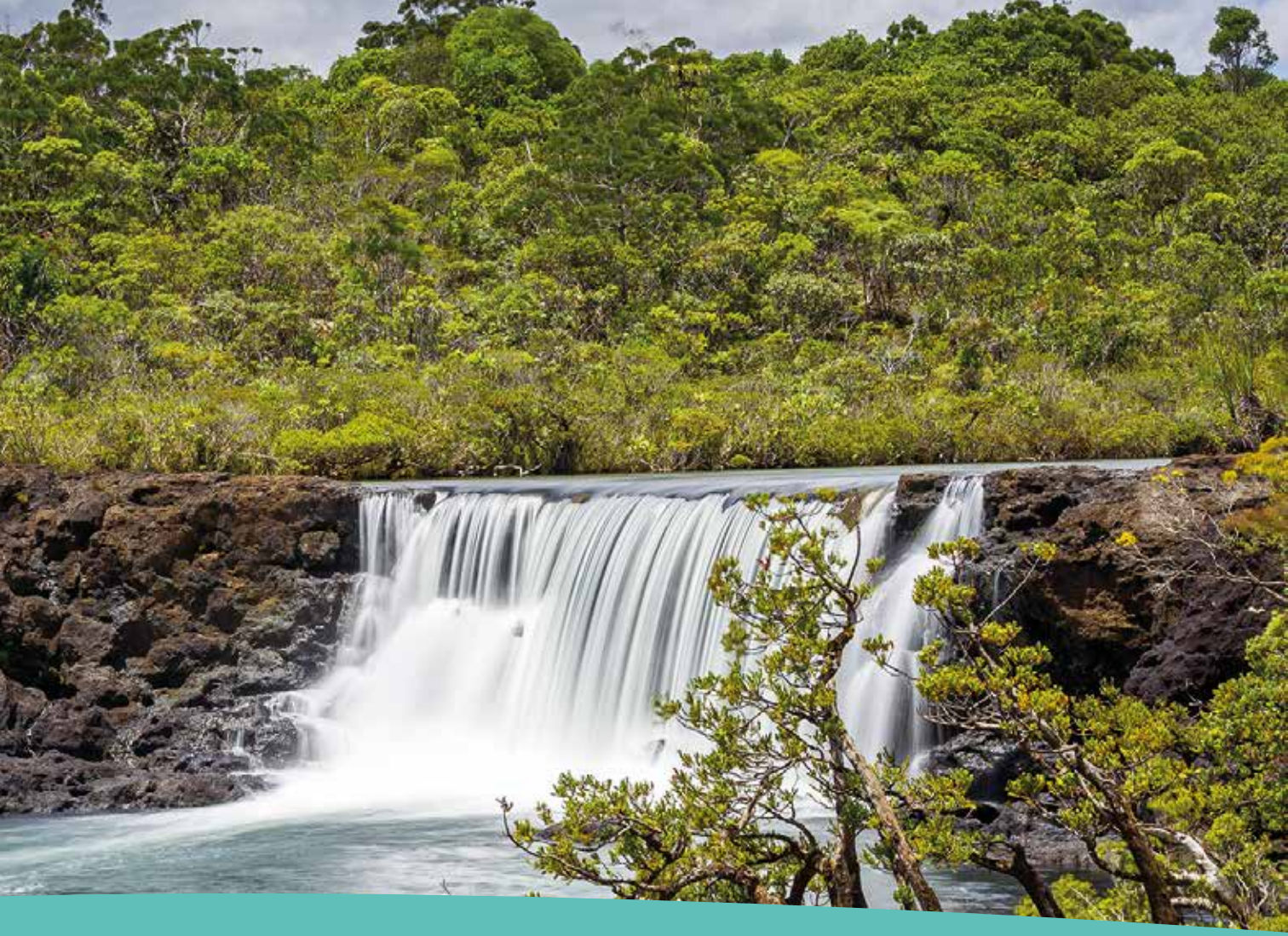


Strolling along the waterways

A real journey to the origins of life, discovering the wetlands of the New Caledonian Great South

ATHANOR

Ramsar

PROVINCE SUD

Preface

The natural heritage and the wetland landscapes of New Caledonia's lakes located in the Great South are managed through a vast network of protected areas, enhanced by their classification under the International Convention on Wetlands known as **Ramsar**. *These landscapes and biodiversity deserve to be preserved for future generations. This is also the vision given to the Tropical Wetlands Relay Centre, a national initiative led from Guadeloupe Island by the French Committee of the IUCN (International Union for Conservation of Nature): "wetland areas preserved for future generations in French tropical territories".*

The South province, through its process of labelling the most important wetlands in its territory, contributes to this vision through the implementation of facilities intended to make them accessible to visitors, thus raising public awareness of their socio-ecological importance and the need to preserve them. Because knowing them better also means respecting them more. This is the invitation that the South Province wished to extend to all readers of this guide, whether they are local residents, decision-makers, business managers or simply people curious about these environment in New Caledonia or elsewhere. The Tropical Wetlands Relay Centre is pleased to join this invitation, which offers you the opportunity to combine the pleasure of walking with that of discovering this exceptionally rich environment of New Caledonia's South province, ***along the waters, over time.***

The IUCN Tropical Wetlands Relay Centre - International Union for the Conservation of Nature.

Contents

Niaouli trees in the Blue River Provincial Park

Preamble

Wetlands

What is a wetland?

"Wetlands are areas of marshes, fens, peat bogs or natural or artificial water, permanent or temporary, where the water is stagnant or running, fresh, brackish or salty, including areas of marine water whose depth at low tide does not exceed six meters."

Definition of the 1971 Ramsar Convention

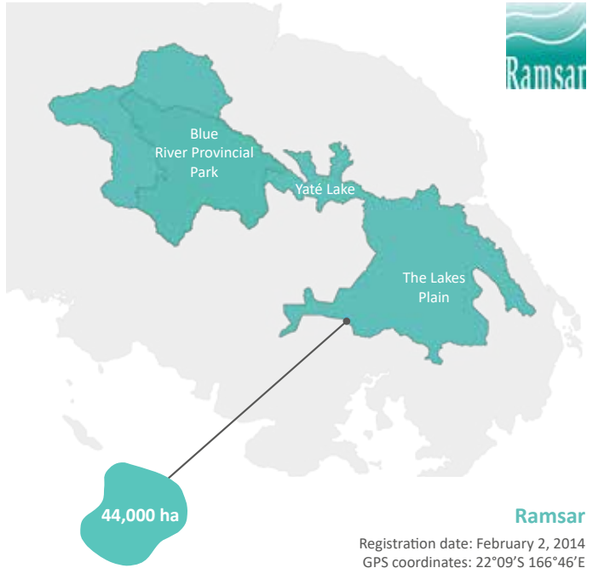
These wetlands often unfairly suffer from a bad image, with unhealthy conditions or mosquito nests. However, these environments, where water is the dominant factor of life, constitute genuine reservoirs of biodiversity**: they are a fabulous asylum, a Noah's ark for flora and fauna but also for us, humans.**

Ramsar, an international Label

The Great South Lakes, a site of international importance

A preliminary study by the National Museum of Natural History, led in 1998 on the entire territory, identified the region of the Great South Lakes as the largest wet area of New Caledonia and the most original in terms of its ecological richness, with 90% endemic plant formations.

Like the lagoon, listed as a World Heritage Site, this terrestrial area is an exceptional and unique natural heritage in the world, recognized internationally by its classification under the Ramsar convention in the same way as famous wetland areas such as St Michael's Mount Bay, Lake Titicaca and the Moorea or the Venice lagoons.



Ramsar

Registration date: February 2, 2014
GPS coordinates: 22°09'S 166°46'E
Surface area of the Great South Lakes classified site: 43,970 ha

Protect water, a source of life

The Great South Lakes region represents the largest freshwater reservoir in New Caledonia. Connected to a vast network of creeks and groundwater, the region's various wetlands (lakes, marshes, rainforests) help regulate the flow of waterways, thus protecting against flooding, drought and erosion. Fires, mining activities and logging are factors that disrupt this water resource and biodiversity.
The classification of the site under the Ramsar convention gives the Southern province a responsibility in preventing these various threats. It also implies that the developments and activities taking place there are part of a sustainable development approach consisting of limiting and better controlling pressures on this territory.

Functions, values, roles and issues of wetlands

Biological functions

They promote the diversification of habitats for both flora and fauna (feeding, refuge and reproduction areas). The fluctuation of water becomes the guarantee of a remarkable, sometimes unique presence whose existence depends on these environments.

Biodiversity reservoir

Social functions 1

As "socio-cultural showcases", they can reinforce the identity and attractiveness of territories: improvement of landscapes and the living environment, provision of cultural testimonies or past activities, creation of leisure areas (swimming, hiking, mountain biking, canoeing), hunting and fishing areas, develop traditional pharmacopoeia, places for nature education where the general public can come and observe specific biodiversity.

Recreation & education

Purifying functions

They improve water quality by taking part in the retention and filtration of numerous substances and thus allow their natural purification.

A natural filter

A vital issue for populations

The Great South Lakes region constitutes a major freshwater resource for New Caledonia, a unique biodiversity and landscape and a cultural heritage. Wetlands also reduce the natural risks linked to flooding and provide islands of freshness.

Water that sleeps but works

Climate functions

They act as "natural thermoregulators" contributing to climate regulation, in particular by capturing large quantities of carbon, even more than forests.

Hydraulic functions

They behave like natural sponges, capable of storing and then releasing water, thus playing a role as a natural regulator (low flow support*).
** Low water level: Periodic drop in water levels (of a river); the lowest water level.*

Sponge

During rainy periods, they:
- store and regulate the volumes of water and flows,
- attenuate and spread out flood peaks,
- limit runoff,
- protect soils against erosion.

In the **dry** season, they:
- promote water infiltration,
- replenish waterways and groundwater,
- ensure a certain volume of water during periods of drought.

Reading the landscape

What is the landscape?

"The landscape is the expression observable by the senses on the surface of the Earth of the combination between nature, techniques and human culture. It is essentially changing and can only be understood in its dynamics, that is to say within the framework of History which restores its fourth dimension."

Jean Robert Pitte

The Great South Lakes Site: (re)discover its unique landscapes

A remarkable colour palette

Red earth loaded with iron...

Its flora: shades of green to grey...

...scattered with vibrant colours

Water, its blue gold

Numerous shades

Blue, green, white, grey...
Transparent, milky, dark...

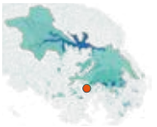
River, creek, lake, waterfall, marsh...

Landscapes changing over time, throughout the walk.

Did you say blue?

Oasis Falls

*Broken mining armour**
Gushing waterfall
Water as a conductor



A contrasting landscape resulting from a hydrogeological marriage

On the path, revealing itself between sparse Gymnostoma, the emergence of a plateau glowing red or black with metallic shine; an armour of cemented ferrous elements forming an indurated crust: the carapace of the mining grounds contrasting with the tender green of the flora.
Here, the course of the Carénage (Fairing) River abruptly interrupts: this difference in altitude gives a glimpse of the work of water, which alters the rock over time to reshape new micro-landscapes like this waterfall, a haven of well-being.

Place called the Oasis

GR®NC1, stage 1 of Prony > Neocallitropsis refuge.

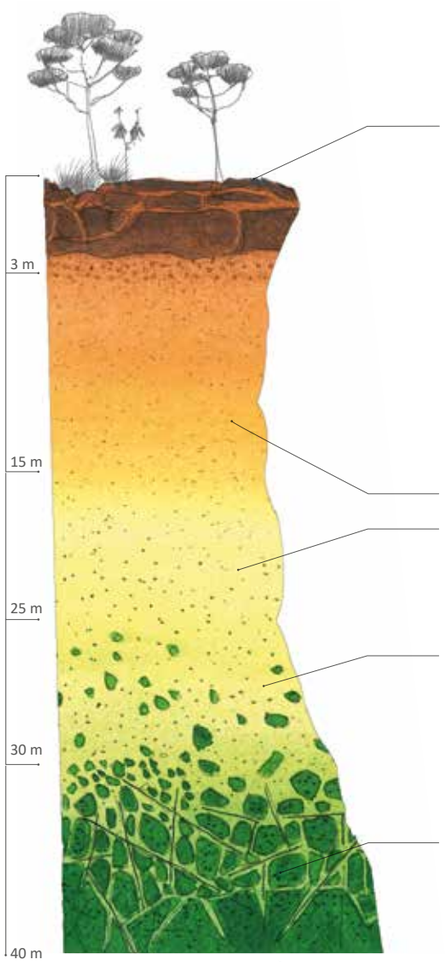
Here, a witness to erosion: the shaping of the water created a collapse of the plateau and gave rise to this waterfall.

** Armour: shell of mining terrain whose thickness varies from 1 to 3 m*

Shaped by time

The geological base

The landscapes of the Great South offer striking contrasts created by geological history which directly influence soil characteristics and local biodiversity.



Schematic profile showing the succession of horizons or alteration products of Peridodites (Illustration based on the Jeanpert diagrams, 2017)

The armour

Shot and armour result from the accumulation of iron at the top of the profile. Iron, poorly soluble, is not leached by water and accumulates in the first centimetres of the profile.

The gravel

Horizon composed of gravel, coming from the dismantling of the armour.

The laterites

Laterites are the products of more advanced alteration. We distinguish the yellow ones, exploited by the mining industry, and the red ones.

Red ones

Yellow ones

The saprolites

They are the first phase of alteration. They retain the structure of the parent rock but are very friable. The mining industry exploits them, this level is even richer in nickel than laterite.

The peridotites

Rocks from the earth's mantle, called ultrabasic (green-blue in colour, rich in iron, magnesium, nickel, cobalt, chromium and manganese and poor in silica).

From rock to ground, where does this typical colour come from?

The red colour of soils in the Great South is due to the presence of oxidized iron: rust, in a way. In our humid tropical climate (with high temperature and heavy rain), the parent rock (peridotite) weathers and leads to the formation of these so-called lateritic or iron soils topped with a crust.

Also called **red earth**, poor in nutrients (naturally deficient in nitrogen, phosphorus, potassium, calcium), but rich in heavy metals (nickel, chromium and cobalt) potentially toxic for plants, these soils are at the origin of a drastic environmental selection which results in a high rate of endemism. The flora and habitats that develop there, resulting from a long evolution, constitute some of the most original ecosystems on the planet, including very rare, even threatened, species.

The peridotites

Essentially made up of a green mineral -olivine-, the colour of peridodites is not always easily perceptible for two main reasons:

- *The green of peridotites is extremely dark, almost black.*
- *When this rock weathers, it takes on a patina and the colour of this patina is orange.*

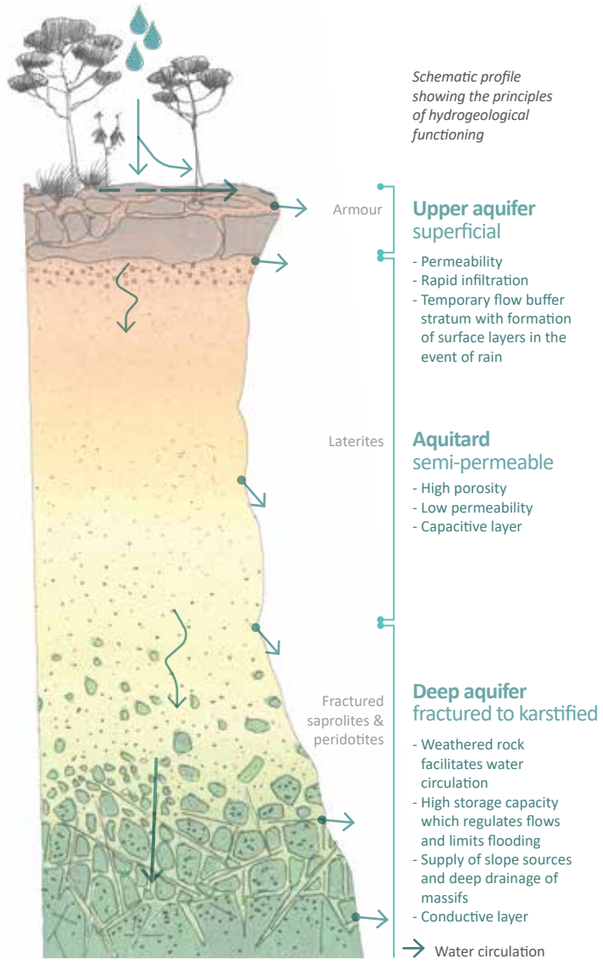
The presence of these mantle rocks on the surface testifies to a geological phenomenon called obduction. While they are rarely observed in the rest of the world, they cover more than a third of the surface of New Caledonia's Main Island (Avias, 1967).*

* Obduction: geol. Overlapping of an oceanic plate over a continental plate.

Shaped by water

Water, the founder of landscapes

Sculpting the reliefs, forming the geological profile of the subsoil, constraining movement and human settlement, water reveals itself to be a natural constituent of the great South's landscape.



Schematic profile showing the principles of hydrogeological functioning

A surface hydrographic network

Seen from the sky, the Great South presents a dense hydrographic network, scattered with multiple bodies of water, lakes and marshes, a genuine mosaic of silvery or blue-green spots where some waterways seem to slip through, get lost, dilute and resurface. These disappearances in fact reveal a very complex hydrogeological functioning invisible on the surface.

A unique example on a global scale

The alteration of peridotites has led to the development of real karst* type models where water infiltrates mainly into the subsoil, instead of flowing on the surface, thus digging numerous underground paths or cavities. The Great Lakes region is therefore based on an original underground system comparable to that which models the limestone regions but here, the limestone is replaced by peridotite, which does not completely dissolve, and its coat of lateritic alteration. It is called "peridotitic pseudokarst".

Karst landscapes are characterized by the existence of:

- sources and resurgences,
- losses or dry valleys (openings through which a watercourse becomes underground after a course in the open air),
- sinkholes, which can be defined as "more or less circular closed depressions that can be a few meters to more than a kilometre in diameter and a few meters to several hundred meters deep" 1.

A fragile system that is still poorly understood

Sinkholes appear to connect surface water and groundwater systems. This phenomenon therefore makes the aquifer particularly vulnerable to pollution. The underground circulation of water can be rapid, and its poorly identified path without corresponding to the surface watersheds, further increases the fragility of this system.

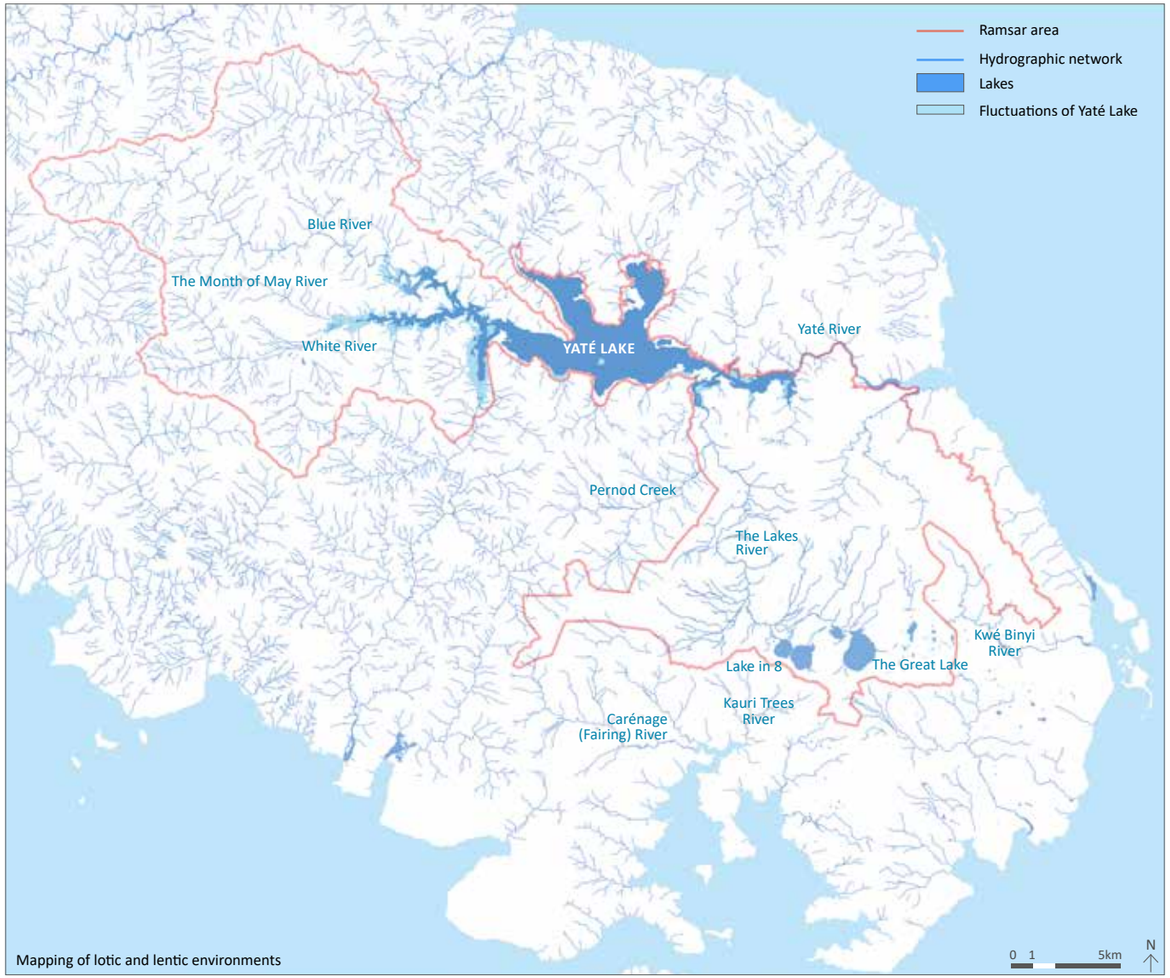
* Karst system: region of limestone formation characterized by the preponderance of underground drainage and by the development of an original topography due to the dissolution of the rock under the action of water (caves, chasms, resurgences, etc.)

[1] *Diagnosis of sinkholes in New Caledonia by the CNRT, 2018*

Aquatic ecosystems

_ The lotic environment

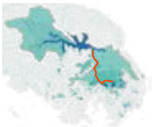
Suitable for running water (rapid circulation of water), it corresponds to all waterways: rivers, rivers, creeks, etc.



Mapping of lotic and lentic environments

The Lakes River

A winding shore
Explored with family
Surprising maquis (shrubland vegetation)



A riverside landscape

As rivers and creeks are subject to currents, and their banks to periods of submersion, the banks present specific plants, with tortuous shapes that are firmly anchored but with the flexibility of steel.

Sometimes deep, sometimes distended, these rivers create varied landscapes and offer multiple recreational spaces.

The Great South, an abundant water reserve for the Main Island

The Great South Lakes region is the only one in New Caledonia where the hydrographic network is meandering and where numerous bodies of water accompany the rivers. The pseudokarst base makes it possible to regulate the flow rates of the various rivers in the region: support of flow rates in the dry period by water from the deep water table and buffering of floods in the wet season, via the infiltration of water into the base and the role capacity of the lakes.

_ The lentic environment: lakes and sinkholes

Suitable for calm waters, with low flow, or even stagnant waters, it corresponds to lakes characterized by their large extent, to ponds, etc.

Lake in Eight

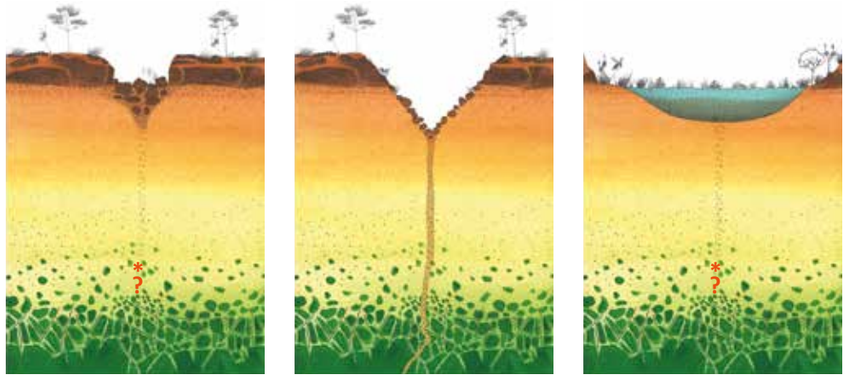
Types of sinkholes

Types of sinkholes
There are several types of sinkholes. The diagrams opposite illustrate the 3 main cases encountered in the South.

An example of a funnel sinkhole, the *Tahitian Hole*, at the Lakes Plain, forms a vast cross-shaped depression, approximately 25 m deep. Today, it represents a unique case. The water staying there temporarily presents rapid piezometric variations and the sinkhole reveals a loss when it finds itself dry.

© Bio Eko

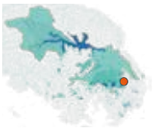
	Collapse sinkhole	Funnel or bowl sinkhole	Flat bottom sinkhole
Drawing	Following the sudden collapse of the armour.	In V.	In a flat-bottomed bowl linked to the accumulation of sediment.
Shape	Circular and small.	Circular to oval, deep and modest in size.	Circular to oval, shallow, larger in diameter.
Edges	Steep walls with large blocks of collapsed armour at the bottom.	Gentler sloped walls with large blocks of collapsed armour and gravel in the slopes.	Soft walls.
Water	Transparent, if present.	Transparent, if present, very variable in height, seeming temporary.	Blurred, if present, at fairly constant and probably permanent height with herbaceous and hydromorphic vegetation on the slopes.



Illustrations based on the Serino diagrams, 2012

Water sinkhole

Enigma behind the scenes
Soft sponges
Intermittent



Dotted with bathtubs, the Lakes Plain

Crystal clear water contrasting with the metallic crust of the glowing soil or a bowl of murky water teeming with wet grass, the sinkholes hidden within the vegetation offer us their magical atmospheres to contemplate. The large ones are subject to sedimentation while those with steeper walls are the superficial manifestations of erosion phenomena which take place in the subsoil, under the action of "pseudokarstic" underground flows.

Mysteries to be solved

An alignment was noted between several depressions because a large fracturing - fault allowed their formation. The presence of a withdrawal phenomenon (extraction from below caused by the circulation of groundwater) constitutes one of the origins of these depressions.

Shaped by humans

In New Caledonia's Great South region, there is a feeling of nature. Infrastructure and roads are few. The majority of the habitat is distributed among four tribes - Goro, Touaourou, Wao, Unia - installed on a narrow plain along the coast. The low population density is explained by the reduced size of the cultivable space and the absence of colonial pressure.

Forest exploitation

Traces from the past

Traveling through the Great South, we notice the presence of old, discreet vestiges, gradually disappearing into the vegetation: rails, schlittage (sleigh) paths*, a winch locomotive (towards the White River) but also some well-preserved witnesses of this history such as the Perignon Bridge, entirely made of wood in 1958.

* Schlitte : *Long sled used to transport cut wood on rails*

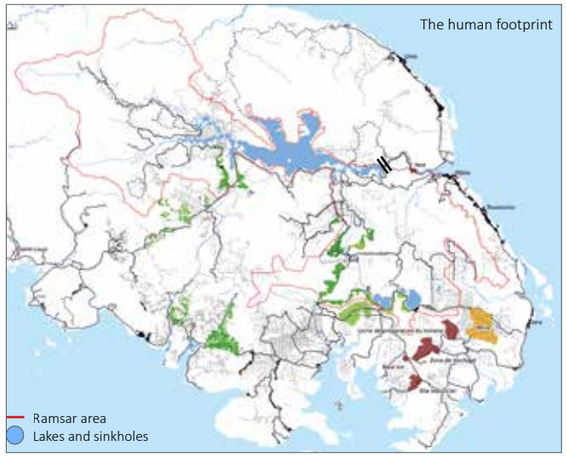
A brief history

"In 1866, Governor Guillain entrusted Captain Sebert with responsibility for supplying the emerging capital with wood. The Southern Forests were chosen. He found exploitable forests in Prony, located near the sea. The operations began in 1868, in the Kauri Bay area. In 1873, the artillery gave way to the prison administration. From 1889, the condemned were replaced by the relegated. The workforce swelled. The yield dropped. The men were scattered between Bonne-Anse, Port-Boisé, The Carénage, North Bay and Prony. This forestry adventure ended up in 1907 and operations closed in 1911."

Guide GR®NC1, From Prony to Dumbea, Jean-Francis Clair

Opposite: Overview of the former forestry establishment of Prony >>>

Then, at the beginning of the 20th century, the exploitation of the forests of the Blue River and the White River valleys began. Thirty-seven kilometres of railway tracks were laid to transport locomotives to the operating area and then to transport the logs to the sawmill settled at the mouth of the Pirogues River. During the Second World War, this railway line was also used by the Nickel Company *to evacuate the Chromium ore which it had taken over.*



Forestry production, high plots in the plain

In the mid-1970s, forestry essentially based on Caribbean pine developed. The sector then diversified with endemic tropical species (Araucaria, Kauri tree, Sandalwood, etc.)

An arboretum as an emblematic tree

Located in the Blue River Provincial Park (BRPP), this arboretum is home to 14 (including 11 endemics) of the 20 species of Araucarias listed in the world. To date, it constitutes the largest global collection of its kind with nearly 20 different conifer specimens. It pursues three missions: conservation, seed orchard and public awareness support.


ANC, Album Nouméa-Aden-Mascara 101 Fi –68


Funicular, Corenage Bay ©B. Suprin

The mining industry

Holes and galleries are scattered in this island, giant terraces cut deeply into the mountain, winding roads scar its sides, erosion exposes the rock, large greyish spots reveal the path of bushfires, crisscrossed by numerous tracks imposing an artificial mesh signed by the hand of man. Mining activity leaves its mark on the territory.

Mining in the Blue River Provincial Park (BRPP)

The mining past of the areas that today make up the Blue River Provincial Park and its surroundings mainly concerns the Month of May River, Bon Secours and Renaissance mines. They were exploited using open-air quarrying techniques.

In short,

- ***Cobalt:*** *low content. At the end of the 19th century and at the beginning of the 20th century, New Caledonia was the main supplier of this precious metal. Digging narrow trenches was the only means of prospecting to cross the thick lateritic cover in order to reach the minerals. When the cobalt diggers followed interesting concentrations, they opened galleries called cobalt diggers' holes.*
- ***Chromium:*** *low content. A deposit discovered around 1890. Located in coastal or weathering formations (examples: Prony and Ouen Island).*
- ***Iron:*** *the armour contains a lot of it. Operated at Goro in the years 1940 and 1941 and at Prony between 1956 and 1968.*
- ***Nickel:*** *considerable reserves, but the low content has delayed its exploitation for a long time.* **(P)** *Mining prospecting wells (a technique widely used until the 1970s in the search for this ore), made by hand using crowbars and shovels, could reach a depth of 20 m. Several mining companies exploit it.*

GR®NC1 Guide, From Prony to Dumbéa, Jean-Francis Clair, extracts


P


A mine in Prony

© Nicolas Charpin

Mine landscapes in literature [1]

Among several writers predominates the image of a metamorphosis of landscapes used for economic reasons, ravaged by prospects describing the mountain as a wounded creature, a sad landscape or one with chromatic uniformity.

"Huge portions of the island are gigantic mineral blocks" J. Mariotti.
"From the front, the extreme tip of the cape outlined its reddish and bare mass with its sides open with bloody wounds in the grey heather - the prospects of the nickel seekers -." J. Mariotti.

"They seemed, these majestic chains, to say with pride to those smaller than them: Stand back! Make way for us! We are the serpentines, New Caledonia's backbone. We are the ones who make the law, we give the movement, we create the activity. In our bosom we contain the infernal lava of Pluto, crystallized into inexhaustible riches.
See these yellow, gaping wounds, which open in stages in our large chests; they are dug there to extract the nickel which is our flesh.
And these deep, bloody bowels, which yawn in our red clay dermis; they were incised to tear out our chromium ribs which will, throughout the world, harden metals.
Look at these black holes which penetrate into our bowels, like the lairs of cyclops; they are dark and tortuous tunnels which lead into places full of mysteries, bleeding our veins blued with cobalt."
Savages and civilized, G. Baudoux

"The landscape is sad, with the grey tones of its shrubs which resemble thyme laurels and the reddish colour of the soil. There is a melancholy there common to all places where there is a lack of water and large trees."
Mining, F. Ordinaire.

"An impalpable dust of yellowish ochre covered the entire landscape like a veil of earthy saffron (...)"

1 .Eddy Banaré

Shaped by humans

The exploitation of water as a source of energy

A few figures:
Dam inaugurated in 1959, length: 641 m
Lake surface area: 40 km², dimensions: 22 km by 6.5 km
10% of the Ramsar classified area
Watershed supplying the reservoir: 436 km²
The dam meets 30% of the electricity needs of public distribution in NC.

The hydroelectric dam

Built between 1956 and 1959, the 60 m high Yaté dam is made up of three impressive slide spillways and flood spillways. This monumental work, however, remains barely perceptible from the road. Its construction led to the creation of a huge water reservoir which flooded around 4,000 ha of land.

An artificial central receptacle of the mouths of several rivers, Yaté Lake connects the north-western parts, with the confluence of the natural beds of the Blue and White Rivers and the south-eastern parts of the Ramsar area, with the Lakes River and Pernod Creek. A 2.6 km long gallery leads the water to the factory located below. It supplies the urban area and the Doniambo factory.

Yaté Lake - © Catherine Geoffray

Press article, 1990 © Hourdan

Yaté Lake at the Pérignon Bridge, in 2007- © J.M. Mériot

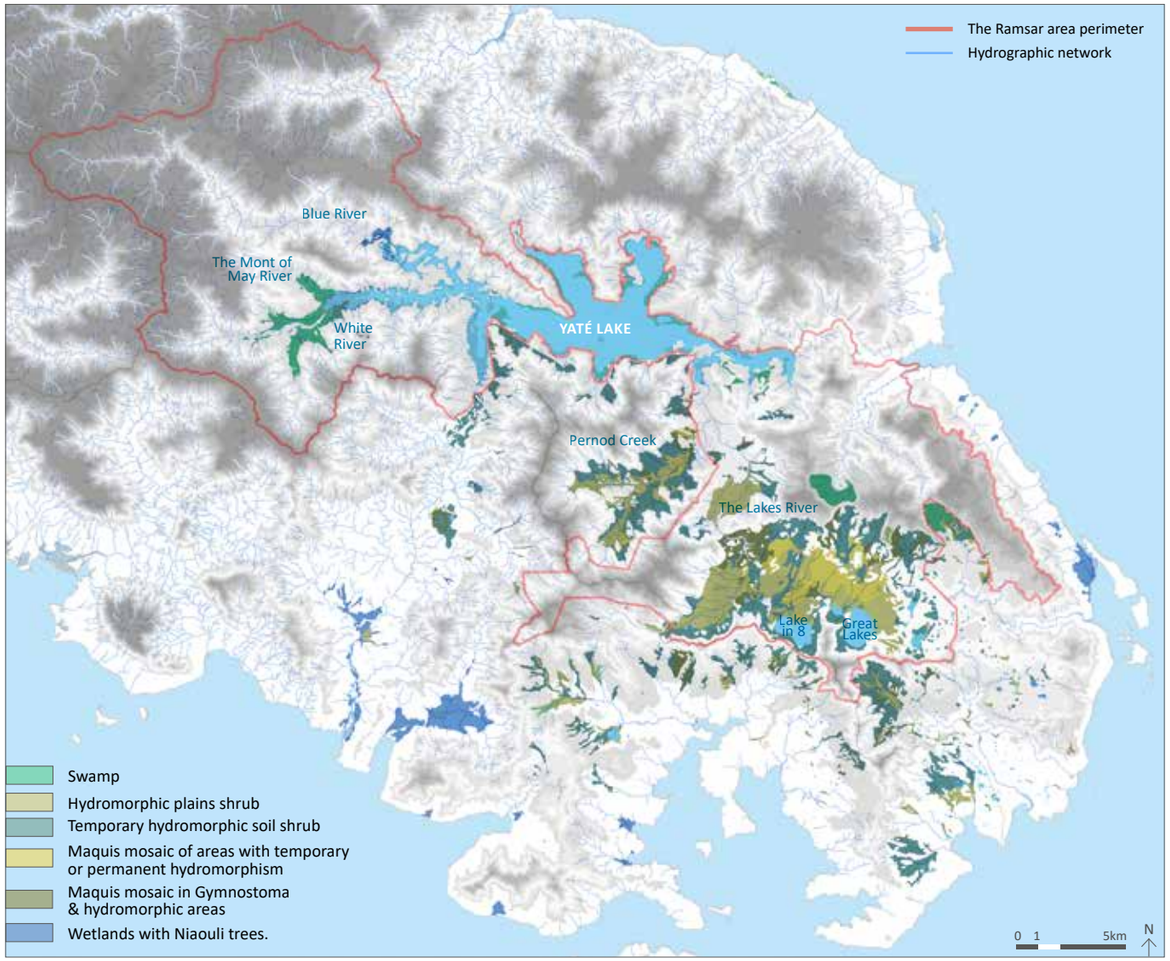
In 2017

Typical landscapes

Typology of wetlands

The main typologies of wetlands are distinguished according to the degree of hydromorphic * of the soil. The map below shows the location and distribution of these major typologies.

** saturation of soil pores with water over a more or less long period of the year leading to asphyxiation phenomena which disrupt soil fauna and vegetation.*



The maquis with almost permanent hydromorphism

Particularities linked to the degree of hydromorphism of the soil

The maquis of the almost permanent wetlands occupy the low plains and the alluvium of the waterways which drain it. They are divided into three large formations:

- The maquis of the hydromorphic plains
- The riparian maquis, along rivers and creeks
- The plant grouping of sinkholes.

A unique ecosystem under threat

The maquis of almost permanent wetlands (maquis of hydromorphic plains and riparian maquis) constitute a particular and very original ecosystem, which is only found in the extreme south of New Caledonia's Main Island.

They may find themselves threatened by fires, future mining, forest and industrial activities since they are directly under the influence of variations in the hydrological environment likely to be modified by water reservoirs and mining works.

The maquis of hydromorphic plains

An uncovered landscape with distant horizons

These large expanses of grass, undulating in the wind, offer a landscape that is often very open where the gaze sweeps across and embraces the horizon.
A few slender shapes of shrubs emerge very occasionally from this herbaceous mass where droplets and cobwebs hang. Surrounded by the surrounding reliefs or by areas of high shrub installed on low reliefs, the masses of compact plant tufts in areas of variable density alternate with the sparkling zones reflecting the sky.

Formerly a tree-like landscape

These wet and floodable areas would have previously been occupied by shrubby, tall to tree-like marshy formations according to palynological studies carried out in the lakes of the Goro plateau (Hope and Pask 1998) - lakes constituting real archives of the history of the vegetation of the South of the Main Island over the last 30,000 years. Today, this grouping is referred to as the association with *Pancheria communis* and *Cloezia buxifolia* (Jaffré, 1980), shrubs commonly found in these environments

The shrubby swamps

Isolated or in narrow cord, sculpted by water

The shrubby swamps stretch discontinuously along the more or less stony banks of the waterways.
Composed of shrub and herbaceous species supporting waterlogging and temporary, partial or total coverage by water, this maquis is very rich in specific species despite its limited surface area and is difficult to assess. Equipped with highly developed root systems, they resist being carried away during cyclonic floods and often lean downstream.

A very original biotope under threat

The vegetation of the riparian shrub and marshy areas has been largely degraded due to fires. The fact that these populations of rare species are already fragmented and reduced increases the risk of extinction of the species or at least the loss of its genetic integrity. This very original biotope deserves to be communicated and monitored for better preservation. Several species are listed as endangered, threatened, vulnerable, etc. such as *Retrophyllum minor* or *Dacrydium guillauminii.*

The plant grouping of sinkholes

A concave setting, an oasis of serenity

This plant group is mainly composed of *Melaleuca quinquenervia* (niaouli tree) and *Sannantha leratii* (false heather), often located on the edges of banks or all around the immediate perimeter of a sinkhole, up to the high water level because it adapts to temporary submersions, as well as more clearly aquatic species, such as *Lepironia articulata*, *Eriocaulon spp* (opposite) appearing as ephemeral and specific white pompoms emerging or not from the surface of the water.

Temporary hydromorphic maquis

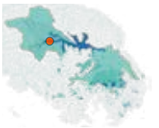
Moving away from the flow, a landscape at eye level

Away from the water circulation zone, different facies develop. A discontinuous herbaceous stratum present on alluvial soil reveals areas of gravelly or armoured soil. It is accompanied by a loose shrub layer barely exceeding 1.50 m, sometimes topped with trees reaching a few meters in height, establishing themselves on the high or stony parts.
This floral procession includes around 185 species with an incredible endemism rate of around 94%.

A transitional plant association

This ligno-herbaceous maquis, which can be described as semi-humid, is found between the foothills of the lower slopes and the maquis on soils with almost permanent hydromorphism. It benefits from a supply of water and organic matter coming from the slopes. Composed of specialized species capable of withstanding phases of soil waterlogging, this plant group, existing only in the extreme south of the Main Island, was defined by the publication of Jaffré, in 1980, as an association with *Homalium kanaliense* and *Costularia comosa* today called *Tetraria comosa*.

Wetlands with niaouli trees



A tree of light loving open environments

Emerging from the water or punctuating the banks of lakes and rivers with its singular shape, the niaouli tree likes to capture the light through its white trunk covered with its multi-layered onion skin bark.

In 1893, Jules Prévet filed a patent and marketed his essential oil under the brand Goménol, the name of which partly refers to an estate called Gomen in New Caledonia.

A tree full of resources and linked to tradition

The essence extracted from the leaves, rich in eucalyptol, is used against bronchitis. Its bark is used to cover the walls and roofs of the native huts. It holds an important place in customary ceremonies: during a birth, the infant is wrapped in niaouli tree bark to protect him and give him strength. During a funeral, the leaves and branches wrap the white currency authorizing the exchange between two clans.

A unique flora in the world

Conifers

© Katia Michalezyk

Callitris pancheri
Former name: Neocallitropsis pancheri

This small tree with a very twisted trunk, giving it the appearance of a giant bonsai, was widely exploited for its oil, used as a perfume fixative. As a threatened species, it became, in 1942, the first one to be officially protected locally.

Madeleine Falls, Lakes Plain

© Jean-Jacques Villegente- Netcha

Dacrydium araucarioides

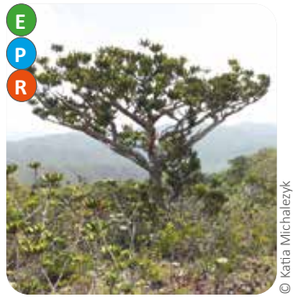
The leaves, structured in tight scales, aggregate into smooth and sinuous branches, in the upper half of the trunk, giving this small tree a candelabra shape.

© Dominique Garnier- Madeleine waterfall

Dacrydium guillauminii
Cat Tail

Growing with its feet in the water, this small shrub is characterized by its needle-shaped leaves, very bushy on the branches, which give it the appearance of a cat's tail. One of the rarest conifers in the world.

Banks of the Lakes River



© Katia Michalezyk

Agathis ovata
Mountain Kauri

Its characteristic shape with a tabular crown, in the shape of an isosceles triangle, points downwards emerges from dense humid forests of medium altitude or from the shrub as isolated individuals.

> The originals

Callitris pancheri

The name of this tree is one of around thirty groups of species dedicated to the botanist Jean Pancher (1814-1877) who lived in New Caledonia from 1857 to 1877 and who died in Uaraï Bay near Fort Teremba (Moindou, New Caledonia).

An exceptional endemism

The isolation of New Caledonia for millions of years has allowed the particular evolution of many species. In the Great South, extreme living conditions, with lots of sunshine, soils unfavourable for plant growth, generate an exceptional rate of endemism. The Ramsar labelled area offers a multiplicity of natural habitats, with mining shrubland, humid forests, lakes and swamps.

© Katia Michalezyk- Plaine des Lacs

Drosera neocaledonica

Recognizable by its rosette of red leaves covered with hairs, the carnivorous Drosera produces a false nectar which attracts insects. Those who stick to it are killed!


© Katia Michalezyk- Plaine des Lacs

Cladonia pycnoclada and Cladia retipora
Arbusculate Lichen and Coral Lichen

Without stem, leaf or root, slow growing, lichens result from the symbiotic association between a fungus and an algae.

E Endemic P Protected R Rare R+ Rare, in critical danger

Aquatic species

© Katia Michalezyk - Madeleine River

Retrophyllum minus
Corkwood tree

Often represented by a few isolated tree plants present along waterways, it can resist total submersion for several days.

Light and anchored
Gondwana Relic
Crescent feet in the water

© Irène Létocart- Lakes Plain

Pandanus lacuum
Water Pandanus

Recognizable by its slender stem supported by aerial stilt roots submerged in water, this rare, microendemic pandanus is in great danger.

The Lakes Plain

© Katia Michalezyk - Lakes Plain

Xyris neocaledonica

Grass located in the marshes of the mining areas of the Great South where three species are present, all endemic. The solitary flowers develop three bright yellow petals.


© Adeline Suprin

Utricularia Uliginosa

This herbaceous carnivore, with a long floral stem punctuated with purple flowers, ingests microorganisms thanks to its fine foliage equipped with utricles, like so many wineskins with trap doors which trap their prey by sucking them in as soon as it comes into contact.

Retrophyllum minus

The Lakes Plain

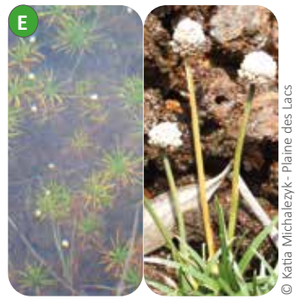
Formerly used by miners for making corks, it owes its name to the lightness of its wood, comparable to that of balsa.
It is a relic conifer of Gondwanan origin, with a very particular habit, a characteristic "bottle" trunk, resembling a baobab. This species formerly occupied the vast marshy areas of the Lakes Plain, thus constituting real marshy forests today replaced by ligno-herbaceous shrub of the marshy areas. (Palynological studies in the lakes of the Goro Plateau (Hope and Pask, 1998).
Very sensitive to fire, trampling and mutilations of campers, it particularly attracts the attention of international bodies for nature conservation.

© Nicolas Charpin

Blechnum francii
Franc's aquatic fern

This aquatic fern, attached to the bottom of the water by roots, can grow to incredible depths of 10 m.

Bed of the Lakes River



© Katia Michalezyk- Plaine des Lacs

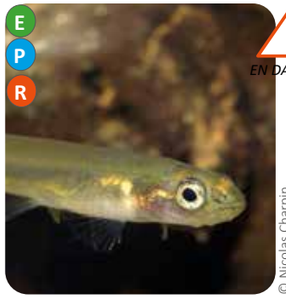
Eriocaulon neocaledonicum

This semi-aquatic herbaceous plant sometimes lines the edges of rivers and lakes. Its flowering takes place in dry periods when the plant is then more exposed.

A discreet fauna

E Endemic P Protected R Rare

Fishes



© Nicolas Charpin

Galaxias neocaledonicus

Looking for its dinner
Unfair competition
Endangered fish

Lakes River, Great Lake, Lake in Eight, BRPP

This emblematic species, a vestige of the ancient fauna of Gondwana, is microendemic to the Lakes Plain. This rare fish particularly likes fresh water and rocky bottoms. Rather carnivorous, it feeds on small crustaceans and aquatic insects. It is seriously threatened with extinction due to the introduction of other fish (Black bass, Tilapia, Rainbow fish) which feed on it, chase it from its territory or enter into food competition.

© Nicolas Charpin

Protogobius attiti

Discovered in 1998, it was named in honour of one of the Melanesian chiefs of Goro tribe, the great chief Charles Attiti, who died in 2004.


© Nicolas Charpin

Anguilla megastoma
Mountain eel, Red eel

A catadromous species, it is born at sea, migrates to rivers to grow before returning to the sea again to reproduce (only once in its life) and die. An eel seen in fresh water has never reproduced.


© Nicolas Charpin

Giuris viator
Rainbow Lochon

Living in fresh or brackish water, these predators (25 to 30 cm) of rivers are found in the Indo-Pacific sphere.

Birds

© Frédéric Desmoulins

Egretta sacra albolineata
Sacred Egret

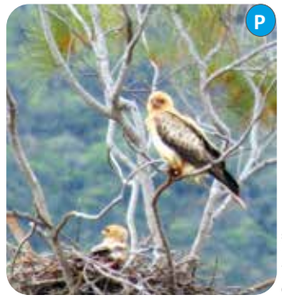
Prey spotted
Neck unfolded, beak pointed
Nourishing water

© Frédéric Desmoulins

Phalacrocorax melanoleucos melanoleucos
Pied Cormorant

Frequenting lakes, mangroves and river mouths, this bird with its white fleece, uncommon in N.-C., lives in colonies.

20 to 30 pairs
Visit Yaté Lake



© Julie Villegente

Haliastur sphenurus
Eagle or Whistling Kite

Recognizable by its hooked black beak and its beige belly streaked with red, this raptor hovers above wetlands.

Observation of nests
on the Drowned Forest's trunks

The little beasts

© Frédéric Desmoulins

Ischnura pamelae Dragonfly

Between two worlds
Protection of the biotope
Imaginal flight


© Nicolas Charpin

Haliplus oberthuri

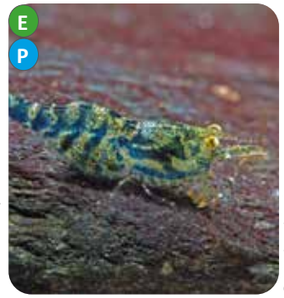
Riverside calm
This rare beetle
*Thought gone **

**rediscovered in the South more than 130 years after its first collection in the Anse-Vata Marsh of Noumea (before 1883).*

© Nicolas Charpin

Lynceus insularis (crustacean)

Endemic to temporary sinkholes, the female lays eggs when the sinkhole is wet, which only hatch after a period of drying. The new generation will only appear at the time of re-watering.



© Nicolas Charpin

Paratya caledonica

This small (2 cm) speckled shrimp, living strictly in fresh water, displays a multitude of colours (blue, yellow, black, red, white, etc.)

Micro-endemic
of the Lakes Plain


© Nicolas Charpin

Leptoceridae Oecetis

From the order of Trichoptera, this larva adapted to life in fresh water makes a small sheath from sediment to form a roof.

Lake Xere Wapo

© Nicolas Charpin

Glyptophysa petiti

Having become very rare since the early 1990s, this aquatic snail, reaching 5-8 mm in size, as an adult, is in danger of extinction.

Micro-endemic of
the Lakes Plain

Soundscape, listening to biodiversity

The study of these sounds makes it possible to estimate biodiversity, to detect a disturbance of the ecosystem, to establish monitoring of the restoration of disturbed systems and to establish a temporal (day/night) and spatial signature of the fauna present in these landscapes.
Thus, several scientists, including recently a team from the IRD, the IAC and from Poland, noted that the forest had, in places, become silent. They highlighted a causal relationship between this silence and the presence of the electric ant. Indeed, this invasive species, introduced in 1960, devastates everything in its path. Many insects (worms, caterpillars, cockroaches, etc.) are disappearing, causing a change in soils and animal populations. The decline of these various insects, which are the kagu birds' only pantry, leads the latter to flee and drastically reduces their living space.

** "all of the biological, geophysical and anthropogenic sounds that emanate from a landscape and which vary in space and time, reflecting important ecosystem processes and human activities."* Pijanowski and Al., 2011

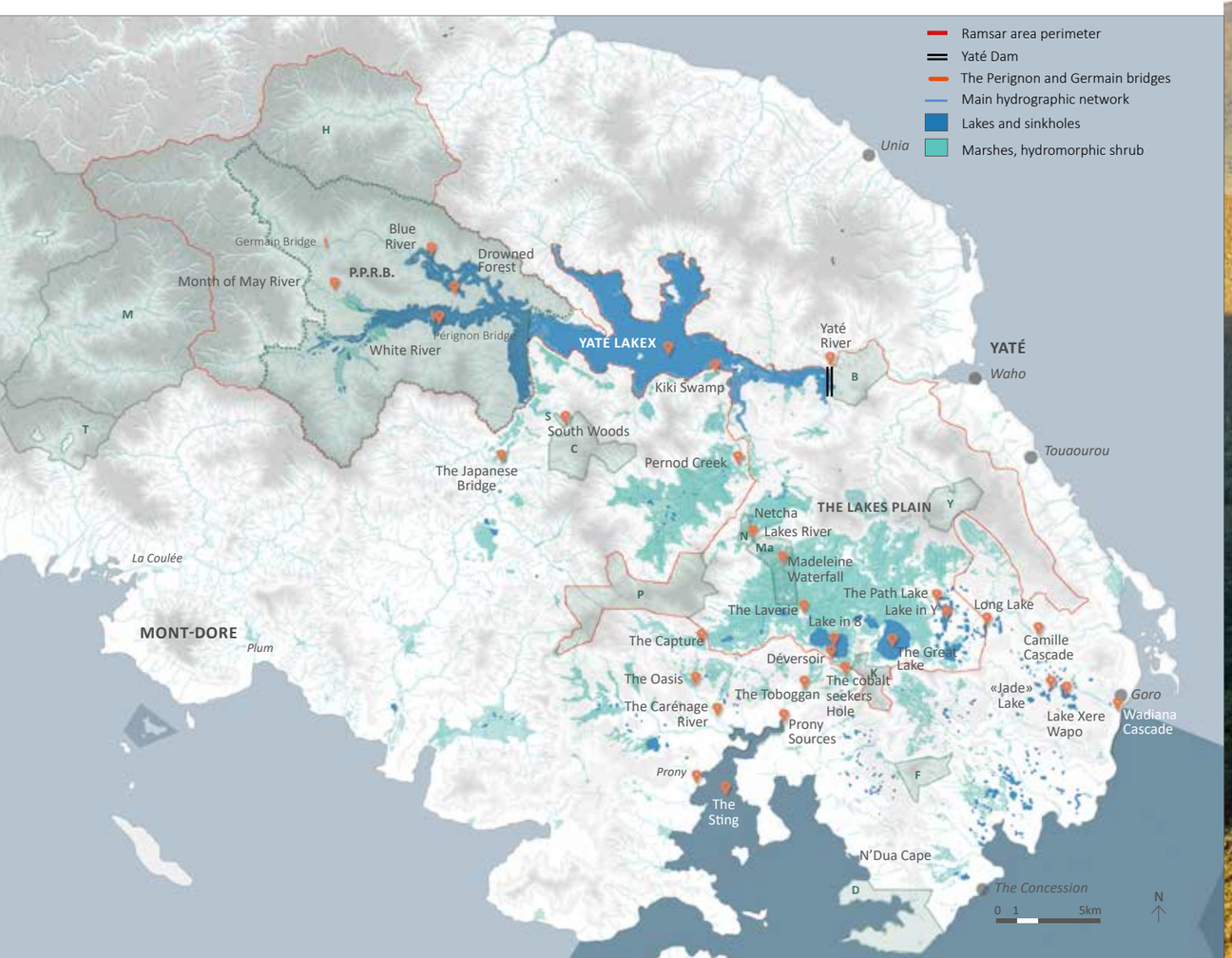
The sites

TERRESTRIAL PROTECTED AREAS

The Blue River Provincial Park P.P.R.B.

Ma Madeleine Falls
N Netcha
P Pine Peak
Y False Yaté River
K Great Kauri Peak
B Yaté dam
H High Pourina River
S The Southern Woods
C Hidden Forest
M The Springs Mountain
D Cape N'Dua
F Northern Forest
T Thy Valley

Yaté Lake



The Blue River Provincial Park (BRPP)

A multifaceted park, an example of biodiversity

Created in 1980, in the heart of the Great South's massif, the Park extends over 22,000 ha and includes the nature reserves of High Pourina and High Yaté.

Varied atmospheres and environments

It contains varied plant formations (mining shrub, dense forests and wetlands) and is home to unique species in the world. Of great variety, the forest is made up of kauri trees (*Agathis lanceolata*) and araucarias (*Araucaria bernieri*) which sit alongside endemic palm trees (*Cyphophoenix fulcita*) as well as spectacular tree ferns (*Cyathea vieillardi)*.

Omnipresent water, shaping landscapes

The White and Blue Rivers are the two main rivers of the BRPP. Permanent, they supply the water reservoir of the artificial lake of Yaté. Along these waterways, riparian forests develop which have the advantage of not depending on rainfall and which cross all environments.
Located essentially on the outskirts of these open freshwater areas, the Park's marshes have vegetation adapted to more or less permanent waterlogging, forming a transition with the shrub on the slopes.

Proud of the conservation of an emblematic bird

Most New Caledonian land birds are found there. The BRPP is home to the largest population of wild kagu birds. Specimens bred in captivity, at the Noumea Provincial Zoological and Forestry Park, have been successfully reintroduced into the park. Unfit to fly and therefore subject to predators (dogs, cats, pigs, etc.), they reproduce little (a single egg per year), hence their rarity and their protected status, a program led by the South Province. Due to deforestation, caused by the exploitation of nickel mines, humans have restricted its living areas and represented a certain pressure for these endemic Rhynochetos jubatus.

Why can't the kagu fly?

It would only lack powerful pectoral muscles, atrophied over time because it used to live in an environment without predators and find its food in the ground, so flight was no longer vital to it.


Rainforest


At the Grand Cascade


The Blue River


The Perignon Bridge


The Blue River

The Upper Blue River

A narrow cord

Humidity and lushness

From the wide and peaceful outlet of the Blue River, the path, a long ribbon of red earth, gradually penetrates into the silent shadow of the forest. The river in turn takes the form of a blue and green ribbon, colouring with the sky and the depth of the water. Its slopes, covered with a magnificent preserved primary forest, invite us to walk among palm trees with aerial roots, ferns and huge trees such as kauris, making the atmosphere of this walk fresh or overwhelming.

A sanctuary for the country's emblem

With its crest deployed to intimidate, its feathers inflated, the kagu bird, with its grey plumage, walks there. Its name comes from its characteristic song which resembles the bark of a dog sounding like kagu.

*Rare and protected, **The Big Kauri tree** is said to be more than 1000 years old. It reaches 45 m in height and the diameter of its trunk 2.70 m*

Second Devil's Horn, crossing the Blue River on the GR®NC1

Micro landscape
Bright reflection
Rear view soul-mirrors

The Great Waterfall

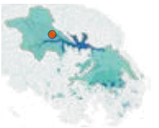
The Giant Pots

Dotted with pots - mirrors

The Giant Pots

Natural cavities, hollowed out by the swirling of water and pebbles giving them an almost circular shape, they are numerous in the bed and on the banks of the Blue River, particularly in the Devil's Horns sector.

! *Flash floods can occur during heavy rains and make this area dangerous.*



Discreet traces

The GR®NC1 trail follows an old track traced on the mountainside for logging, with destroyed culverts, vestiges of logging, a place called La Tranchée, a small canyon of red earth, cut into the mountain by the old logging machinery.

The White River

A mysterious fragmenting hydrographic network

An enigmatic circulation

The White River takes many forms, sometimes narrow, sometimes wide and sometimes impetuous, at the edge of its waterfalls. Being a river with a variable flow rate due to the fact that it drains a relatively large catchment area, crossing it can be difficult or even impossible in the event of heavy rain.

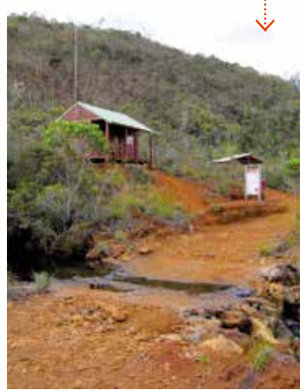
As it travels, it develops long and meandering networks which divide then come together forming a communication between numerous ponds which shelter eels in particular.

The Mule Drivers' Refuge, near the marshes

Its name comes from its location near an old mule trail used by the GR® NC1 trail.

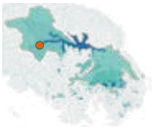
Its paths were used either by convicts for mining or forestry, or by the Kanaks to pass from one valley to another and exchange with other tribes. The development of the GR® NC1 trail was based on the layout of these trails in order to minimize the environmental impact and preserve the memory of these paths with their historical and heritage character. During your walk, you may see some vestiges of this past (old stone walls, mining remains, old logs cut during logging).

Waterfall on the White River



White River Marshes

Winding through the plain dotted with discreet remains



Remains of rails

The Locomobile

A witness to logging at the beginning of the 20th century, this boiler is the vestige of a locomotive. A huge steam winch, it was used to pull felled trees in the forest on a slope. Guided in their descent, the trees transported to the side of the track were loaded onto wagons and transported by small train to the mouth of the Pirogues River.

The White River, its marshes

An open, moving expanse

The swamps

In its meandering course, the river loses itself to form vast marshy areas covered mainly with sedges, niaouli trees, xyris and other cunoniaceae which are located at the bottom of the White River Valley. The path of the water gets lost and becomes perceptible again, gaining height.

To the West, a view over the marshes and Yaté Lake

Caressed by the wind

Explore the marshes of the White River

"The trek is not just a question of altitude or inaccessible lands. You should also know how to enjoy a long walk around a marshy expanse whose rushes bend gently, caressed by the discreet breath of the trade wind. You have to know how to walk under the gaze of curious birds who survey their domain by describing long graceful curves in the sky."

GR®NC1, From Prony to Dumbea, Jean-Francis Clair

The Month of May River

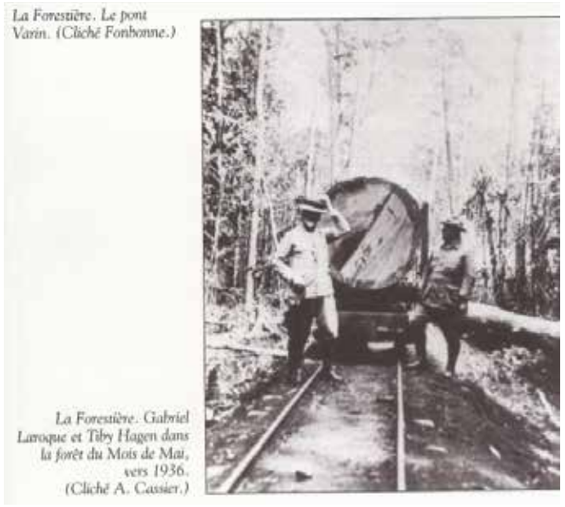
A walk through the rainforest

Running along the foothills of a ridge, the long walk of the Month of May trail, between dense humid forest, mining shrub and perspectives of wetlands, leads the walker from the Upper Valley of the Blue River to the White River.

A few remains

There remain few traces of the mining activity (the chrome ore extracted from the Month of May Mine was evacuated by rail to La Pirogue) and forestry activity which took place there, apart from a few paths.

The marshes of the Month of May River



La Forestière. Le pont Varin. (Cliché Fonbonne.)

La Forestière. Gabriel Laroque et Tiby Hagen dans la forêt du Mois de Mai, vers 1936. (Cliché A. Cassier.)

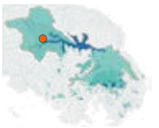
Blechnum obtusatum

Rainforest

Swamps

Month of May River Bridge

An intimate freshness



A place full of mystery

"It then penetrates into the depths of the Mont of May forest: an enigmatic space where light and shadow give the water of the creeks this very particular appearance. Branches and dead leaves crunch underfoot. The harsh smell of lush, damp earth caresses the nostrils."

GR®NC1 Guide, From Prony to Dumbea, Jean-Francis Clair

A forest history

Between 1920 and 1929, 53,000 m³ of wood, mainly kauris, were extracted throughout the Pirogues River Valley (35,000 m³) and in the Blue River Valley (18,000 m³). A 37 kilometre railway line, leading to the beautiful Month of May forest, allowed the transport of logs. The activity ceased in 1932 (Source: Chronicles of the Red Lands, the Great New Caledonian South, *by Jacques Valette*)

At the confluence

The disappeared mouthpieces

Here, the rivers flow dully into the calm waters of Yaté Lake. In the rainy season, when the lake fills, the entire Blue River Valley is flooded. In summer, at low water, bare ground appears, littered with shot and petrified or living plants, such as eriocaulon.

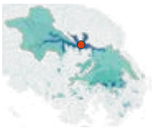
The Perignon Bridge, a trace of logging

Today a registered monument, this bridge (1) entirely made of wood connects Bon Secours (2) and its marsh, the White River and Month of May River to the Blue River, hidden by a ridge that separates them.
Completed, in 1958, by the forestry operator Perignon, this bridge, more than 80 meters long, spans the mouth of the White River on the banks of the lake. Its sleepers and beams were cut from gum oak, a heavy, resistant and rot-proof wood, as can be seen by the numerous dead trees of the Drowned Forest (3) which have remained present since the valley was impounded in 1959.
Its apron can be covered by around ten centimetres of water when the lake is at its maximum level (160 m). Although Cyclone Erica, in 2003, shook its structure, forcing the park administration to close it to automobile traffic, it nevertheless allowed nature-loving visitors to walk there.

The Bon Secours marshes

View of the Drowned Forest

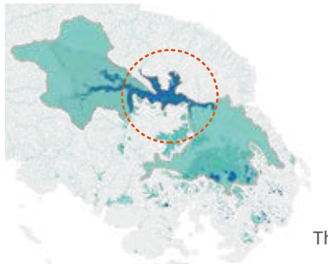
The Drowned Forest



An artificialized graphic landscape and a drowned biodiversity

Between a steep forest meander and the clear horizon of a flat lake, enigmatic and even ghostly shapes of greying trunks emerge from the lake. The impoundment of the reservoir linked to the Yaté dam has drowned the forest present on the watershed of the river, creating a sinister, enigmatic or aesthetic atmosphere, depending on opinions, but leaving no one indifferent.

Yaté Lake, a centrality

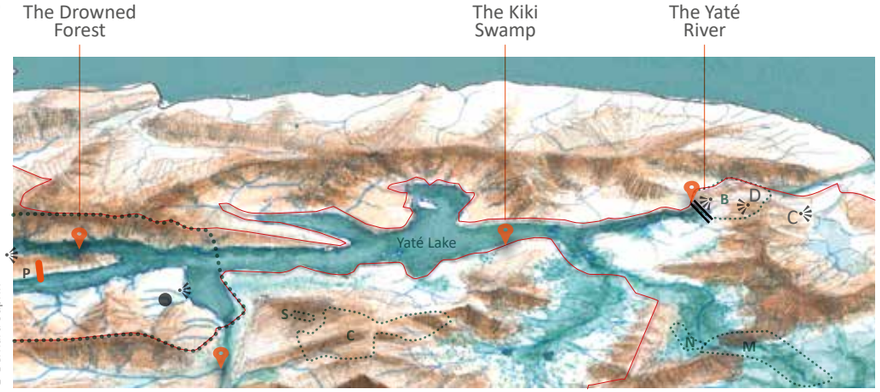


Ramsar area perimeter
Blue River Provincial Park
Protected area

Yaté Dam
Pérignon Bridge (P)

The Park House- BRPP
C Yaté's road pass
K Djuru dere

© Bernard Suprin



Under Yaté Lake, when the dam was emptied in 1991, an ancient landscape was revealed, that of a river cut into the shape of a mini-canyon.

At the rivers' confluences, an huge reservoir

A feeling of embraced immensity dominates. The reliefs form the background of the infinite horizon of this lake: the foothills of the central chain to the West and North, the Yaté plateau to the East, and small chains separating it from the Southern plateau.

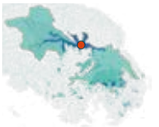
Islets with marbled banks mark the body of water whose very jagged fringes follow the contours of the relief, thus revealing the high points of yesterday's plain, now flooded. The low mining shrub vegetation around the lake testifies to the artificialization of this body of water which, on its fersiallitic banks, only presents little flora typical of freshwater wetlands.

According to the fluctuations

Banks lined with red, cracked soil, emerging reliefs or exposed shallows; the absence of rain reveals a morphology usually hidden. The weather makes this landscape extremely dynamic. The colour of the water changes from blue to ochre red, depending on the strength of the rains, the chiaroscuro of the sky playing on the appearance of the lake.

An aquatic landscape unit

O extended sky
Soothing at bedtime
Infinite dream



Drown your gaze in the immensity of the azure

"The Yaté Lake, like a great silver river, winds between the festoons of red earth which border the green islets. The sun caresses the surface of the water and the light bursts everywhere in brilliant showers. The marsh of the White River spreads its colourful fringes in the misty distance..."

GR®NC1 Guide, From Prony to Dumbéa, Jean-Francis Clair

Nearby

Yaté's road pass - Wato Téaru* in the Nûmèè language

wato / tea / ru
nickname / ride / walk
Wato goes up while walking
The pass was named so because in the past the postman delivering mail to Yaté was named Wato. He climbed the Yaté Pass by walking and that is why the pass was named like that. Wato was the nickname of old Akapo Victor, known as Wanut, postman from Yaté in the 1960s.

The Erythrines Forest - Djuru Dere - Jurudrèrè*
in the Nûmèè language. *Located at the top of the pass.*

juru / drèrè (Botany: tree, erythrine, poplar)
tuft, grove, forest / erythrine

The legend
Originally, Charybdis was the daughter of Gaia, Mother Earth, and Poseidon, god of the seas, and was therefore known as the goddess of the tides. However, the goddess had a monstrous appetite and so he regularly stole livestock along the coasts of Sicily. One day, the hungry divinity made the mistake of devouring Hercules' oxen and this is how Zeus, king of the gods and father of Hercules, immediately struck her down and threw her into the Sea. Charybdis then transformed into a gigantic swirling chasm...

© Guillaume Juge

The enigmatic Charybdis chasm

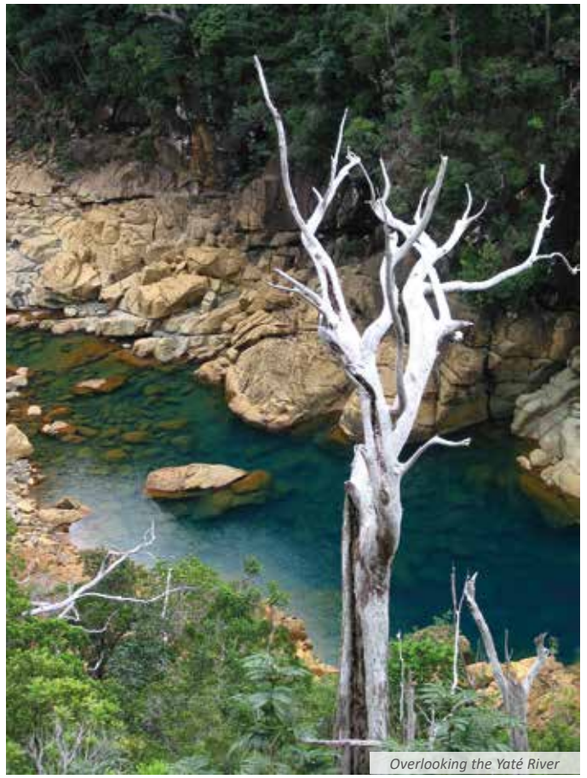
The chasm located along Lake Yaté takes its name from this legend, even if none of the local residents have (yet) testified to having seen whirlpools forming on the lake... In any case, it remains no less mysterious: if you are lucky enough to see it (and find it) without it being submerged by water, and if you manage to approach it closely enough, you will see that it gives the impression that one can go caving in its den. Stay careful though! The stability of the chasm is not yet known today.

The Kiki Swamp- Nê Jawari* in the Nûmèè language
(Lake of the Jawari Clan)

*This place is known as the **Kiki Swamp**. A version of this French toponym says that a gendarme once wanted to take his horse, called Kiki, across. As this place was marshy, the horse sank into it and broke its leg, hence the name of the **Kiki Swamp**. According to our informants, the Jawari Clan fished for eels in this place. They also said that in times of drought they fished for eels buried in the mud.*

* "Study on toponymy" see p.74

View over Yaté Bay



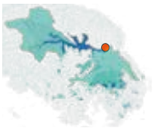
Overlooking the Yaté River

The Yaté River

Overhanging

Crossing this nature reserve, between wooded plateau and deep sinkholes overgrown with vegetation, beautiful panoramas are offered to the walker over the mouth of the Yaté, the red earth banks and the green islets of the eponymous lake.

Yaté Dam's
Natural Reserve

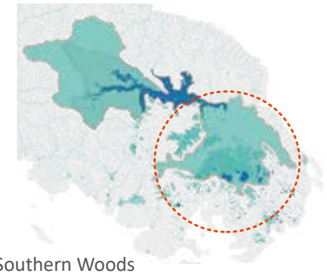


! *Watch out for water releases*

Yaté's Timetabled Road

The trail follows part of the Timetabled Road which is currently closed to traffic. Formerly open by time slot, alternately to one direction of traffic then the other, due to its narrowness, its name comes from this old method of access. It's a beautiful cornice route allowing you to admire magnificent turquoise water holes and numerous waterfalls.

The Lakes Plains



Meandering network of the Lakes Plain

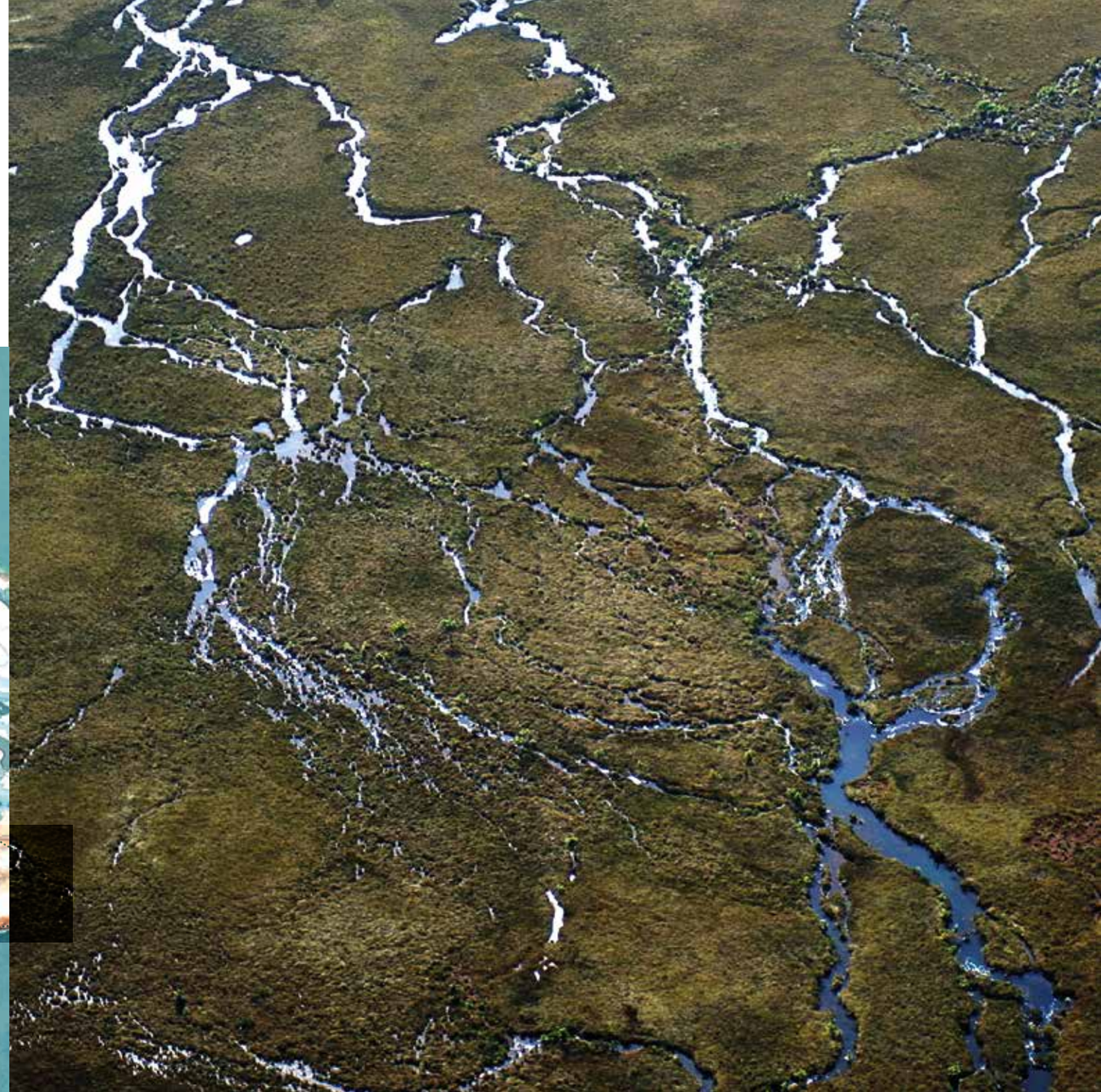
Terrestrial protected areas

- **Ma** Madeleine Falls
- **N** Netcha
- **P** Pine Peak
- **Y** False Yaté
- **K** Great Kaori Peak
- **B** Yaté Dam
- **S** Southern Woods
- **C** Hidden Forest
- **F** North Forest
- **D** Cape N'Dua

Ramsar area

Southern Woods
Pernod Creek
Netcha
Madeleine waterfall
Lake in 8
Geat Lake
Camille waterfall
Lake Were Wapo

Yaté Dam
Yaté Lake
Ka yé Wagwé
Pine Peak
Big Kauri Peak
Main harbour
Prony
North Bay
Prony Bay
Bonne Anse (Good Cove)



The Lakes Plain

A very particular context

A river without a valley

Flows coming from the southern slopes of the False Yaté River's crest supply the plain. Nourished by the foothills of the Lakes Plain, the **Lakes River** which drains it flows peacefully for 25 km at the foot of the Nengoné Mountains/ Great Kauri Peak

(M) At the level of the **Madeleine Falls**, a rocky barrier closes the plain and the roaring waters concentrate to overcome the drop of approximately 20 m over 2 km long. After the narrows, the river disappears not into the subsoil but by dispersing into numerous rivulets which regroup into a single bed 2 km further on. It widens considerably further, offering a vast water hole, suitable for swimming, and whose depth exceeds 10 m on the outskirts of the Netcha protected area.

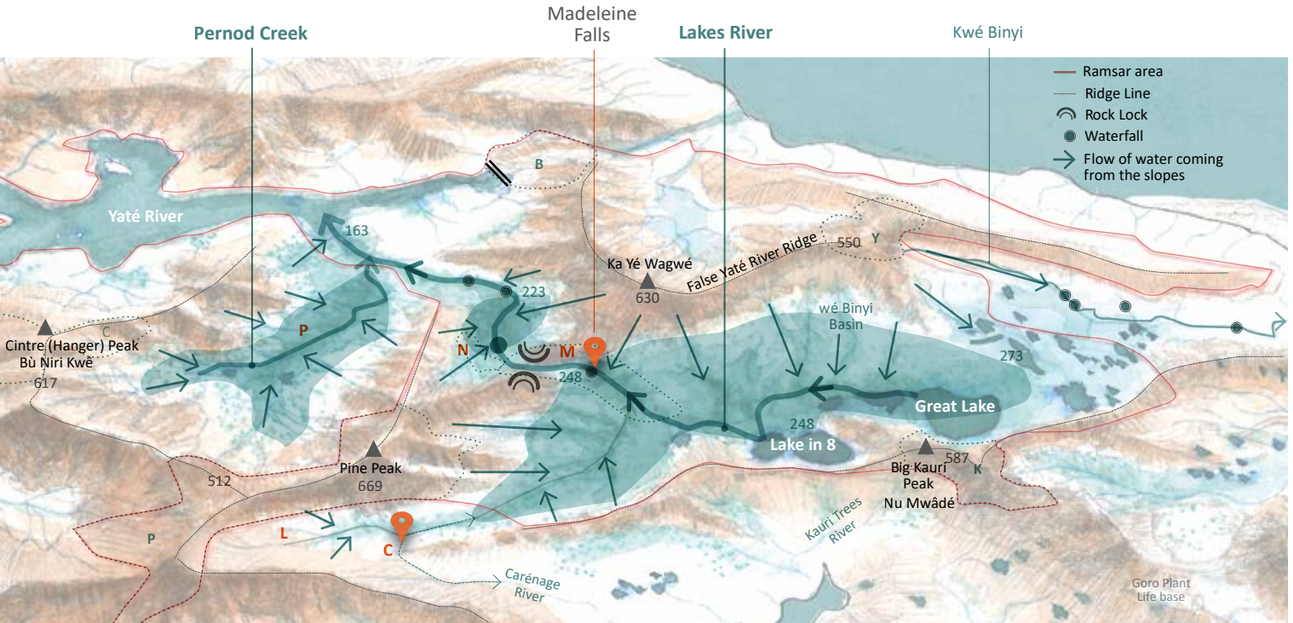
(N) Downstream of **Netcha**, the network fragments again to form a new marshy area which receives diffuse flows from the slopes on both of its banks. A succession of small waterfalls marks the end of the river's marshy area which then joins the Yaté Lake after having collected the Pernod Creek on its left bank.

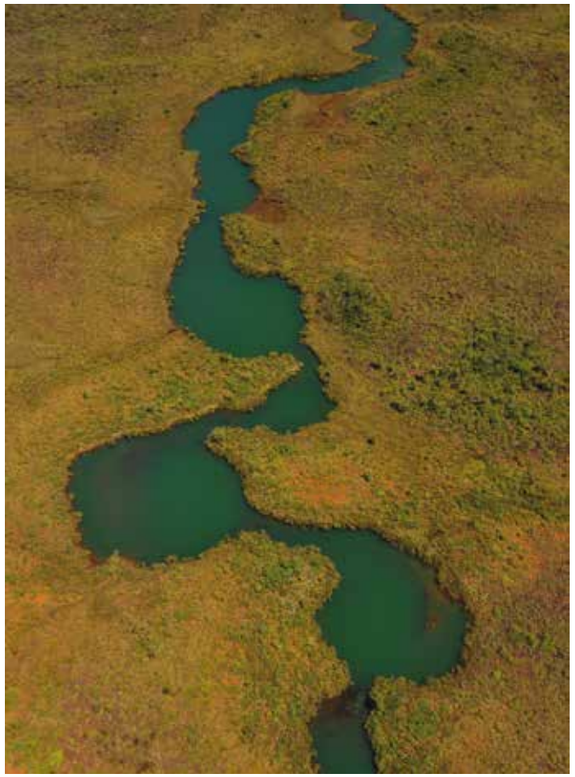
(P) Taking advantage of a large flat part at its bottom, the **Pernod Creek** spreads out and diffuses to shelter a wetland of major interest which collects water from the South of the Hidden Forest's massif and the North of the Pine Peak's massif.

Another receptacle supplies the plain

(L) **The Laverie's (Laudry's) Cove** drains the southern slope of the Pine Peak's massif and the ridge overlooking the lakes to form a large diversion teeming with wet grass at the bottom of the valley.

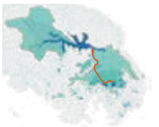
(C) At the **Capture**, part of the river flows towards the Lakes Plain, while the other crosses a rocky barrier to join towards the South, the Carénage (Fairing) River, which flows into the bay of the same name, north of the village of Prony.





A typical meandering network

Three viewpoints over the Lakes River



A very diverse wetland landscape

The Lakes Plain offers a vast wetland area, made up of a set of depressions, in the armoured plateau forming lakes (Lake in Eight and Great Lake) and sinkholes separated by vast marshy areas. A dense network of creeks and rivers, with capricious trickles of water, discreetly meanders this plain.

High rainfall

Open to the prevailing winds, its relief creates ascending currents which promote condensation and generously water the Lakes Plain, which receives on average 3 m of rain per year spread over approximately 300 days.

Protected areas: the Madeleine site

A unique prehistoric landscape

A topographic rise located on the Lakes River, the Madeleine Falls rumble in the heart of a marshy plateau, delimited by a series of mountain ranges forming a cirque.

An exceptional showcase of southern flora

It is home to low shrub vegetation and several primitive conifers with tortured shapes, vestiges of the secondary era, giving this site an almost prehistoric atmosphere.

The presence of a few gum oaks also testifies to the forest nature of the *climax** vegetation.

The reserve, rich in 168 plant species, demonstrates an incredible rate of endemism of around 95%. Let us cite among them: the remarkable presence of *Callitris pancheri*, a relict species which remains in the south of the Main Island; cork wood, growing on the bank; *Dacrydium guillauminii,* an extremely rare conifer.

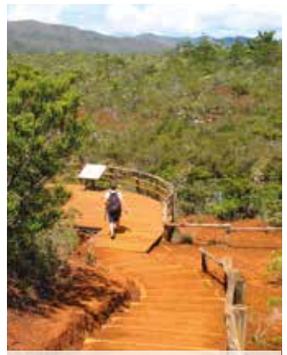
**The climax designates a final, lasting, natural state (more or less theoretical) balance reached by a plant association during its evolution and in certain climatic and pedological conditions (soil).*

The maquis, of lateritic hydromorphic plains, represent a major challenge in terms of preservation; in fact, the latter constitute a very particular and poorly represented biotope which deserves to be preserved in the same way as forests. The conservation of these rare species is strongly dependent on the Madeleine Falls' natural reserve: more than half of the numbers of *Dracrydium guillauminii* are found there, as well as several populations of *Retrophyllum minus* and a significant population of *Callitris pancheri*.

Added to this *extraordinary* vegetation is an original aquatic group, home to a fish: the galaxias. Upstream of the waterfall, the bats (microbats) in the area come to drink and feed.

! *Swimming is prohibited for the preservation of the flora*

Entrance to the site



Botanical trail

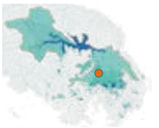
The Madeleine Falls

The Anna-Madeleine Mine

© M. Dosdane

A historical heritage

Rumbling River
Flora Sanctuary
Prehistoric



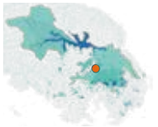
The Anna-Madeleine Mine

This small open-air chrome mine was mined by hand at the beginning of the 20th century.
It left a deep gash in the mountain. We can clearly see the location of the open-air mining and the different railway tracks on the upper floors for clearing the waste rock. The ore was lowered into the plain by an aerial cable then transported on a railway line several kilometres long. A funicular then took it to the Carénage (Fairing) Bay.

In the name of his daughters

Mining prospector, Charles Jacques Felix Metzdorf (1868-1946) travelled throughout New Caledonia to estimate the potential of the different concessions. He gave the name of his two daughters, Anna and Madeleine, to this mine, located higher up.

Protected areas: **the Netcha Site**



Water, a source of leisure

Shortly after the barrier formed by the Madeleine Falls which concentrates the waters, the hydrographic network is divided again, downstream of Netcha. A new marshy area opens widely and receives diffuse flows from the slopes on its two banks. On the edge of the river, nature offers you its silence before the appearance of bathers who take advantage of a good depth of water in this place.

A recreational place

The Netcha Site was created following the ban on swimming at the Madeleine Falls. It includes campsites as well as a refuge dedicated to the GR®NC1 long-distance hiking trail. A wooden pontoon allows controlled access for swimming and kayaking.

Protected areas: **the Southern Woods Site**

A peaceful place in the heart of the forest

The Southern Woods protected area (developed in 2009) is established in a beautiful humid forest, at the heart of a small stream. Located at the foot of the Pine Peak and its natural reserve, this area was created to guarantee the protection and conservation of natural heritage, as well as for leisure and environmental awareness. It offers a large picnic and camping area in the forest.

Kauri, a tree for construction

It has a strong cultural value for the Melanesian world since it represents the sustainability of the chiefdom. Its wood produces a yellowish resin and is used in the construction of war canoes, in carpentry, structural work and cabinetmaking. This tree can live a very long time: the Great Kauri of the Blue River Provincial Park is more than 1,000 years old.

Witness to logging

The fuel reserve

Stand at the Tamanu tree cabin and look at the small climb, just opposite... On the tractor, Jacques, Mr. Lucien's son, drags a log of wood to cut it with the saw, located near the Gum Oak cabin. The gasoline reserve (on the right in the photo) was locked away, after Mr. Lucien's grandchildren (Jean-Louis, Lucien and his sister) played at dousing themselves with gasoline! Today, the ashes of Jean-Louis' sister, who died in the years 2000s, rest on one of the hills to the south of the site.

Housing

The Lucien family lived in the half-moon house and the house nearby. Both facilities were located near the showers opposite the Blue Wood cabin. The large kauri tree you can see next to the showers was planted by the Lucien family around 70 years ago.

The wood drying shed

These hangars were located just to the right before the bridge. The planks and beams were left to dry at the current location of the Kauri cabin.

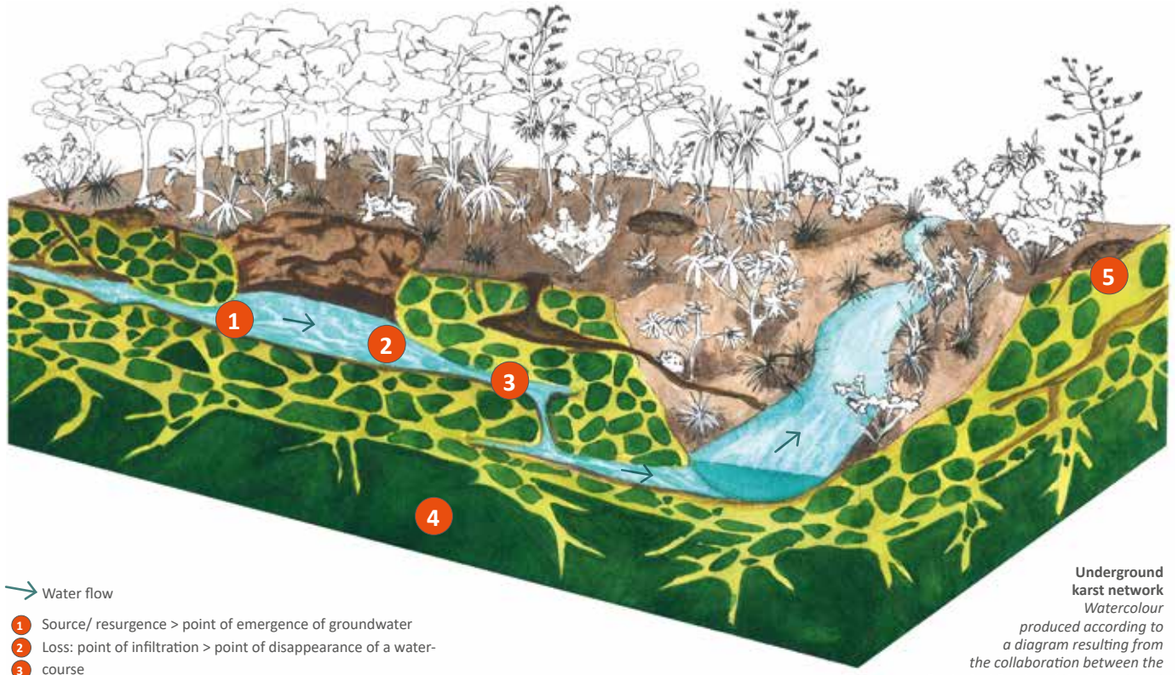
N.B. : The information provided and the period photos come mainly from the memories of Jean-Louis Lucien and Philippe Guépy, the grandsons of two of the Southern Woods farm managers who lived and spent their childhood on the site. Documents from on-site communication panels in the Southern Province. Photos from 2013: Michel Mai.

Memory of a sawmill

This site of more than 80 hectares, partially integrated into the Hidden Forest's natural reserve, is made up of 30% gum oak, a forest wood species that has become rare following fires and logging. Historically, the Southern Woods was home to a sawmill, from the early 1940s to the late 1980s, which exploited species present on site: gum oak, kauri, husk, tamanu, bluewood and columnar pine trees. Foresters felled noble trees such as gum oak, cut and left the pieces deemed unusable for the sawmill.

On the ground, we observe numerous stumps and tree heads which bear witness to the intense logging of the 20th century.

Spectator of the pseudo-karst system



Water flow

1. Source/ resurgence > point of emergence of groundwater
2. Loss: point of infiltration > point of disappearance of a water-course
3. Underground Cavity Healthy Peridotite
4. Sinkhole
5. Sinkhole

Underground karst network
Watercolour produced according to a diagram resulting from the collaboration between the Geological Service of the Department of Industry, Mines and Energy of New Caledonia & the South province.

A behind the scenes revealed

This site reveals a section of the underground pseudo-karst network exposed to the open air after the collapse of the vault over the underground cavity. It can dry out during the low water period. It bears witness to this exceptional hydrographic network which shows a face usually hidden from our gaze as spectators.

Loss: downstream of the fallen cave © Michel Mai

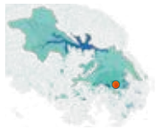
Source: uptream of the fallen cave

North view

Lakes

Bushfire in the Lakes Plain, 1991 © B. Suprin

The Great Lake



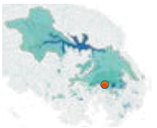
A marriage of waters

Several large bodies of water, such as the Great Lake, the Lake in 8 or the Lake in Y, result from the coalescence of several sinkholes which, by merging, gave birth to uvalas (landform), large depressions then taking a more irregular and sinuous shape.

The Great Lake, covered with rushes on the peripheral part, has a shallow depth (between 0.5 and 2.80 m). Fires represent a real threat to these specific ecosystems.

East view

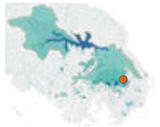
The Lake in 8



Rust and water

Also shallow, its sandy muddy substrate, dotted with blocks of armour visible on the open banks, contrasts with the green of the plant touches. The presence of Blechnum francii in the waters and Dacrydium guillauminii on the banks, which is one of the rarest conifers on the planet, calls for vigilance. Maintaining water quality is crucial to avoid endangering these two exceptional species.

The Lake in Y

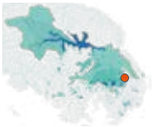


Riveted with “plug” wood

Named so because of its shape resembling the letter of the alphabet, this shallow lake (between 0.5 and 2 m deep) presents hydrophilic species typical of the Great South. From the shore, littered with blocks of armour where the astonishing *Retrophyllum minus* grows, its muddy substrate reveals carpets of white pompoms springing from their leafy graphic tufts: the emblematic *Eriocaulon neocaledonicum.*

The Long Lake

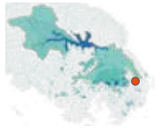
et © Bernard Suprin



A Callitris, a relic as old as Lascaux*

From a typical zig-zag branch, pointing discreetly underwater, history emerges. Buried alive by a collapse of the ground and deprived of oxygen by its mud sarcophagus, the Callitris exhumed here (250 years old), incredibly preserved, exhaled, once sliced, its characteristic camphorous odor. This occurred more than 12,030 years old (dating to carbon 14) after its death, which happened well before the arrival of Europeans and even Melanesians.

The *Jade Lake*



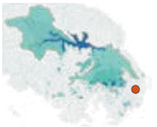
A magnificent jade colour

A very varied route provides access to this sinkhole which is adorned with water the colour of jade stone, as soon as the sunlight shines through. As you walk along the horizon, the plateau and the Isle of Pines with the N'Ga Peak clearly emerge, offering a unique panorama over the bay.

What future imprint of man?

Various paths allow you to wander, sometimes marked by cairns and drawn by the footsteps of men over the past centuries, sometimes created by another hand of man, that of the mine, just a stone's throw away.

Lake Xere Wapo

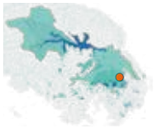


The Mine, very close

A lake on borrowed time

It would constitute the oldest record in the history of the Western Pacific (Stevenson and Al., 2005). The analysis of sediment cores made it possible to trace the history of climate and plant formations over more than 90,000 years, a period during which, well before the arrival of man, natural fires punctuated the alternation between forests and shrub in *Gymnostoma*. In this lake, a micro-endemic species of sphagnum was discovered in 2019. But will the lake, its history and its sphagnum moss survive the drying up predicted by the progress of neighbouring mining?

The Pass Lake

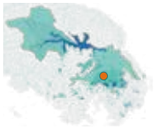


In not so lost nature: humans

This distant lake, with its particular very elongated shape, is fed by an artificial canal dug in order to divert the Amos stream which originally flowed towards the Kwé Binyi River. Its flows now lead, via the reception basin of the Lakes River, to the artificial reservoir of the Yaté Dam for hydroelectric production.

The other sites

The Laundry Hole



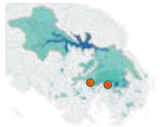
A mining bathtub

The Laundry Cove is drained by the southern slope of the Pine Peak's massif and the ridge which forms a vast marshy area at the bottom of the valley. Formerly the Laundry Hole, and in particular the river which flows into it, served as a laundry site, where the miners washed the ore in order to separate the different metals such as cobalt.

On the right, verse 5 of *The Cobalt Seekers song*, by G. Baudoux

They don't give a damn
The washers
Here are some guys
who roll it up
On our sweat.
They don't dance
To climb on the hill
And they make money
The drummers.

The Capture & Déversoir (Spillway) sites

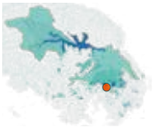


Capturing the river

Downstream from the Laundry Cove, the flows are divided: the part which flows towards the Lakes Plain is artificial, hence its name Capture. Made to increase the flow towards the laundry, it was used to wash the chromium ore from the Anna-Madeleine mine (above the Madeleine Falls), the other part (1) which passes through the lock is natural and heads towards the Prony Bay.

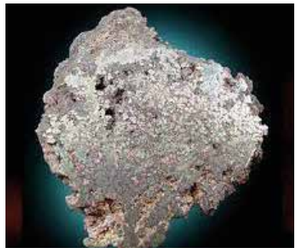
The Cobalt Seekers Hole

! *As this site is not stabilized, do not enter this tunnel*



A name linked to mining for a little-known curiosity

Coming from *Kobolds*; Legendary creatures from the Scandinavian folklore, accused by miners of yesteryear of transforming silver into a blue mineral, cobalt designates a natural metallic element, of a turquoise blue colour, more or less light. In any case, the Cobalt Seekers Hole takes its name from the miners who both shaped it and used it to extract cobalt.



When we dig into cobalt
We're doing well.
But if there's nothing at all
Naughty boy
We have to do some
earthmoving
And push forward
Yes that's what's funny
Such a dirty job

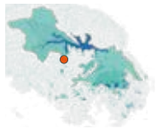
On the right, verse 3 of *The Cobalt Seekers song*, by G. Baudoux

The remains of the Japanese Bridge

The Gauzère Bridge water hole

© JM Delefortrie

The Japanese Bridge



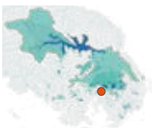
Between historical and recreational exploration

The hiking trail runs along the Pirogues River with its crystal clear green water offering numerous swimming opportunities. A multitude of creeks flow into the river. Dry or not, they sink to the bottom of small canyons two to six meters deep. The railway once spanned them using rudimentary culverts. Today, they have disappeared or are in ruins. The walker will sometimes test his balance by playing tightrope walker.

In the footsteps of an old railway

This walk takes its name from the former Japanese logging railway used to transport wood using carts in the 1930s and 40s. Its operation was interrupted in 1942, after the attack on Pearl Harbour, where all Japanese were arrested. The wooden remains are still present despite vegetation and forest fires.

The Toboggan Trail



Discreet traces

Lost in the middle of the maquis, vestiges of rusty rails and rubber oak sleepers appear on the walking route. Opposite, there's a schlittage track, used in the 1870s to launch kauri trunks into the river called the *Toboggan* or *Tobogan.*

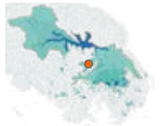
Witness to a past history

These vestiges bear witness to the past, to the intense logging operations, the very first of colonization since it was a question of obtaining timber to build Port-de-France, the former name of Noumea.

Pernod Creek

Waterlogged plain
Tributaries meander
Anise colour

! *Delicate crossing, even dangerous in case of heavy rain*



In immersion, a place full of poetry

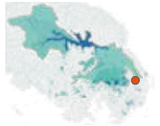
"Following the trail of the pack animals who tirelessly travelled the Great South to supply prospectors, miners or foresters, you will cross the strange Pernod Creek Valley, crisscrossed by capricious trickles of water that meander discreetly under the rushes. After wandering on the dark armour spotted with shiny puddles, you will climb the Hanger Peak for a panoramic overview over the region."

GR®NC1 Guide, From Prony to Dumbea, Jean-Francis Clair

A colourful name for latent distress

*This creek takes its name from the colour of its water, associated with the **Pernod** brand, a well-known alcoholic drink. Located hydraulically upstream of classified wetlands, its integration into a mining area represents a significant risk for the integrity of these ecosystems already weakened by a fire in 2013 which burned more than 800 hectares of vegetation in 12 days.*

The Camille Cascade

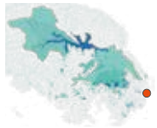


At the heart of a setting

Nestled upstream of a large meander, this waterfall is located on the lower part of the Kwé Biny (Kuebeni) River. Access is via a track then a path which descends quite steeply through the mining shrub leading to this magnificent turquoise-coloured water hole with a beautiful majestic waterfall suitable for swimming.

The Wadiana Cascade

Funicular attached to the slope and portico of the Mine



An easy to reach refreshing stopover

These 30 m high waterfalls, commonly called Goro Cascade, welcome many bathers.

The Japanese Iron Mine (1938-1941)

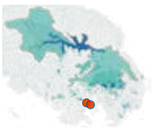
Placed on the water, like a stationary dog, the metal sentinel, witness to a past of hard work where the Japanese came to exploit iron ore, freezes in a rusty silence.

The Carénage (Fairing) Bay

Waterfall on the Fairing River

Fairing Bay

Prony, a story of waters



A true inland sea

A heavily indented coastal landscape, made up of well-sheltered bays, gives the Fairing and Kauris Bays a very safe anchorage, renowned as a *cyclone spot* for sailors exposed to the worst weather situations. The bay forms a glowing setting with its ultramafic soil and a green one with its vegetation where the columnar pines widespread in this area emerge from the sloping base. The hydrophilic flora mixes herbaceous plants and mangroves around the coast.

A privileged place for whale watching

The bay is a starting point for observing humpback whales, a species protected since 1963 in the splendid Caledonian lagoon classified as a World Heritage Site by UNESCO.
Prony Bay is named after the steamship Prony which carried out hydrographic surveys of its depths between 1853 and 1855.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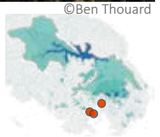
©Ben Thouard

Prony, a story of waters

! *If allergic to sulfur, refrain*
Do not wash in it



Thermal springs, sometimes invisible, flow here

At the Carénage (Fairing) Bay, rock masses, invisible at high tide, are exposed at low tide and release warm water whose temperature reaches around 43°C. *(1)* At the Kauris Bay, located on the left bank, the spring emerging on clay soil appears less hot and less active than the previous one (32°C on average). A developed site *(2)*, on a promontory, offers a small rectangular pool. This first thermal establishment was described, in 1878 by Charles Lemire, as having a wooden bottom and a drainage channel.

The Prony Needle, *(3) a unique curiosity in the world, discovered in 1979, forms a kind of giant stalagmite taking root 35 meters deep and rising 6 meters below the surface. This concretion, covered with multiple, very colourful corals, sculpts the architecture of a cathedral bell tower bristling with several small pinnacles. This protected natural area was one of the filming sites for the film Atlantis, by Luc Besson.*


1


2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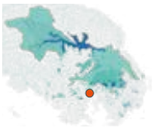
A forest history



A forestry branch of the penal colony

Instead of the Prony village, we discover remains of constructions scattered in the area's wooded landscape. From the time of Camp Sebert, which became a forestry site in 1873, only the permanent buildings of the prison administration remain: the powder magazine *(3)*, the accountant's accommodation, the bread oven, the remains of the equipment store, a the supervisors' accommodation and the base of the farm manager's house *(2)*, invaded by the magnificent century-old banyan tree spreading its roots to the past.

Perpetuate the memory

After felling the trees, the logs (trunks with bark) were transported to the sawmill using sleds, also called schlittes, which were pulled by man arms on the wooden rails of the towpaths. In 1997, the Prony village association reconstructed identically and on an original route, a 50 m portion of towpath and its schlittes.(1)

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Activities and accommodation: www.sudtourisme.nc/

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In a natural space,
I adopt the right actions

Do not collect plant or animal species from the site
Keep your waste with you.

Clean your shoes to avoid spreading seeds of invasive species

Remain on the trails to avoid soil erosion

ISBN request in progress

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ATHANOR

Strolling along the waterways – The wetlands of the New Caledonian Great South

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