Memv'ele Falls

CMNTIPA015

Country: **Cameroon**
Administrative region: **South (Region)**
Central co-ordinates: **2.40410 N, 10.37810 E**
Area: **33km²**

Qualifying IPA criteria

A(i)

IPA assessment rationale

The site qualifies as a potential IPA under criterion A(i) due to the presence of several globally threatened species, particularly members of the genus Inversodicraea, which are narrowly endemic to the site alone or also occur at a few nearby parts of the river system which are also threatened by the hydro-power project. The site might best be treated together with the Partie Camerounaise du fleuve Ntem and Forêt de protection reserve Ma'an/Boucles du Ntem but little plant data is available for these areas.

Site description

The Memv'ele Falls at Nyabessan in Cameroon's South Region is located on the Ntem river, approximately 60 km east of the coastal town of Campo and close to the border of both Equatorial Guinea and Gabon. It lies immediately to the south of the Campo Ma'an National Park. The Memv'ele falls is the site of a large hydroelectric project on the Ntem river which flows through a narrow gorge in this area downstream from the confluence of a network of backwater channels (Boucles du Ntem) that branch South of Ma'an as the Mvila and Ntem tributaries meet.

Botanical significance

The site lies within a relatively sparsely populated area with remaining valuable forest habitat. The falls themselves are significant for the presence of several important rheophytic species, including Critically Endangered local endemics Inversodicraea tchoutoi, I. ntemensis, I. achoundongii, I. senei and Psychotria torrenticola. All of these species are narrowly endemic to a small area of the Ntem river around Memv'ele. The site has the greatest species diversity for the genus Inversodicraea globally (Cheek et al., 2020), and at least 10 species of Podostemaceae have been recorded from the Ntem river (Schenk et al., 2015). Growing close to the falls but not in the river itself, the tree rare tree Xylopia calva (EN) has also been collected at one of only three known global locations (Johnson & Murray, 2018). A collection of the genus Cola (Ngansop 327) from the site is thought to represent an undescribed new species, and the surrounding forest is thought likely to contain further rare species although it has been previously logged (X. van

der Burgt, 2020, pers. comm., 29 September).

The larger area incorporating Memv'ele has been described as a refuge for plant species during quaternary glaciations when humid forest contracted in Central Africa (Idriss, 2012). A total of 1,471 species of vascular plants were recorded from Campo Ma'an by Tchouto et al (2006a), with 114 national endemics (Tchouto et al, 2006b). To the South and incorporating Memv'ele, the RAMSAR site (no. 2067) Partie Camerounaise du fleuve Ntem is also botanically important.

Habitat and geology

The Ntem river flows westwards to the Atlantic between the Ntem massif of Campo Ma'an to the north and the mountains of Equatorial Guinea to the South. Geologically, the area lies within the South Cameroon Plateau and is dominated by Precambrian metasedimentary basement complex rocks such as gneisses, migmatites and schists (Idriss, 2012; Nkoungou et al., 2012). At the site of the falls themselves, the solid outcroppings are granitic gneiss (Nkoungou et al, 2012). These hard rocks give the river its black colour due to the low silt content. The rocks might be some kind of conglomerate as loose material appears to become consolidated into the bed of the river channels (X. van der Burgt, 2020, pers. comm., 29 September).

The topography rises to around 1,000 m on either side of the valley and is very steep in places. After the Boucles du Ntem, where there are multiple backwater channels and marshy areas, the river enters a gorge at Nyabessan as it cuts through hills blocking the valley to the West. Here at the spectacular Memv'ele Falls the energy of the concentrated and rapidly descending river with a catchment area of 26,350 km2 has been exploited through a hydro-power station (Chen & Landry, 2016).

Soils in the area are predominantly acidic, ferralitic and lateritic and can be deep but are shallow on steep slopes; they have good physical properties but low nutrient content (Idriss, 2012).

Average annual temperature in the region varies little around 25 °C. Annual rainfall at Nyabessan is 1,670 mm, considerably less than at Campo on the coast where there is 2,800 mm (Tchoutou et al., 2006a,b). The climate pattern is bimodal, with a dry season between July and August and a longer one between December and February (Schenk et al., 2015; Cheek et al., 2020). However, due to the extensive buffer provided by the marshy area of upstream river loops, seasonal variation in waterflow is less than at some sites, enabling the use of a run-of-the-river style hydro station with limited reservoir capacity (Chen and Landry, 2016).

The forest in this area is at the interface of Letouzey's (1985) types 228 (Atlantic Biafran forest rich in Caesalpinioid/Detarioid legume species) and types 233 and 166 (mixed Atlantic evergreen and semi-deciduous forest.

Conservation issues

The Memv'ele falls is the site of a major 200 MW hydro-electric project which is close to completion (Chen & Landry, 2016). At the main falls a 20 m high earthfill dam of 1.5 miles length has been built which will create a 19 million m3 reservoir, flooding the villages of Nyabessan and Alem and an area of the Campo Ma'an national park according to Chen and Landry (2016). As well as destroying the main waterfalls or channeling water away from them, the project will flood rocky channels above the falls and disrupt water levels downstream where other populations of some of the Critically Endangered species are also found (Cheek et al., 2020; Schenk et al., 2015). Seasonal fluctuation in water levels is crucial to the reproductive cycle of the rheophytic Podostemaceae species which flower and fruit during drier periods when water levels drop (Schenk et al., 2015; Cheek et al., 2017) and therefore the dam severely threatens all populations of these species at the site or downstream. In addition to the impact of the dam itself, the construction of roads and transmission infrastructure, as well as the influx of migrant labour, will impact an area which was previously sparsely populated and hard to access (Carrière et al., 1999). Typical threats such as logging and habitat clearance for cultivation are likely to increase (Idriss, 2012). These issues, in addition to construction directly associated with the hydro-power project, also threaten rheophytic species through increased pollution and water turbidity; Podostemaceae in particular normally require clear water and their growth and reproduction is impaired by silt (Cheek et al., 2015, 2020).

The site is closely adjacent to two conservation areas, the protected Campo Ma'an National Park to the North and the Partie Camerounaise du fleuve Ntem (2067) to the South, a RAMSAR wetland of international significance (one of only seven in Cameroon) (Idriss, 2012). The latter incorporates the Memv'ele falls site along with a larger upstream area; a further, smaller area is designated as a Forêt de protection reserve Ma'an/Boucles du Ntem (WDPA ID 146,629; 12,083 ha). A large logging concession (FMU 09-024) lies to the south.

Site assessor(s)

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IPA criterion A species

SPECIES	QUALIFYING SUB-CRITERION	≥ 1% OF GLOBAL POPULATION	≥ 5% OF NATIONAL POPULATION	1 OF 5 BEST SITES NATIONALLY	ENTIRE GLOBAL POPULATION	SOCIO-ECONOMICALLY IMPORTANT	ABUNDANCE AT SITE
Psychotria torrenticola O.Lachenaud & Séné	A(i)	✓	✓	✓	–	–	
Begonia microsperma Warb.	A(i)	✓	✓	–	–	–	
Nothospondias staudtii Engl.	A(i)	–	✓	✓	–	–	
Psychotria camerunensis E.M.A.Petit	A(i)	✓	✓	✓	–	–	
Pavetta mpomii S.D.Manning	A(i)	✓	–	–	–	–	
Hymenostegia viridiflora Mackinder & Wieringa	A(i)	✓	✓	–	–	–	
Inversodicraea achoundongii J.J.Schenk, Herschlag & D.W.Thomas	A(i)	✓	✓	✓	✓	–	
Inversodicraea ntemensis (Y.Kita, Koi, Rutish. & M.Kato) J.J.Schenk, Herschlag & D.W.Thomas	A(i)	✓	✓	✓	–	–	
Inversodicraea senei Cheek	A(i)	✓	✓	✓	✓	–	
Inversodicraea tchoutoi Cheek	A(i)	✓	✓	✓	–	–	
Virectaria salicoides (C.H.Wright) Bremek.	A(i)	✓	✓	✓	–	–	
Ledermaniella bifurcata (Engl.) C.Cusset	A(i)	✓	✓	✓	–	–	
Thecacoris lancifolia Pax & K.Hoffm.	A(i)	✓	✓	✓	–	–	
Liparis hallei Szlach.	A(i)	✓	✓	✓	–	–	

SPECIES	QUALIFYING SUB-CRITERION	≥ 1% OF GLOBAL POPULATION	≥ 5% OF NATIONAL POPULATION	1 OF 5 BEST SITES NATIONALLY	ENTIRE GLOBAL POPULATION	SOCIO-ECONOMICALLY IMPORTANT	ABUNDANCE AT SITE
Guibourtia tessmannii (Harms) J.Léonard	A(i)	–	–	✓	–	✓	
Xylopia calva D.M.Johnson & N.A.Murray	A(i)	✓	✓	✓	–	–	
Englerodendron graciliflorum (Harms) Estrella & Ojeda	A(i)	–	–	✓	–	–	
Macropodiella heteromorpha (Baill.) C.Cusset	A(i)	✓	✓	✓	–	–	
Oddoniodendron gambanum Ngok & Breteler	A(i)	✓	✓	✓	–	–	

IPA criterion C qualifying habitats

HABITAT	QUALIFYING SUB-CRITERION	≥ 5% OF NATIONAL RESOURCE	≥ 10% OF NATIONAL RESOURCE	1 OF 5 BEST SITES NATIONALLY	AREAL COVERAGE AT SITE

General site habitats

GENERAL SITE HABITAT	PERCENT COVERAGE	IMPORTANCE
Wetlands (inland) - Permanent Rivers, Streams, Creeks [includes waterfalls]	–	Major

Land use types

LAND USE TYPE	PERCENT COVERAGE	IMPORTANCE

Threats

THREAT	SEVERITY	TIMING
Energy production & mining - Renewable energy	High	Ongoing - stable
Natural system modifications - Dams & water management/use - Large dams	High	Ongoing - stable
Transportation & service corridors - Roads & railroads	Medium	Ongoing - increasing
Pollution - Agricultural & forestry effluents - Soil erosion, sedimentation	High	Future - inferred threat
Pollution - Agricultural & forestry effluents - Nutrient loads	High	Future - inferred threat
Agriculture & aquaculture - Annual & perennial non-timber crops - Shifting agriculture	Low	Ongoing - trend unknown

THREAT		SEVERITY	TIMING
Biological resource use - Logging & wood harvesting		Medium	Ongoing - trend unknown

Protected areas

PROTECTED AREA NAME	PROTECTED AREA TYPE	RELATIONSHIP WITH IPA	AREAL OVERLAP
Campo Ma'an National Park	National Park	protected/conservation area overlaps with IPA	—

Conservation designation

DESIGNATION NAME	PROTECTED AREA	RELATIONSHIP WITH IPA	AREAL OVERLAP
Partie Camerounaise du fleuve Ntem	Ramsar	protected/conservation area encompasses IPA	—

Management type

MANAGEMENT TYPE	DESCRIPTION	YEAR STARTED	YEAR FINISHED
No management plan in place		—	—

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