

Name of Protected Area: Sinub Island Marine Wildlife Management Area

Part 1: Basic information about the protected area

Table 1. Protected area information

Name, organisation and contact details for person(s) conducting the assessment <i>Person 1: Name, Organisation, Address, Email, Phone</i>	Ann Peterson, SPREP/Protected Area Solutions, 283 Madill Road, Tandur, Q4570, Australia, a.peterson@uq.edu.au, 0414300955
<i>Person 2: Name, Organisation, Address, Email, Phone</i>	Bernard Suruman, CEPA, bsuruman@dec.gov.png.
Today's Date	22/08/2016
Name (or names) of protected area	Sinub Island Marine Wildlife Management Area
Size of protected area (ha)	11.8
PNG Code or number	
World Database of Protected Areas site code (these codes can be found on www.unep-wcmc.org/wdpa/)	220246
What level or kind of protected area is it? (National Park, Wildlife Management Area, Sanctuary, Reserve, Locally Managed Marine Area etc)	Marine Wildlife Management Area
IUCN Category	III
International protected area? e.g. World Heritage or Ramsar?	
Country	Papua New Guinea
Province/s	Madang
District/s	Madang
Local level governments	Ambenob
Ward/s	6
Nearest big town	Madang
Location of protected area (brief description)	The WMA is located about 9km north of Madang town within the Madang Lagoon, Bismarck Sea. The customary landowners live on the mainland in the village of Riwo. The WMA is about 250m north east of their village. The marine protection area extends about 200 metres from the island. Sinub WMA is connected for management purposes with Laugum and Tabad WMAs, through the Madang Lagoon Association.
Map references	
When was the protected area gazetted or formally established?	26/01/2006 (Community agreed to establish Marine WMA in 1997)
Reference for gazettal or Memorandum of Understanding (MoU)	
Who owns the protected area? please enter Government Private Community/ customary	Customary landowners: Azonanen Clan (about 400 people)

landowners, private, Other (name) and include Clan name(s)	
Number of households living in the protected area	0
Population size within the protected area	0
Who manages the protected area? (e.g. please enter government, customary landowners [add clan names] management committee [how many and what gender])	Customary landowners. Management Committee (3 female, 5 male) from Azonanen Clan
Total number of staff (this means anyone working on the protected area in paid jobs – whether NGOs, community, rangers or customary landowners	0 (but assistance from WWF for monitoring)
<i>Temporary paid workers</i>	0
<i>Permanent paid workers</i>	0
Annual budget (US\$) – excluding staff salary costs	0
Operational (recurrent) funds	0
Project or special funds	0
Reason for park establishment	To protect the marine area so that fish numbers would increase in Madang Lagoon and be used by our clan as well as others. Before when I was a young boy we had lots of fish around the village and in the harbour. We did not have to travel far to catch the fish. But then the people started using dynamite (30-40 dynamite explosions per day) and as a result they spoiled the reef and fish. We decided to protect our area so that we would have some fish in the Madang Lagoon, not only for our clan but for others. Sinub was the first WMA and then others followed (Lagum, then Tabad, and then Tab).
What are the main values for which the area is designated (Fill this out after data sheet 2)	Fish, reef, culture, water quality, megapodes
List the primary protected area management objectives (add lines if needed after the most important objectives): <i>Management objective 1</i>	Breeding ground for fish.
<i>Management objective 2</i>	Provide livelihood for people
<i>Management objective 3</i>	Protect important reefs. There is a healing rock – they gather moss around the rock and it helps to heal sick people.
Number of people involved in answering the assessment questions	5
Name/organisation/contact details of people participating the assessment (<i>Please do not insert return/enter or dot points</i>)	<i>Bonny Wadui</i> , Monitoring Officer, Riwo Village, Madang, 79771245; <i>Mazik Gatedai</i> , WMA Committee Member, Riwo Village, Madang; <i>Francis Wadui</i> , Madang Lagoon Coordinator of Lagoon, Sinub, Laugum and Tab WMAs, Riwo Village, Madang, 72041214; <i>Lasek Laiu</i> , Vice Chairman, WMA, Riwo Village, Madang, 72590152; <i>Samson Daber</i> , Executive officer, WMA, Riwo Village, Madang; all c/-WWF Madang.
Customary landowners/other community; CEPA, Other national government agency; Provincial govt; local level govt; Protected area staff (anyone working on the protected	Customary landowners.

area in paid jobs; NGO; Donors; External experts; Others	
Please note if assessment was carried out in association with a particular project, on behalf of an organisation or donor.	SPREP through the PNG Protected Area Assessment Project, which is a component of the GEF Community-based Forest and Coastal Conservation and Resource Management Project in PNG.

Part 2: What makes this protected area special and important?

Sinub WMA is a marine protected area that includes a small island and the surrounding marine reefs (to about 200m from the shore). The island sits about 2m above the sea level. We protect the area mainly for the fish. There are many different species (e.g. surgeon, long Tom) and also sharks, dolphin, turtles, crayfish, black and white sea snakes and beche de mer. We did this because the number of fish was declining. We have two healing stones (made of coral rock) on the reef – they are legendary stones. The people usually wash around the rocks and they can heal their sores or any other sickness. We have planted some seagrass (from CSIRO, Australia). On the land there are gardens in the middle of the island. It has some trees (Kalapulim, coconut and mango) and birds (megapodes and blue and white kingfisher). The reefs help to prevent island erosion from the sea waves. There are some white sand beaches and a wreck on the northern side. The ship was sunk in the 1980s to provide diving opportunities for tourists, but there are no boat moorings. Sinub is connected to Laugum and Tabad and this expands the area given protection.

Table 2. Key values of the protected area

No.	Key values	Brief description	Note if endangered species or ecosystem (IUCN)
1	Fish/marine species	Surgeon fish (eating and for market), lobster, turtle, squid; No take zone for fishing. It is a breeding zone and the spillover effect means that there are fish to eat.	
2	Reefs	Protection of the reef is important for young fingerlings, which grow into larger fish to support the community. Fish monitoring was undertaken in 2010 (Mama Graun) and fish numbers had declined (due to reef bleaching in 2010), but it is slowly recovering.	
3	Culture	Presence of healing stone on the reef, which heals a range of sicknesses. Preserving our traditional culture relating to fish harvesting (e.g. use of traps, spears and nets) is important.	
4	Water quality	Water testing has been conducted in the past, and it indicates that the quality is declining. The water has oil in it. There are 50 fishing ships in the Madang Lagoon. The Pacific Industrial Marine Zone has been established to the north of the WMA. It is a fishing hub for the Pacific and this attracts a lot of fishing boats. There are two fishing companies here with 50 fishing boats. They release their bilge water and the oil enters the harbor and there is also engine cleaning which affects the water quality.	
5	Megapode	Fewer than five megapodes remain. The regulations to prevent hunting or taking of eggs will help the numbers to recover.	

Table 3. Checklist of values/benefits

Not important 0; Important 1; Very important 2; Don't know DK

How important is the protected area for each of the listed values/benefits?	Score (0,1,2, DK)	Comment
1. Biodiversity – the presence of many different kinds of plants, animals and ecosystems	2	Many species of fish (sturgeon), sharks, dolphins, lobster, turtles, squid and birds (megapode, kingfisher) and a few island trees.
2. Presence of rare, threatened, or endangered species (plants and animals)	2	Sturgeon fish
3. Ecosystems (e.g. wetlands, grasslands, coral reefs etc) that are rare because they have been cleared or destroyed in other areas	2	Reef ecosystem is important, although its values have been reduced due to coral bleaching.
4. Protecting clean, fresh water	0	
5. Sustaining important species in big enough numbers that they are able to survive here	2	The island is small, but the reef is big. It is important because it is connected to Laugum and Tabad WMAs.
6. Providing a source of employment for local communities now	0	
7. Providing resources for local subsistence (food, building materials, medicines etc.)	2	
8. Providing community development opportunities through sustainable resource use	2	Nothing much at the moment, but we are trying to improve community development to help the clan members.
9. Religious or spiritual significance (e.g. tambu places)	2	Healing stone
10. Plant species of high social, cultural, or economic importance	2	There is garden land in the island where we plant crops. Just for household use. Noni (herb) is found on the island and has a variety of uses (e.g. body oil, eating)
11. Animal species of high social, cultural, or economic importance	2	Fish are important outside – spillout effect
12. Attractive scenery	2	
13. Tourism now	1	Some tourists; they pay fee to the tourist operation; no benefit to us.
14. Potential value for tourism in the future	2	If the tourists come and we take them around that would be OK; facility to take them to the island; pay fee to the community.
15. Educational and/or scientific value	2	Some research and monitoring
16. Maintaining culture and tradition on customary land and passing this on to future generations	2	Because of healing stone; grandfathers used to do the same as us; later they opened the area then fished; and later closed it.

Part 3: What are the threats to the protected area?

Table 4: Threats to the protected area

- H** High significance threats are seriously degrading values. This means they are badly damaging some value –it might be a kind of animal or plant, or your traditional gardens
- M** Medium threats are having some negative impact – they are damaging values but not so badly
- L** Low threats are present but not seriously damaging values
- 0** N/A where the threat is not present in the protected area or where something is happening but is not threatening the values at all

Threat type	Score (H,M,L,0)	Notes
1.1 Housing and settlement	M	More settlement on the mainland and more people (from other clans) and they break the laws for the WMA e.g. illegal fishing, diving, netting and causing damage to the WMA. We have no rangers in place to stop this illegal entry. This mainly happens at night.
1.1a Population increase in the protected area community	M	Growth of local population (Ward 6 has >6000 people). Family planning is in place and it is working. There are many unwanted/unplanned pregnancies. The 'meri stap' group and church groups try to educate young people. Traditional practices of birth control are not common, although we still have the 'boy house'. People are beginning to see the impact of population on the use of resources and the expense associated with having many children. So people are starting to think about reducing population.
1.2 Commercial and industrial areas	H	RD Tuna Company, which processed canned fish (to the north of the WMA) puts waste into the waterways which enter the Lagoon. Fishing vessels come in to the wharf and we see fuel and oil on the water; waste products enter water; and there is a smell from the factory. There is very infrequent water quality monitoring (only when funds are available) e.g. Reef Check (WWF funds and other small projects). The pollutants in the water make our skin itchy and we can't swim in the water at some times.
1.3 Tourism and recreation infrastructure	M	Tourists from the mainland enter Sinub by boat. However, there is no tourist mooring site and visitors just throw out the anchor onto the coral. Tourists fish illegally, walk and swim on the reef and this causes damage to the reef.
2.1 Customary land owner and community gardens and small crops	0	
2.1a Drug cultivation	0	
2.1b Commercial plantations	0	
2.2 Wood and pulp plantations	0	
2.3 Livestock farming and grazing	0	
2.4 Marine and freshwater aquaculture	0	
3.1 Oil and gas drilling	0	
3.2 Mining and quarrying	0	
3.3 Energy generation	0	
4.1 Roads and railroads (include road-killed animals)	0	
4.2 Utility and service lines (e.g. electricity cables, telephone lines)	0	
4.3 Shipping lanes	M	Passenger vessels travel from Karkar to Madang and we believe that the engine noise affects wildlife and also results in oil and grease entering the Lagoon.
4.4 Flight paths	0	
5.1 Hunting, killing and collecting terrestrial animals (including killing of animals as a result of human/wildlife conflict)	0	
5.2 Gathering terrestrial plants or plant products (non-timber)	0	
5.3a Logging and wood harvesting for local/customary use	0	

Threat type	Score (H,M,L,0)	Notes
5.3b Logging and wood harvesting – commercial logging	0	
5.4a Fishing, killing and harvesting aquatic resources for local/customary use	H	People enter the WMA at night – to night dive. If we had rangers we could control this, but there are no people to enforce the laws. There is spear fishing and netting that take place illegally.
5.4b Fishing, killing and harvesting aquatic resources for commercial use	H	There is some take of reef species for commercial use i.e. sale in the local markets.
6.1 Recreational activities and tourism	L	There was a ban on tourists entering the WMA and bylaws were approved in 2006. There are tambu areas for snorkelling in the WMAs. Two other islands are supposed to be used for tourist snorkelling. However, hotels and other tourist operators have boats that anchor in the WMA and cause damage to the reef. There is no compensation or payment to the WMA. They go with their guides and the local people don't know what they are telling the tourists. We want our local landowners to be paid guides. In this way we can compare the protected and unprotected and discover whether the tourists are impacting on other reefs. At Wanga there is anchor damage, reef walking, and coral loss).
6.2 War, civil unrest and military exercises	0	
6.3 Research, education and other work-related activities in protected areas	0	Found a new type of crab.
6.4 Activities of protected area managers (e.g. construction or vehicle use)	0	
6.5 Deliberate vandalism, destructive activities or threats to protected area staff and visitors	0	
7.1 Fire and fire suppression (including arson)	0	People camp on the island and tend the gardens.
7.2 Dams, hydrological modification and water management/use	0	
7.3a Increased fragmentation within protected area	0	
7.3b Isolation from other natural habitat (e.g. deforestation)	0	
7.3c Other 'edge effects' on park values	0	
7.3d Loss of keystone species (e.g. top predators, pollinators etc.)	0	
8.1 Pest plants	0	
8.1a Pest animals	M	Some crown of thorns starfish. No help provided to remove crown of thorns.
8.1b Diseases such as fungus or viruses that make native plants or animals sick	0	
8.2 Introduced genetic material (e.g. genetically modified organisms)	0	
9.1 Household sewage and urban waste water	H	Toilets are over water and this results in increasing loss of water quality and health hazards for the people. We are trying to have land based toilets introduced, but this is expensive.
9.1a Sewage and waste water from protected area facilities	0	
9.2 Industrial, mining and military effluents	H	The fish factory produces effluent and this causes a problem in the Madang Lagoon e.g. algal blooms.
9.3 Agricultural and forestry effluents (e.g. excess fertilizers or pesticides)	0	

Threat type	Score (H,M,L,0)	Notes
9.4 Garbage and solid waste	H	The impact is high especially around the villages, as people dispose of their waste in the water. In 2007 there was big clean up in the marine area in all the WMAs and there was some education to accompany this. In 2011 WWF ran a tournament for children to clean up the beach and mangroves. The WMA has run other tournaments since then. There needs to be incentives to recycle/clean up community areas.
9.5 Air-borne pollutants	0	
9.6 Excess energy (e.g. heat pollution, lights etc.)	0	
10.1 Volcanoes	0	
10.2 Earthquakes/Tsunamis	0	
10.3 Avalanches/Landslides	0	
10.4 Erosion and siltation/ deposition (e.g. shoreline or riverbed changes)	0	Seagrass on the mainland traps the sediments.
11.1 Habitat shifting and alteration	0	
11.2 Droughts	0	
11.3 Temperature extremes	L	In 2015 it was hot and dry for 7 months. Nowadays the sun is hotter than before. This is not a major problem because there are lots of trees around the island.
11.4 Storms and flooding	H	Stronger winds and longer periods of rain. There is no pattern to the storms and rain.
11.5 Coral bleaching	H	We don't monitor the reef frequently so it is difficult to say what the impact of bleaching has been. Monitoring was conducted in 2010 and 2012. Most of the reef is bleached, but we see some evidence of recovery.
11.6 Intrusion by saltwater into gardens etc.	H	Affecting well water along the coasts. Gardens are further inland and less impacted by salt water intrusion.
11.7 Sea level rise	H	The high tide is penetrating further on the mainland and other islands. Sinub is 2m above SL and is not being so severely affected.
Other (please explain)		
12.1 Loss of cultural links, traditional knowledge and/or management practices	H	Losing the skills in building fish traps (umben – net). We don't use these traditional methods anymore. There are new western style methods for fishing (finer nets and longer nets). We need to get back to the old ways and then we will get more fish (i.e. smaller nets).
12.2 Natural deterioration of important cultural site values	0	
12.3 Destruction of cultural heritage buildings, gardens, sites etc.	0	
Other (please explain)		

Table 5. Worst threats and ways forward

Threat No.	Threat (Most significant first)	Threat number or name (copy no. from Table 4)	Nature of the threat, impact and how to reduce the impact.
1	Human waste (toilets) and garbage, intrusion of salt water, sea level rise)	9.1,9.4	Over-sea toilets are used. Water quality monitoring indicated increased amounts of bacteria in the water. If all the toilets were transferred to land this would help reduce the problem. It is also related to population increase. This impacts on the reef and fish. More incentives are needed to change garbage disposal practices within the community.
2	Climate change (storms, bleaching,	11.4,11.5,11.6,11.7	We can't control this and so it is a big problem. We need a global approach to this. The high tide will eventually catch up. We can adapt and move back, but the WMA will be lost.
3	Population increase	1.1a	An immediate threat to the extraction of resources in the WMA.
4	Industrial effluent	9.2	The fish cannery (RD Tuna Company) is a major problem. In 2002 there was serious air pollution (pungent smell) from the cannery – no tourists came into Madang. We went to the manager of the

			cannery and we got advice from marine biologist and he said they could reduce the smell. Now the smell has reduced. There are threats from the Pacific Marine Industrial Zone from oil, bilge waste, and increased shipping.
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Part 4: What is the management like in the protected area?

Table 6. Management effectiveness scores, comments, next steps

Issue	Score (0,1,2,3, NA)	Comment	Next steps
1a. Legal status	3	Legally gazetted WMA.	
1b. Legal status			
2a. Protected area regulations	2	Several rules control where to fish and how to fish (e.g. no dynamite, net sizes, night fishing)	We need rangers to help us to patrol the area; equipment (boat); training in monitoring (e.g. when we started we had monitoring every 6 months, with assistance from WWF, Mama Graun, TNC, but now the help has been removed).
2b. Protected area regulations			
3. Law enforcement	1	Agreements are in place and we have some human capacity, but we don't have a ranger to help us to monitor both at night and during the day. There are penalties that were set under the WMA Management Plan and the fines were quite low and this is not a deterrent.	Need funding for ranger presence in the area and equipment e.g. boat and operational funds (e.g. fuel). There needs to be tougher penalties for offenders. There needs to be an agreement with the Local Level Government to set penalties that will deter offenders. We need to raise awareness with all communities in the Madang Lagoon, especially in urban communities who engage in recreational activities that damage the WMA.
4. Protected area objectives	2	There are several controls that have been developed as a result of the PA objectives.	
5. Protected area design	3	The WMA is small in size, but it is managed in conjunction with Laugum and Tabad WMAs, and this makes the design relatively effective. Madang Lagoon Association helps with this coordinated management.	
6. Protected area boundaries	1	The boundaries are generally respected even through there is not a visible boundary on the water. Because the WMAs are joined there is cooperation with adjacent WMA communities.	We need to raise awareness with the whole Madang community.
7. Management plan	2	The Management Plan was developed in 2006.	Greater funding is required to be able to implement the actions in the Management Plan and also to update the plan.

Issue	Score (0,1,2,3, NA)	Comment	Next steps
7a. Planning process	1	Issues are addressed and discussed with project committees and the Management Committee.	
7b. Planning process	0		
7c. Planning process	0	There was monitoring in the past e.g. socio-economic monitoring in Madang Lagoon; Reef Check monitoring; fish count monitoring; sea grass monitoring, but there is no funding now and thus no input into planning.	
8. Regular work plan	0	There is a lagoon wide work plan to undertake certain monitoring activities but there is no funding to implement this.	Funding is needed to implement the work plan.
9. Resource inventory	2	The Madang Lagoon Association is helping to train people to better manage their areas and to understand their WMAs.	More information is needed on fish breeding, numbers, mangrove areas. This requires funding for more extensive monitoring systems and training of local community members.
10. Protection systems	0	It is only by chance that we find people who should not be in the WMA.	A physical presence is needed in the WMA e.g. through rangers who can monitor and enforce the regulations.
11. Research and monitoring	1	There is some informal monitoring e.g. size of catch, species of fish.	
12. Resource management	2	Tourists are going to other islands and don't visit Sinub so often; there are fishing restrictions in place.	
13a. Staff numbers	0		
13b. Other people working on the protected area	2		
14. Training and skills	2		Management committee training e.g. planning, office/ administration, finance, IT and on-ground ranger training e.g. species monitoring, ranger exchanges
15. Current budget	0		Income generating activities in the WMA are needed e.g. ecotourism (recreational diving and village stays).
16. Security of budget	0		
17. Management of budget	NA		
18. Equipment	0	At times we have to hire equipment.	Diving equipment (goggles etc), marine survey equipment, computer to assist with data analysis, camera, boat and motor.
19. Maintenance of equipment	NA		
20. Education and awareness	1	There is not a regular programme, but there was assistance from WWF.	Raise awareness with all fishers in the Madang Lagoon (based on community survey); school education to learn about the importance of corals and fish and other resources in the WMA; hotels and tour boat operators.
21. Planning for land use or marine activities	0		

Issue	Score (0,1,2,3, NA)	Comment	Next steps
22. State and commercial neighbours	1	There was some discussion between the cannery and the community over waste disposal (it kills the shellfish in the mangroves and other fish), but there was little consideration of the impacts of these industries on our WMA.	There needs to be improved communication between the community and the neighbours. The government needs to have stronger regulations and engagement with the community to support their interests.
23. Indigenous people/ Customary landowners	2		
24a. Impact on communities	0		There has not been proper consultation with the community about WMAs. Establish an environmental officer position in the Provincial Government and this person could liaise with the community. The absence of a provincial officer means that information is not relayed to CEPA.
24b. Impact on communities	0		
24c. Impact on communities	1		
25. Economic benefit	0		
26. Monitoring and evaluation	1		
27. Visitor facilities	0		
28. Commercial tourism operators	0		
29. Fees	0		
30. Condition of values	2		
30a. Condition of values	0		
30b. Condition of values	0		
30c. Condition of values	0		

Part 5: Condition and trends of protected area values

Table 7. Values, condition and trend

Key value (from Table 2)	Condition Score (VG, G, F, P, DK)	Trend Score (I, S, D, DK)	Information source and justification for Assessment and HOW the condition can be IMPROVED
Fish	VG	S	There are problems with water quality and illegal take of fish. Improved protection systems (e.g. ranger presence) are needed and adequately resourced WMA staff.
Reefs	G	I	The reef has experienced the impacts of coral bleaching, and over-fishing, but the current management, which restricts use of the reefs, is having a positive impact and fish numbers are increasing.
Culture	F	D	Traditional fishing practices have largely been lost and other aspects of culture, mainly due to western influences.
Water quality	F	D	Water quality is impacted by human waste from toilets and garbage and the effluent from the fish cannery. Water quality monitoring is needed to provide data that can inform improved management responses.
Megapode	P	S	Very few remain, but with the protection of their habitat, it is expected that numbers will increase.

Table 8. Recommendations and ways forward

1.	2.	3.
Establish an environment and conservation office in Madang Province. The officer could provide assistance with management issues and information on funding opportunities.	Increase funding for a range of essential equipment and personnel within the WMA and to enable the Madang Lagoon Coordinator to effectively undertake his responsibilities. Funding is also needed for rangers so that they can effectively conduct their duties.	Establish an office for use by the Management Committee and the community and provide essential office equipment and training.

Table 9. Strengths and challenges (facilitator/recorder synthesis)

	Strengths	Challenges
1	The community is supportive of the WMA and its management approach and there is a Management Committee in place that is eager to deliver effective management outcomes.	Trying to maintain the values of the WMA in the face of limited funding from national and provincial governments and the withdrawal of NGOs.
2	The WMA is managed cooperatively with both Laugum and Tabad with the assistance of the Madang Lagoon Coordinator.	Trying to maintain community support in the face of limited assistance from other stakeholders (e.g. government).
3	The biological values remain high, although the reef has experienced the impacts of coral bleaching and crown of thorns starfish.	To improve the communication among all levels of government with the WMA community.
4	The WMA has the support of the LLG (Ward Councilors have regular meetings of Mondays and the WMA is discussed). They punish the law breakers and support the landowners.	To find ways to better engage with the tourism industry and tourist operators to ensure that they respect the values of the WMA and provide equitable benefit sharing as a result of their commercial tourist activities (e.g. diving, recreation etc).