

Name of Protected Area: Mt. Kaindi 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>	Gregory Peterson, SPREP Protected Area Solutions, 283 Madill Road, Tandur, Q4570, Australia, gregpeterson53@hotmail.com, +61754835155.
<i>Person 2: Name, Organisation, Address, Email, Phone</i>	Vagi Rei, Conservation and Environment Protection Authority, P.O. Box 6601, Boroko, National Capital District, rei.vagi@gmail.com, 76224416; and Ann Peterson, SPREP/Protected Area Solutions, 283 Madill Road, Tandur, Q4570, Australia, a.peterson@uq.edu.au; 0414300955.
Today's Date	30/08/2016
Name (or names) of protected area	Mt. Kaindi Wildlife Management Area
Size of protected area (ha)	1503
PNG Code or number	
World Database of Protected Areas site code (these codes can be found on www.unep-wcmc.org/wdpa/)	316937
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	Morobe
District/s	Bulolo
Local level governments	Wau Rural
Ward/s	7
Nearest big town	Wau
Location of protected area (brief description)	South-west of the provincial capital of Lae and near the town of Wau. It is close to McAdam National Park and Mt Susu Natural Reserve. The WMA covers the top of a mountain (elevation ranges from 1600 to >2300m) and includes the two highest peaks. The boundary follows a road for some distance. The mountain area has steep sided hills with tropical forest. It has several waterfalls and creeks (e.g. Kunai and Hospital Creeks), which provide the water supply for the town on Wau. It is surrounded on all sides by mining and settlements.
Map references	1:100,000 Topo. Wau sheet 8283
When was the protected area gazetted or formally established?	15/03/1990
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. Bialgai tribe. Clans: Siwik; Kelege; Munanga; luanni; Kobiaklinge; Kongawe.
Number of households living in the protected area	No customary landowners live in the protected area, although there are illegal settlers.
Population size within the protected area	Unknown number of illegal settlers (thought to be large).
Who manages the protected area? (e.g. please enter government, customary landowners [add clan names] management committee [how many and what gender])	Wildlife Management Area Committee
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	0
Reason for park establishment	To stabilise hills and surrounding mountains to protect the town of Wau (from encroaching miners and squatters) and to protect the wildlife.
What are the main values for which the area is designated (Fill this out after data sheet 2)	Insect and butterfly and Alexander butterfly, bird of paradise, waterfall, tree wallaby, araucaria trees, medicine plants.
List the primary protected area management objectives (add lines if needed after the most important objectives): <i>Management objective 1</i>	To protect species
<i>Management objective 2</i>	To preserve the natural environment and ecosystem.
<i>Management objective 3</i>	Clean water for town water supply.
Number of people involved in answering the assessment questions	6
Name/organisation/contact details of people participating the assessment (<i>Please do not insert return/enter or dot points</i>)	<i>Samuel Sesiguoc</i> , Patrol Officer, Wau Rural LLG, PO Box 81 Bulolo, ssesiguoc@yahoo.com, 72161956/73275799; <i>Steven Pabia</i> , Bulolo District Rural Development Officer, Bulolo District Administration, PO Box 178, Bulolo 71752952; <i>Martin Denny</i> , Mt Kaindi WMA Chairman, c/- Wau Rural LLG, PO Box 81 Bulolo; <i>Arisap Yiamu</i> , c/- Wau Rural LLG, PO Box 81 Bulolo, 73672957; <i>Robert Buka</i> , c/- Wau Rural LLG, PO Box 81 Bulolo, 79620135; <i>Kaiyu Kipai</i> , c/- Wau Rural LLG, PO Box 81 Bulolo, 71475803.
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, Local level government.

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 consists of mountains with vegetation comprising *Araucaria* mixed forests (with oaks), *Eleocharpus* mixed rainforest, *Nothofagus* mixed rainforest and alpine forests, but has suffered significant loss as a result of the illegal activities of the squatters. There are also pandanus palms that have cultural importance. There is a range of fauna, including the Alexander birdwing butterfly, beetles, birds, snakes and fish. The area once had tree kangaroos and cassowaries, and the rare short-nose echidna, but these have not been seen recently. The WMA is very scenic and has an access road to the top of the mountain. Gressitt's (1978) book "Guide to Mt Kaindi: Background to Montane New Guinea Ecology", outlined a diverse range of fauna and flora in Mt Kaindi.

Table 2. Key values of the protected area

No.	Key values	Brief description	Note if endangered species or ecosystem (IUCN)
1	Alexander birdwing butterfly	Potential income source from mounting specimens for sale overseas.	Alexander birdwing butterfly
2	Spiritual places	Sacred place that kills people (i.e. the lake).	
3	Beetle collection	Potential income source from mounting specimens for sale overseas.	
4	Fresh water	Fast flowing creeks with scenic waterfalls. It is also a source of water for the town of Wau. Water is taken from the Hospital and Kunai creeks, which have sources in the WMA.	
5	Protecting the natural environment	Significant scenic qualities of steep mountain ranges and forested hills, with diverse species	

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	It is a safe haven for plant and animal species in an environment that has been largely altered outside the boundaries of the WMA (e.g. by mining and gardens). It is thought to provide habitat for several birds (Wattled brush turkeys, lorikeets and fruit doves), small mammals and bats. It also provides a landscape function as it is in close proximity to other protected areas (e.g. about 7kms from McAdam National Park and further to Mt Susu Natural Reserve and other remnant habitat to the south of the park).
2. Presence of rare, threatened, or endangered species (plants and animals)	2	It may provide habitat for the Alexander birdwing butterfly, Boelen's python and echidna. However, no information is available on these species or other rare and threatened species or endemic species.
3. Ecosystems (e.g. wetlands, grasslands, coral reefs etc) that are rare because they have been cleared or destroyed in other areas	2	Surrounding areas are all mined and the WMA provides "an oasis of natural environment". There are important forest ecosystems including <i>Araucaria</i> mixed forests (with oaks), <i>Eleocharpus</i> mixed rainforest, <i>Nothofagus</i> mixed rainforest and alpine forests.
4. Protecting clean, fresh water	2	Water from Hospital Creek and Kunai Creek, which originate in the WMA, supply Wau town.

5. Sustaining important species in big enough numbers that they are able to survive here	2	The WMA provides is important to provide habitat to wildlife, but there is no information on the current status of wildlife in the WMA.
6. Providing a source of employment for local communities now	2	There is no employment now, other than some customary landowners and illegal settlers who engage in alluvial gold mining (some have mining leases). Assistance is needed to realize the potential of the area.
7. Providing resources for local subsistence (food, building materials, medicines etc.)	0	The customary landowners, in general, reside outside of the WMA and obtain their subsistence materials elsewhere. However, there are many illegal settlers who obtain food, building material and resources from within the WMA.
8. Providing community development opportunities through sustainable resource use	1	Most activities are illegal (mining, gardening and hunting) and they are unsustainable.
9. Religious or spiritual significance (e.g. tambu places)	2	Significant places for ceremonies are found in the WMA.
10. Plant species of high social, cultural, or economic importance	2	Perfume, plants for decoration and paint, the pandanus palms (which traditionally signify land ownership) and beetlenut and some medicinal plants.
11. Animal species of high social, cultural, or economic importance	2	Python, lizards, cassowaries, bird of paradise and tree wallabies (although some have not been seen recently).
12. Attractive scenery	2	High natural amenity based on mountains, rivers and forests.
13. Tourism now	0	There is no tourism now. Marketing is required to realize the potential.
14. Potential value for tourism in the future	2	We have big hopes for future tourism. We need help to work out a business plan.
15. Educational and/or scientific value	2	The University of Technology, Lae is establishing forestry research projects in nearby Bulolo. The personal development subject that is taught in schools includes environmental studies. The WMA was supported in the early days by the Wau Ecology Institute, which conducted research since the 1960s and provided several type species that are lodged in museums in PNG and elsewhere. The Institute ceased operations around 2007 (now managed as a local coffee plantation).
16. Maintaining culture and tradition on customary land and passing this on to future generations	2	Critically important that the protected area plays a role in the continuation of ancestral traditions.

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	Squatter numbers are increasing in the WMA and outside. They settle illegally and then extract resources from the WMA.
1.1a Population increase in the protected area community	H	Very high because of settlement of people from outside the local area. The settlers started to come into the area in the mid-1980s (before the park was gazetted). The settlers come in search of alluvial gold and the services that are available within the Wau-Bulolo area (e.g. electricity, health, finance).
1.2 Commercial and industrial areas	L	It is starting to become a problem with rapid increase of squatters who are beginning small scale plantations (e.g. coffee)

Threat type	Score (H,M,L,O)	Notes
1.3 Tourism and recreation infrastructure	0	There is currently no tourism, but there is a future plan for tourism, but the impact will be low.
2.1 Customary land owner and community gardens and small crops	H	The settlers have constructed gardens in the WMA and this has resulted in loss of vegetation and wildlife and fragmentation of the WMA. Some have established coffee gardens and some vanilla.
2.1a Drug cultivation	L	
2.1b Commercial plantations	M	Coffee plantations by squatters
2.2 Wood and pulp plantations	L	
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	H	Small scale mechanised gold mining occurs within and around the WMA. Small scale miners and prospectors continue to move into the WMA. This results in erosion and sedimentation and the potential input of heavy metals (e.g. mercury) into the streams, thus polluting the water supply and impacting on instream fauna and flora.
3.3 Energy generation	0	
4.1 Roads and railroads (include road-killed animals)	H	Results is the killing of animals in both the night and day.
4.2 Utility and service lines (e.g. electricity cables, telephone lines)	L	Very small section of the protected area has electricity cables, but the impact is low.
4.3 Shipping lanes	0	
4.4 Flight paths	L	Chemicals carried by helicopters enter the WMA.
5.1 Hunting, killing and collecting terrestrial animals (including killing of animals as a result of human/wildlife conflict)	H	Squatters constantly encroach inside protected area and illegally hunt animals.
5.2 Gathering terrestrial plants or plant products (non-timber)	H	Squatters encroach into the park and take eaglewood, orchids, ferns and grasses for building materials.
5.3a Logging and wood harvesting for local/customary use	H	Hardwood is used for house construction.
5.3b Logging and wood harvesting – commercial logging	0	
5.4a Fishing, killing and harvesting aquatic resources for local/customary use	0	
5.4b Fishing, killing and harvesting aquatic resources for commercial use	0	
6.1 Recreational activities and tourism	L	Bulldog Track is a wilderness for overland trekking by tourists.
6.2 War, civil unrest and military exercises	L	There are increasing tensions between e squatters and the customary landowners and unrest within squatter settlements.
6.3 Research, education and other work-related activities in protected areas	L	
6.4 Activities of protected area managers (e.g. construction or vehicle use)	L	
6.5 Deliberate vandalism, destructive activities or threats to protected area staff and visitors	L	Isolated cases of low level vandalism.
7.1 Fire and fire suppression (including arson)	H	Fires occur only in the dry season and are a threat to biodiversity, including pine species.
7.2 Dams, hydrological modification and water management/use	L	
7.3a Increased fragmentation within protected area	M	Illegal settlers are creating fragmentation of the forest area.
7.3b Isolation from other natural habitat (e.g. deforestation)	L	

Threat type	Score (H,M,L,O)	Notes
7.3c Other 'edge effects' on park values	L	
7.3d Loss of keystone species (e.g. top predators, pollinators etc.)	L	
8.1 Pest plants	M	Mustard plant strangles the host plant and makes the soil infertile.
8.1a Pest animals	M	Domestic dogs and cats can be a threat to wildlife
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	0	
9.1a Sewage and waste water from protected area facilities	0	
9.2 Industrial, mining and military effluents	L	This is unknown, but may include heavy metal poisoning (e.g. mercury from extraction of gold). This is a problem for the river system and the people who use the water in the creeks.
9.3 Agricultural and forestry effluents (e.g. excess fertilizers or pesticides)	0	
9.4 Garbage and solid waste	0	
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	L	
10.3 Avalanches/Landslides	H	Seasonal from high rainfall and damage caused to forests and other ecosystems as a result of gardening and mining.
10.4 Erosion and siltation/deposition (e.g. shoreline or riverbed changes)	M	Seasonal from high rainfall and damage to the forest and other ecosystems as a result of mining and gardening. Increasing sedimentation of creeks and also the Bulolo River.
11.1 Habitat shifting and alteration	L	
11.2 Droughts	L	
11.3 Temperature extremes	M	It is becoming hotter in the day and cooler at night.
11.4 Storms and flooding	L	
11.5 Coral bleaching	0	
11.6 Intrusion by saltwater into gardens etc.	0	
11.7 Sea level rise	0	
Other (please explain)		
12.1 Loss of cultural links, traditional knowledge and/or management practices	H	The influence of western culture is having negative impacts on traditional values and way of life.
12.2 Natural deterioration of important cultural site values	L	
12.3 Destruction of cultural heritage buildings, gardens, sites etc.	M	
Other: land dispute	H	Gazettal of new committee members.

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	Housing and settlements	1.1	The natural amenity of the WMA is in decline due to construction of illegal housing inside the WMA along the road that forms a WMA boundary and within the WMA.
2	Population increase	1.1a	Illegal settlers are placing pressure on resources (as detailed above).
3	Mining	3.2	Damaging the water supply (erosion and sedimentation). Impact will be reduced by controlling illegal panning for gold.

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 rules originally imposed a prohibition on lighting fires, cutting trees, killing fauna, developing new gardens, building new houses and mining for gold. Most of these rules are not adhered to due to the illegal settlers who garden, hunt and remove timber.	
2b. Protected area regulations			
3. Law enforcement	1	There has been an absence of effective law enforcement since gazettal. There is a history of illegal settlement and mining and a failure to prevent these activities and their related impacts. A new Committee has been formed, but there has been a delay in approving the new committee.	Gazettal process for new members need to be fast tracked so that a new Management Plan can be developed and relevant enforcement provisions and funding identified. The new protected area bill needs to be enacted.
4. Protected area objectives	1	There are no known objectives (from the time of gazettal in 1990), although the landowners indicated that the purpose was to protect the environment of the WMA. The Management Committee was not gazetted and there is no effective on-ground management to achieve the objectives.	Gazettal process for new members needs to be fast tracked and a Management Plan developed that clearly identifies appropriate objectives, especially related to biodiversity outcomes.

Issue	Score (0,1,2,3, NA)	Comment	Next steps
5. Protected area design	2	The park was originally established with the help of the Wau Ecology Institute, a research organisation involved in ecological studies in the Mt Kaindi area. The original purpose was to protect the mountain area from settlers who engaged in mining and gardening. It was utilised as a scientific study site.	
6. Protected area boundaries	1	While agreement was reached between the Biangai and Watut leaders concerning the boundaries, the illegal settlers do not respect the WMA boundaries.	Forced eviction of illegal settlers. Legal status to be recognised and confirmed by a court. Rezoning of the Mt Kaindi WMA boundary by CEPA
7. Management plan	1	No Management Plan is known to exist. The Wau Ecology Institute assisted the landowners (primarily the Management Committee) in management at the time of gazettal in 1990, but since the closure of the Institute (about 2007) and the loss of their funds, there has been no on-ground management.	Develop a Management Plan in consultation with all relevant stakeholders. Seek potential funding from CEPA and others agencies. Develop the skills and capacity of the Management Committee to implement the Plan.
7a. Planning process	1		
7b. Planning process	0		
7c. Planning process	0		
8. Regular work plan	0		Gazettal process for new members need to be fast tracked to enable a work plan to be identified.
9. Resource inventory	1		Information about the WMA and its resources is needed to improve management outcomes.
10. Protection systems	0	There are no mechanisms to prevent the illegal settlers entering the WMA and utilising its resources.	Input into management is needed, particularly concerning patrols and access.
11. Research and monitoring	0	The Wau Ecology Institute was involved with the WMA when it was originally established and undertook some monitoring and research.	Formally include research within in the management plan.
12. Resource management	0		Develop a Management Plan. Seek potential funding opportunities from CEPA and others agencies.
13a. Staff numbers	0		
13b. Other people working on the protected area	0		
14. Training and skills	1		A training 'needs assessment' should be undertaken
15. Current budget	0		Seek potential funding opportunities from CEPA and others agencies.
16. Security of budget	0		
17. Management of budget	NA		
18. Equipment	0		Build relationships with neighbouring companies.

Issue	Score (0,1,2,3, NA)	Comment	Next steps
19. Maintenance of equipment	NA		
20. Education and awareness	0		Work with schools to include environmental studies in the curriculum.
21. Planning for land use or marine activities	0		CEPA should develop a land use plan (or engage an organisation to undertake this responsibility).
22. State and commercial neighbours	0		Build partnerships with the WMA's neighbours e.g. Local Level Government and community members to liaise with commercial neighbours.
23. Indigenous people/ Customary landowners	1		
24a. Impact on communities	1	There is some communication with Local Level Government.	
24b. Impact on communities	1	Welfare programs are being implemented just outside the protected area.	
24c. Impact on communities	1	There is general support for the WMA.	
25. Economic benefit	0	There is no return to the traditional owners from income generating activities. However, some traditional owners engage in mining.	Seek potential funding opportunities from CEPA and others agencies.
26. Monitoring and evaluation	1		Some training is required to undertake monitoring and evaluation.
27. Visitor facilities	0	Facilities were in place before, but not now.	Build new signs and simple structures.
28. Commercial tourism operators	0		Build relationship between Tourism Promotion Authority, CEPA and WMA committee.
29. Fees	NA		Develop entry conditions for researchers, students and the public and work out a fee structure.
30. Condition of values	1	Illegal settlers present a significant threat to most values.	Get assistance to conduct inventory and monitoring.
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
Alexander birdwing butterfly	DK	DK	The butterflies have been observed in the WMA, but their status is unclear
Spiritual places	P	D	There are spiritual places in the WMA, but the landowners do not live here and they have been impacted by the illegal settlers
Beetles/insects	DK	DK	Several beetles and other insects are found in the WMA and have potential economic value, but their status is unclear
Clean water	VG	S	The watercourses are important to provide clean water to Wau town; they are largely away from the illegal settlers
Natural landscape and environment	G	S	Important remnant habitat in relatively good condition, although impacted by the illegal settlers

Table 8. Recommendations and ways forward

1.	2.	3.
Confirm the new management committee to secure a workable future	Training in many areas of protected area management. Establish communication with all stakeholders to assist. Linkages and networks to enhance development opportunities	Equipment and a vehicle to assist the committee in managing the protected area. Water pump. Hand tools. Chainsaw. Gumboot

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

	Strengths	Challenges
1	Biodiversity values remain, although without monitoring the condition is unknown.	Gaining re-gazetted based on the updating of the membership of the Management Committee.
2	Provides, fresh water to Wau town.	Resolving the illegal settler issue.
3	The WMA has scenic amenity values.	Gaining support from CEPA to conduct land use planning that will limit the impact of surrounding activities on the WMA.
4	The customary landowners remain interested in retaining the WMA and improving the management outcomes.	Establishing a dialogue with relevant departments/sections of all levels of government.
5		Securing sufficient funding to adequately protect the values of the park from the diverse threats, largely as a result of illegal settlement and harvesting of resources.