

Name of Protected Area: Laugum 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 Person 1: Name, Organisation, Address, Email, Phone	Fiona Leverington, SPREP/Protected Area Solutions, Fiona@protectedareas.com.au, 61746573024.
Person 2: Name, Organisation, Address, Email, Phone	Greg Peterson, SPREP/Protected Area Solutions, 283 Madill Road, Tandur, Q4570, gregpeterson53@hotmail.com.
Today's Date	22/08/2016
Name (or names) of protected area	Laugum Wildlife Management Area
Size of protected area (ha)	75
PNG Code or number	
World Database of Protected Areas site code (these codes can be found on www.unep-wcmc.org/wdpa/)	316938
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	
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)	Islands in the Madang Lagoon, and some of the land and a lake. 15km north of Madang. Mainly marine, mangroves and islands. Laugum WMA is connected to Sinub and Tabad and is part of the Madang Lagoon Association.
Map references	
When was the protected area gazetted or formally established?	26/01/2006
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 Clan name(s)	Customary landowners, the community. Dauzagaz

Number of households living in the protected area	Around 20 on the islands; and 15 on the mainland within the WMA.
Population size within the protected area	The clan consists of 700 people and over 175 people live within the protected area.
Who manages the protected area? (e.g. please enter government, customary landowners [add clan names] management committee [how many and what gender])	Customary landowners – Dauzagaz Clan – Laugum Management Committee (4 men)
Total number of staff (this means anyone working on the protected area in paid jobs – 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	UNDP and WWF provided funds for boat hire and the mangrove nursery project (labour and materials). Funding stopped after the nursery was destroyed by vandals. About 20,000 kina was spent and the rest is in a WWF account.
Reason for park establishment	The protected area was started because the number of fish was declining and the human population was increasing. We decided to gather the community for a meeting and agreed on establishing the WMA. Prior to this several individuals (e.g. the marine biologist Aaron Jenkins, Sullivan and Larry Olsen) and groups (e.g. the Christensen Research Institute in Madang) motivated the community to protect their marine resources.
What are the main values for which the area is designated (Fill this out after data sheet 2)	Fish breeding area and fishing; cemetery reserve; mangroves; Laugum Lagoon and reef; dolphin and turtles.
List the primary protected area management objectives (add lines if needed after the most important objectives): <i>Management objective 1</i>	To maintain or increase the fish catch through protecting fish breeding areas in the mangroves and reefs.
<i>Management objective 2</i>	To protect important cultural sites in Laugum lagoon and knowledge.
<i>Management objective 3</i>	
Number of people involved in answering the assessment questions	3
Name/organisation/contact details of people participating the assessment (<i>Please do not insert return/enter or dot points</i>)	<i>Wolf Aduadak</i> , Chair, Management Committee, 79274920; <i>William Begg</i> , Management Committee member, PO Box 702, Madang, 70061844, wbe57@live.com ; <i>Frankie Duadak</i> , Management Committee member 73585637.
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 and chairperson, management committee.

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

The WMA area is partly connected to Sinub and Tabad. The three WMAs are connected. The communities are living within the WMA on two islands. We preserve one island as the cemetery and there is no gardening there. There was a catholic church on the island before World War 2. The WMA is divided into three zones: 1) a breeding zone with no fishing; 2) the fishing zone with only traditional methods of fishing allowed, such as spear guns, bow and arrows, hooks and line (no poison rope); 3) breeding area with some fishing allowed at some times. Marine species are important for livelihoods and some are for sale (e.g. fish, crayfish and prawns). Turtles are seen in the water, but do not nest in the WMA. The vegetation is grassland as the trees were cut down by missionaries and for use in building canoes. The climate change program funded by the UNDP enabled us to develop a mangrove nursery. However, due to internal disputes (e.g. a person was put in prison for dynamiting the reef outside the protected area), people sprayed the mangrove as a form of retribution and destroyed the nursery. It is now not operational.

Table 2. Key values of the protected area

No.	Key values	Brief description	Note if endangered species or ecosystem (IUCN)
1	Fisheries (fish catch)	Main value from the customary landowner viewpoint is to breed fish for use (both subsistence and commercial). The breeding zone where there is no fishing is an important nursery supplying marine resources for other areas of the WMA and the Madang Lagoon.	
2	Mangroves	Mangroves in the past were destroyed by our fathers (75%) to make sandy beaches and to use the mangrove wood. The community has learned the importance of the mangroves and is trying to restore them. The mangroves' role as a fish nursery is now respected.	
3	Laugum reef has cultural value	There is respect for the reef. Laugum is the name of the spirit that looks after the reef. Our tradition is to take water from the reef and wash the newborn child. If people are sick, they dive down on the reef and drink the water and will be healed. There are voices in the area – especially at full moon. Women mainly fish at the full moon. Men do night diving.	
4	High fish diversity (e.g. endemic damsel fish)	Scientists have discovered a new fish restricted to Madang lagoon and many landowners are aware of the Madang Lagoon's biodiversity.	
6	Spinner dolphin, bridled dolphin, turtles and dugong	These animals are seen in waters within the WMA, but their status is unknown. People see the tracks of the dugong in the seagrass.	Spinner dolphin, bridled dolphin, turtles
5	Coral reefs	These systems are important to provide habitat for fish and other species. They are of very high quality and diversity. They are affected by bleaching and crown of thorns starfish.	

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	The WMA is important for a wide range of species, many of which are endemic. It is important for fish and coral (estimates of coral species diversity for Madang Lagoon are as high as 700 species) and it helps to provide for food security. Within the lagoon are turtles (hawksbill and green), dolphins and dugong, as well as birds. Madang Lagoon is the most ecologically diverse lagoon on PNG's north coast (Jenkins 2002). The reef fish in the Lagoon are of local, national and international importance (Jenkins 2002). 850 reef species have been recorded within the lagoon and these represent 57% of PNG and 14% of world reef species (Jenkins 2002).
2. Presence of rare, threatened, or endangered species (plants and animals)	2	There are endemic damsel fish and other globally endangered species. However, there is no recent data on occurrence or numbers. The customary land owners believe that it is very important for the children to know about these species for the future. They are trying to involve boys in this. The WMA contains globally endangered hawksbill and green turtles and several IUCN listed marine mammals (e.g. spinner/bridled dolphin and dugong).
3. Ecosystems (e.g. wetlands, grasslands, coral reefs etc) that are rare because they have been cleared or destroyed in other areas	2	The main ecosystems are reefs, mangroves and seagrass. The coral reefs are very important, especially for fish and a range of marine species and also the coastal mangrove ecosystems (e.g. breeding area for fish and rays).
4. Protecting clean, fresh water	2	Wells on the islands are important to provide water and salt water is also used for cooking (and must be clean).
5. Sustaining important species in big enough numbers that they are able to survive here	2	The WMA is important for fish breeding. It is also connected to Sinub and Tabad WMAs, thus providing a much larger area of protection to species within Madang Lagoon.
6. Providing a source of employment for local communities now	0	There are no employment opportunities now, however, this could change in the future.
7. Providing resources for local subsistence (food, building materials, medicines etc.)	2	The WMA is very important in providing resources, mainly marine resources (e.g. fish and shells).
8. Providing community development opportunities through sustainable resource use	2	There is little community development currently (the mangrove rehabilitation project has ceased operation). However regeneration of the mangroves is important in the future.
9. Religious or spiritual significance (e.g. tambu places)	2	Laugum reef has special cultural importance (refer Table 2).
10. Plant species of high social, cultural, or economic importance	2	Few trees remain, but the plant species do have cultural importance.
11. Animal species of high social, cultural, or economic importance	2	Shells are used to make necklaces; fish provide protein for subsistence and for sale; a butterfly fish is carved into headdresses, which are worn for dancing and festivals.
12. Attractive scenery	2	The water and reefs have aesthetic values, especially to attract tourists.
13. Tourism now	2	It is important, but there is little tourism currently. We have tried tourism development on the island but have not had sufficient support from the tourism authorities. All economic benefits go to the resorts in the area.
14. Potential value for tourism in the future	2	This is important for our future. There is potential for diving tourism.
15. Educational and/or scientific value	2	The Madang Lagoon is an important marine area and is important for scientific research and also for education of our community (e.g. there are programs in the schools).

		Many scientists have come in the past (e.g. mangrove rehabilitation training). Research was important in the past because the Christensen Research Institute was located there.
16. Maintaining culture and tradition on customary land and passing this on to future generations	2	This is very very important – ‘if we lose this, we lose our identity. We must keep our culture for the future’.

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	This is a high threat because population is increasing and as a result the bush needs to be cleared for new houses. There are also some problems with the settlement on the island.
1.1a. Population increase in the protected area community	H	Most people have from four to 10 children and the increasing numbers are a threat to the marine resources e.g. there is overfishing.
1.2 Commercial and industrial areas	H	The tuna cannery is a very high threat to the WMA. The Pacific Marine Industrial Zone (PMIZ) will be built within the Madang Lagoon. The bridge construction has already started. Up to 10 canneries will be built in the area. Many concerns have been raised with the authorities, including the national government. There is the threat of oil spills from fishing vessels, whose number will increase, and the dumping of rubbish. We were not consulted in the development of the Environmental Impact Statement. The environmental plan needs to be reviewed as this development will be a major disaster for the WMAs. The area was declared as an economic development zone. More than 100 vessels will use the area.
1.3 Tourism and recreation infrastructure	L	
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	There used to be a crocodile farm.
3.1 Oil and gas drilling	0	
3.2 Mining and quarrying	0	There is potential for this to occur in the future – a feasibility study is being undertaken.
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	H	Coastal ships travel between Laugum and Sinub WMAs. Waste is dumped in the area and the ships damage the reefs. This pressure will increase in the future with further industrial expansion.
4.4 Flight paths	H	The nearby airport is to be expanded and noise is a threat to the WMA and this will increase in the future. Aircraft fly directly over the houses.
5.1 Hunting, killing and collecting terrestrial animals (including killing	0	

Threat type	Score (H,M,L,O)	Notes
of animals as a result of human/wildlife conflict)		
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	Outsiders enter the WMA at night and steal fish. Clan members are also included in this take of marine resources.
5.4b Fishing, killing and harvesting aquatic resources for commercial use	0	There is no commercial fishing within the WMA, but the commercial fishing in surrounding waters may be having an impact on fish stocks within the WMA.
6.1 Recreational activities and tourism	M	People picnic on the islands and leave rubbish. Boat anchors also cause 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	
6.4 Activities of protected area managers (e.g. construction or vehicle use)	0	The customary landowners who look after the WMA take care when they are in the WMA.
6.5 Deliberate vandalism, destructive activities or threats to protected area staff and visitors	H	The mangrove nursery (located on the mainland) was destroyed by vandals and has not been replaced. The mangrove rehabilitation program has stopped as a result.
7.1 Fire and fire suppression (including arson)	0	
7.2 Dams, hydrological modification and water management/use	M	Wells on island sometimes become brackish.
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	H	There are negative effects from the nearby tuna cannery e.g. water pollution, odour (see threat 9).
7.3d Loss of keystone species (e.g. top predators, pollinators etc.)	H	Some fish species that were seen in the past have now disappeared e.g. some eels, big mud-crabs and some corals.
8.1 Pest plants	L	Algae is growing over the reefs and killing them.
8.1a Pest animals	H	Crown of thorns starfish is present on the reef and causing destruction of the reefs.
8.1b Diseases such as fungus or viruses that make native plants or animals sick	DK	Don't know what causes some mortality.
8.2 Introduced genetic material (e.g. genetically modified organisms)	0	
9.1 Household sewage and urban waste water	H	Most houses have toilets over the sea and the waste pollutes the water in the lagoon.
9.1a Sewage and waste water from protected area facilities	0	
9.2 Industrial, mining and military effluents	H	Waste is dumped from the Basamuk refinery (Ramu Nickel, which is a nickel/cobalt mine) and this has killed fish in the lagoon. There is also pollution from the tuna cannery.
9.3 Agricultural and forestry effluents (e.g. excess fertilizers or pesticides)	H	Logging occurs upstream and effluent enters the Madang Lagoon and affects the water quality and marine species.
9.4 Garbage and solid waste	H	There is plastic 'all over the mangroves' and other waste material. This impacts particularly on the turtles and there are 'many dead turtles'.

Threat type	Score (H,M,L,O)	Notes
9.5 Air-borne pollutants	H	There is a very bad smell every day from the tuna cannery.
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)	H	There is siltation from the rivers and some islands are disappearing. The main cause is from logging on the mainland. There is erosion along the coastal mainland.
11.1 Habitat shifting and alteration	H	There is a change in the type of species.
11.2 Droughts	0	
11.3 Temperature extremes	M	We have noticed a change in water temperature – it is sometimes very hot.
11.4 Storms and flooding	M	
11.5 Coral bleaching	H	Many corals are bleached and there is algae growing on the coral. The 'fish are leaving'.
11.6 Intrusion by saltwater into gardens etc.	0	There are no gardens within the WMA.
11.7 Sea level rise	M	There is some evidence of a rise in the sea level, with erosion of the coastline.
Other (please explain)		
12.1 Loss of cultural links, traditional knowledge and/or management practices	H	The children are losing their language This is partly due to marriage to outsiders. There is a loss of knowledge of the names of fish, corals and other species. 'Tok Pisin (the national language) is not good enough to communicate these values'.
12.2 Natural deterioration of important cultural site values	0	
12.3 Destruction of cultural heritage buildings, gardens, sites etc.	0	The destruction of cultural heritage sites results in a loss of our traditions and population.
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	Industrial development	2.1	The expansion of the Pacific Marine Industrial Zone is likely to increase negative impacts on the Madang Lagoon. There are existing impacts from the Basamuk Refinery and tuna cannery. This has impacts on water quality and loss of species and deterioration in reefs.
2	Housing and settlement	1.1	Causes loss of vegetation and contributes to other threats, including increased pollution, rubbish and loss of culture
3	Vandalism	6.5	Vandals destroyed the mangrove nursery and mangrove rehabilitation site.

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	The Management Plan has agreed objectives, but these rules are not always achieved. There is a marine zoning plan in place, including no take areas (about 60%) and areas for subsistence fishing using non-destructive methods.	We need improved communication with the community about the WMA's rules.
2b. Protected area regulations			
3. Law enforcement	1	People come in at night to steal fish and other marine food. This is difficult to monitor and enforce (e.g. we don't have a boat). The Management Committee are members of the same community and it is difficult for community members to enforce the law with their own people. Police can enforce some laws relating, for example to dynamite fishing.	We need a budget and improved skills within the community. The Government agencies also need to provide patrols to assist with implementation of the rules.
4. Protected area objectives	2	Objectives are agreed, but not all the objectives have been achieved.	Regular review and updating of the objectives.
5. Protected area design	1	The WMA is connected to Sinub and Tabad WMAs and this compensates for the small size of the WMA. The WMA is part of the Madang Lagoon Association and this assists with more integrated management. Population is too large, or the WMA is too small to provide for the needs of the community.	Discuss options for more integrated management, for example through the Madang Lagoon Association.
6. Protected area boundaries	1	The boundary is known but not everyone respects it.	Awareness raising and education programs are needed to ensure customary landowners and others are aware of the WMA boundaries.
7. Management plan	3	The current Plan is dated 2006 and it is believed to be 'still okay'.	More funding is needed to assist with management planning.
7a. Planning process	1	There is a process to involve the customary landowners in management planning.	
7b. Planning process	0	There is no regular plan review process.	Obtain funding to assist with plan review.
7c. Planning process	0		
8. Regular work plan	1	A work plan exists e.g. there is a plan to monitor fish populations and undertake a reef check every six months. People are trained. However, after a couple of years of operation, this work has ceased.	More funding is needed to assist with implementing the work plan and training the community.

Issue	Score (0,1,2,3, NA)	Comment	Next steps
9. Resource inventory	1	There has been some inventory of fish stocks in the past.	Regular monitoring would give more data about fish numbers and breeding etc. Information is important for management.
10. Protection systems	2	The WMA zoning system regulates resource use. The community knows what is going on in their WMA e.g. the people hear if dynamite is being used and they are watching what is happening.	Protection would be improved with some equipment, e.g. boat to enable access to the WMA.
11. Research and monitoring	1	There was a big survey undertaken in the past by a French research team, but there has been no recent research and monitoring.	Equipment (e.g. boat) and training are needed to assist with monitoring and research.
12. Resource management	2	We have identified and implemented no-fish zones and we had started a revegetation program (mangrove nursery was destroyed by vandals).	We need to restart the mangrove nursery and to get assistance to help with monitoring and management.
13a. Staff numbers	0		
13b. Other people working on the protected area	2	Committee and customary landowners are working on the WMA.	
14. Training and skills	2	People were trained in the past to undertake monitoring.	The community would like more skills in data collection, diving, marine biology, report writing, finance, law enforcement and general management.
15. Current budget	0	There has been no budget for management.	We need income generation within the WMA, e.g. tourism.
16. Security of budget	0		
17. Management of budget	NA		
18. Equipment	0	There is no equipment to assist with management and enforcement.	We need diving equipment, an office, computer, boat and motor, marine survey equipment and moorings.
19. Maintenance of equipment	NA		
20. Education and awareness	2	There is a school program that includes issues about the environment. Community meetings are held every Monday and we can get messages out to the whole group at that time. There is a notice board that includes reminders to everyone, including visitors, about the WMA's rules.	Funding is needed to get better education into the schools. The billboard at the entrance is getting a bit old and faded and should be replaced.
21. Planning for land use or marine activities	0	Outside developments threaten the WMA and land use planning has not taken the conservation needs into account. There are pressures from industrial development and settlement especially on the mainland.	Improved consultation with a wide range of external stakeholders is needed to ensure that impacts on the WMA are nil or minimal.

Issue	Score (0,1,2,3, NA)	Comment	Next steps
22. State and commercial neighbours	3	Officers from the Local Level Government have discussed various developments proposed in the region with the community. There has been less communication with the national government.	There needs to be regular meetings and better dialogue with both government and commercial enterprises.
23. Indigenous people/ Customary landowners	3	The customary landowners directly participate in decision making in the WMA.	
24a. Impact on communities	0	There has been little or no communication with CEPA.	There needs to be regular interaction with CEPA to assist with achieving management outcomes.
24b. Impact on communities	0	There are currently no programs directed at improving community welfare.	Mangrove revegetation, if restarted, could provide long-term employment for the community.
24c. Impact on communities	1	The landowners support the WMA because they can see benefits from it.	
25. Economic benefit	2	Catching fish that contributes to people's livelihoods and some are used for sale to generate income.	The tourism potential of the WMA could be explored.
26. Monitoring and evaluation	1	Unplanned monitoring occurs, mainly as a result of the landowners moving through the WMA and being aware of activities in the WMA.	Improved monitoring and evaluation are needed to enhance management outcomes.
27. Visitor facilities	0	There are no visitor facilities.	Engage tourism operators so that tourists will come and appropriate facilities can be built.
28. Commercial tourism operators	0		See above.
29. Fees	0		There is potential for the operators to contribute to the protected area
30. Condition of values	2	The condition of the values, in general remains good.	
30a. Condition of values	0	There has been no monitoring and evaluation.	
30b. Condition of values	0	There are no specific management programs to address threats.	
30c. Condition of values	0	There are no routine activities undertaken to manage the WMA.	

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
Fisheries (fish catch)	VG	I	Mangrove revegetation program will further improve the fish catch.
Mangroves	G	I	Mangroves had been destroyed by fathers (was 75%) to make a sandy beach, for wood etc – now trying to restore
Laugum Reef (cultural)	VG	S	

High fish diversity e.g. endemic damsel fish	G	S	Need more information on this – numbers may be increasing
Spinner Dolphin, bridled dolphin, turtles, dugong	DK	DK	Dolphins are often seen; see the tracks of the dugong in the seagrass; some turtles come in to die – they are affected by plastics
Coral reefs	G	D	Bleaching affects coral; and there is crown of thorns damage

Table 8. Recommendations and ways forward

1.	2.	3.
Investigate funding opportunities.	Improve the equipment within the WMA e.g. an office/resource centre.	Implement training and capacity building projects and create income-building projects to get people away from a reliance on fishing all the time.

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

	Strengths	Challenges
1	Strong community support for the WMA.	Lack of any resources or external support.
2	Connectivity with other adjacent WMAs, within the overall Madang Lagoon Association.	Increasing population with finite and decreasing resource base The gardens are producing less, the populations are increasing so there is less land, and consequently the people have to buy more food from the markets. There is a need for the WMA to provide additional resources.
3	Visible success of the WMA's management in increasing fish populations.	Minimising the potential impacts from the large-scale industrial development planned in Madang Lagoon.
4	Remaining strong cultural links with the reefs.	