A Survey of Kaburi Creek, West Suriname, and its Conservation Implications

by Dr Nicole Duplaix [1], Marchal Lingaard [2], and Claudine Sakimin[3]

This study was commissioned by:

The Oceanic Society
Fort Mason Center, Bldg E
San Francisco, CA 94123, USA

[1] Former Chairman, IUCN-SSC Otter Specialist, 5251-18

restry Officer (Nature Conservation), LBB Nature Conservation Department, POB 436, Cornelis Jongbawstraat 14, Paramaribo, Suriname. E-mail: m_lingaard@hotmail.com

[3]Student of the Anton De Kom University of Suriname, Environmental Sciences, Leysweg POB 9212, Paramaribo, Suriname. . E-mail: claudinesakimin@yahoo.com

A Survey of Kaburi Creek, West Suriname, and its Conservation Implications

Background

1. Habitat

Kaburi Creek is located on the Corantyne river in West Suriname just north the Carib Indian settlement of Washabo (N 05°.15'. 586, W 057°.12'.782). It is a small black water creek that narrows to a few meters in width as it meanders along its winding 13 km east/southeasterly course, eventually disappearing into a densely vegetated swamp due south of Nanni Lake.

Due to its proximity to the equator, Suriname has a genuine tropical climate with high temperatures and humidity (82-95%) throughout the year. There are two rainy seasons: a long rainy season (April-July) and a short one (December-January). The amount of rain and its onset and duration can vary markedly from year to year.

Vegetation along the banks of small forest creeks such as Kaburi Creek can be divided into the following categories:

- *Riverbank high forest*. The mesophytic rain forest grows to the creek's edge and tall Mora tropical hardwood trees (*Mora excelsa*) are seen. High banks guard the forest from seasonal flooding. Riverbank high forest is found in patches along the first 3 km of Kaburi Creek. Otters prefer lower lying areas with some undergrowth.

- *Mixed marsh and high swamp forest*. Xerophytic floodable swamp forest is lower than riverbank high forest and is flooded during the rainy season to a depth of 2 m or more. Tall trees such as pencil-thin Pina palms (*Euterpe oleracea*), or hydrophytic trees such as babun trees (*Virola surinamensis*), and mataki trees (*Symphonia globulifera*) predominate as well as dense stands of thorny keskesmaka palms (*Bactris maraja*). The thick clay soil drains slowly and it is usually poor otter habitat.

- *Low marsh forest*. Floodable swamp forest may be under water for most of the year. It is largely composed of thick vegetation and few small trees. In more open areas the Mauritius palm (*Mauritia flexuosa*) is seen, standing tall among the floating grass islands common in this habitat. The soil drains well when the ground is above water level and it is used by otters during the dry season.

- *Grass islands and floating meadows*. Floating grass mats, usually composed of *Ipomoea reptans* are found in the more open areas of the creek. These are fishing spots highly favored by both the Indians and otters: Arawaboo Pond, Swallow Pond, Karekouya Pan, Monkey Pan. (see map)

Kaburi Creek is also characterized by high ground “islands” of marsh forest and high swamp forest that are dry year around or flooded only at the height of the rainy season. They are located at wide intervals along Kaburi Creek. Such areas are prized by both Indians and Giant otters (*Pteronura brasiliensis*) as dry season campsites (see below and Table 2).

2. Biodiversity

Centermost of the three Guianas, Suriname is under populated, by South American standards, and remains 85% uninhabited. The rainforests of central Suriname are a stronghold of endangered and rare species that have been extirpated in other regions of South America. The biodiversity of these areas is extraordinary and remains largely unstudied due to their remoteness.

Kaburi Creek, within easy reach of local Carib and Warrau Indian fishermen and hunters, has been exploited on a sustainable yield basis for centuries. Only the manatee (*Trichechus manatus*) was hunted to extinction in this creek some 40 years ago (James Lingaard, pers. comm., 1978). The manatee is said to still occur in Nanni creek and Nanni Lake just north of the creek.

Even though it is a relatively narrow black water creek in its upper reaches, above 14 km from the mouth, the variety of the successive habitats makes Kaburi Creek a rich environment for a wide variety of forest and swamp species. These species are seldom seen farther north in the coastal savannahs where the effects of agriculture, hunting and habitat loss have taken their toll. This mosaic of successive habitats promotes biodiversity, making the Kaburi Creek area particularly valuable for conservation purposes.

3.The Giant Otter

The species. The Giant otter one of the larger carnivores of South America, is a primarily terrestrial mustelid that has become extremely well adapted to using an aquatic environment. Adult males measure up to 1.8 m and weigh 26-32 kg. , females measure up to 1.7 m and weigh 22-26 kg. It lives in large, noisy family groups and shows little fear of humans.

Its status Such a large, diurnal and gregarious animal makes an easy target for pelt hunters. Today it is the combined effects of habitat loss and the demands of the fur industry that are responsible for *Pteronura*’s endangered status over much of its range in South America. In Suriname where the local populations have never hunted it, the Giant otter enjoys relative security, particularly in the more remote areas. For this reason, the first detailed study of *Pteronura* in the wild was made in Suriname in 1976-1978, much of it in Kaburi Creek (Duplaix, 1980).

Habitat selection and seasonal requirements. Like many carnivores, Giant otters select habitat according to prey abundance/availability/vulnerability criteria that may fluctuate seasonally. In Suriname *Pteronura* prefer slow-flowing clear black water creeks and rivers, particularly during the dry season when they prey heavily on fish that rest on the bottom in shallow water like *Hoplias* (pataka*)* and catfish (kwikwi and jacky). The availability of preferred prey species in shallow water is the governing factor in *Pteronura*'s seasonal movements. Farther, low sloping banks with good cover and close access to prime fishing areas are preferred by otters for their campsites where they rear their cubs. All these conditions are met in Kaburi Creek from mid-September to April during the dry season making it ideal Giant otter habitat.

Group structure and behavior. Pteronura in Suriname are seen in groups ranging in size from two (a pair) to an extended family group of 7. Larger groups of 14 or more otters have been seen but these were probably two family groups traveling together from their dry season area to their rainy season area. Solitary animals, usually subadults, are transient animals passing through the area that seldom remain for long.

The ecology and behavioral repertoire of *Pteronura* have been described in detail in several publications and will not be reviewed here (Duplaix, 1980, Groenendijk, 1995, Laidler, 1984, Schweizer, 1992, Carter & Rosas, 1992).

Seasonal population dynamics in Kaburi Creek. The resident otters observed in 1976-1978 in Kaburi were divided into 4 to 5 groups, each occupying a territory at the height of the dry season in March of about 2-4 km in length. Each of the groups was associated with at least one of the floating grass islands areas (called "ponds" or "pans" by the Indians) along the creek that are prime fishing areas. For instance, one solitary male H1 (it lost its mate and offspring) saw his territory invaded by a larger downstream group of seven otters. Hemmed in on either side by other groups, he eventually occupied less than 1 km of river bank which centered on Arawaboo Pond, an excellent fishing area.

Each group clears a "campsite" along the bank and marks it with feces and urine, mixed with mud. The best sites, often perennial, are in key areas near fishing "ponds" or shortcuts avoiding a loop in the creek. These larger sites may have a den in the bank, and some even have backdoor exits into the forest or swamp away from the creek. Such sites are often the only areas available particularly in the upper portion of Kaburi 7-15 km from the mouth where high ground is at a premium. One group may use and mark several campsites in its territory and use several dens to rear its cubs.

Giant otters were identified individually using the variation in white spots and blotches on their necks. After a few days' observation on Kaburi Creek it was possible to recognize most of the individuals in each group along the creek. Easy individual recognition is a great asset in determining territory boundaries and group movements up and down the creek. Figure 1 shows the neck patterns of the otters seen during this brief survey.

The Survey and Findings

1. The Purpose of the Survey.

The goal of this study was to assist STINASU (Nature Conservation Foundation of Suriname) and LBB-NB (Nature Conservation Division of the Suriname Forest Service) in evaluating the changes in Kaburi Creek since the 1978 proposal of creating a Kaburi Creek – Nanni Lake Nature Reserve.

Kaburi Creek was visited and surveyed from September 2000 to March 2001 every two months to determine the following:

- Human impacts since the Giant otter study conducted in 1976-1978.
- Present status and distribution of the Giant otters in Kaburi Creek.
- Estimating the biodiversity of the creek by conducting a bird survey.
- Feasibility of introducing low-impact community-based eco-tourism to the area and: a) the potential impact of tourism on the Giant otter and other wildlife. And b) the level of interest of the Washabo Indian community to this proposal.

2. Kaburi Creek

The approach of Kaburi Creek along the Corantyne river bypassing Kaburi island has not changed. The island is still covered by swamp forest and high trees. There is no sign of regular boat access or of paths being cut into the thick curtain of Arum lilies or Mokomoko (*Montrichardia arborescens*). Hoatzins (*Opisthocomus hoatzin*), an unusual bird not seen elsewhere in Suriname, are present here.

The bridge at the entrance to Kaburi Creek, built in 1977, has disappeared with only a few wood supports remaining. There is a wide area of cleared bank here that occurred when the road was built.

Three permanent Indian camps and kitchen gardens have been built on the northern banks in the first two kilometers (see Figure 1 and Table 2). There is no refuse or rubbish visible in the creek and these areas are clean.

This wide area of the creek is associated with high Mora tropical hardwood (*Mora excelsa*) forest which has been logged. There are a few that have fallen across the creek which slows access to larger boats. Smaller creeks branch off to the north and south ending in swamps a few kilometers upstream. The first, Oralli Creek, joins the swamp forest to the north where Giant otters spend the rainy season. The next, Firestick Creek (Km 2.5), has a large tree now blocking the entrance.

Big Yarwaw Creek is quite narrow (Km 3.7). Next to it, a path on the south bank crosses forest and savannah all the way to Washabo. It takes 2-3 hours to walk there.

Soon after that there are two old logging camps: one on the opposite bank, now abandoned, the other in use until January 2001. A large campsite and kitchen garden is now visible here, belonging to a former Captain of Washabo. This is a new permanent camp (Km 4.37), started in August 2000. The very large kitchen garden measures 250m x 350m and more land is being cleared with chain saws.

Dawalloo Pan is the next portion of the creek. It is forested but the undergrowth is thicker. Old otter campsites and a den are found here. One site (Km 4.8) had just been cleared in September ’00 of leaves and tiny plants. It was muddy with a strong smell of feces and urine – typical of very fresh sites that can be detected by smell from up to 10m away. We saw otters in this area almost every day during our stay in September. In January they were using a den nearby and still marking the area in March. This was the first “core area” on the creek. The old “core areas” further downstream which were used heavily in ’76-’78 are no longer, probably because of the increased human activity and permanent camps.

Swallow Pan (Km 5.16) is the first floating grass mat area with floating water lilies which is prime fishing habitat for both otters and Indians. Hedges of arum lilies mask the banks and the otters chase fish into the shallows to catch them.
This middle stretch of the creek is narrower and the swamp vegetation lower. Low trees predominate. The flooded areas are still drying out in September and otter sites are rare in the Ayarina area until Big Bend just below the open grass mat area of Arawaboo Pond (Km 7). There was an otter campsite there that had also just been cleared even though it was still surrounded by flooded forest.

Lana Swamp is low floodable forest, still under water in September and again in January. Here the trees are higher, and the narrow creek becomes shady. Frenchman’s Landing is the next high land area (Km 9.7) and there is a perennial otter site there with several old dens. This campsite has been here for at least 30 years and probably longer. It was visited briefly in the ’00-’01 season and a den was used. There is logging area just above it and the noise and human activity may have discouraged the otters.

Upper Monkey Pan and Winana Creek (Km 14) is a transition zone between flooded forest and open swamp. It was a “core area” for otters and a group of seven was spotted here in November ’00. Immediately upstream there are several open areas with tall Mauritius palms (*Mauritia flexuosa*), a sunny contrast to the shady narrow creek.

The creek continues for several more kilometers, barely a meter across in places, until Kaiwiriwiri Creek (Km 15.5) where it disappears into a swamp. The path to Nanni Lake starts here. There are several low swamps along on the way. It takes a day and a half to reach the Nanni Lake on foot.

3. The otters

Giant otters The Indians of Washabo use the creek daily. They report that the number of Giant otters they see during the dry season has not decreased over the years and that the fishing also remains as good as ever. As before, they say, there are usually several groups of Giant otters that patrol portions of the creek. The otters ignore humans after a few snorts of surprise and alarm. Just a few weeks before we arrived in September a group of seven was seen fishing at Two-mouth Loop near Oralli Creek near the mouth of the creek (Km 1.3).

However we feel the Indians may be optimistic. Over the course of the ’00-’01 season the otters became increasingly shy until they bolted at the sight of a boat 100m away in March – not ‘undisturbed’ Giant otter behavior. Normally a group of otters will swim up to a boat and investigate before swimming on. Now there is active avoidance behavior with visible panic. Why? It may be due to several factors: 1) increased daily human activity, and 2) possible hunting activity – have the otters been shot at? Probably not by Indians who do not shoot otters but by other visitors.

We also heard of a Giant otter cub that had been caught and offered for sale in Nickerie. It was taken to Paramaribo and raised successfully. It was conficated by the Wildlife Enforcement officers and released in the Coesiwijne River Nature Reserve where its chance of survival alone at three months old were nil. We do not know whether it came from Kaburi but such a ‘kidnapping’ would certainly result in active avoidance of humans by the parents. Capture of cubs had also occurred in 1978 and the cubs were also released into the river with no hope of survival.

Giant otter sightings. We spotted otters every day during our stay in the creek in September, usually for only minutes at a time but once for a 45-minute stretch as we watched a group of three fishing in the shallows below Swallow Pond near our camp (Km 4.85). In March we only caught brief glimpses of otters, also a group of three, further upstream and they tried to actively elude us by submerging under vegetation along the banks.

The September the Swallow Pond group of three may have been a pair with a subadult offspring. We took photographs to record their neck markings which will useful in identifying them if seen again (Figure 1). We saw the same three individuals either alone or together as they made their way up and down from Firestick Creek (Km 2.2) to just above Swallow Pond (Km 6). This corresponds to the territory length of otters that were studied in 1976-1978 on the creek. We found two campsites in that stretch (one containing a den), both freshly cleared and marked by the otters. (see Table 1).

There were other otter campsites along the creek in areas of higher ground. Some were in use with fresh markings, others were not but had been used during the last dry season as evidenced by the old fish scales in the latrines used by the otters. The very large campsite at Frenchman’s Landing (not in current use, and maybe not last year either) had also been a site in 1976-1978 which indicates that campsites may be used intermittently over many decades. Also it is the only suitable spot of dry land in a 2-kilometer stretch of low floodable swamp forest.

Virtually every Giant otter “core area” along Kaburi is close to such grass mat fishing area: Swallow Pond (Km 5.16), Arawaboo Pond (Km 7), Lana Swamp and Creek (Km 8), Karekouya Pan (Km 10), and Monkey Pan (Km 12). The only exception is

- **Big Bend-Arawaboo Group** (Km 6.81-7). There were active campsites and dens here in September, November, January and February but not in March. Two otters were seen here briefly in November

- **Lana Swamp-Creek Group** (Km 7.71-8.48). This, with the Winana Group below, was the most active group on the creek with 3 dens and 6 campsites that were visited regularly during the dry season. The proximity of Lana Creek that connects with a large swamp makes it ideal habitat.

- **Monkey Pan-Winana Group** (Km 12-15) In November a group of seven otters was seen in Winana (Km 14.6) where they was an active den. Two otters rushed out of the den where they may have been cubs. The campsites in this area were active during the whole season from September through March. Winana Creek is at the very top of Kaburi and has the lowest level of human disturbance. In November, this group was observed for 10 minutes and showed little fear, swimming close to the boat. In January two otters were seen in the Monkey Pan grass-mat area swimming downstream and were not shy.

These 'core areas' correspond to the areas that were also used during '76-'78. The otters are restricted to finding campsites in areas that are: 1) on high ground during most of the dry season, 2) close to good fishing areas on Kaburi or in nearby swamps on either side of the creek, and 3) are relatively undisturbed. The third factor has forced the otters to shun the first three kilometers of Kaburi where human activity is constant. It has also pushed the most active campsites to 7 kilometers up the creek whereas before the most active areas were situated between Km 2 and Km 10. This shows that the otters are losing ground on Kaburi creek.

The dilemma, which will eventually dictate the success or failure of Kaburi Creek Nature Reserve as a Giant Otter sanctuary, is that there is little 'high ground' available that is not flooded during the rainy season. Both the otters and the Indians zero in on these dry areas, particularly those located near grass-mat fishing areas, to built their camps (and, for otters, to excavate their dens.) Certain areas are targeted by both 'users,' in particular: Frenchman's Landing (Km 9.7), upstream of Karekouya Pan (Km 9.9), Monkey Pan (Km 12) and Nut Landing (Km 14).

Neotropical otters

One new and exciting event in September was the sighting of a pair of Neotropical otters (*Lontra longicaudis,* formerly known as the Guyana otter *Lutra enudris*). I had never seen these smaller relatives of the Giant otter on Kaburi Creek before. They are shy, nocturnal and elusive. Normally seen in smaller forest creeks deep in the interior it was a surprise to see them at 8:00 AM one morning near Big Yarwaw Creek (Km 2.83). We were paddling the canoe very quietly at the time. Jacob Lingaard says that he has seen them before but not often.

They were seen again as a pair in November, but only as a solitary individual in January at Karekouya (Km 9). In March we saw a solitary *Lontra* twice, in Karekouya again and below Lana Swamp (Km 7.7) at the same time as three *Pteronura.* We believe this was the male of the pair seen in September 5 km downstream. *Lontra* female otters, unlike *Pteronura*, raise their cubs on their own and the male does not participate.

We did not see the female who we think had a den in Dawallo (Km 4.5). An Indian living further down the creek (Km 0.8) saw a mother and cub on the bank in Dawallo and, later we located the den. He grabbed the cub that was about 2 ½ months old and could barely walk or focus its eyes. The female ran off into the woods. He took the male cub to Washabo and gave it to his friends. We recovered it two days later. The cub was still strong but had not eaten. It was at the critical weaning stage when it needs both milk and tiny pieces of fish every two hours around the clock. He accepted fish but squeaked constantly in obvious distress. Since there was no rehabilitation facility, no medication and no alternative available, the next day we were forced to put this cub to sleep with sleeping pills as its chances of survival were nil.

After this most unfortunate incident we spoke with all the Indians living along Kaburi and explained the situation. They did not realize that an otter cub was unlikely to survive at that age as a pet and could not be released by itself in the wild. All promised not to take otter cubs again and to stop anyone else from doing so.

We hope that Kaburi's resident *Lontra* pair will breed again next year and that this time they will be able to raise their cub(s) in peace. We recommend the development of an action plan to deal with orphaned or injured wildlife, including otters.

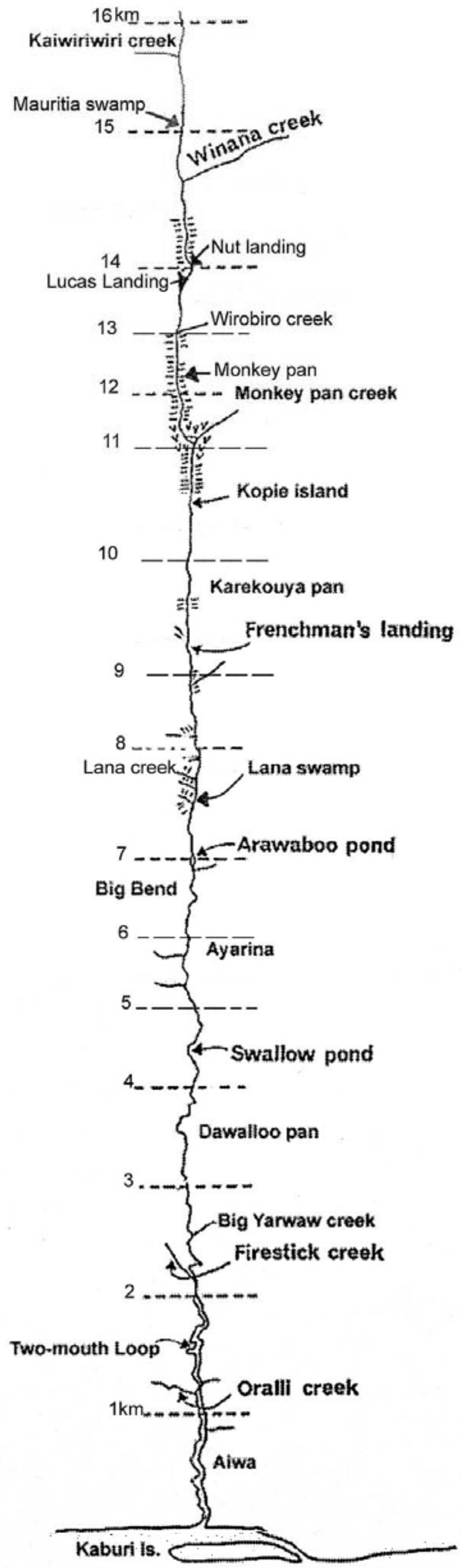

Figure 1. Map of Kaburi Creek with Indian place names (not to scale)

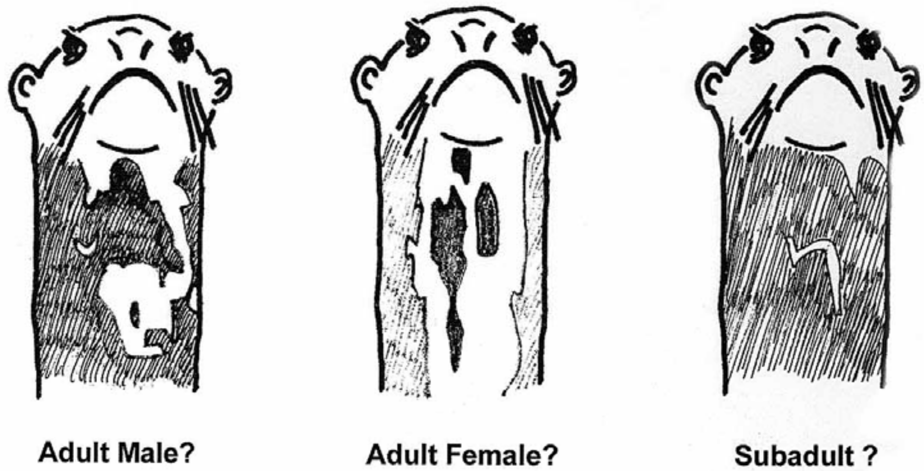

Figure 2. Individual markings of the three otters seen on Kaburi creek

Table 1. Giant Otter sites on Kaburi Creek Sept. '00 – April '01.

Sites: In use ●, Not in use ○, **Dens**: In use ■, Not in use, □, **Latrine** = L, **Tracks** = T, **Otters sighted** = ✚

Location	Place Name	Site	Sept.	Nov.	Jan.	Feb.	March	GPS coordinates
Km 0	Creek entrance - Aiwa		✚	✚	✚			N05°.15.628' W057°.12.748'
1.31R	Oralli Creek	2	○□	○□	○□	● L □	○□	N05°.16.146' W057°.12.262'
1.31L	Oralli Creek	2B	○□	○□	○□	● L □	○□	N05°.16.127' W057°.12.276'
1.74R	2-Mouth Bend	2-mouth	○	○	○	○	○	N05°.16.146' W057°.12.262'
1.78R/L	Tight Bend X-over	X-over	○	○	○	●L	○	N05°.16.082' W057°.11.895'
2.59R	Firestick Creek X-over	X-over	○	○	○	○	●T	N05°.16.255' W057°.11.491'
2.79R/L	X-over site	XI	○	●L	○	○	●L	N05°.16.212' W057°.11.358'
2.89R	Big Yarwaw Creek	X	--	○	○✚	○	○✚	N05°.16.161' W057°.11.275'
4.67R	Above Dawalloo Loop	1B	--	● L ■✚	○	○	○	N05°.16.453' W057°.11.376'
4.68L	Above Dawalloo Loop	1A	--	●L	○	○	○	N05°.16.447' W057°.11.373'
4.68L	Above Dawalloo Loop	1C	--	●L	○	○	○	N05°.16.463' W057°.11.362'
4.80L	Above Dawalloo Loop	1	✚●L	○	○	●L	○	N05°.16.474' W057°.10.308'
5.16R	Swallow Pond	II	--	●L	Flooded	?	F	N05°.16.238' W057°.10.027'
5.52L	Ayarina (nr Pingo)	3	✚●L	○	●L	●L	○	N05°.16.320' W057°.09.849'
6.81R	Big Bend	BB	●L	●L✚	Flooded	●L	○	N05°.16.577' W057°.09.190'
7.07L	Below Arawaboo	IV	--	●L	Flooded	●L	○	N05°.16.826' W057°.09.006'
7.61L	Lana Swamp	2	●L	○	○	○	○	N05°.17.043' W057°.08.924'
7.71L	Lana Swamp	V	--	● L ■	○□	● L ■	●■✚	N05°.17.086' W057°.08.859'
7.77R	Lana Creek	Lana	■	■	■	?	□	N05°.17.100' W057°.08.812'
8.0L	Above Lana Creek	5	●L	○	○	○	○	N05°.17.094' W057°.08.744'
8.01L	Above Lana Creek	VI	--	●L	○	○	○	N05°.17.094' W057°.08.744'
8.48L	Above Lana Creek	Top	--	--	--	--	● L ■	N05°.16.926' W057°.08.357'
9.77L	Frenchman's Landing	VII	○□	● L ■	● L □	● L □	○□	N05°.16.587' W057°.07.557'
9.78L	Frenchman's Landing	4C	○□	○□	○□	○□	○□	N05°.16.587' W057°.07.557'
9.95R	Above Karekouya Pan	6	○	○	○✚	○	○	N05°.16.288' W057°.07.405'
9.96R	Above Karekouya Pan	7	○	○	○	○	○	N05°.16.251' W057°.07.396'
9.99L	Above Karekouya Pan	8	○	○	○	○	○	N05°.16.253' W057°.07.374'
9.99R	Above Karekouya Pan	I	○	○	○	●L	○	N05°.16.244' W057°.07.382'
10.6L	Kopie Island	9	○	○	○	○	○	N05°.16.015' W057°.07.038'
10.65L	Kopie Island	10	●L	○	○	○	○	N05°.15.995' W057°.07.016'
10.65R	Kopie Island	10B	○	○	○	○	○	N05°.15.993' W057°.06.998'
10.7L	Kopie Island	11	○	○	○	●L	○	N05°.15.987' W057°.07.003'
11.4L	Above Kopie Pan	2	--	--	--	○	○	N05°.15.779' W057°.06.589'
11.4L	Above Kopie Pan	2B	--	--	--	●L	○	N05°.15.776' W057°.06.591'
12.0R	Monkey Pan	12	○	○	○✚	○	○	N05°.15.678' W057°.06.248'
13.9R	Lucas Landing	VIII	--	● L ■	F	?	● L ■	N05°.15.630' W057°.05.207'
14.6L	Winana	13	○□	○□	○□	○□	● L ■	N05°.15.772' W057°.04.875'
15.1	Winana	14	○	●■✚	●■✚	● L ■	● L ■	N05°.15.915' W057°.04.599'
Km 15.2	Mauritia Swamp - top							

5. Human Use

The use of Kaburi Creek by the Washabo people and others has increased since the 1970s and now shows tell-tale signs of human use, new and old, over much of its length all the way up to Winana Creek 15 km upstream (see Table 2). Many of these campsites, both temporary lean-tos and more permanent structures, are in prime otter habitat, some even on otter campsites. The otters seem to shun these human campsites even after they have been abandoned.

Along the first kilometer where the creek is still wide there are two Indian settlements on the high northern banks. These are permanent camps that have been built using local trees and palm fronds. The camps were built when the soil of the kitchen gardens around Washabo became infertile, a normal occurrence when the thin layer of forest soil is cultivated. Five years is the normal length of fertility for these lateritic and clay soils that eventually become concrete-hard. The kitchen gardens of these two camps are not visible from the creek extending into the forest behind the camp. A few dug-out canoes are pulled out onto the river bank as the residents do not use outboard motors.

Three Washabo families now live in the creek permanently (Km 0.8, 0.3, 4.37) and six others have kitchen gardens which they visit regularly which have temporary camps (Km 1.59, 2.3, 2.48, 3.6, 4.5, 9.82).

Directly upstream from these permanent camps (Km 3) are several large clearings where the tall Mora hardwoods (*Mora excelsa*) were cut down or areas that were cleared for logging earlier. These logging concessions were granted to the Guyanese by the Indians in Washabo and the Indians provided the labor used to fell the timber. (By law, only the government can issue logging concession licenses but in this case, it seems, the Indians took the initiative.) These areas can be seen as denuded clearings along the muddy bank (Km 1.78, 2.2, 2.15, 2.83, 9.85)

The newest logging site (Km 2.15), still in use in September, had a large wooden barge tethered to the shore that was used to carry logs downstream and a partly submerged high-lift tractor that had fallen into the creek. It was extracted and removed, and the logging stopped. We did not inspect these sites farther inland but from the creek the clearings are visible and constitute an eyesore. Secondary growth will eventually mask the openings, however.

There is another logging site much farther upstream just north of Frenchman's Landing (Km 8) but it has only a narrow opening onto the creek. It was in use when we were there as evidenced by a fresh pile of small logs by the bank. This is of concern as it is located far from upstream and the transport of the logs down the length of the creek will cause disturbance.

The STINASU camp at Km 4.85 is also a large clearing with pole shelters. The site belongs to the Lingaard family of Washabo and also has a kitchen garden close by. This camp is masked by a stand of trees from the creek. It is ideally situated for eco-tourism purposes, just upstream from the more visible camps and logging sites, and it is in the middle of prime Giant otter habitat.

There are several temporary hunting camps farther upstream. One at Ayarina (Km 5.52), two at Awaraboo (Km 7.09, 7.26), two at Frenchman's Landing including an old logging site (Km 9.66, 9.85), and six more between Km 12 and 14.6., all used by fishermen and hunters at irregular intervals.

Finally at the top of the creek (Km 13.3) is a macaw smugglers' camp. We found a pencil-thin *Euterpe* palm with its fronds tied together. The smugglers hide inside the frond shelter and brandish a tame macaw tied to a pole through the leaves to attract wild macaws flying over. They catch the macaw attracted by the noise with a noose on another pole, quickly sever one of its primary tendons or pull out its primary wing feathers, and throw it down to their partner below who stuffs the bird into a small wire mesh cage. Scarlet macaws are the species of choice but other species of macaws are also captured. Experienced smugglers quickly catch many birds in this manner.

Later we met these Guyanese smugglers who were operating in the creek without the permission of the Washabo Indians, and we told them that they were breaking the laws of Suriname and Guyana by illegally capturing and exporting protected species without the proper permits. We asked that they return to Washabo to obtain permission from the Indians to catch macaws in the creek. They did not return while we were there but we cut down their modified *Euterpe* palm tree for good measure.

Discussion

1. Human/Otter conflicts

Both the Indians and the Giant otters are dependent on Kaburi Creek for their food and shelter. The Indians use the creek year around but know, like the otters, that the fishing is particularly good during the dry season. One species does not begrudge fishing by the other but what will happen if the fishing stocks dwindle due to over-fishing and/or pollution? Will the otters then be seen as undesirable competitors that must be eliminated? This has been the attitude towards otters in many parts of the world from salmon fishermen in Scotland to Abalone fishermen in California.

Traditionally, otters in Suriname have not been hunted for their pelt or meat by the people in the interior. The Indians in Washabo have indeed taken special pride in *their* otters, particularly when they were filmed by the BBC television and appeared in a *National Geographic* magazine article in 1980. The Indians in Kaburi *want* to protect their creek in a Nature Reserve and are more than likely to protect “their” otters in the future.

But there are other threats to Kaburi Creek too. Human/otter conflicts involve the results of human activity that degrade the creek habitat.

- **Permanent human camps** are the biggest direct and indirect threat to the Giant otters. Such camps result in 1) increased human presence in prime otter habitat with subsequent loss of otter territories in the first three kilometers of the creek (Table 2), 2) Soil erosion due to land clearing for camps and kitchen gardens and consequent muddying of the water, 3) water pollution due to bathing and washing clothes and dishes with detergent in the creek – a twice-daily activity for the Indians.
- **Fishing and hunting** result in 1) increased human presence in prime otter fishing habitat, 2) otter campsite loss when the fishermen build temporary campsites on the banks on or near otter campsites. Otters do not appear to ‘take back’ these human campsites again. (Table 1 and 2)
- **Logging** results in 1) noise pollution of the outboards and chain saws, 2) heavy boat and barge traffic, 3) bank erosion and collapse due to the wave action from large outboard motors and subsequent otter campsite loss.

2. Biodiversity impacts and threats

The factors that affect human/otter conflicts will also affect the biodiversity. Land clearing and increased human presence can only affect the biodiversity negatively. For instance, kingfishers and sungrebes fly ahead and away from boats heading up or down the creek, sometimes for kilometers at a stretch. This must exhaust them and may make them seek quieter creeks elsewhere. Farther, as the hunting of the common species becomes more difficult due to over-hunting, as seen by the recent extirpation of the Muscovy duck, other less common species such as the larger herons and even macaws will be shot. This is a particular threat if more unscrupulous hunters from town ‘discover’ Kaburi as a good hunting area.

Table 2. Location of Human Use and Giant Otter Sites on Kaburi Creek

R = right side of Creek **L** = left side of Creek **Otters Sighted** = ✚
Sites: Not in use ○, Intermittent Use ○● **Dens**: Not in use □, Intermittent Use ■□
Human Use: Permanent Camp ▲, Temporary Camp △, Kitchen Garden o
Logging ▣, Old Logging ⊡

Location	Place Name	Site	Use ’00-‘01	Human Use
Km 0	Creek entrance - Aiwa		✚	
0.80R	Aiwa			▲o Bamboo
0.83R	Aiwa			▲o Vincent
1.31R	Oralli Creek	2	○●□	
1.31L	Oralli Creek	2B	○●□	
1.56R	Below 2-Mouth Bend			△
1.59R	Below 2-Mouth Bend			o
1.74R	2-Mouth Bend	2-mouth	○	
1.78R/L	Tight Bend X-over	X-over	○●	
1.785L	Above Tight Bend			⊡ and path
2.2L	Below Firestick Creek			⊡
2.15R	Below Firestick Creek			⊡△
2.30R	Below Firestick Creek			▲o
2.48L	Below Firestick Creek			o
2.59R	Firestick Creek X-over	X-over	○●	
2.79R/L	X-over site	XI	○●	
2.83R	Big Yarwaw Creek			⊡△
2.89R	Big Yarwaw Creek	X	✚○	
3.60R	Big Yarwaw Creek			▲o
3.72L	Big Yarwaw Creek			Path to Washabo
4.37R	Dawallo			▲o McIntosh
4.50R	Dawallo			△o
4.67R	Above Dawalloo Loop	1B	○●■	
4.68L	Above Dawalloo Loop	1A	○●	
4.68L	Above Dawalloo Loop	1C	○●	
4.80L	Above Dawalloo Loop	1	✚○●	
4.85L	Below Swallow Pond			▲ Stinasu Camp
5.16R	Swallow Pond	II	○●	
5.52L	Ayarina (near Pingo)	3	✚○●	
5.58 L	Pingo Camp			△
6.81R	Big Bend	BB	○●	
7.07L	Below Arawaboo	IV	○●	
7.09L	Arawaboo Pond			△
7.26R	Above Arawaboo			△

Location	Place Name	Site	Use '00-'01	Human Use
7.61L	Lana Swamp	2	○●	
7.71L	Lana Swamp	V	✚○●■	
7.77R	Lana Creek	Lana	□■	
8.0L	Above Lana Creek	5	○●	
8.01L	Above Lana Creek	VI	○●	
8.48L	Above Lana Creek	Top	○●■	
9.66L	Before Frenchman's L			△
9.77L	Frenchman's Landing	VII	○●■	
9.78L	Frenchman's Landing	4C	○□	
9.85L	Frenchman's Landing			⊡△
9.95R	Above Karekouya Pan	6	✚○	
9.96R	Above Karekouya Pan	7	○	△ on otter site
9.82L	Above Karekouya Pan			▲o
9.99L	Above Karekouya Pan	8	○	
9.99R	Above Karekouya Pan	I	○●	△ on otter site
10.6L	Kopie Island	9	○	
10.65L	Kopie Island	10	○●	
10.65R	Kopie Island	10B	○	
10.7L	Kopie Island	11	○●	
11.4L	Above Kopie Pan	2	○	
11.4L	Above Kopie Pan	2B	○●	
12.0R	Monkey Pan	12	✚○	△ on otter site
12.1L	Monkey Pan/Creek			▲
13.3R	Wirobiro Creek			△ Bird trappers
13.9R	Lucas Landing	VIII	○●■	△ on otter site
14.1 L	Nut Landing			▲ + forest path
14.6L	Winana	13	○●■	△ on otter site
15.1	Winana	14	✚○●■	
Km 15.2	Mauritia Swamp - top			

both a sense of hopelessness and urgency. He was willing to accept help from any source as long as it came quickly.

4. Tourism Development

While Kaburi Creek has definite eco-tourism appeal, particularly for otter lovers and bird watchers, new initiatives must be introduced slowly and carefully. Increased human use of the creek has already taken its toll on the wildlife: loss of otter territories, noise pollution, fumes and oil pollution from even small outboard motors, detergent pollution run-off at the human campsites, wood collection and smoke. It all adds up – quickly.

Increased human visibility may affect Giant otters negatively, particularly in the early months of cub rearing from August to December. Giant otters in captivity have stopped lactation due to stress after birth or eaten their cubs (Wunnemann, 1992). In Peru, tourism was curbed in Manu National Park during the Giant otter breeding season (Carter & Woods, 1997). While Giant otters in Kaburi are used to seeing Indians paddle by in their small canoes, it is another matter for a motor boat filled with tourists to follow them closely for hours at a time. In 1976-1978 I habituated the otters to my presence and could follow some of them part of the day, but never all. And most of the time I paddled and did not use an outboard motor. Even then some individuals and groups were shyer than others and stayed well away.

When tourists are introduced to Kaburi on a regular basis it will have to be on a closely supervised and regulated basis. At the moment we just do not know what consequences this added presence could have on the otters. We may, at a moment's notice, have to restrict or curtail this activity on the creek in the best interest of the otters.

It may, with time, be possible to habituate some otters to the point where they will be unconcerned with a boat following them. However, if other human activities increase on the creek, such as another new permanent Indian camp or increased fishing, it may not be possible to approach the otters on a regular basis. Over a 4-5 month period trained observers can easily habituate some of the otters. After that it will be possible to introduce tourists and guarantee them a good chance of seeing more than a fleeting glimpse of the otters. Such a habituation process takes time but could be part of an ongoing long-term study of the Giant otters in the creek. It must be remembered that the otters are also capable of recognizing the "good guys" from those they don't know or trust, so habituation need not pose a threat to their ultimate safety. However, once the trust is lost – if they are harassed or shot – the habituation must be started all over again and that level of trust may never be regained.

Another consideration in developing eco-tourism is the very primitive accommodations for tourists on the creek. A hammock under the tarp with a drop toilet is not for everyone, particularly in a hot, humid and buggy environment. There is no privacy and no comfort. For hours on end you sit on a hard seat as you travel up and down the creek in the hot sun. You may or may not see otters. Only the most fervent otter lovers can put up with these conditions for long.

5. Other problems

Another grave concern is the animal capture and smuggling activities in the creek. First it brings an undesirable element into the creek, people who will exploit all its wildlife for a quick profit until is gone, as they have done elsewhere in Suriname with no concern for laws or local people (Duplaix, 2001). Second, the word may get around, attracting other depredators such as commercial bushmeat hunters. Their activities if unchecked, will have a severe impact on the creek's amazing biodiversity. For it is its fauna and flora that make Kaburi unique.

Unfortunately there are no funds available at present to the LBB Conservation Division to post wildlife rangers to monitor or intervene in these illegal activities. World Wildlife Fund-Suriname plans to launch a TRAFFIC-like operation in the Guianas to monitor the wildlife trade but whether there will be any funds to patrol West Suriname on a regular basis is unlikely.

Help from the government in Paramaribo is doubtful any time soon. Ultimately it will be up to the Indians to patrol their creek and intervene when they see problems – already several of them have volunteered to do this including those living permanently on the creek. By nature and tradition they are non-confrontational, preferring to avoid conflict. Perhaps the proposed environmental education programs can stress the importance of defending their creek against unscrupulous outsiders such as wildlife smugglers. For if the Indians don't defend their 'holy place', who will?

Recommendations

1. Conservation

The fragile biodiversity of Kaburi deserves to be conserved as a top priority. In1978, STINASU and LBB already recognized the unique environmental qualities of the Kaburi-Nanni Lake area and proposed to grant it a Nature Reserve status. Changes of government, the civil strife of the 1980s and even interdepartmental friction between water management priorities and conservation have all conspired to delay the creation of the Nature Reserve. Now the time is right and all the entities concerned appear to agree – but we must act quickly before the human impacts on the area increase still farther. Also, the Indians in Washabo wish to see the Nature Reserve created as quickly as possible. However, even if the Nature Reserve stops illegal activities and encroachment by the Guyanese, who will stop the Indians from Washabo building more permanent camps and kitchen gardens in the creek?

2. Education

STINASU and the Oceanic Society wish to launch a local environmental education program based in the Washabo area. STINASU staff will train local volunteers to become nature conservation educators, guides, guards and boatmen. Once their training is complete they will visit local schools and communities in Suriname to explain the value of the Kaburi Creek area and the reasons for preserving it as a Nature Reserve. They will also act as volunteer guards for the Nature Reserve until STINASU appoints a Reserve Manager who will train permanent staff. Wildlife capture and trade regulations will also be explained to the local communities so as to prevent smugglers from exploiting the wildlife in the creek and elsewhere in the region.

3. Utilization of Kaburi Creek

The Washabo community will continue to use Kaburi Creek to hunt and fish using traditional means on a sustainable yield basis, and cultivate their kitchen gardens as they have always done. Such activities are part of their culture. The only difference is that now they must plant their gardens further and further away as the soils become arid, and as the population increases – and Kaburi creek is a location of choice. They will be asked to continue their tradition of using canoe and paddle only or very small outboard motors (under 15HP) in the creek. Since they do not wish to see outboard motors polluting the creek this will be readily agreed. However, tree felling to accommodate the large kitchen gardens has gotten out of hand. There are now nine large gardens in the creek, measuring 250m x 350m or more. The trees and underbrush are cleared down to the soil -- this will cause erosion and run-off into the creek during the rainy season.

Any new logging or tree felling operations must be strongly discouraged, particularly in the middle and upper creek above Km 4 where high dry land is rare and forest patches are small. Current logging operation contracts have been halted by the Indians. Whether the Indians will agree to maintain this welcome initiative which impacts their economic revenue remains to be seen.

Animal capture and trade of any kind must be stopped. It is against the wishes of the Indians and, depending on the species taken, against government and international regulations. If the environmental education programs can be implemented quickly a new team of Wildlife Agents can be trained to monitor and stop such activities both in the creek and in nearby Apura. The Indians living at the mouth of Kaburi will keep a look out for such traders and stop them. If unable to do so, they will alert Washabo immediately so the Forestry Officers or other officials can act quickly. (see also Duplaix, 2001).

When can Kaburi be opened to eco-tourism? Initially, a small number (4-5) of service project volunteers could visit Kaburi with a guided motorboat tour as early as October 2001. How often this can be done remains to be determined. We do not know how this activity will affect the otters on top of the Indians' daily use of the creek. Perhaps it would be better if project volunteers did not spend more than a few nights in the very primitive camping conditions in the creek but use the Apura guesthouse instead.

The visits to Kaburi should be spaced so that the creek wild life can 'recover' from the intrusion, particularly if otter cubs are present. Further, if the otters do not wish to maintain contact, the boat should allow them to retreat. At this time we can only suggest caution and flexibility in opening the creek to visitors until the otters tell us what they are willing to put up with so we can structure tourism accordingly.

Other activities can be planned such a forest walks, savannah or swamp birding tours to keep the volunteers busy during their stay in the area. One of the most interesting aspects of Kaburi is the succession of habitats: low creek forest, high forest, swamp, savannah – each with its own fauna and flora. Guided walks or short canoe trips up the smaller creeks, at key points along the creek, would make the trip upstream that much more appealing – particularly when the otters are nowhere to be seen.

Expanding the number of 'other' activities will make the visit to Kaburi to see its otters and birds more rewarding and allow regular visits during dry season from September to December, and March-April as well. If the Giant otters have cubs and appear sensitive to the added disturbance, certain areas of the creek could be avoided.

Kaburi is not ready for large scale eco-tourism yet. We recommend that STINASU control all other eco-tourism tour operators wishing to go into the creek, regardless of the reputation of tour operator involved – perhaps by issuing a permit that could be collected by trained volunteers at one of the Indian camps at the entrance of Kaburi. STINASU might require that all potential tour guides undergo the same conservation education training as the local Washabo tour guides – and pay for it.

A number of tour operators already propose trips to Washabo, Apura and up to the Wonotobo falls area so their interest in Kaburi is certain to happen. The most important recommendations are to keep the size of tourist boats small, and to keep motorized boat traffic <u>to a minimum</u> because it has the worst side-effects. Restricting boat traffic at any given time (e.g., one motorized boat permit issued per day or week) and particularly at the beginning of the dry season when the otters have young will be necessary.

4. Implementation Phases

Phase 1. **Kaburi-Creek-Nanni Lake Nature Reserve**. Both STINASU and LBB-Nature Conservation are working together accelerate the Nature Reserve designation process with the help of World Wildlife Fund. This is a welcome initiative after decades of inactivity. The designation is expected to be ratified before the end of the year.

Phase 2. Conservation education program in Washabo. STINASU, with help of the Oceanic Society, is anxious to launch a local environmental education program based in the Washabo area. STINASU staff will train local volunteers to become nature conservation educators, guides, guards and boatmen. The Indians in Washabo are also looking forward to this proposed conservation education program. It should be encouraged to proceed and assistance should be given to find funding.

Phase 3. A Giant otter study in Kaburi Creek and ongoing biodiversity monitoring should become a long-term project as soon as possible. It may be possible to combine it, in the beginning with Phase 1, using Marchal Lingaard and Claudine Sakimin assisted by trained volunteers from Washabo. It is important to identify individual otters (using their neck patterns) to determine their territories and movements in and out of the creek. In this manner it will also be possible to evaluate the impact of increased human presence or activity in the creek particularly on the shyer otters there. Again assistance should be given and funding sought to insure that data collection and analysis meet scientific requirements.

Phase 4. Eco-tourism. The residents of Washabo and Apura are particularly interested in this potential income-generating aspect of the project. They hope that eco-tourism will be a profitable activity for many of them. We recommend that eco-tourism be introduced to the creek as a pilot project on a very limited basis from October – December 2001 and mid-February – April 2002. The camping conditions on the creek are primitive and limited. Heat and humidity take their toll. This tourism destination will appeal to only the most adventuresome Giant otter lovers. One two-day tour a week could be envisaged. Other activities in the area could include walking/birding trails in each habitat along the creek: high forest, low swamp forest, swamps, savannah, and even canoeing up the smaller creeks.

Phase 5. Publicize and promote the value and unique qualities of Kaburi Creek through publications, videos, and bird recordings. It is much harder to destroy an area that has received wide international media attention.

Summary

Kaburi Creek is a biodiversity jewel of Suriname and should be viewed as a precious asset of its natural heritage. All care must be taken to minimize human impacts and threats to its continued well-being. The Kaburi Creek-Nanni Lake Nature Reserve proposed in 1978 should be declared this year and the necessary controls put in place as soon as possible.

The Giant otters are still using Kaburi Creek regularly despite of the increased human activities and competition for high ground. However, sooner or later there will be an imbalance when the otters will not be able to find suitable campsites in key habitat areas of the creek as humans take them over one by one for their own use.

Currently the human use and impacts to the creek are increasing at an alarming rate, and this just during the past four months. Activities include fishing, hunting, logging, permanent and temporary human camps and large kitchen gardens and the capture of wildlife.

A long-term study of the Giant otters in the creek should be initiated and monitoring its biodiversity should become a project. We propose that a team of two researchers be stationed in the creek from September 15 to December 15, 2001 to insure that the otters are protected during the breeding season. Our past strategy of a seven-day visit every two months has proved insufficient.

A local environmental education program supervised by STINASU and based in Washabo should be launched as soon as possible. Limited eco-tourism could be introduced to the creek in October 2001, provided the supervised groups are kept very small and spend no more than a few days on the creek at one time. We recommend that other walks and tours be planned if the otters are shy.

Bibliography

Carter, S.K., and F.C. Woods, 1997. Biology and conservation of the Giant otter, Pteronura brasiliensis. *Mammal Rev.* 27(1): 1-26.

Duplaix, N., 1980. Observations on the Ecology and Behavior of the Giant otter *Pteronura brasiliensis* in Suriname. *Rev. Ecol. (Terre Vie)*, vol. 34, 495-620.

Duplaix, N., 2001. Evaluation of the Animal and Plant Trade in the Guayana Shield Eco-Region, Preliminary Findings. World Wildlife Fund-Suriname Report. 30 pp.

Groenendijk, J., 1995. A Review of the Distribution and Conservation Status of the Giant Otter (*Pteronura brasiliensis)*, with Special Emphasis on the Guayana Shield Region. IFAW-IUCN Report. 55pp.

Laidler, P.E., 1984. *The behavioural ecology of the giant otter in Guyana. PhD dissertation*. University of Cambridge, Cambridge, England. 296 pp.

Schweizer, J. 1992. *Ariranhas no Pantanal: Ecologia e Comportamento de* Pteronura brasiliensis. Edibran-editora Brasil Natureza Ltda., Curitiba.

Thiollay, JM, 1992. *Influence of selective logging on bird species diversity in a Guianan rain forest*. Conservation Biol. 6(1): 47-63.

Wunnemann, K., 1992. *Das Verhalten von Landraubtieren mit uberdurchschmittlicher Cephalisation*. Doktorarbeit: Tierartzliche Hochschule Hannover.

Appendix I.

Mammals and birds observed along Kaburi Creek and in the Washabo area, Sept. '00 – March, '01

NOTE: * denotes animals rarely seen or of special concern

Mammal (16 species)	Sept.	Nov.	Jan.	March
Tamandua *	●			
Squirrel Monkey	●	●	●	●
Capuchin	●	●	●	●
White faced capuchin	●		●	
Howler monkey	○	○		○
Spider monkey *	○	○		○
Golden-handed tamarin		●		
White-faced saki			●	
Paca		●		
Agouti	●	●	●	●
Tayra *	●		●	
Giant otter	●	●	●	●
Neotropical river otter*	●	●	●	●
Sac-winged bat	●	●	●	●
Fish-eating bat	●	●	●	●
White-lipped peccary	●			
Birds (212 species)				
Great tinamou			○	○
Little tinamou	○			
Variegated tinamou	●	○		○
Pied-billed grebe	●	●		●
Neotropical cormorant	●			
Anhinga	●	●	●	●
White-necked heron	●	●		●
Snowy egret	●			
Capped heron		●	●	
Striated heron *	●	●		●
Chestnut-bellied heron	●			
Yellow-crowned night heron	●			●
Rufescent tiger heron	●	●		●
Boat-billed heron *	●	●		
Tri-colored heron		●		●

Green ibis *	●	●	●	●
Muscovy duck				●
King vulture *	●			●
Black vulture	●			●
Turkey vulture	●	●	●	●
Greater yellow-headed vulture	●	●		●
Swallow-tailed kite *	●		●	●
Double-toothed kite	●			●
Plumbeous kite	●			●
Gray-headed hawk			●	
Roadside hawk		●	●	●
Gray hawk	●	●	●	●
Zone-tailed hawk*			●	
White hawk	●			●
Black-collared hawk	●	●		●
Crane hawk	●			
Harpy eagle *			●	
Osprey	●	●	●	●
Laughing falcon	●			
Barred forest falcon	●			
Black caracara			●	●
Red-throated caracara	●	●	●	●
Orange-breasted falcon				●
Bat falcon	●		●	●
Peregrine falcon		●		●
Little chachalaca	●	○	○	●
Marail guan	●			●
White-headed piping guan				●
Ash-throated crake	○			
Sunbittern *	●	●		●
Sungrebe	●		●	●
Wattled jacana	●	●		
Yellow-billed tern			●	
Solitary sandpiper	●			
Spotted sandpiper	●			
Scaled pigeon	●			
Pale-vented pigeon	○			
Ruddy pigeon	●	●	○	○
Plumbeous pigeon		○		
White-tipped dove			○	●
Gray-fronted dove				●
Ruddy quail dove *	●			
Violaceous quail dove	●			

Blue and Yellow macaw	●	●	●	●
Scarlet macaw *	●		●	
Red and green macaw	●		●	
Red-bellied macaw	●			
Red-shouldered macaw	●			●
White-eyed parakeet				●
Brown-throated parakeet	●	●	●	●
Painted parakeet	●		●	
Green-rumped parrotlet			●	
Golden-winged parakeet	●	●	●	●
Black-headed parrot	●	●	●	●
Blue-headed parrot	●		●	●
Dusky parrot	●	●	●	
Yellow-headed parrot	●		●	
Orange winged parrot	●	●	●	●
Mealy parrot	●	●	●	
Red fan parrot*	●		●	●
Hoatzin *	●	●	●	●
Squirrel cuckoo				●
Black bellied cuckoo	●			
Little cuckoo			●	●
Greater ani	●	●	●	●
Smooth-billed ani	●			
Striped cuckoo	●			●
Crested owl	○			
Spectacled owl			○	○
Greater potoo	○	○	●	
Common potoo	○		○	○
Blackish nightjar	○			○
Pauraque				○
Short-tailed swift	●	●	●	●
Fork-tailed palm swift	●	●		
Rufous-breasted hermit	●	●	●	●
Long-tailed hermit	●	●		●
Straight-billed hermit	●			●
Reddish hermit	●	●	●	
Little hermit			●	●
Black-throated mango	●			
Blue-tailed emerald	●	●	●	●
Gray-breated sabrewing			●	
Blue-cinned sapphire			●	
Black-eared fairy				●
White-tailed trogon	●	●	●	●

Violaceous trogon	●	●	●	○
Black-tailed trogon		●		
Ringed kingfisher	●	●	●	●
Amazon kingfisher	●	●	●	●
Green kingfisher		●	●	●
Green and rufous kingfisher	●	●	●	●
Pygmy kingfisher	●	●		●
Blue-crowned motmot	●		●	●
Brown jacamar	●	●	●	●
Green-tailed jacamar	●	●	●	●
Paradise jacamar	●	●	●	
Bronzy jacamar			●	
White-necked puffbird	●			
Pied puffbird	●	●		●
Black nunbird	●	●	●	●
Swallow-wing	●		●	●
Guianan toucanet		●		○
Black-necked aracari	●	●	●	●
Green aracari	●		●	
Channel-billed toucan	●	●	●	●
Red-billed toucan	●	●	●	●
Arrowhead piculet			●	○
Yellow-throated woodpecker	●	●	●	
Chestnut woodpecker	●		●	
Ringed woodpecker	●	●		●
Crimson-crested woodpecker	●			●
Lineated woodpecker			●	●
Cream colored woodpecker		●		●
Red-necked woodpecker			●	
Wedge-billed woodcreeper	●	●		●
Straight-billed woodcreeper	●	●		●
Buff-throated woodcreeper	○	●	●	●
Speckled spinetail	●			
Plain-crowned spinetail				●
Great antshrike			●	
Mouse-colored antshrike	●	○	●	●
Amazonian antshrike	●			
Cinereous antshrike	●	○	●	
Fasciated antshrike			●	
Pygmy antwren	●		●	
Streaked antwren	●		●	

White-flanked antwren	●			●
White-fringed antwren				●
Gray antwren	●		●	
Warbling antwren	○	○		●
Black-headed antbird	●	○	○	●
Warbling antbird			●	
Ferruginous-backed antbird	○	●		
Black-chinned antbird		●	●	●
Silvered antbird		●	●	●
Black-faced antthrush		●		
Thrush-like antpitta		●	○	
Screaming piha	○	●	○	○
Purple-throated fruitcrow	●	○	●	●
Bare-necked fruitcrow	●			●
Crimson-hooded manakin	●	●	●	●
Tropical kingbird	●	●	●	●
Boat-billed flycatcher		●		
Rusty-margined flycatcher			●	●
Great kiskadee			●	●
Lesser kiskadee	●	●		●
Cinnamon attila	●	●		●
Cinereous mourner	○	○		
Grayish mourner	●			○
Gay-crowned flycatcher				●
Common tody flycatcher				
Yellow-breasted flycatcher	●	○		
Spotted tody flycatcher	●			
Short-tailed tyrant		●		
Pale tipped tyrannulet	●	●	S	
Yellow-bellied elaenia				●
White-winged swallow	●	●		
Gray-breasted martin	●		S	●
White-banded swallow	●			
Barn swallow	●			S
Coraya wren	○			●
Buff-breasted wren	○		H	
House wren				●
Musician wren *	○		H	
	●			
Tropical gnatcatcher	●		S	●
Shiny cowbird	●			
Ashy-headed greenlet				●
Crested oropendola	●	●	S	●

Green oropendola	●		S	●
Yellow-rumped cacique	●			●
Red-rumped cacique				●
Epaulet oriole				●
River warbler				●
Banaquit	○	○		●
Purple honey creeper	●	●	S	
Red-legged honeycreeper	●			
Green honeycreeper	●		S	
Blue dacnis		●		
Turquoise tanager	●		S	●
Purple-throated euphonia	○			
Violaceous euphonia		●		●N
Blue-gray tanager	●	●	S	●
Palm tanager	●	●		●
Silver-beaked tanager	●	●	S	●
White-lined tanager	●		S	
Fulvous-crested tanager	●	●		
Grey-headed tanager		●		●
Hooded tanager	●		S	
Blue-black grosbeak	●	●	S	●
Grayish saltator				●
Yellow-green grosbeak				●
Lesser seed finch				●
Variable seedeater				●
Lesson’s seedeater				●
Chestnut-bellied seedeater				●
Blue-black grassquit				●