

## Name of Protected Area: Horseshoe Reef 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>	Warren Jano, SPREP, wjano2009@gmail.com, 73780347, 75388867.
<i>Person 2: Name, Organisation, Address, Email, Phone</i>	Ann Peterson, SPREP/Protected Area Solutions, 283 Madill Road, Tandur, Q4570, Australia, a.peterson@uq.edu.au, 0414300955.
Today's Date	03/03/2017
Name (or names) of protected area	Horseshoe Reef Wildlife Management Area
Size of protected area (ha)	395.9
PNG Code or number	
World Database of Protected Areas site code (these codes can be found on <a href="http://www.unep-wcmc.org/wdpa/">www.unep-wcmc.org/wdpa/</a> )	NA
What level or kind of protected area is it? (National Park, Wildlife Management Area, Sanctuary, Reserve, Locally Managed Marine Area etc)	Wildlife Management Area
IUCN Category	NA
International protected area? e.g. World Heritage or Ramsar?	NA
Country	Papua New Guinea
Province/s	Central
District/s	Hiri
Local level governments	Bootless Bay
Ward/s	9
Nearest big town	Port Moresby
Location of protected area (brief description)	The reef is located at the edge of Bootless Bay, about 600m from the coastal villages of Pari, Tubusereia and Barakua and is south east of Port Moresby.
Map references	9° 34' 60" S, 147° 19' 0" E
When was the protected area gazetted or formally established?	09/06/1981
Reference for gazettal or Memorandum of Understanding (MoU)	
Who owns the protected area? please enter Government Private Community/ customary landowners, private, Other (name) and include <b>Clan name(s)</b>	Customary landowners – whole village comprising 9 clans.

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 [ <b>add clan names</b> ] management committee [ <b>how many and what gender</b> ])	There is no management and no Management Committee.
Total number of staff (this means anyone working on the protected area in <b>paid jobs</b> – whether NGOs, community, rangers or customary landowners	0
<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	
Reason for protected area establishment	So many animal species were disappearing that we decided to protect it.
What are the main values for which the area is designated (Fill this out after data sheet 2)	Coral reef; Fish; Recreation and tourism; Clean reef water; and Culture and tradition.
List the primary protected area management objectives (add lines if needed after the most important objectives): <i>Management objective 1</i>	To protect the marine species and reef.
<i>Management objective 2</i>	
<i>Management objective 3</i>	
Number of people involved in answering the assessment questions	4
Name/organisation/contact details of people participating in the assessment	<i>Sibona Hetohn</i> , CVES Central Village Environmental Services, PO Box 1607 Waterfront, hetahus@gmail.com, 73130880. <i>Gamoga Rei</i> , CVES, PO Box 1107 Waterfront, 70091412; <i>Samoa Ragi</i> , CVES, samoahirage@gmail.com, 70450968; <i>Vagi Rei</i> , CEPA, vrei@dec.gov.pg.
Customary landowners/other community; CEPA, Other national government agency; Provincial govt; local level govt; Protected area staff (anyone working on the protected area in paid jobs; NGO; Donors; External experts; Others	Customary landowners, Central Village Environmental Services, CEPA.
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?

Horseshoe is our traditional land, and has been a popular fishery for all the surrounding communities and for us to use. However, outside people use dynamite and nets to fish and this destroys the coral and the fish. There has been no enforcement to create laws to stop negative fishing. If we can come up with a waste management plan in the village this will help people to become involved in managing the reef. It will involve all the villages in the area. Horseshoe reef is very unique in terms of coral – a central area where all the fish inhabit. The two surrounding communities are attracted here to find big fish, but now they only catch small fish. The big fish are further out now. It is important to conserve it as people as using dynamite and other harmful methods of fishing. We are proposing a joint CEPA and Jica project to determine the impacts of pollution/waste water on the marine environment. We need to coordinate a program so that the village can be informed on waste management and marine conservation.

**Table 2. Key values of the protected area**

No.	Key values	Brief description	Note if endangered species or ecosystem (IUCN)
1	Coral reef	The reef ecosystem is important for the coral and also to provide habitat for fish. The WMA is mainly a portion of the barrier reef in the shape of a horseshoe; the southern portion of the reef is exposed during the low-water spring tidal levels, while the northern side is submerged. The submerged south-eastern end of the reef is connected to the adjacent submerged reefs while the north-west end border the Padana Nahua channel, one of the four major channels of the western sector of the Papuan Barrier reef. Coleman (1982) recorded 70 coral species	
2	Marine animals/fish	Fish are important for personal subsistence use and for sale. All fishers go here – it is a hotspot. The methods include line fishing, spear fishing and dynamite.	
3	Recreation and tourism	The reef is important for tourism. Port Moresby scuba divers and snorkelers come to the reef. The scuttled shipwreck of MV Pacific Gas is at a depth of about 40m on Horseshoe Reef. It is largely intact with a diversity of marine life. It is included in the 'Top Five Dive Sites near Port Moresby) (Papua New Guinea Tourism Promotions Authority, 2015).	
4	Clean reef water	To get the community involved to reduce the waste (including plastic) and keep the water clean. If we can control waste then people will support the WMA.	
5	Culture and tradition	We have canoe races that are social – a type of traditional sports.	

**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	Our culture and our traditions depend on biodiversity. Traditionally we have never damaged anything. Nowadays everything is depleting and becoming extinct and we need to preserve it. It has many fish (red emperor, snapper and marlin), turtles (green), dolphins, sea birds, sea shells and beche de mer.
2. Presence of rare, threatened, or endangered species (plants and animals)	2	
3. Ecosystems (e.g. wetlands, grasslands, coral reefs etc) that are rare because they	2	This is an important coral reef ecosystem that provides habitat for many species.

have been cleared or destroyed in other areas		
4. Protecting clean, fresh water	2	Clean water, without rubbish, is important for the wildlife.
5. Sustaining important species in big enough numbers that they are able to survive here	2	We want a diverse range of species to be able to survive here and we would like to bring back some species, such as the dugong.
6. Providing a source of employment for local communities now	0	At the moment the customary landowners are not employed in the WMA. People from other islands manage the diving and other tourism. We would like to have our people engaged in some of these income earning activities.
7. Providing resources for local subsistence (food, building materials, medicines etc.)	2	The WMA provides a source of income and fish for the customary landowners. This forms the main part of our diet.
8. Providing community development opportunities through sustainable resource use	0	There is no community development now. We are seeking this through our planned waste management program with CEPA and Jica.
9. Religious or spiritual significance (e.g. tambu places)	2	Traditionally people didn't go to the reef as it was too far to get there and fish and this place was conserved.
10. Plant species of high social, cultural, or economic importance	2	There is sea grass on the reef, but this is disappearing, perhaps because of the dynamiting. It is important to bring this back to see the return of species, such as dugong, that feed on the seagrass.
11. Animal species of high social, cultural, or economic importance	2	All fish are important for income. Some are seasonal (e.g. tuna – but now this requires a lot of effort and cost [for fuel] to get some tuna).
12. Attractive scenery	2	It is beautiful and unique – there is not much coral beyond our reef. The tuna fish come in this way. There is colourful coral, fish and shells.
13. Tourism now	2	Tourism is good now. The coral can be used as a surfing area (for board riders as there is big surf). It is also used for snorkeling and diving. There are two dive operators that do on average five dives per trip with 2 dives in the day and two at night.
14. Potential value for tourism in the future	2	Our children need to see the fish and ecosystem preserved. The Lamana Hotel is building a hotel on a nearby island and this will bring in further income to the customary landowners as a result of increased tourism.
15. Educational and/or scientific value	2	UPNG use the reef for educational and research purposes.
16. Maintaining culture and tradition on customary land and passing this on to future generations	2	It is important for the social canoe races.

### 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	H	With the increase in housing and settlement there is more waste created and an increase in over-fishing, with impacts on loss of some species and a decline in fish numbers and fish size. There is lack of education and awareness.
1.1a Population increase in the protected area community	H	The population is increasing along with the lifestyle and people generate more waste.
1.2 Commercial and industrial areas	0	There no commercial and industrial areas close to the WMA.
1.3 Tourism and recreation infrastructure	0	

Threat type	Score (H,M,L,0)	Notes
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	L	There are some shipping lanes close to the WMA and six ships have run aground in nearby areas. There is potential for ships to cause damage to the reef.
4.4 Flight paths	0	This is where the flights take off and land. The only problem would be if there was a plane crash.
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	
5.3b Logging and wood harvesting – commercial logging	0	
5.4a Fishing, killing and harvesting aquatic resources for local/customary use	H	Both the customary landowners and other communities take the fish. They use harmful methods including dynamite, small nets and night fishing. This has resulted in the decline of several species.
5.4b Fishing, killing and harvesting aquatic resources for commercial use	L	Sea cucumber, trochus, prawns and fish are sold in the local market.
6.1 Recreational activities and tourism	L	The dive companies have an anchorage point. The local community do not have these anchorage points and the boats cause some damage to the reef.
6.2 War, civil unrest and military exercises	0	
6.3 Research, education and other work-related activities in protected areas	0	UPNG use the reef for research and education purposes.
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	L	Dynamite is used in fishing (perhaps only once per year) and this destroys the coral and all the living things there. This is mainly used by outsiders who come into our area. This can also be dangerous and deadly for the people who use the dynamite. The new protected area legislation will prevent the use of dynamite fishing.
7.1 Fire and fire suppression (including arson)	0	
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	

Threat type	Score (H,M,L,0)	Notes
7.3c Other 'edge effects' on park values	0	
7.3d Loss of keystone species (e.g. top predators, pollinators etc.)	H	In the olden days – from the 1960s there were big fish coming into the village. Now this is all gone. The dugongs are gone. The sharks and crocodiles are gone.
8.1 Pest plants	0	
8.1a Pest animals	0	
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	M	Sewage waste from Port Moresby is deposited at Ella Beach. Many of the settlements have over-water toilets. This causes the entry of pollutants into the area of the reef. This threat includes open drainage from Port Moresby and other settlements. The currents take the polluted water to the reef.
9.1a Sewage and waste water from protected area facilities	0	
9.2 Industrial, mining and military effluents	L	There is industrial effluent from Port Moresby.
9.3 Agricultural and forestry effluents (e.g. excess fertilizers or pesticides)	0	
9.4 Garbage and solid waste	H	The garbage comes from the city and villages as there are no formal disposal places. There is no waste management in the villages (currently people burn and bury the waste, but most ends up in the water).
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)	M	There is silt coming from the rivers and this affects the coral.
11.1 Habitat shifting and alteration	H	There has been some change in habitats e.g. the seagrass has disappeared and this may be due to climate change.
11.2 Droughts	0	
11.3 Temperature extremes	H	The temperature of the water has changed and it is now warmer – it is like summer all year long. The temperatures are hotter and stay that way for longer.
11.4 Storms and flooding	0	
11.5 Coral bleaching	H	We can see changes to the colour of the reef and it is changing to a white colour. Temperature change could be a factor. Up to 30% is bleached.
11.6 Intrusion by saltwater into gardens etc.	L	Salt water has entered the village and now the water in the wells is brackish.
11.7 Sea level rise	0	There are higher king tides.
Other (please explain)		
12.1 Loss of cultural links, traditional knowledge and/or management practices	H	We have lost many of our traditions e.g. our fishing methods, especially the taboo times for fishing, there has been some loss in Tok Place in relation to the marine species, and some decline in customary sports of canoe racing (we used traditional products to make the canoes, but now they are fibreglass). The women have shell fishing and this is now slowing down. People now go and buy tin fish instead of practicing the traditional fishing ways.
12.2 Natural deterioration of important cultural site values	0	

Threat type	Score (H,M,L,O)	Notes
12.3 Destruction of cultural heritage buildings, gardens, sites by people	0	
Other (please explain)		Lack of awareness and understanding of the reef and the threats to it.

**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	Lack of awareness and understanding of the reef and the threats to it	Other	A failure to understand the importance of the reef and the impacts of diverse threats has led to a decline in management and caring for the reef.
2	Pollution (solid waste)	9.4	Pollution sources are diverse, with the main threat currently being from solid waste (as a result of limited or no waste management in the villages) and increasing entry of garbage from Port Moresby.
3	Population increase and changing lifestyles	1.1a	

## 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	The WMA is formally gazetted.	
1b. Legal status			
2a. Protected area regulations	1	With modernisation the traditional rules are not working e.g. there are problems with waste management and overfishing in the WMA.	The village courts should introduce rules about the use of the marine resources and appropriate penalties such as fines and community work.
2b. Protected area regulations			
3. Law enforcement	0	There is no current enforcement.	We would like to see the community abide by the rules. We would like to develop a management program for waste and this will raise awareness about good practices in relation to the WMA.
4. Protected area objectives	0	There are no agreed objectives.	We need to develop the waste management program and consult with the community identify our agreed objectives.
5. Protected area design	0	The WMA is small.	The whole of Bootless Bay should be protected.
6. Protected area boundaries	1		We need to raise awareness within the wider community of the boundaries and value of the WMA.
7. Management plan	0		
7a. Planning process	0		
7b. Planning process	0		
7c. Planning process	0		
8. Regular work plan	0		

Issue	Score (0,1,2,3, NA)	Comment	Next steps
9. Resource inventory	0	There is no information available.	We want the area to be fully protected and respected and with sufficient information for us to manage the area.
10. Protection systems	0		Local people need to get permission to enter the WMA and for tourism operators we would like to establish benefit sharing arrangements and this would help us to manage the reef.
11. Research and monitoring	0		We would like some information about the reef and its species.
12. Resource management	0		
13a. Staff numbers	0		
13b. Other people working on the protected area	0		
14. Training and skills	0		The Waste Management Plan aims to introduce a ranger system with people from the village trained as rangers. The rangers would then run programs to raise awareness.
15. Current budget	0		Our aim is to seek assistance from CEPA and Jica to fund the Waste Management Program. We have had discussions with CEPA, Jica, the Provincial Government and some local businesses and LLG. This is a cooperative effort that would solve problems in the wider area.
16. Security of budget	0		
17. Management of budget	NA		
18. Equipment	0		We need dinghies, flat top truck and a backhoe (for scooping up rubbish).
19. Maintenance of equipment	NA		
20. Education and awareness	0		Plans are being prepared to help raise awareness.
21. Planning for land use or marine activities	0		
22. State and commercial neighbours	2		
23. Indigenous people/ Customary landowners	1		
24a. Impact on communities	1		
24b. Impact on communities	0		
24c. Impact on communities	1	Some of the fishers have mixed feelings about protecting the reef. If people protect the reef they are concerned about not having access to the reef.	
25. Economic benefit	2		
26. Monitoring and evaluation	0		
27. Visitor facilities	0		We would like tourists to pay to use our reef.
28. Commercial tourism operators	0		We need a benefit sharing arrangement.



Issue	Score (0,1,2,3, NA)	Comment	Next steps
29. Fees	NA		
30. Condition of values	2		
30a. Condition of values	0	There is no monitoring to assist management	
30b. Condition of values	0	There are no specific management programs.	
30c. Condition of values	0	There is no routine management.	

## 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
Coral reef	F	D	For waste the condition is poor and it affects many other aspects of the reef.
Fish	F	D	The fish are depleting and dying out.
Recreation and tourism	G	S	The site is popular with tourists who come to dive and snorkel. The relative closeness to Port Moresby enhances its popularity.
Clean reef water	DK	DK	Water is thought to be in decline, but there is no monitoring information available.
Culture and tradition	F	D	There is a loss of tradition and culture, especially in relation to Tok Place used to describe the fish and elements of the environment.

**Table 8. Recommendations and ways forward**

1.	2.	3.
We need leadership training to raise awareness among the community.	We need funding to implement the Waste Management Plan.	Improve the equipment available for use in the WMA e.g. boat, flat top truck and backhoe.

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

	Strengths	Challenges
1	There are potential future benefits from commercial tourism.	Negotiating a benefit sharing arrangement with the commercial tour operators that visit the WMA.
2	The WMA is legally gazetted.	Obtaining sufficient funds and support to develop the community's proposed Waste Management Plan.
3	Close access to Port Moresby offers opportunities for expanded tourism and income generation.	
4	Attractive scenery within Bootless Bay.	

### References

- Genolagani, JMG. Nd. An assessment on the development of marine parks and reserves in Papua New Guinea, National Parks, Conservation, and Development. National Parks Service, Office of Environment and Conservation, Papua New Guinea, 322-329.
- Papua New Guinea Tourism Promotions Authority, 2015. Top five dive sites near Port Moresby. Available at <http://www.tpa.papuanewguinea.travel/ViewServices/News.aspx?EventPage=1&rqEventID=457>.