



Ivindo National Park: Resource Use on the Ivindo River Corridor

Progress Report and Draft Strategy Document

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Preface

This document is a progress report prepared for USAID-CARPE on ongoing activities to implement a participatory resource use management plan for fishing communities using the Ivindo River corridor passing through the northern section of Ivindo National Park. Work is continuing through FY08 and following completion of field activities, a more comprehensive set of recommendations for the use of this corridor based on findings from the study and participatory stakeholder meetings will be detailed.

Background

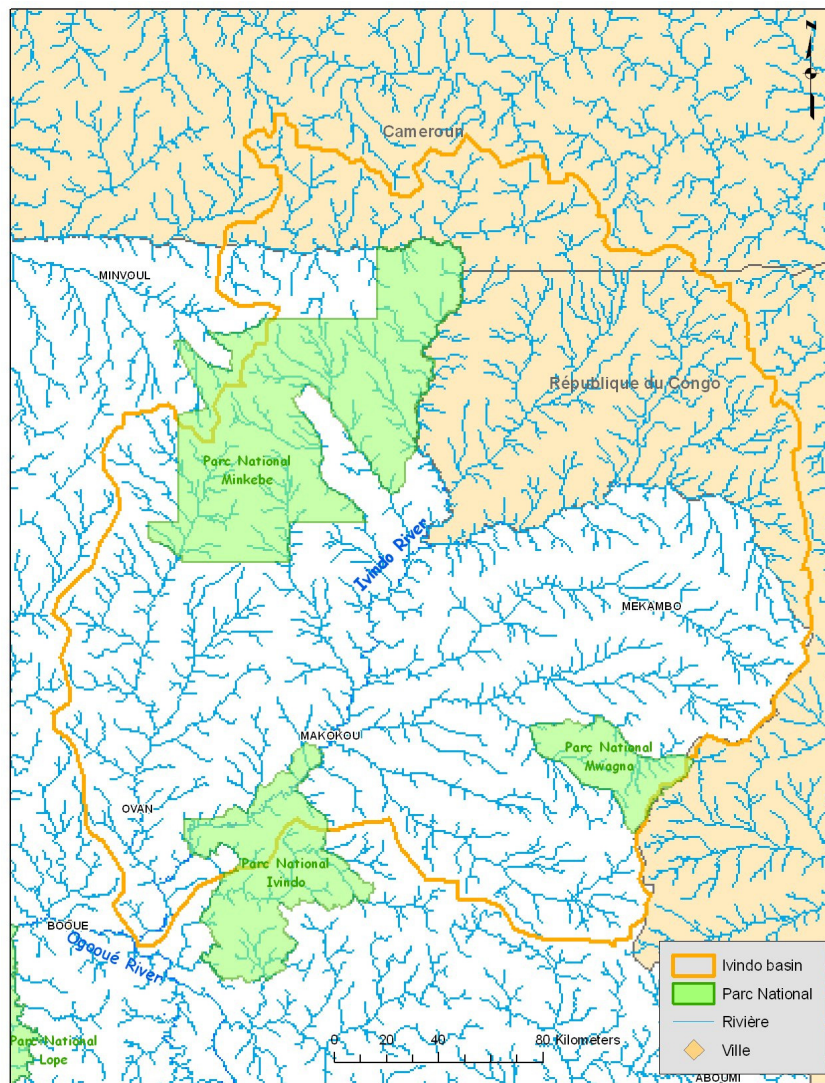
General

The Ivindo River is one of two major tributaries of the Ogooué and is responsible for draining most of northeastern Gabon, along with areas of northern Congo and Southern Cameroon. Due in large part to the significant organic decomposition in the waters of its tributaries, Ivindo is one of the only large blackwater rivers in the sub-region. Currently, the Ivindo River Basin drains what is either primarily intact forest or sparsely populated areas, with the Gabonese provincial capital Makokou (pop ~ 15,000) as the only major populated area within the basin.

The Ivindo River Basin covers 62,700 km² and drains a significant area of the TRIDOM landscape, containing within it parts of three National Parks in Gabon: Minkebé, Mwagna and Ivindo (Map 1). The river itself runs through what is considered to be the most spectacular series of waterfalls in Central Africa – beginning with the impressive Kongou falls downstream of Makokou (Fig 1) through the Tsengué-Lélédi falls right before it mixes with the brown waters of the Ogooué.



Figure 1. Shot of part of the center segment of Kongou Falls (Mike Nichols, NGS)



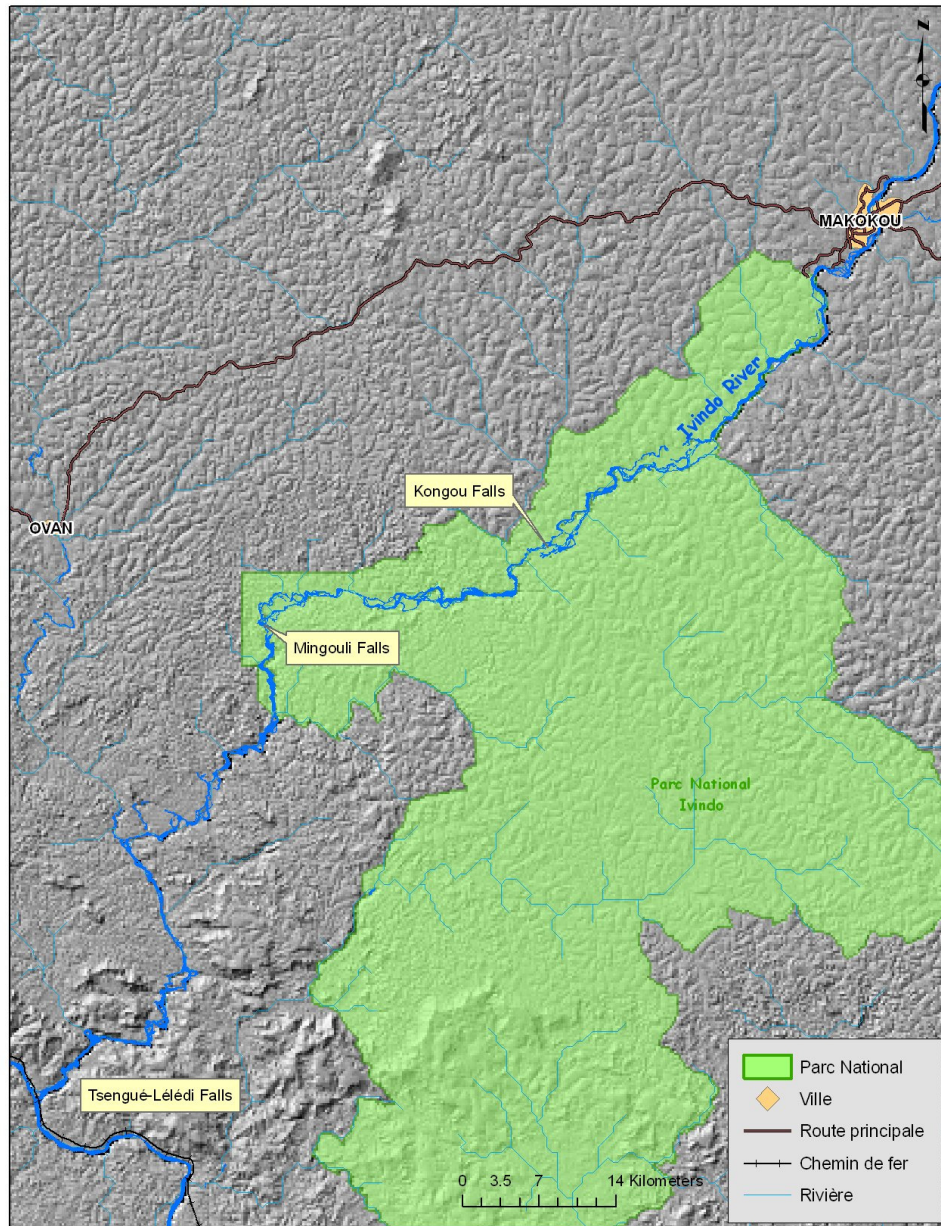
Map 1: Presentation of the Ivindo River basin and its drainage of 3 national parks in Gabon.

While only draining about one-third of the surface area of Ivindo National Park, the river serves as a primary means of access and transport running through the northern sector of the park. It is also a highly diverse aquatic ecosystem with respect to fish fauna and the river around Makokou has been shown to be a center of diversity for the Mormyridae family of weak electric fishes, as well as, giving rise to the description of a number of species new to science from other freshwater fish families. Much of the rest of the river remains largely to be explored by science and as such very little is known about the ichthyofauna of the Ivindo in the area that is now the park, including the stretches of falls and rapids with their significant habitat heterogeneity and numerous geographic barriers. Given the newly described species found elsewhere on the Ivindo, it is highly likely that this area contains other species new to science. Thus, the Ivindo River and notably the stretch running through the falls, is an area of significant importance to conservation.

Local fishing communities

The ichthyofauna of the Ivindo River are not of exclusive importance to science however, the local village populations surrounding the towns of Makokou and Ovan depend on fishing the

river for a significant part of both the nutritional and economic contributions to their livelihood. The traditional range on the Ivindo for fishermen from the Makokou area extends about two-thirds of the way through what is now classified as Ivindo National Park. Ovan fishermen live much further from the Ivindo River and thus it appears that their use of the river is more limited than those of Makokou (Map 2). Little is known at present as to the seasonality or intensity of this catch. Additionally, the local fishermen are not presently organized in any formal association recognized by the state and with which the park administration and collaborators may be able to engage towards the development of a plan to manage these resources.



Map 2: Presentation of Ivindo National Park, major inhabited areas in its environs and the major sets of waterfalls along the Ivindo River corridor.

Fishing on the Ivindo is carried out through 4 principal techniques: (1) Gill net set, using nets made from either nylon or monofilament, mesh ranging from 2-4 cm and length varying from

10-100m; (2) *ligne de fond* – a weighted line with many (up to 75-100) hooks coming off it, that is baited and placed along the bottom for catfish and other benthic species; (3) cast nets; and (4) placing barriers on small streams (or isolated areas of main river) and then emptying water out to get fish (usually done by women). Of these, the gill net sets are by far the most frequented used by the men and appear to contribute the vast majority of catch in terms of weight. Species composition however, apparently varies significantly by material and/or method.

There have been several incidences since the creation of Ivindo National Park and the installation of park staff in Makokou in 2004-5 in which members of the local population have been found to be hunting well within the park (and often for elephants). On at least two occasions, guns, outboard motors and ivory have been confiscated from those hunting within park limits – using the river as a means of access. Following these incidents, the park Conservateur carried out a sensitization campaign to inform local communities as to where the limits to the park existed along the river. While local communities seemed, at this point, to accept the need to have this area off limits to hunting, they protested vociferously that these boundaries cut off too much of their important fishing grounds and that they should be allowed to fish up to the Kongou waterfalls (including area just below falls). As an effort to find a tentative compromise, pending further studies, the park Conservateur worked out an arrangement with the main fishing communities in which they would be allowed to fish inside the park, but must only conduct fishing activities and stop a few kilometers upstream from the Kongou falls at what is called Besa-boka rapids. This seems to have been initially respected, but with the installation of a parallel administration with the naming of the Ministry of Forestry Conservateur, the local population appears to have taken advantage of the lack of clarity to begin fishing and hunting once again in the area surrounding the Kongou falls. This was the situation at the start of our study on the ground in the first part of 2007.

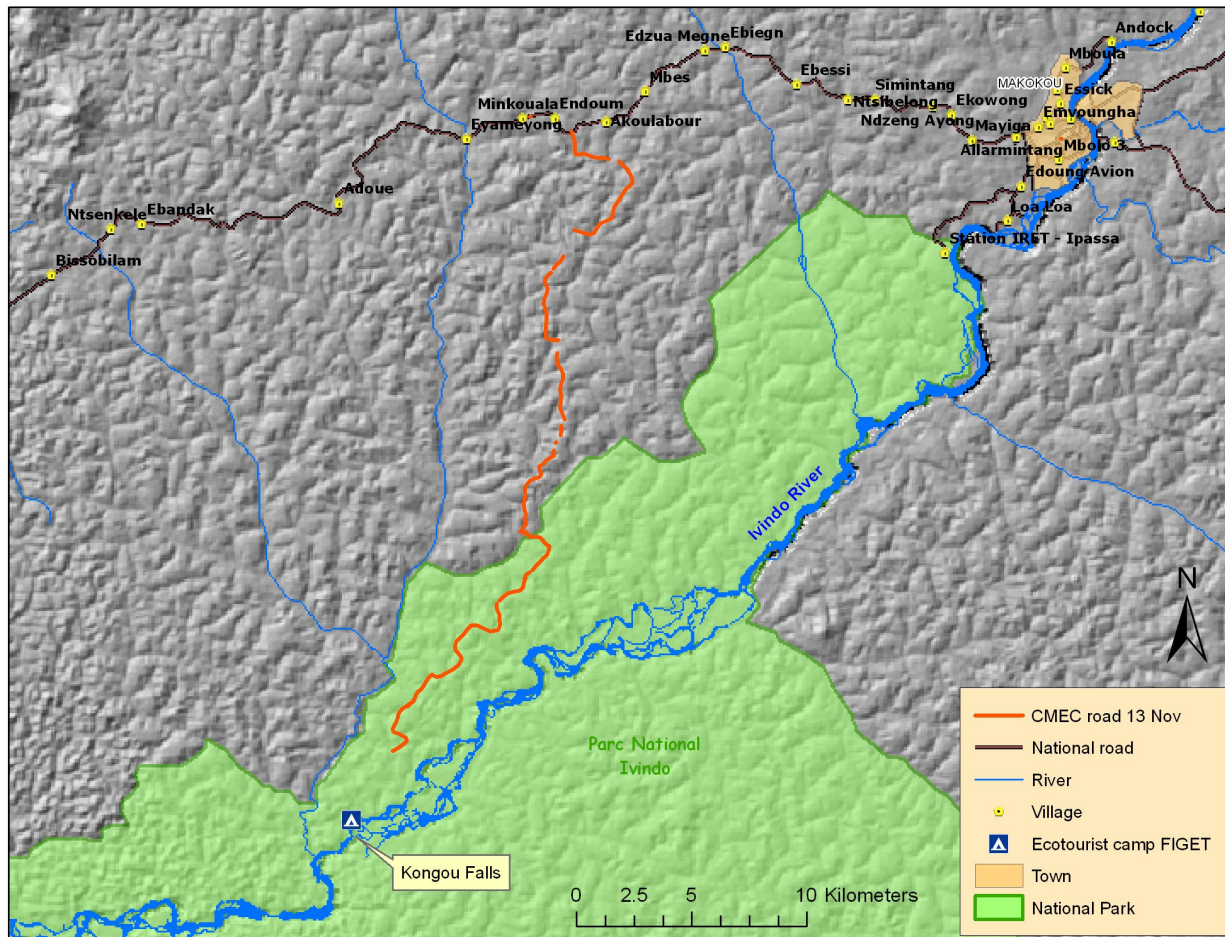
Tourism

Since 2001, a non-profit tourism operator called the *Foundation Gabonaise et Internationale d'Ecotourisme* (FIGET) has been running a small tourist circuit between Makokou and the Kongou falls on the Ivindo. Prior to the establishment of the park, FIGET had acquired a concession for this area and built a rustic lodge to house tourists. They do not currently run at capacity of 12 tourists per night, but do take on 2-3 tourists per week on average. FIGET and WCS are working in partnership to increase the publicity of these excursions in addition to expanding on options for activities, including linking the Kongou falls circuit to that of Langoué Bai (currently operated by WCS) in the south of Ivindo National Park. To date, tourism activities along the Ivindo river in the park have led to the employment of 6 local fishermen as guides and outboardists – another 4 are used part-time and FIGET has assisted in the financing of a primary school in the village of Loa Loa (closest to the park on the river).

Recent developments

2007 has brought about rapid and important changes with respect to the integrity of Ivindo National Park in general, but especially with respect to the integrity of the Ivindo River aquatic ecosystem and the protection of the Kongou waterfalls both for tourism and as a sacred site for the local population. As part of a proposed investment to provide power to the planned Bélinga iron ore mine, set to open in the near future, the Chinese company China National Machinery and Equipment Import and Export Corporation (CMEC) has since July 2007 been in the process of building a road into the park with the stated intent of constructing a hydroelectric dam at the

very Kongou falls mentioned above. As of the latest joint field excursion between WCS and the Ivindo National Park Conservateur, CMEC was within only 4 km of the falls (Map 3) and showing no signs of slowing down. The Minister of Mines has unilaterally declared that there will be no official Environmental Impact Assessment as is called upon by both the National Park Law and Environment Code. Furthermore, from our regular field visits and meetings with local authorities having jurisdiction over this work, we have found that only the park Conservateurs are following this with an attentive eye, but that none of the other respective ministries are attempting to monitor the current road building.



Map 3. Layout of the northern section of Ivindo National Park, showing CMEC progress in construction of the road leading to Kongou Falls. As of 13th November, the road stopped only 4km from the falls.

In the numerous studied cases on the effects of dam building on the aquatic ecosystem and hydrology, it has been shown that significant impacts are often born by the local ichthyofauna and that the infrastructure also causes reduction in water quality, especially if the dam is the reservoir dependent model. Given the unique and diverse fish population of the Ivindo River and its contribution to local and nutritional well-being, the construction of a hydroelectric dam at the Kongou falls is of great concern. These activities have also thrown a serious wrench into our working with local fishing communities towards the sustainable management of fish stocks on this stretch of the Ivindo River.

Objectives

Little information was available at the beginning of this study as to what the quantity and value of catch was by fishing communities in and around the park, whether this varied by season, whether the current catch approximated sustainability, whether productivity varied by location (standardized for material) and to what extent fishing activities were mixed with hunting activities in the park.

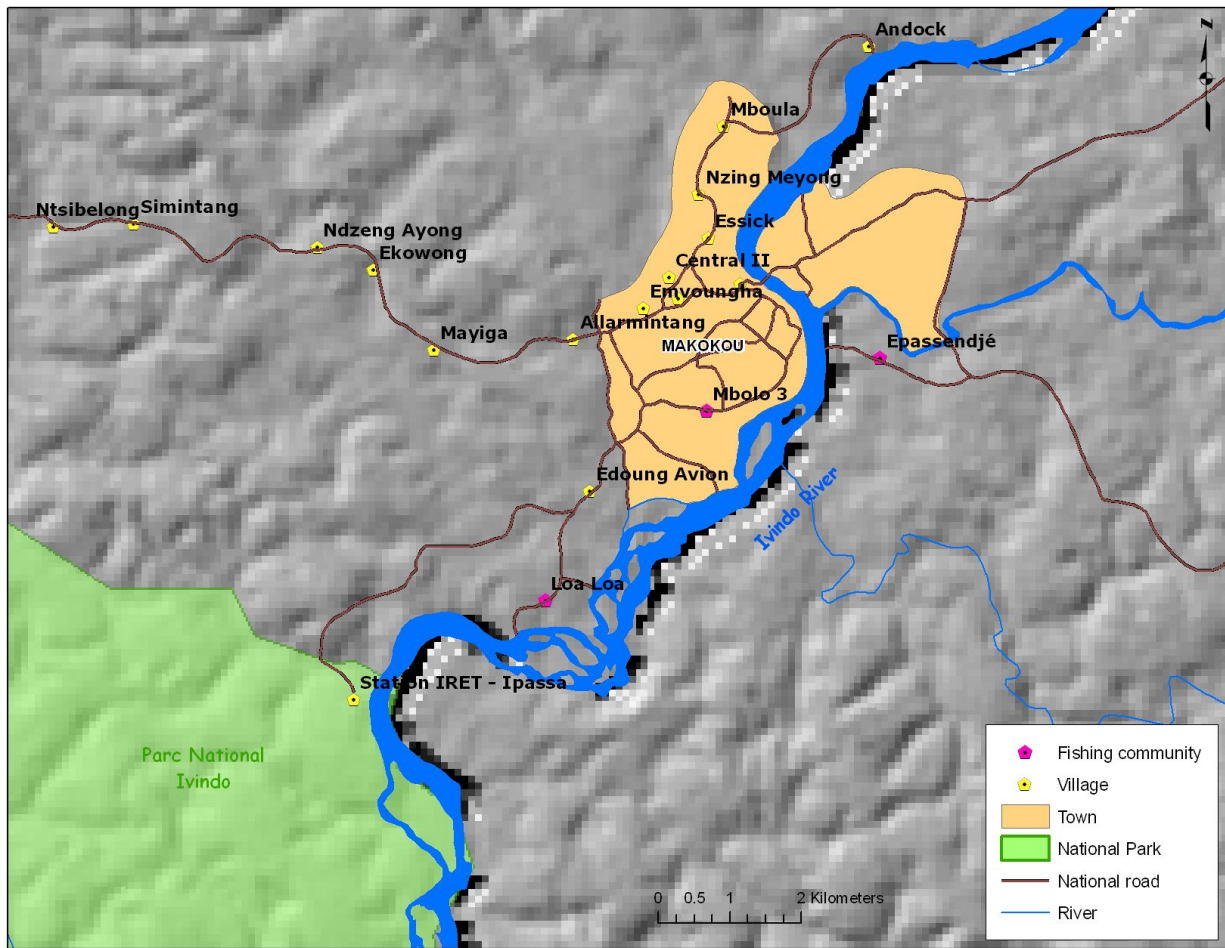
The goals of this project are five-fold: (1) identify the principal actors in the local fishing sector on the Ivindo River downstream of Makokou; (2) to measure the economic and nutritional contribution of fish both to the households of primary fishermen as well as to the local and national economy (where relevant); (3) to assess whether current catch levels fall within a range of natural stock replenishment (i.e. are they sustainable?); (4) to work with local fishermen to organize into a constituency that will be a formal partner in river tourism activities, as well as, the design and implementation of a management plan for the use of these aquatic resources; and (5) to collaborate with the Ivindo National Park, Ministry of Forestry administration and local fishing associations in the development and implementation of a management plan for the Ivindo river that takes into account local use of fish resources as well as conservation demands.

The recent developments relating to the Bélinga iron ore mine and associated hydroelectric dam on the Ivindo River in the region of the park have resulted in a need to change the focus of our activities to include the potential impacts that the construction of such a dam might have on the local ichthyofauna, and thus the communities dependent on these resources.

Activities and progress

Stakeholder meetings

In order to solicit concerns and participation of the proximate users of both fish and other natural resources in Ivindo National Park, participatory meetings were held with the principal fishing communities identified as using the Ivindo River downstream of Makokou and into the park (Map 4). The major communities identified in Makokou are: (1) Epassendjé, (2) Mbolo 3 and (3) Loa Loa. Two different stakeholder meetings were held with the active fishermen in each of these communities, prior to the beginning of actual field work with the fishermen. During the first of the meetings we discussed the process of developing a resource management plan for the National Park through a participatory manner, interpreted from the latest draft of the National Park Law, introducing as well the need to consider fish harvest in this. The second meeting we presented and discussed in greater detail the fish study methodology as well as the steps along the process as it related specifically to the use of the Ivindo River corridor and its resources.



Map 4: Layout of the very northeastern section of Ivindo National Park and the provincial capital of Makokou. The main fishing communities using the downstream section of the Ivindo River are presented in purple.

Major concerns expressed by the local fishermen at each of these meetings was a desire to be truly involved in the process of managing the river and not just having decisions imposed on them. There was also a near universal request that the area of the river surrounding the Kongou falls be left open to fishing because these grounds were not only of traditional significance but they were also the most productive in terms of catch. Given that these communities are in close proximity to the *Institut de Recherche en Ecologie Tropicale* (IRET) research station, there exists a bit of research/study fatigue and the meeting participants insisted that WCS and the Park Administration following through on producing results from our collaboration. While the former points will be addressed through the study, the latter is certainly something we are sensitive to.



Fig 3. Stakeholder meeting with fishing community of Epassendjé, April 2007 (photo: Y-E Moubagou)

Overall involvement by local communities was strong with respect to the number of active fishermen, with a total of 47 participants – all men. The participants are listed in Table 1 and are broken down by village. Continued stakeholder meetings and activities are planned following the completion of field work, in order to discuss findings and collaborate to propose recommendations to move forward towards a more comprehensive resource management plan for the Ivindo River corridor.

Table 1. List of fishermen using Ivindo River downstream from Makokou

Name	Age	Number of pirogues	Number of nets	Traditional fishing zone
<i>Village Epassendjé</i>				
Ndongo Ekibadi Jean-Mari	28	0	2	Mbélé koumou
Boteoug Jean-Rémi	29	1	7	Pendou - Mandémé
Ebidjibidji Benjamin	26	0	7	Mbélé koumou
Menssieng Eric	25	0	1	Mbélé koumou
Bengoye Florant		1		Bawaka
Empopo Dieu	75	1		Mbélé

donné				
Betoua Benoit Jean-Roger	33	0	2	Ntouala
Zangobadi Begoye	24	0	6	Bawaka
Mapoang Gilbert	43	0		Bawaka
Ybeset Patrice	40	1	3	Loa-Loa
Ambangoye Anicet		0		
Ekibadi Brice		0		
Moumbaza Parfait		0		Bawaka
Ehakazokou Yves		0		Bawaka
Botsika Steeve		0		
<i>Village Loa-Loa</i>				
Léong Olivier		1		
Bebolou Abel		1		
Motomoko Augustin		1		
Bouendo Jacques		1	6	
Nzoukou Jean- Paul		1		
Mangongowé André		1	11	Laitai
Mébiame Félicien	41	0		Bambomo – Bodja
Ndongobadi Christian	35	0	8	Kongou
Zakama Basile		0		Maine
Madabi Rodrigue	33	0		Kongou
Massieng Nestor	40	1	3	Bandjetche
Tekateka Jean- Paul	39	1	4	Mbélé
Tsigouazokou Basile	58	0	3	Bandjetche
Massona Albert				
Toukou Augustin			2	
Ngouang Fimin				
Bouchika Basile				
<i>Village Mbolo 3</i>				
Ekass		1		Besaboka –

				Imagna yamekoba
Mbokamboka		1		Kongou
Azouhou				Kongou
Minssoko				Imagna yamekoba
Talibadi Alphonse		1		Besaboka
Koulou				Messangako
Ayaza Simon				Besaboka
Ngombibadi Emmanuel		2		Maniakolo
Mouaziagoye Emile		1		Bandjetche
Ngnate Roger				
Ilélé Rémon		1		
Mpébadi		2		
Ngadi Emile				
Ekadjima Claude				
Bedjitsi Aristide				

Fishing camps and range of grounds

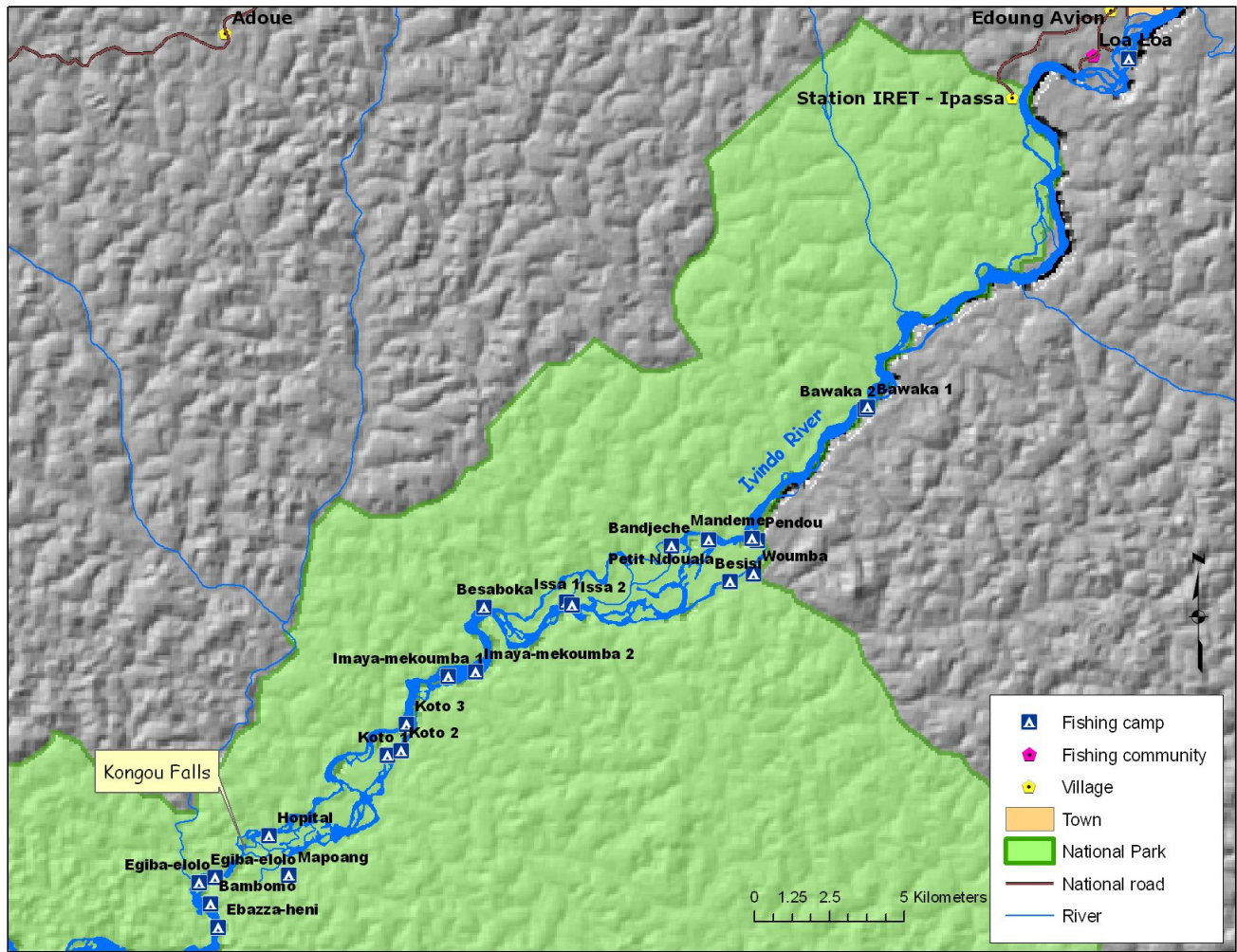
In order to determine where and with what intensity each of the fishing communities is using the Ivindo River downstream of Makokou, we are mapping all of the current fishing camps, determining primary occupants and noting whether this changes with season. Map 5 presents the 23 fishing camps identified thus far. As is evident, the majority of these camps are in the area now classified as the park. Intensity of use varies by season, occupant's access to an outboard motor, etc. One of our initial observations is that those with outboard motors tend to be using the camps located in the park during both the rainy (high water) and dry (low water) seasons, whereas those with no outboard motor access tend to only visit the fishing camps during the dry season. Reasons for this are two-fold: (1) during the dry season the river currents are much less severe and thus easier to paddle; and (2) fish are much more concentrated and so easier to catch during the dry season – resulting in much greater occupancy in general of the fishing camps during this season. We continue to identify and map fishing camps as new ones become active and/or old ones are abandoned.

Fishermen are actually fishing more intensively closer to Makokou, however, they can get to and from these fishing grounds in a matter of hours and thus do not need to erect camps from which to fish from.



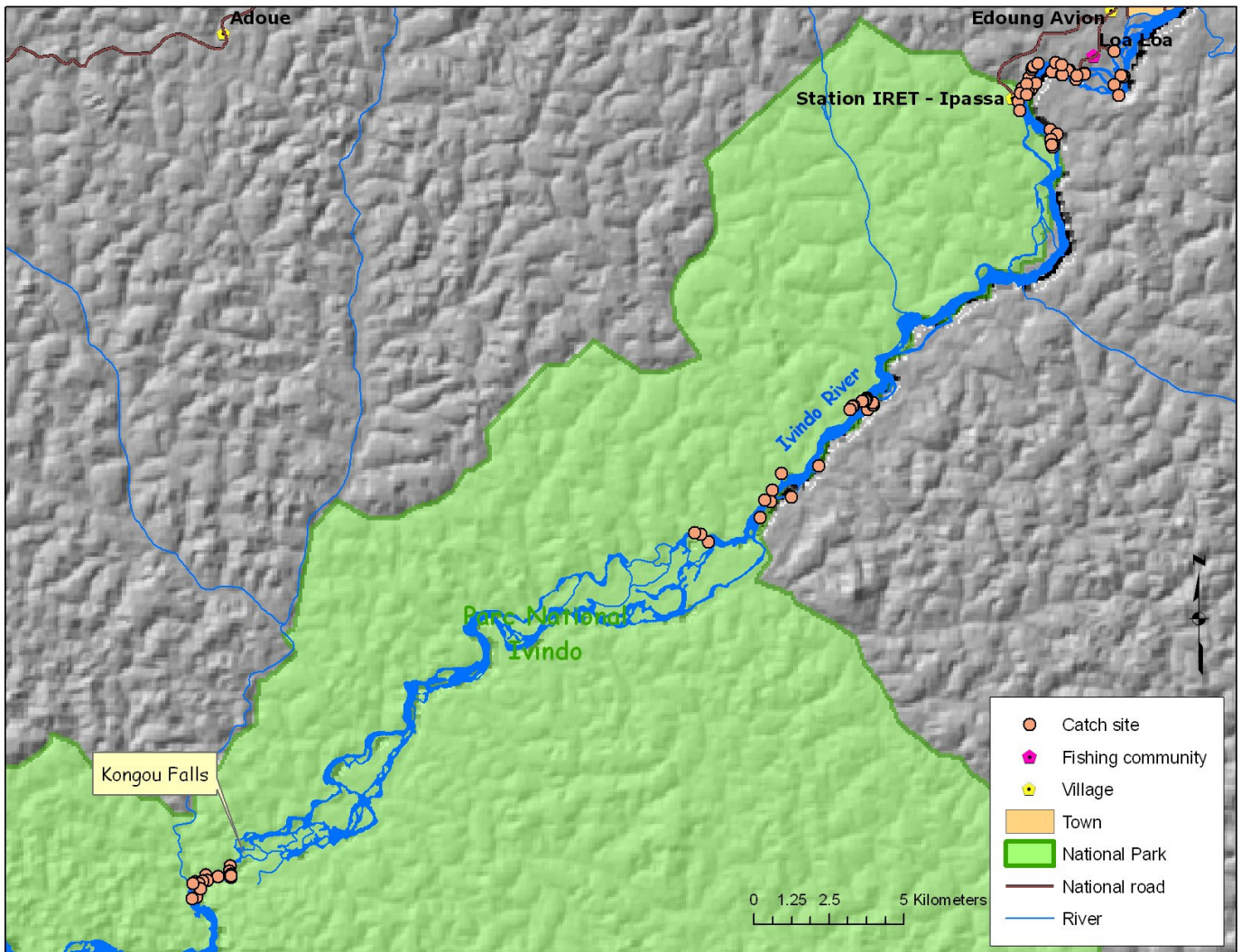
Fig 4 (left). Photo of fishing camp Bandjetche located on the Ivindo River in the region of the park. Note bushmeat smoker in foreground and fish smoker in far background.

Map 5 (below). Presentation of the 23 fishing camps visited and mapped thus far. Occupation of these camps varies significantly by season, with highest occupancy occurring during the long dry season (Jun-Sept).



Catch study

In order to be able to understand better the economic and nutritional value of the Ivindo River fish catch to the local population, we are in the midst of carrying out a systematic analysis of catch by material and location. This study involves two general methods: (1) on-site – accompanying the fishermen to their actual sets in order to measure catch, material, water quality, geographic location and habitat; and (2) landings – measuring only catch and effort at the location where the fishermen come ashore. All measurements are conducted using standardized techniques and calibrated instruments. Examples of the data forms for both the on-site assessment and catch can be found in the Appendix.



Map 6. Presentation of our *in situ* study sites. All sites were visited following active local fishermen using the region. Sites for which only catch landings were recorded do not appear on this map.

To date, we have sampled 84 catch sites *in situ* as well as more than 100 additional catches measured at landings both in Makokou and at various fishing camps along the river (Map 6). While this study remains ongoing and data has yet to be analyzed, several results and observations can be brought forth at this point.

- The vast majority of fishing along the Ivindo River is done using gill nets made out of either nylon or monofilament, ranging in mesh size from 2-4 cm and length from 10-100m;
- The typical net set is one of 24hr, in which the nets go in the water in the morning and are brought out the next day first thing;
- While based in the village, fishermen are essentially active everyday – exception being when they are pulled away from the village by travel or other work;
- An average total catch around Makokou ranges from 3-6 kg per fisherman/per day (valued at between \$7-13), while just below the Kongou Falls it ranges between ~15-20kg (valued at between \$33-44/day);
- Given observed average individual size of fish and total catch comparison between the Makokou region and the Kongou Falls area, it appears as if the current level of pressure around Makokou is depleting stocks – more analysis of seasonality needed though to make any conclusions here;
- For fishermen’s families, their fishing activities make up a significant portion of both their economic and nutritional well-being;
- The nature of fishing activity on the Ivindo River lends itself well to participatory management and enforcement, with relatively few actors (< 75 individual fishermen), only three main communities and only one main access point – the Ivindo River itself out of Makokou;
- Many of the fishing camps serve as a base for hunting as well, with observation hinting that the latter is often the primary activity – this being truer the further one gets into the park;
- There is a significant elephant poaching ring run through several actors using what is referred to as “fishing” camps.

Training

In order to carry out field work on this study, 6 local Gabonese employees were trained in methods of fish, water quality and habitat surveys. They were trained on such things as how to measure gear, effort, catch (species identity, various measurements, sex and weight), water quality using a multi-parametric instrument, standard habitat description and economic valuation. All field assistants are male and listed in Table 2.

Table 2: Local research assistants having received aquatic research training as part of this study.

Name	Function	Months of on site training
NDZE Brice	Field assistant	6
ANDA AKARE Geraldo	Field assistant	3
EBIE BEKAH Hilbert	Field assistant	3
TONDANGOYE Wilfried	Field assistant	3
MEBIAME Félicien	Outbordist/field assistant	6
NDONGOBIADI Christian	Boat guide/field assistant	6

Planned activities for FY08 and strategy for future work

Local fishing communities

Work with fishing communities along the Ivindo River downstream of Makokou is set to continue through FY08, building on the activities and studies started in FY07. More specifically, we are in the process of finishing catch studies with communities around Makokou and intend to expand to cover communities near the town of Ovan over the coming year. In collaboration with the Ivindo National Park administration and local fishing communities, we will begin to elaborate a more comprehensive management plan for the use of resources in and along the Ivindo River corridor, taking into account as feasible needs of all parties. While the National Park Law was promulgated in August 2007, the by-laws defining how management plans are to be developed and implemented are still to be elaborated. This lack of legal definition will certainly slow down the implementation of any proposed management plan if it is not elaborated in the near future.

Additionally, efforts to support the formation of officially recognized fishing associations will accelerate. To date, no such associations exist in the villages with which we are currently engaged. Most fishing is currently organized as loose relationships based on familial ties or access to material and thus there is no organic momentum to associate according to villages or fishing grounds as would be effective to partner with park administration. Incentives to form associations will take time to develop, and with key support from CARPE, WCS will bring strategic interventions towards this end.

Tourism

WCS currently collaborates closely with FIGET in developing and promoting tourist circuits using the Ivindo River corridor. We plan to increase this collaboration throughout the coming year and hope to be able to finalize long discussed plans to link the Kongou Falls tourism circuit with that of Langoué Bai tourism in the south of the park, thus creating a diversified circuit that is completely Ivindo National Park. The major wild card here is how the ongoing dam construction plans will affect the tourism potential of Kongou Falls, and furthermore, whether this iconic site will remain in the park or not.

Bélinga iron mine activities

As was stated in the Background section of this report, the rapidly unfolding activities relating to the proposed Bélinga iron ore mine and associated hydroelectric dam on the Ivindo and construction of railroad through the landscape, have quickly become an issue of major concern and attention for Ivindo National Park specifically and the TRIDOM landscape generally. If indeed the Chinese do go ahead with building the dam on the Kongou Falls, as is being proposed, then this area of the park will likely be declassified. If this goes through, it will almost certainly have quite serious ramifications for everything from aquatic habitat integrity to local fishing communities, to tourism, to (least of which) efforts by WCS and the park administration to work with these fishing communities to develop a resource use management plan for the Ivindo River corridor. To date, the plans for the exploitation of the mine and construction of major supporting infrastructure have been shrouded in secrecy and thus it remains difficult to say what is really in the works and when it will go through. As was mentioned above, what we do know is that CMEC is actively building a road into the park in the direction of the Kongou Falls with the stated intention of erecting a dam at this location. However, no known feasibility study has been done to date (outside of an *Electricité de France* study from 1966 stating that the downstream Tsengué-Lélédi Falls were best suited for a dam) and so it remains unclear as to why Kongou has been chosen as the preferred site. This affair has become highly politicized and thus makes differentiating truth from political grandstanding all the more challenging.

Given the current state of affairs, we are implementing two strategies – one that includes a hydroelectric dam on the Ivindo in the park and one that does not. For the latter, we essentially maintain our proposed work plan of engaging local populations and park administration (as principal stakeholders) in the management of this corridor. However for the former, under the assumption that there will be a hydroelectric dam built on the Ivindo at some level, we are on the one hand working on the ground to collect biological and socio-economic data to be able to better inform decision-makers, and on the other trying to engage meaningfully with the implementing company CMEC, as well as, the Ministry of Mines which is driving the project. In a public address in September 2007, the president stated that the Bélinga project's steering committee would include two NGOs, but in spite of repeated attempts by the environmental NGO community in Gabon to follow-up on this, Bélinga activities continue to move forward under a veil of non-transparence and exclusion. Given that the Bélinga mine project seems to be an eventuality, we are hoping to arrive at a similar situation to the SINOPEC oil exploration in Loango National Park, in which WCS, the park administration and SINOPEC are collaborating to engage in low-impact activities.

While dam construction at Kongou Falls is the most immediate issue of concern, the Bélinga iron ore mine will bring significant impacts to much of the Gabon side of the TRIDOM landscape. Thus, we are increasing efforts to strengthen the coalition of partners to better confront and address the myriad issues stemming from the execution of this project. WCS and WWF are building on our history of collaboration within the landscape to head this up, while engaging other partners such as tourism operators, local NGOs, local communities subject to impact, responsible administrations and logging companies operating in the zone of impact.