten the availability of resources for the future generation.

a.2 Mangrove and Mudflat Ecosystem



An approximate total of 21.6 hectares of remaining mangroves was assessed in the five (5) coastal barangays of Samuan Pampanga namely: Malusac (0.3 hectare), Batang 1st (3.5 hectares), Batang 2nd (14.1 hectares which include the islet with 11 hectares), Mabuanbuan (3.1 hectares) and Sebitanan (0.45 hectare). Most of

the mangrove areas are classified as riverine types of mangrove with sandy to muddy substratum. The sparsely vegetated riverine types of mangroves were observed at the riverbank of Pasac-Macabebe River low course extending up to the upstream of the river geographically located within 120°37'36.5" longitude and 14°54'29.7" latitude (Table 1).

Table 1. Assessed Mangrove Areas

Barangay	Area (Hectare)	Mangrove Type
Malusac	0.3	Riverine
Batang 1 st	3.5	Riverine

Batang 2nd		
- <i>Riverbanks</i>	3.1	Riverine
- <i>Islet</i>	11	Overwashed
Mabuanbuan	3.1	Riverine
Sebitanan	0.45	Riverine
TOTAL AREA	21.6	

On the other hand, vigorously growing overwashed mangroves are observed at the river delta of Barangay Batang 2nd. This is a small island of mangroves



located at the intertidal zone of the Pasac-Macabebe River and Manila Bay. This area is observed frequently washed by tides with muddy to clay loam substrates dominated by *Sonneratia alba* (Pagatpat). This site is also within the proposed critical habitat and eco-tourism area of

Sasmuan, Pampanga.

In addition, a total of 58.35 hectares of mangroves area was also recorded outside the study area. The upland barangays of San Antonio, Sasmuan was also recorded with 3.8 hectares of mangrove areas. These mangroves are located within the upper riverbanks of Pasac-Macabebe river with sandy to muddy substrate. The mangrove areas of Lubao and Macabebe, Pampanga was also recorded with 2.7 hectares and 51.8 hectares, respectively. The vigorously growing mangrove areas of Macabebe was located at the eastern riverbanks of the rivers of Brgy. Batang 2nd extending up to the edge of the mudflats areas.

The conduct of ocular survey confirmed the presence of true mangroves and mangrove associates in Pasac - Macabebe River. A total of six (6) true mangrove species represented by *Sonneratia alba* (Pagatpat), *Rhizophora*

mucronata (Bakawaun Babae),

Rhizophora apiculata (Bakauan

Lalake) , *Excoecaria agallocha* (Buta-

buta) and *Nypa fruticans* (Nipa) was

observed in the riverine type of mangroves.



Dominant mangrove specie observed is represented by *Sonneratia alba* (Pagatpat) inhabited the riverbanks from the low course extending up to the upstream and alluvial island formed in the delta of the Pasac Macabebe River. Mangrove associates species recorded in the area include *Morinda citrifolia* (Bangkoro), *Terminalia catappa* (Talisay) *Sesuvium portulacastrum* (Dampalit), *Acanthus ilicifolius* (Diluario) and *Acrostichum aureum* (Lagolo). (Picture deluario, dampalit)

The riverbanks was also observed dominated with *Leucaena leucocephala* (Ipil-Ipil),

Pithecellobium dulce (Camachile) are

also observed present along the

riverbanks.. Likewise some forage

(grass) species recorded grows along

the riverbanks are *Pennisetum*

purpureum (Napier or Elephant grass), *Panicum maximum* (Guinea grass),

Brachiaria mutica (Para grass) and *Cynodon plestostachyus*.



Furthermore, numerous regenerations of *Sonneratia alba* (Pagatpat) are observed vigorously growing at mangroves islands of Sasmuan Critical Habitat and Ecotourism Area. These seedlings can be uprooted and placed in polybags for further growth under nursery condition to be used for future restoration/planting activity.

The Manila Bay Area Environmental Atlas in 2007, characterized the stretch of Pampanga coast as a mudflats area. The mangroves areas assessed are sheltered by the tidal mudflats of Sasmuan, Pampanga. This open muddy areas serve as gleaning areas of coastal dwellers for shell and shellfishes and



at the same time as roosting and feeding areas for endemic and migratory birds. This ecosystem is also significant in preventing coastal erosion along Manila Bay.

b. PROPOSED CRITICAL HABITAT AND ECOTOURISM AREA

b.1 BACKGROUND

The proposed Sasmuan Critical Habitat and Ecotourism Area has a total of 1700 has located in Barangay Batang 2nd, Sasmuan, Pampanga with its geographical coordinates 14° 56' 19" North, 120° 36' 58" East. The Sasmuan climate is classified as Type I Dry season from December to May and wet season from June to November.

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he months of June to September rain periods is at maximum.

b.2 PARAMETERS IN THE IDENTIFICATION AS CRITICAL HABITAT

The Sasmuan wetland is within the large enclosed sea of Manila Bay characterized by intertidal mudflats and sand flats. The identification and



establishment of the proposed Sasmuan Critical Habitat and Ecotourism Area was recognized due to its importance as flyway of wintering migratory birds from countries such as China, New Zealand, Singapore, etc.

There has been already site assessment conducted of the presence of threatened species with the following parameters such as population estimate of threatened species

found in the area, assessment of other wildlife resources present in the area, status of vegetation and ecosystem type/s, presence or absence of area occupants/settlers, wildlife living and key issues/interventions in the area in 2012 by the DENR CENRO



C. Other Intervention

Resource mapping in the area also recorded the locations of the on-going dredging activities conducted in the area. As per interview conducted with the the Pampanga DPWH there are four (4) active dredging equipment in the area. Actual site visits recorded four (4) operational dredging equipment as follows:

1. Watermart Classic IV
2. Pinatubo 1-B
3. Pinatubo 2-B
4. PDDP II
5. Pinatubo IA



Due to the heavy silatation in the area approximately 300 cubic meters of sediments were collected every day. The sediments are place at the (5) spoil sites map located at Brgys. Malusac, Sebetinan, Batang 1st and Batang 2nd.

Dredging can create disturbance to aquatic ecosystem. The suspended sediment load and turbidity of a river are increased during the removal of bed or bank material, it will also affect spawning fish, juvenile fish as well as the micro and macro benthic species which inhabited the substrate. However, interview revealed that this activity is beneficial to the community.

I. ECONOMIC ACTIVITY



The main source of income of the people in the municipality is fishing. The fishing industry in the area plays a key role in the social and economic life of the country as it provides employment for many Filipinos as well as annual protein requirement and tourism enterprise opportunities.

However, it is threatened by illegal and destructive fishing practices which negatively affect food security and productivity of the natural resources base (USAID, 2010).

In Sasmuan, the residents are engaged mostly in raising and selling fish such as tilapia and bangus. Consequently, if the people engage on unlawful fishing practices, it will harm the natural base of the area and all the living species. It will also bring danger to the whole community.

Other sources of income are fishpond operating, caretaker/helper, small business such as “sari-sari” store, food processing such as “bagoong” and “tamales” making, construction worker and banca making.

Also, there are some livestock production for own use identified in the assessment. However, the municipality has no delineated area for livestock production.

E. DEVELOPMENT ISSUES AND CONCERNS

There are different problems and issues raised concerning the management in the area, which cut across social, economic, environmental and institutional factors. Social concerns concentrate on the problems which directly affect humans. Economic problems involve issues which affects the livelihoods and other sources of income of the people in the municipality. Environmental issues comprise the problems regarding the watershed and its resources. Lastly, institutional issues focus on the different groups that affect the area. These problems and issues were gathered from the people and were analyzed in order to elaborate each further.

The management of the resources requires thoughtful stewardship that cannot be attained solely by government regulations or technical specialists. Local community plays an important role in monitoring the socio-environmental conditions, but they require continuing education to keep abreast of scientific and cultural advances.

Various factors in the environment play major roles in the management of watersheds. Without deliberate concern in the protection and proper management of these factors, sustainability of the watershed could be troubled. The succeeding discussions are some manifestations that exemplify the improper management and protection of the environmental factors.

Various factors in the environment play major roles in the management of area. Without deliberate concern in the protection and proper management of these factors, sustainability of the area could be troubled. The succeeding discussions are some manifestations that exemplify the improper management and protection of the environmental factors.

The following are some of the major problems encountered through the community resource assessment ground validation:

1. Illegal Fishing Activities:



“BunBun”: Artificial Reef



“Sudsud”: Small Adaptation of Trawlers



“Pasabal”: Portable Trap

2. Illegal Fishponds



3. Pollution

Most of the coastal barangays do not practice the RA 9003. Hence, there were open dumpsites observed during the ground validation.



Improper Solid Waste Disposal

4. Improper Liquid Waste Disposal

Improper waste disposal such as wastewater discharges from ponds and unsanitary toilets directly pollutes Pasac River. Both attributed to worsening of the water quality of the river and resulted to the decline in biodiversity in the area and affects human health.



a. Wastewater

Discharges from Fishponds

The economic activity of aquaculture in the area has been partly offset by flooding as a result of changes made on the regimen of the river.

Fishpond dike were constructed along both sides of Pasac River, close to the river bank and about 66 water control gates were observed. The constructed dikes constricted the stream flow and contributed to narrowing the river. The structure is designed to allow the entry and exit of fresh water and waste water. Wastewater discharges coming from ponds through gates usually high in nutrients such as Nitrate, Phosphate, Biological Oxygen Demand (BOD), among others.

b. Informal Settlements

About 20 direct toilets built along the river bank. Human wastes were directly discharged to the river as potential to the increase in Total and Fecal Coliform bacteria.



5. Siltation



6. Small Scale Quarrying



7. Poor implementation and monitoring of environmental regulatory laws

Another problem is the poor implementation and monitoring of the environmental regulatory policies and laws which results to non-compliance of the community members to the laws, policies and *barangay* ordinances created for area's management and restoration. These legislative actions will be futile if it cannot serve its purpose and simply not put into practice. This is due to poor implementation of the existing policies and the lack of awareness and knowledge on the existing environmental policies and regulatory laws.



8. Mangrove Degradation

Information gathered through ocular surveys and interviews with the local informants within the five (5) coastal barangays had been subjected to fishpond development for the past years. A total of approximately 1,560 hectares of productive saltbeds/fishponds was recorded and validated in the area. Likewise, some of the said illegal fishpond was also recorded in the area, these are constructed located along riverbanks of the main channel of Pasak-Macabebe River. On the other hand, remnants of the demolished abandoned fishpond were also observed in Brgy Mabuanbuan, accordingly this was removed for obstructing the flow of the river. The conversions of mangrove areas into fishponds are the main

issues facing the mangrove communities of this municipality (Picture demolished fishpond, and photos of fishpond))

Unregulated cutting of mangrove trees was observed along the riverbanks. Uncontrolled tree topping¹ are noticeable in the area. The gathered mangroves tree branches were used as materials for the construction of Bunbun fishing method. With this method the mangrove branches are used to form artificial fish shelters/reef that are set in depths of the river. Accordingly, mangrove specie gathered for this illegal kind of fishing method is only *Sonneratia alba* (Pagatpat) which is locally called as “ Palapat “. As evidenced, most of the *Sonneratia sp* observed in the area are already trimmed.

On the other hand, the mangrove island communities inside the Sasmuan Critical Habitat and Ecotourism Area located in Bry. Batang 2nd was observed in good condition. This area was observed to be of minimal, slight and moderate disturbances. The on-going interventions and efforts in coordination with DENR Regional Office, Local Government Units and communities for declaring the site as critical habitat may contribute for the protection and sustainability of mangrove resources in this area.

9. Improper Mangrove Planting Initiatives

a. Academic Activities

¹ Tree topping is the practice of removing whole tops of trees or large branches and/or trunks from the tops of trees, leaving stubs or lateral branches that are too small to assume the role of a terminal leader. Other common names for the practice include hat-racking, heading, rounding over, and tipping

Unsupervised planting activity was also observed in the site. Clustered planted Bakauan propagules with 0.25m x 0.25 m was transected inside the Critical Habitat, accordingly this planting activity was conducted by



Angeles University Foundation. This strategy is noticeably affecting the growth and development of the propagules in the site. This strategy is deemed inappropriate and unnecessary because the propagules will just compete for space and limited

resources in the substrate, thereby decreasing the likelihood for survival of the propagules.

Furthermore, inappropriate planting methods were also observed along the upstream riverbanks of Pasak-Macabebe River. The specie of Bakauan propagule were planted at the



open gaps of the homogenous Pagatpat communities. Bamboo stakes was also used as a tree guard instead of peg to avoid the uprooting propagules. Accordingly, this planting activity was conducted by Pampanga Agricultural College in

coordination with the barangay. (picture ng mangrove may triangle stake)

b. National

Greening Program

Un-assessed and un-map rehabilitation activity was observed in this area through the National Greening Program (NGP) in coordination with the Barangay. Based from the records gathered



from the CENRO – Pampanga, a total of 292,000 of Bakauan propagules and pagatpat seedling were planted in this area in CY 2013 having an area of 146 hectares. Actual validation observed that most of the planted species in the area are Bakauan propagules, only few Pagatpat species were sighted during the assessment. High mortality rate of these planted mangroves are also noted in the area.



Mangrove species suitability and improper site selection are the major factors that may contribute for the failure of this activity. The planting site was conducted in an open mudflats areas wherein there is no indicators of mangroves grown making it unsuitable for mangrove reforestation. It is also exposed to storm surges, waves and tidal currents during monsoon season which may affects the growth and survival of the planted mangroves in the area. In addition, natural sand shifting activity was also observed in the area.

Planting of propagules or mangroves in this area will soon resulted to the replacement of mudflats ecosystem into another ecosystem. Mudflats are part of coastal ecosystems alongside seagrass beds, coral reefs and mangroves that are interconnected with each other, hence must also be considered for protection and rehabilitation. The Sasmuan Mudflats areas serve as gleaning areas of coastal dwellers for shell and shellfishes and roosting and feeding areas for endemic and migratory birds.

IV. SUMMARY

The Municipality of Sasmuan is economically driven by fisheries and aquaculture, since survey result revealed that majority of its populace engaged to such activities. The development in these sectors shows significant disturbances in balanced ecosystem and compromising the biodiversity in the area.

The degradation of water quality of Pasak River which drains directly towards Manila Bay is one of the conditions to be considered. It serves as the source of freshwater needed to operate fishing and aquaculture activities in the area.

Several culverts were constructed to allow the entry of freshwater and exit of wastewater from and to fishponds, thus gradually but surely degrading the water quality of the river.

The proposed “Sasmuan Critical Habitat “is strategically located at the mouth of Pasak River in Manila Bay. Once the river is not properly managed and worsens its water quality, the abundance of food for migratory birds and other species will significantly decline and lead to extinction.

Being vulnerable to climate change, dredging maybe one of the anthropogenic activities in the area but it necessitate this flood control mechanism. However, it resulted to the destruction of river bed as sanctuary of various organisms to sustain a balanced ecosystem. Also, observed was the absence of mangroves and other vegetation to stabilize riverbanks which lead to siltation and sedimentation and narrowing of the river in the long run

V. RECOMMENDATIONS

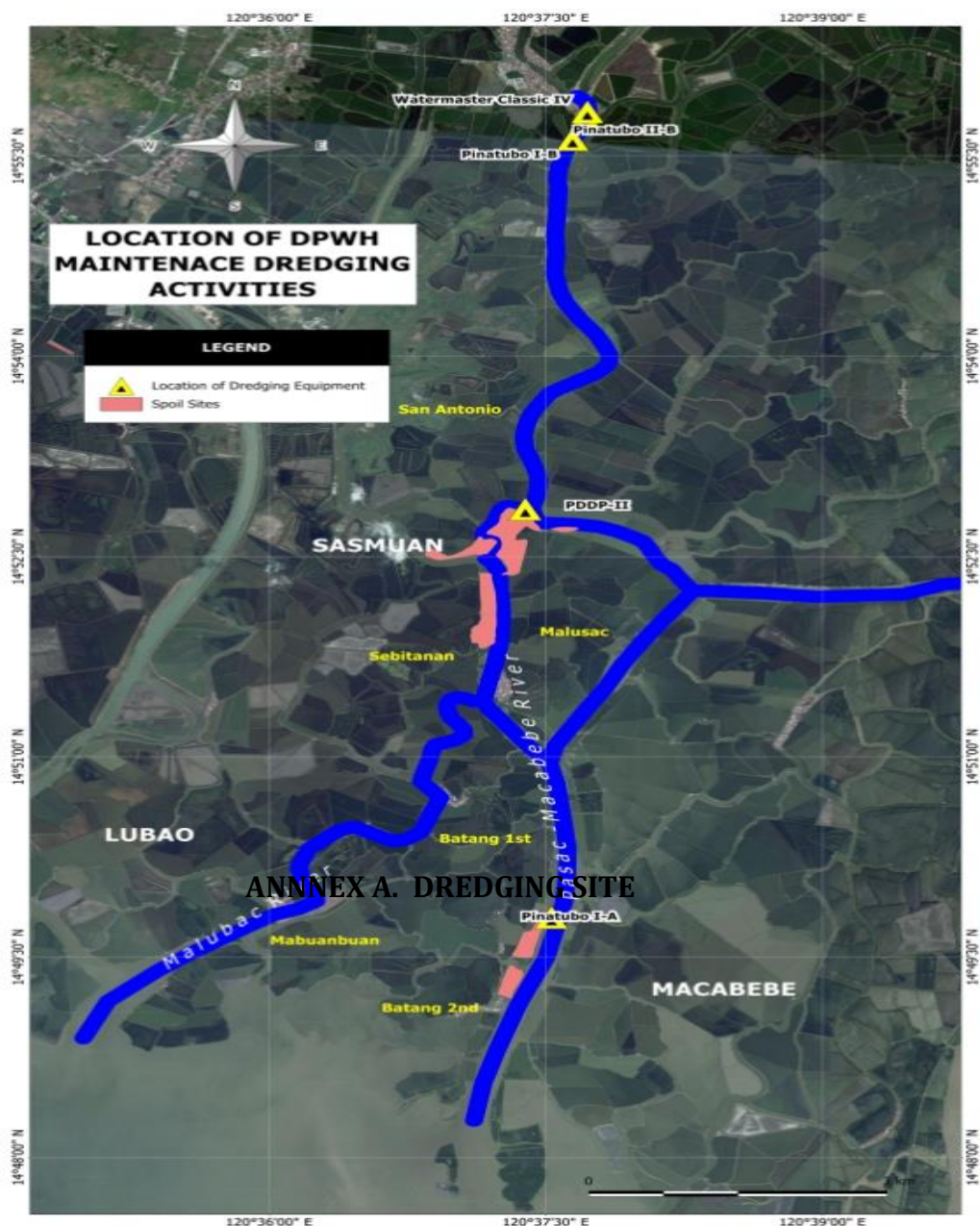
a. For Dredging

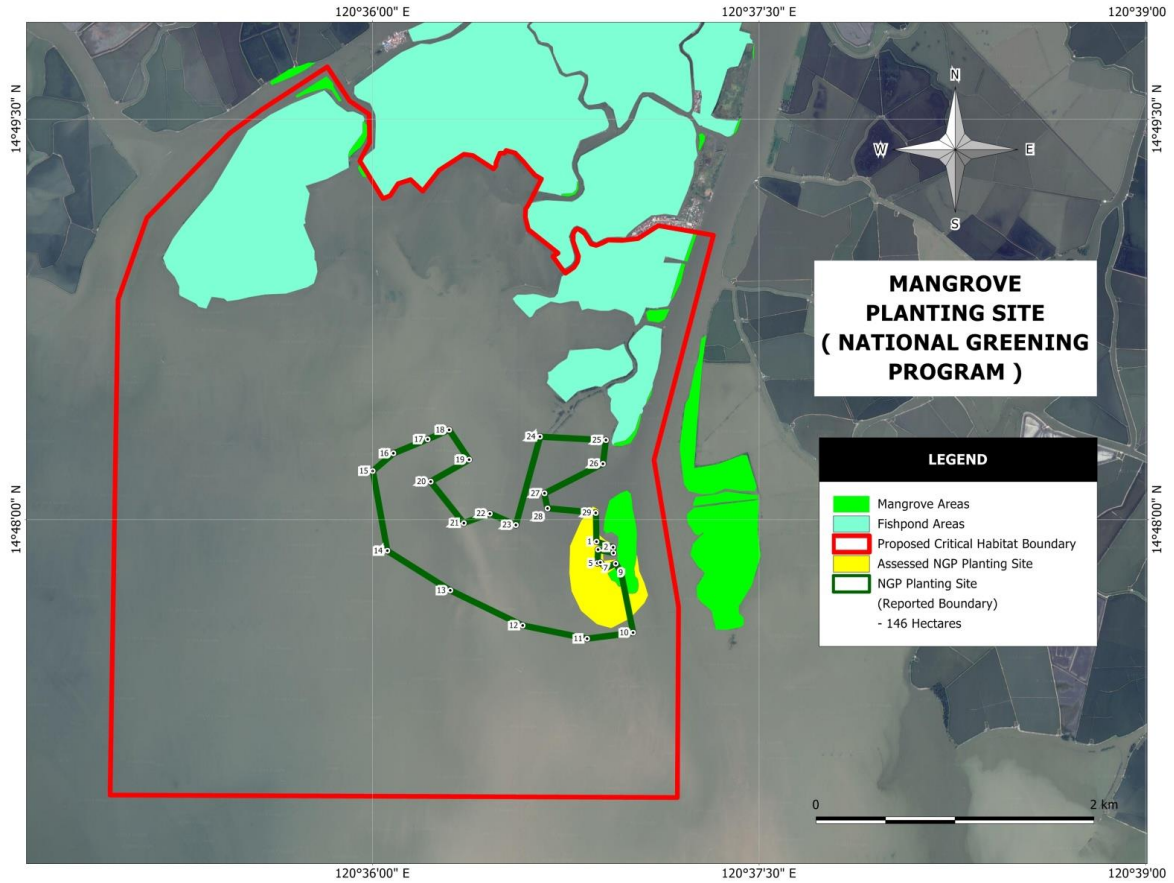
1. Conduct inventory and profiling of aquatic fauna to identify and assess the condition of aquatic species present in the area.
2. Implementation of mitigation techniques must be applied to minimize the impacts of dredging works.
3. Application of environmentally safe dredging techniques to minimize the impact and disturbance to aquatic ecosystem

b. For River, Mangrove and Mudflats Ecosystem

1. Vegetative rehabilitation of riverbanks using the appropriate species
2. The declaration and establishment of mangrove protected area thru Brgy. resolution and municipal ordinances.
3. Development of area as seed source/seed production area (gene pool) to cater to the need of reforestation activities;
4. The establishment of mangrove nurseries;
5. Provide necessary orientation and training regarding proper planting protocols and guidelines
6. Pre-mapping and assessment of the proposed reforestation site before actual planting;
7. The enrichment planting of understocked mangrove areas (open space/gaps) and fish pond dikes

8. Proper site selection and species site matching following the zonation pattern of the mangroves and mudflats;
9. The application of aquasilviculture technology to enhance mangrove rehabilitation;
10. Periodic monitoring of the status and condition of the mangrove areas; and
11. Conduct of regular water quality monitoring of Pasac River.





ANNEX B. NGP PLANTING

