

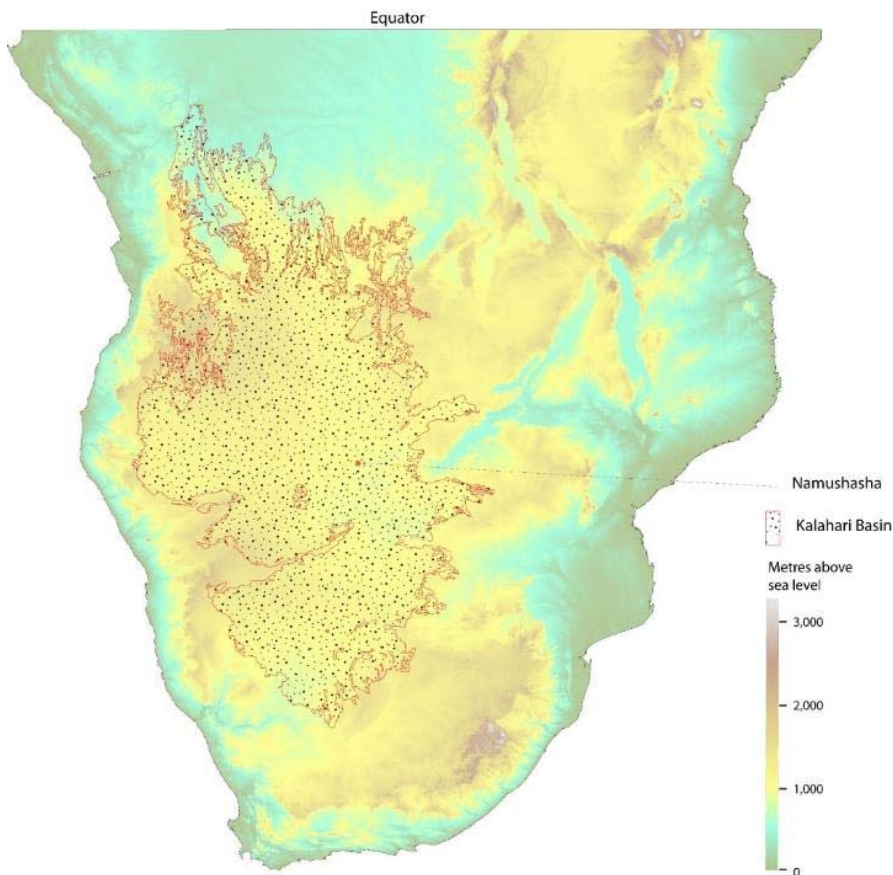
Some observations on the Cuando River

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If you divided Africa along the Equator into halves and placed yourself at about the center of the southern or bottom half, you would be close to the Linyanti Swamps. More precisely, the Linyanti Swamps are some 2,000 kilometres from the Equator and 1,900 kilometres from the southern tip of Africa. East to west, the Swamps is about 1,400 kilometres from the Indian Ocean and 1,200 kilometres from the Atlantic.

Give or take a hundred kilometres, the Linyanti Swamps are pretty well at the heart of southern Africa! These swamps are also the ending of the Cuando River, just like the Okavango Delta being where the Okavango and Cuito Rivers end. All water in the Cuando River therefore feeds into the Linyanti Swamps and normally goes no further.

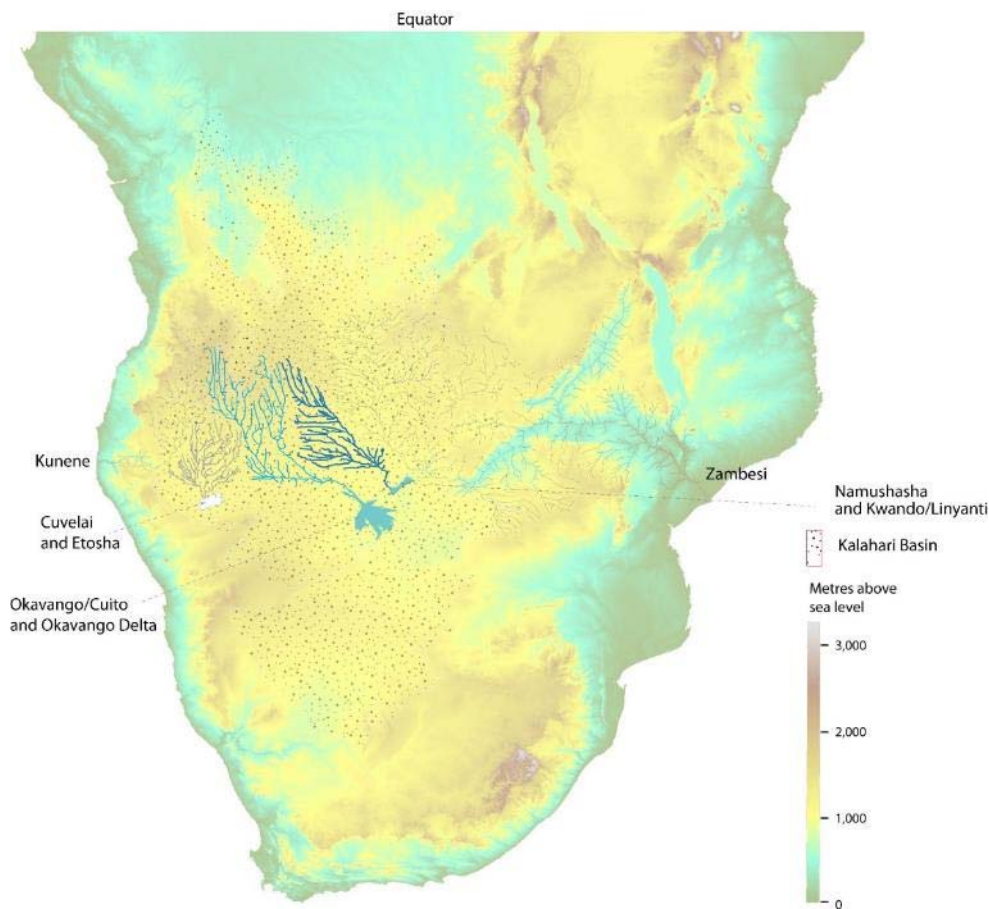
The Swamps are also close to the centre and lowest point of the Kalahari Basin: a gigantic sandpit that is the world's largest sea of sand. Covering some 2.5 million square kilometres, or three times more than all of Namibia, the Basin extends from the Orange River in South Africa 3,000 kilometres north to the Congo River. At its widest point, it covers almost 1,500 kilometres. While its surface consists largely of wind-blown sand, a mix of water- and wind-borne sediments fill the Basin's deeper levels which extend down hundreds of metres in places.



CAPTION: The Kalahari Basin of sand that covers much of southern Africa is surrounded by a rim of higher ground inland of the coast.

Pretty well everything about the Cuando River's immediate and broader environment is a consequence of its setting in the Kalahari Basin!

Rain increases along a gradient from about 200 millimetres per year along the Orange River to more than 2,000 millimetres in the north of the Basin. As a result, the only rivers within the Basin that carry water permanently are in the northern part of the Basin, where they flow either north into the great Congo or southwards to lower elevations in Namibia and Botswana. Plant life becomes more luxuriant from south to north, changing from shrub land to open acacia savanna to deciduous broad-leafed woodland and then to evergreen forest in the north.

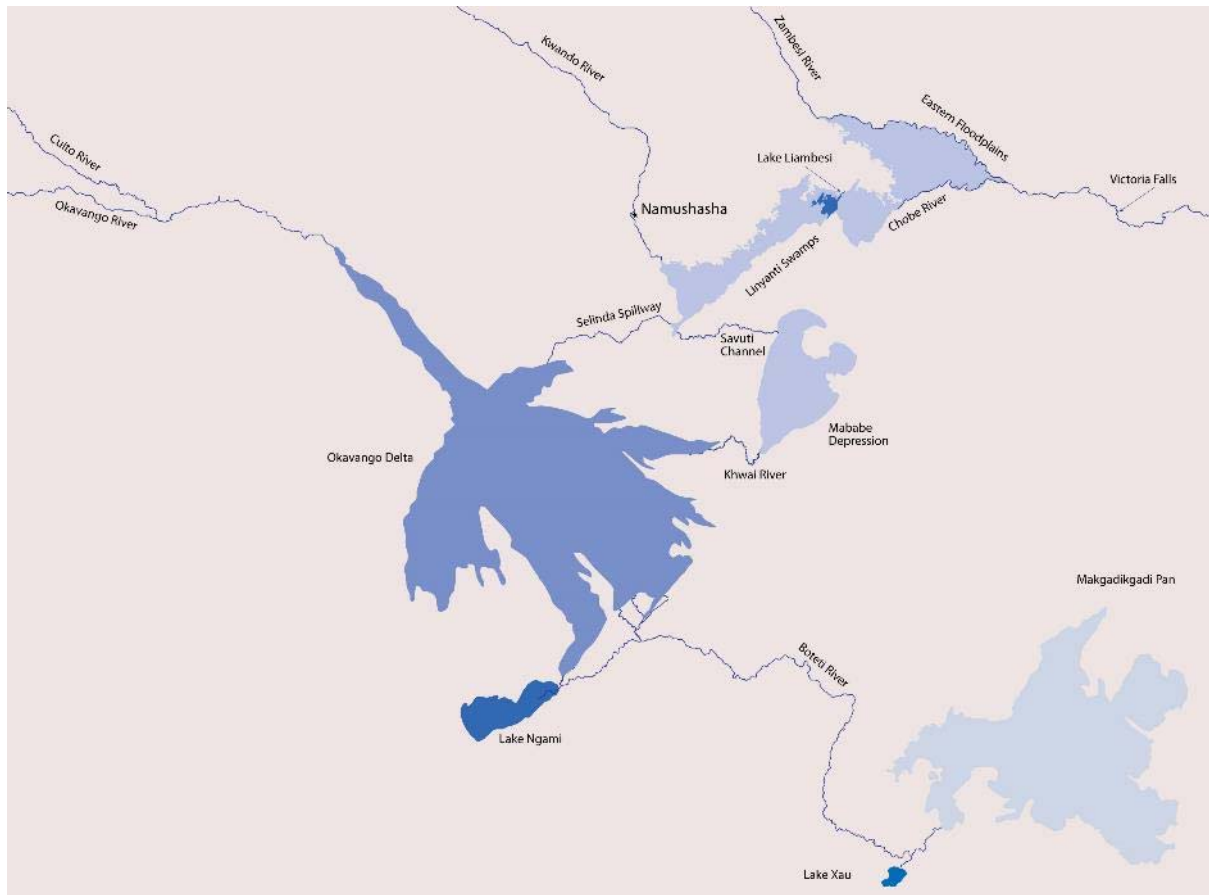


CAPTION: The six major rivers that drain the Kalahari Basin to the south.

Among the northern rivers, there are six that drain the Kalahari by flowing southwards: the Kunene and Cuvelai in the west, the Okavango and Cuito, the Kwando and the Zambesi to the east. Long ago all these rivers ended within the Basin, but the Kunene and Zambesi were later diverted to flow west and east to the Atlantic and Indian Oceans, respectively. The other rivers continue flowing into the Kalahari Basin: the Cuvelai into Etosha Pan, the Okavango and Cuito into the Okavango Delta, and the Cuando into the Linyanti Swamps.

Parallel faults in the basement of the Kalahari Basin direct flows of the Okavango, Cuito, Cuando and Zambesi in a south-easterly direction into a vast network of swamps, channels pans and lakes. For much of the time these are discrete bodies of water, but they connect with each other when water levels are high. For instance, the Selinda Channel links the

Okavango Delta and Cuando's Linyanti Swamps. Water in the Zambesi spreads across the Eastern Floodplains and can flow along the Chobe River and Bukalo Channel into Lake Liambesi and then into Linyanti Swamps. The flows can be reversed so that Okavango, Cuito and Cuando water makes its way into the Zambesi. Flood water in the Cuando and Okavango Delta can flow into the Mababe Depression, or water from the Okavango and Cuito may fill Lake Ngami or reach Lake Xau and the Makgadikgadi Pans down the Boteti Channel.



The network and complex of interconnected wetlands formed from flows down the Okavango, Cuito, Cuando and Zambesi Rivers in north-eastern Namibia and northern Botswana

High water conditions which permit these connections have been recorded sporadically in recent years, such as in the early and late 1960s and again between 2008 and 2012. But river flows have also been very low. For example, Lake Liambesi and Lake Ngami were dry between the early 1980s and 2004.

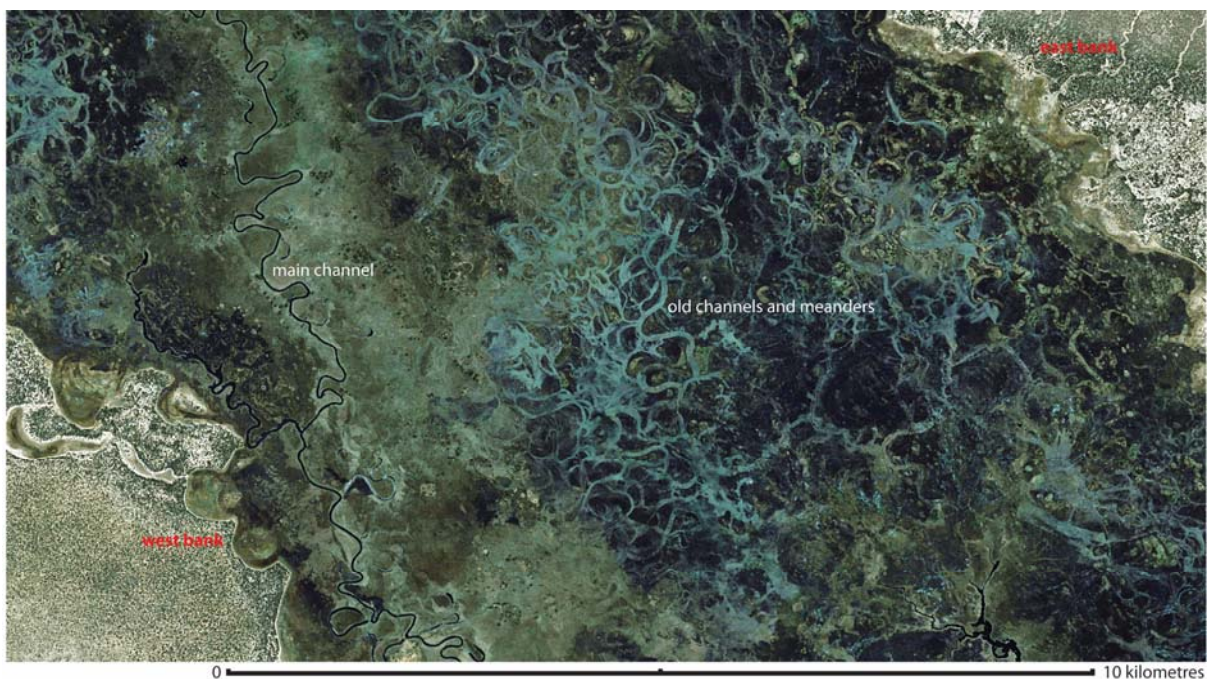
While recent cycles of wet and dry have been the norm, far greater climate changes have occurred historically. The effects of these oscillations are to be seen all around. For example, the parallel ridges across Bwabwata National Park are the remains of sand dunes that formed when average rainfall was several times lower than it is these days. Those dunes were moulded from sand that had been carried down the Cuando River and then blown westwards by prevailing winds from the east. Imagine thousands of years ago when people enjoyed sunset views of sand dunes on the western side of the dry Cuando River valley.

Conversely, when rainfall was double or triple what is recorded nowadays, high flows of the Zambesi River spilled south and south-east to inundate much of the area between the Kongola to Katima Mulilo Golden Highway and the Linyanti Swamps and Cuando River. The most obvious consequence of that flooding are the alluvial or water-borne soils in that area which now support vast areas of mopane woodland.

The great majority of the Cuando River valley is a patchwork of habitats created by current or previous flows of water or by extremely arid periods long ago. These flows have determined the nature of the underlying soils which – in turn – affects the types of vegetation and abundance of wildlife. Fine particles that help to hold water and organic material characterise alluvial soils which are often fertile grasslands that provide rich grazing to cattle, buffalo, lechwe and hippo, for example. On the other hand, tall, deciduous woodlands grow on wind-blown sand, where they provide cover and food to giraffe, elephant, sable and kudu.

The Kalahari Basin is extremely flat, such that river courses normally drop only about half a metre per kilometre. Their flows are thus very slow, often meandering to such an extent that river water spends as much time going sideways as downstream. Another characteristic of the Kalahari's rivers is their extremely clean and clear water, a consequence of water being filtered through sand before finding its way into a river and then being filtered a second time through papyrus, reeds and floodplain grassland.

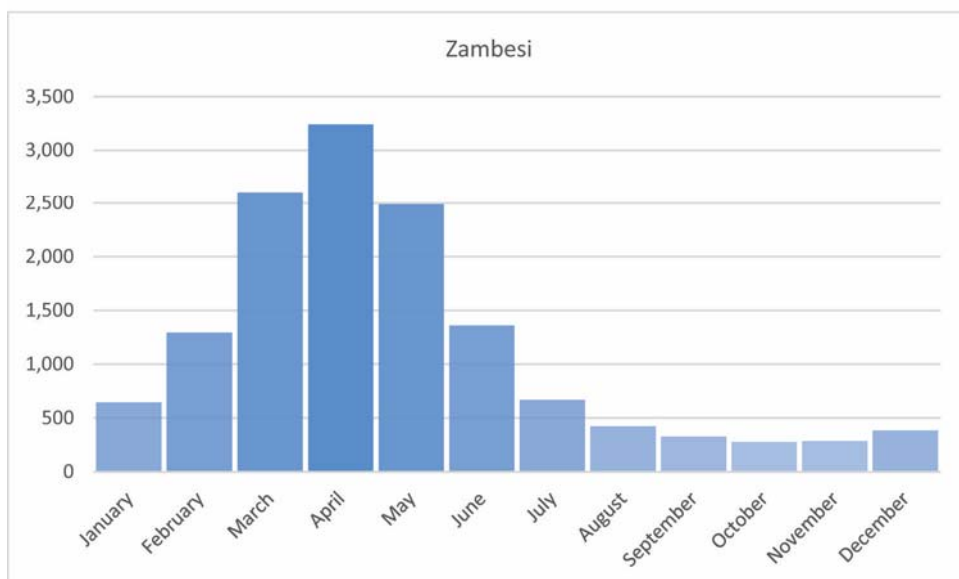
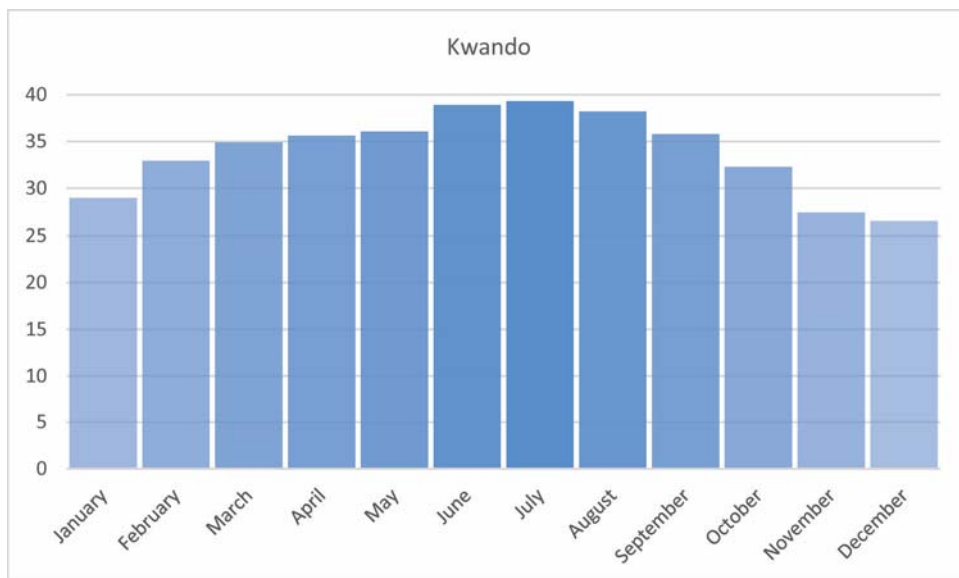
In these respects, the Cuando is in a special class of its own. While its channel of open water is usually narrow, often less than 50 metres, the river valley is much wider than that of other Kalahari rivers. Moreover, the river valley is itself flooded with water lying trapped in great expanses of reeds, which often extend 10 to 15 kilometres from bank to bank. These vast expanses of water filter the water to such a degree that it is almost distilled with very few nutrients. Aquatic life is therefore limited, with very few algae, crustaceans, insects or fish, for example.



The Cuando River valley some 300 kilometres upstream of the Namibian border showing the width and extent of the reed bed filters and old meanders and ox-bow lakes.

Those broad swathes of reed beds line much of the Cuando and its major tributaries, perhaps covering an area more than 5,000 square kilometres, and stem the flow of water to such an extent that water levels and volumes hardly vary during the year. This is clear in the graph of average river volumes per month. Differences between the highest and lowest averages are very modest: from about 27 cubic metres per second in December to 39 cubic metres in July. This is quite different from the Zambesi where volumes increase almost 12 times between low and high flow months: from 277 cubic metres per second in October up to 3,240 cubic metres in April. These figures also show that the Zambesi at Katima Mulilo carries much more water, in fact about 34 times more water per year than the Cuando at Kongola.

Month to month changes in volumes in the Zambesi closely match the accumulating effects of summer rainfall, the flows increasing as more and more rain falls, and then rapidly dropping during the dry winter months. Flows along the Cuando, by contrast, are so held-up by the huge reed beds that peak flows only reach Kongola in July, many months after the peak rains in its catchment.



Average volumes of water (in cubic metres per second) per month in the Cuando as it passes Kongola and in the Zambesi at Katima Mulilo (bottom).

Far fewer people live along the banks of the Cuando and its tributaries than along other Kalahari rivers. Little vegetation has been cleared, and the few chemicals that wash into the river are soon sifted out by the vast reed bed filtration system. Indeed, the Cuando is probably as healthy and natural now as it was thousands of years ago, and among major rivers in the world, the Cuando is about as unique and pristine as these qualities allow.

Let's keep it that way!