

Flood forests of the inner niger delta, mali



**Flood forests of the inner niger delta, mali  
past, present, and future**

**A.J. Beintema  
B. Fofana  
A. Faye  
H.P.J. Huiskes**

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## ABSTRACT

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Flood forests have a special place in the Inner Niger Delta, Mali. They have a great economic value for the local populations, and are hotspots of biodiversity in the delta. This report reviews the status of all flood forests in the Inner Niger Delta, Mali, that are presently known, or have been known to exist in the past. In total, the status of 39 sites has been evaluated. Of the remaining 37 sites, 8 have been totally lost and cleared, while 22 have been severely degraded, losing their function for colonial waterbirds. This leaves 7 forests in a more or less healthy state some of which host very large mixed colonies of waterbirds. Of the severely degraded forests, 8 are included in restoration projects by Wetlands International and IUCN. Of these 8, two still hold small numbers of breeding birds, which means that are forests which have breeding birds and can be considered future nuclei if they are further developed. Based on this, and on a judgement on the other forests, a strategic plan has been developed for the restoration of a functional network of flood forests in the delta.

Keywords: Mali, river Niger, inner delta, waterbirds, Acacia kirkii, flood forests, West africa

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## Summary

Flood forests have a special place in the Inner Niger Delta, Mali. They have a great economic value for the local populations, and are hotspots of biodiversity in the delta, especially for colonially nesting large waterbirds. Flood forests have been largely degraded during the last decades, but today local people wish to have them restored for their own benefit. Restoration and management is best effectuated by the local people themselves, though the establishment of local management committees. Both IUCN and Wetlands International facilitate this process at the local level. Financed by the Dutch Ministry of Agriculture, Alterra Green World Research has assisted Wetlands International in the field, in consortium with RIZA (Rijkswaterstaat) and Altenburg & Wymenga Consultants.

This report concludes the contribution of Alterra, and reviews the status of all flood forests in the Inner Niger Delta, Mali, that are presently known, or have been known to exist in the past. In total, the status of 39 sites has been evaluated. One site never existed and was based on the misinterpretation of a name (Baringasse, site nr 13a, numbers refer to numbering in chapter 3). One site could not be evaluated for logistic reasons (Bora Bora, site nr 18). Of the remaining 37 sites, 8 have been totally lost and cleared, while 22 have been severely degraded, losing their function for colonial waterbirds. This leaves 7 forests in a more or less healthy state, 6 of which host flourishing colonies. Apart from the well known colonies in the successfully restored forests of Akkagoun (site nr 12) and Dentaka (site nr 17), these 6 quite surprisingly include four colonies which had not been known before: Tiayawal Fufu, site nr 24 (existence suspected), Dioulali, site nr 25, Simion, site nr 26, and Konosoro, site nr 32.

Of the 22 severely degraded forests, 8 are included in restoration projects by Wetlands International and IUCN. Of these 8, two still hold small numbers of breeding birds (Amanangou, site nr 21, and Pora II, site nr 37), which means that at present there are 8 flood forests which have breeding birds and can be considered future nuclei if they are further developed. Based on this, and on a judgement on the other forests, a strategic plan has been developed (chapter 4) for the restoration of a functional network of flood forests in the delta.



## 1 Introduction

This report concludes the contribution of Alterra Green World Research, Wageningen, The Netherlands, through the funding of the Dutch Ministry of Agriculture, Nature Management and Food security (LNV) in its Programme 'North-South' (DWK-404), to the joint efforts of IUCN, Wetlands International (WI), RIZA Lelystad, Altenburg & Wymenga Ecological Consultants (A&W), Alterra, and others, to maintain the socio-economic and ecological values of the Inner Niger Delta in Mali, for the benefit of the local people, flora, and fauna.

IUCN has a long tradition of dealing with sustainable development and management in the Inner Niger Delta, starting with a joint project with World Wildlife Fund (WWF) in the mid-1980's. In this project, flood forests already played a key role for IUCN (UICN 1989). Twenty years later, the showcases of the restoration of the flood forests of Akkagoun and Dentaka, are the witnesses of the impact of this project on the local people of the delta. These forests have not been restored by IUCN, but by the local people themselves, and they are managed by the local people, simply because they realised that flood forest restoration was for their own benefit. IUCN only played a role as facilitator in this process.

In 1998, Wetlands International established itself in Mali, and like IUCN, they found flood forest restoration in the Inner Niger Delta a key issue. Their efforts, in a consortium with RIZA (Rijkswaterstaat) Lelystad, and Altenburg & Wymenga Ecological Consultants, were mainly funded through the multiministerial Dutch Governmental programmes of PIN/OS (1998-2002), Partners for water/ecosystems (2002-2004), and BBI (2005 onwards). After 1989 (UICN 1989) IUCN's presence in the Inner Niger Delta became less pronounced for a couple of years, but since 2000, with new funding sources, their activities have increased, again focusing on flood forest restoration. IUCN draws from different funding sources as WI, but at present, a firm co-operation between WI and IUCN has been established. Alterra, specifically aiming at flood forest restoration, joined the consortium with additional funding through the LNV/DWK programme 'North-South', first phase 1998-2001, second and final phase 2002-2005 (Beintema *et al.* 2001, 2002).

This report gives an update on the status of the flood forests in the Inner Niger Delta, Mali. Their status has been previously reviewed by Skinner *et al.* (1987) and Van der Kamp *et al.* (2002). Many of the sites mentioned, had not been visited or checked for their existence for more than twenty years.

The present report may serve as a basis for future plans for restoration of flood forests in the Inner Niger Delta. It is encouraging to see that today flood forest regeneration has been recognised as an important issue for future development by local people throughout the delta.



## 2 Values of the flood forests of the Inner Niger Delta

Flood forests are a special treat of the Inner Niger Delta. Flood forests grow in places which are annually inundated for a period of several months, with maximum water depths of up to 3 m. Only few tree species sustain such inundations. Typical flood forests may consist of only one species, *Acacia kirkii*, sometimes intermingled with patches of *Ziziphus* spec. Some smaller flood forests may consist on *Ziziphus* only. *Acacia kirkii* is often quoted as an endemic species for Mali, but it is also found in other African countries, although its distribution is extremely fragmented due to its special requirements.

During inundation, the water may reach up to halfway the tree crowns. If the forest is dense enough, the crown layer forms an impenetrable thorny mass, a safe haven for colonially nesting waterbirds. In the Inner Niger Delta, large mixed colonies of assorted species of herons, cormorants, darters, ibises and spoonbills, are strictly confined to these impenetrable forests. The birds fertilise the underlying water with their droppings, making these places prime areas for fish production. Thus, the flood forests not only have a high biodiversity value, but also an important economic value for the local people. This value has always been recognised by the fishermen (predominantly Bozo), but other user groups may look at the forests from different perspectives. All agree on the usefulness of forests as a source of firewood, fodder for small ruminants, and sometimes eggs and chicks, but rice farmers may see the forests also as a breeding place for harmful granivorous birds (like Quelea's), while cattle herders may wish to see forests replaced by pasture (bourgou). All agree again on the usefulness of the large heronries as a source of fertilisers, and for controlling locusts in the surroundings, as most colonies are dominated by cattle egrets, which feed on locusts rather than fish.

For centuries, the flood forests and their colonies have been valued and managed by the local people. During the development of the increasing dominance of the Peulh in the delta (from the 13<sup>th</sup> to the 19<sup>th</sup> century) an interesting management system became established, where during the flood the forests were managed by the fishermen, while during the dry season they were managed by the herdsmen. During the flood the local 'Maître d'eau' (Master of the Waters, usually from the Bozo or Somono community) regulated the fishing rights of local inhabitants and passing migrants, while during the dry season the grazing rights at the same location were regulated by a dioro from the Peulh population. In this alternating system, the flood forests were left largely intact.

The local management system continued to exist during the French colonial period, but crumbled in the 1960's, after independence, when the government gave the responsibility of management of natural resources to the governmental service 'Eaux et Forêts'. Then the catastrophic droughts of the 1970's and 1980's followed, during which most of the flood forests were cleared in an attempt to create new rice fields, or to chase away the large flocks of granivorous birds using these forests.

In many cases, local people regret the loss of their flood forests, and would like to see them restored, for their own benefit. Often they fail to do so, because of disagreements between different stakeholder groups. IUCN recognised this in the 1980's, and stepped in to facilitate. This resulted in the success stories of the management and restoration by local management committees of the forests of Akkagoun and Dentaka. This success forms the basis and the justification for the present work on flood forest restoration by Wetlands International and IUCN.

The change in flood forest management through history has been extensively described by Moorehead (1991), and briefly summarised by Beintema *et al.* (2001, 2002).

### 3 Site descriptions

Using the information from the different site lists of IUCN (IUCN 1986), Skinner *et al.* (1987) and Van der Kamp *et al.* (2002), supplemented with information gathered in the field, 38 different sites were identified, where colonial waterbirds have nested in flooded forests in the past, or do so at present. Following Van der Kamp *et al.* (2002) these 38 sites have been divided into three natural geographical groups with 11 sites (1-11) in the Northern Delta, north of the Lac Debo – Lac Korientzé complex, 9 sites (12-20) in the Central Delta, including Lac Debo, Lac Korientzé, Walado Debo and the northern parts of the deltaic branches of the Niger (incl. the Mayo Raneo), and 18 sites (21-38) in the Southern Delta, including the area around Togueré Koumbé, and further south. Table 1 summarises the present status of these 38 sites. The position in the delta is given in Fig. 1.

Descriptions of the individual sites are given below. If the site was not known before, the indication 'New site' is given after the name, even if the site does not exist any more. If the name differs from those in the lists of IUCN (IUCN 1986), Skinner *et al.* (1987) or Van der Kamp *et al.* (2002), all alternative names are given, to facilitate comparison with the other lists. A complete index to the site numbers in the other lists (as they all use a different order in their numbering) is given in Appendix 1.

For each site the co-ordinates are given in UTM grid code, either as a single point taken in the centre of the site, or as a series of points describing the outer limits of the site. In the latter case, the text only mentions the four points furthest North, East, South, and West. The full list of all co-ordinates obtained in the field is given in Appendix 2. The index of site names and identification numbers of co-ordinates is given in Appendix 1. In a few cases, where sites could not be visited, the co-ordinates were estimated using the map position relative to the nearest known site.

For each site a brief description is given of the nature of the forest, the history, and the present status. Where known, the villages responsible for the management are listed. Lastly, a recommendation is given on possible actions to take.

Table 1. Summary of the status of 38 forests in the Inner Niger Delta, and an indication of their potential for recovery. An X in the last two columns indicate whether the forest is presently used by herons and cormorants for roosting (R) and nesting (N)

Nr	Site name	Status	Recovery Potential	R	N
Northern part of the delta					
1	Toya (not visited)	Lost, changed into sand dunes	none		
2	Djelika (Kourioum��)	Lost, replaced by village	none		
3	Kabara	Degraded, changed into dry forest, lack of floods	minimal		
4	In Tarouel (Goundam)	Degraded, changed into dry forest, lack of floods	minimal		
5	Legual Poural	Too small, too much disturbed	perhaps		?
6	Konso Souma	Degraded, changed into dry forest, lack of floods	minimal		
7	Toga (not visited)	Degraded, changed into dry forest, lack of floods	minimal		
8	Toba	Degraded, changed into dry forest, lack of floods	perhaps	X	
9	Bama	Totally cleared	perhaps		
10	Gome	Degraded, changed into dry forest, lack of floods	little		
11	Doundewal	Degraded, changed into dry forest, lack of floods	little		
Central part of the delta					
12	Akkagoun	Recovered <i>Acacia kirkii</i> flood forest	healthy	X	X
13	Sobesaba	Spontaneous re-growth of <i>Ziziphus</i>	large	X	
13a	Baringasse	Never existed, misinterpretation of name			
14	Gourao (not visited)	Degraded <i>A. kirkii</i> , but may be restored in future	large	X	
15	Korientz�� (not visited)	Lost	none?		
16	Kota	Degraded	perhaps		
17	Dentaka	Recovered <i>A. kirkii</i> flood forest	healthy	X	X
18	Bora Bora (not visited)	Not known			
19	Timisobo (not visited)	Lost	perhaps		
20	Mbouna (not visited)	Degraded <i>A. kirkii</i> , but may be restored in future	large	X	
Southern part of the delta					
21	Amanangou	Degraded <i>A. kirkii</i> , but in restoration	large	X	
22	Longuel (not visited)	Degraded <i>A. kirkii</i> , but in restoration	large	X	X
23	Idole Diouguba	Lost	none		
24	Tiayawal Fufu (Diarende)	Small but healthy <i>Ziziphus</i> forest	large	X	X
25	Djoulali (Diarende)	Small but healthy <i>Ziziphus</i> forest	large	X	X
26	Simion	Fairly large colony in healthy <i>Ziziphus</i> forest	large	X	X
27	Tenakaye	Scattered but healthy <i>Ziziphus</i> forest	large		
28	Nelbel	Degraded, changed into dry forest, lack of floods	minimal		
29	Boudouol	Degraded, changed into dry forest, lack of floods	minimal		
30	Wilibana	Lost	none		
31	Ngomi	Lost	none		
32	Konosoro	Spontaneous regrowth of healthy <i>A. Kirkii</i> flood forest	large	X	X
33	Tiayawal Tomona	Lost	none		
34	Ndiakoye Nelbi	Degraded, changed into dry forest, lack of floods	minimal		
35	Pora I	Degraded <i>A. kirkii</i> , but may be restored in future	large	X	
36	Pora II	Degraded <i>A. kirkii</i> , but may be restored in future	large	X	X
37	Pora III	Degraded <i>A. kirkii</i> , but may be restored in future	large	X	
38	Soro	Degraded, but healthy <i>A. kirkii</i> present, good floods	large		?

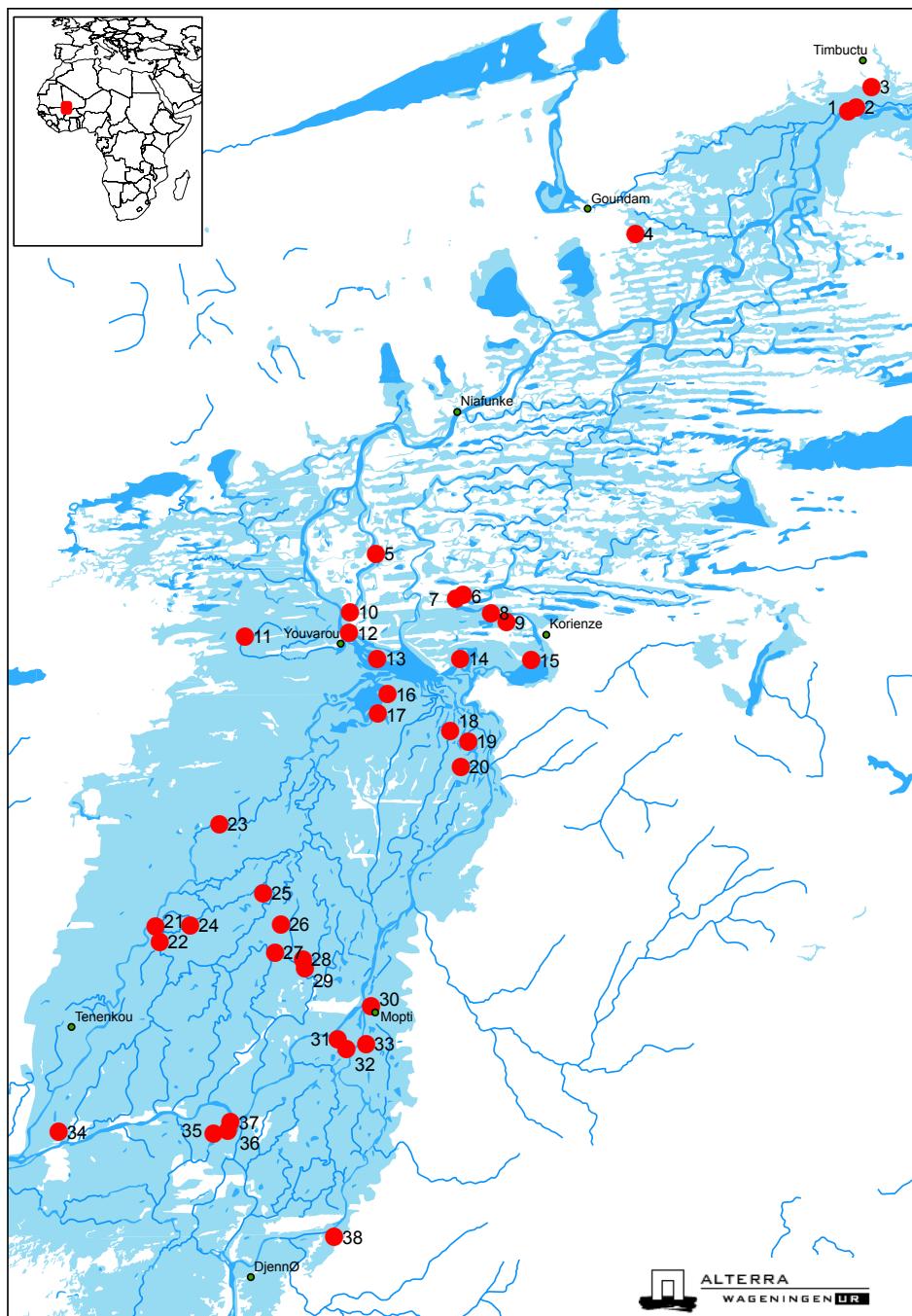


Figure 1. Present and past flood forests in the Inner Niger Delta. The numbers refer to the listing of sites in table 1

### **3.1 Northern part of the delta**

#### **Toya (1)**

New site

No GPS position taken, as the site was only seen from a distance, and could not be reached. The position was estimated relative to the next site (Djelika).

Estimated co-ordinates (UTM):

30Q 495190 1841374

The site is located on the left bank of the Niger, about two km upstream from the harbour village of Kourioume, near Tombouctou. There used to be a forest, hosting large colonies of various heron species, but the forest was already destroyed more than 50 years ago. If there has been a flooded depression in the past, it is now completely filled up with bare, moving sand dunes, so there is no potential for recovery.

Recommended actions: none.

#### **Djelika (2)**

Otherwise known as:

Kourioum  (IUCN 1986)

Co-ordinates (UTM):

30Q 497440 1842243

This forest, which used to host waterbird colonies in the past, was completely destroyed because it was exactly situated where the harbour village of Kourioum , near Tombouctou, was established in the first decades of the 20<sup>th</sup> century. There is no potential for recovery.

Recommended actions: none.

#### **Kabara (3)**

New site

Co-ordinates (UTM):

30Q 501360 1847628

This forest, which hosted bird colonies in the past, has been reduced to degraded stands of mainly *Acacia seyal*. Due to the construction of dykes and sluices for

irrigation, the area does not receive natural floods any more, so the forest has changed into (degraded) dry forest, surrounded by dry forest plantations. There is no potential for recovery.

Recommended actions: none.

### **In Tarouel (4)**

Other names:

In Tariouel (IUCN 1986, Skinner *et al.* 1987)

Co-ordinates (UTM):

30Q 440652 1808631

In Tarouel is a depression about 20 km SE of Goundam, just north of the road Goundam-Diré. It used to be flooded regularly in the past, but floods have been failing since the droughts of 1973-1985, even in the wet years since 1994. As the water from the Niger has to come into the area through channels over a distance of more than 30 km, it is possible that silting up is a problem. The forest mainly consists of *Acacia seyal*, and is partially degraded. Some parts are still (or again) in a fairly healthy state, but dry. Most of the destruction, including the loss of colonies, took place during the droughts of 1973-1985.

Morel & Morel (1961) found Glossy Ibis *Plegadis falcinellus* nesting in In Tarouel, the only documented breeding of this species for West Africa (Skinner *et al.* 1987).

In view of the chronic lack of water, the potential for recovery must be regarded as low.

Recommended actions: none.

### **Legual Poural (5)**

Otherwise known as:

Owa (Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 373338 1723707

Legual Poural is located on the west bank of the eastern branch of the Niger (Bras Ambiri), about 20 km north of Akka, just opposite the village of Owa. It is, and has always been a very small forest, consisting of *Cynometra vogelii*, only covering an area of 60 x 30 m. It has long been known as a specific nesting site of Night Herons, together with Cattle Egrets, until as recent as five years ago. Nesting ceased as a result of disturbance by people. It is possible that the forest suffers from erosion, as

it is positioned on the river bank, which is very steep here, and shows signs of strong currents, which may prevent growth of seedlings. Trees are dying of old age, and no young trees were seen. The trees are not cut, however, because the forest is the home for spirits.

Nesting may occur again, when the forest is left in peace. Nesting may still occur sometimes, as during the May 2005 mission remains of one single nest were seen, which did not look older than one year. The site is still used as a roost. The site is too small to host any significant numbers of colonially nesting waterbirds in the future, but may regain its specific value for Night Herons.

Recommended actions: none.

### **Konso Souma (5)**

Otherwise known as:

Kossouma (IUCN 1986)

Koussouma (Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 395816 1712745

Located on the west bank of the Koli Koli, next to the village of Guindo, just opposite the village of Gobi, about 20 km NW of Korientzé, covering an area of about 6 x 6 km.

Before 1973, the forest of Konso Souma was very large and very dense, and was regularly flooded, but not always. The dominant tree species was *Acacia seyal*, and not *Acacia kirkii*, so it was of a drier type than the true *A. kirkii* flood forests, such as Akkagoun and Dentaka. Other species are *Acacia nilotica*, *Mitragyna inermis*, and *Diospyros mespiliformis*. In many years, the forest hosted large colonies of cormorants and heron species. During the droughts of 1973-1985, the forest was largely cleared for agriculture, and no nesting of colonial birds has occurred since. Presently, the forest is heavily degraded, and is hardly recognizable as a forest. It was also reported that flooding does not take place very often any more, not even in the wet years since 1994.

Konso Souma is managed by the neighbouring villages of Kordige, Gounki and Fao. The potential for recovery seems low. Even if the forest can be restored, the result will be a dry type of forest, which is not very suitable for colonial birds.

Recommended actions: none.

## **Toga (7)**

New site.

No GPS position taken, as the site was only seen from a distance, from the other side of the river. The position was estimated relative to the previous site (Konso Souma).

Estimated co-ordinates (UTM):

30P 393998 1711512

In earlier reports (IUCN 1986, Skinner *et al.* 1987), the Toga forest was probably regarded as part of Konso Souma. It is also located on the west bank of the Koli Koli, just to the west of Konso Souma. In its present state, the forest just looks like Konso Souma (totally degraded). The forest was not visited during the May 2005 mission (so also no GPS position was taken), but only seen from across the Koli Koli. Its centre can be estimated at 2- 3 km SW of the centre of Konso Souma.

Toga is managed by the village of Gounki.

Recommended actions: none.

## **Toba (8)**

No other names.

Co-ordinates (UTM):

30P 402965 170786

Toba is located on the west bank of the Koli Koli, halfway Korientzé and the forests of Toga and Konso Souma, and covers about 12 sqkm. It is also dominated by *Acacia seyal*, but the forest is still in a comparatively healthy state. Other species include *Diospyros mespiliformis*. Like in Konso Souma, there has been no nesting of colonial birds since the droughts of 1973-1985, but since 2001 the forest is used by large numbers of cattle egrets as a night roost. Local people reported this place as a colony still in use, but during the field visit it turned out that there was no real evidence for nesting, and that most people do not distinguish between nesting and roosting. Signs of roosting were very evident, trees and forest floor being whitewashed. People considered the presence of large numbers of birds beneficial for fish production and agriculture.

Toba is managed by the village of Mindié, located on the right bank of the Koli Koli, just opposite the forest. The people of Mindié appreciate the forest, but use it too intensively at present.

Recovery potential as a nesting site is not quite clear. It is possible that if the forest is allowed to become denser again, nesting would re-occur, even though the place is not flooded very often. A large roost, however, is always an indicator for potential nesting. In its present state, the forest will further degrade, as intensive cutting was seen, while the forest floor was kept totally bare by the goats. No seedlings or saplings were seen.

Recommended actions: none.

### **Bama (9)**

Otherwise known as:

Beima (UICN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 407004 1705278

The Bama forest, mainly consisting of *Acacia seyal*, was located around a large lake between the Toba forest and Korientzé, called Mare de Bama, which was fed by a channel from the Koli Koli. The lake used to be fringed by a dense forest, hosting large colonies of waterbirds. The forest was totally cleared for agriculture during the droughts of 1973-1985, but the forest was also destroyed as a means to control the occurrence of *Quelea quelea* ('mangemil') pests.

Bama (lake and former forest) is managed by the nearby village of Toungouna.

As there is hardly any tree left to start with, the recovery potential must be regarded as very low.

Recommended actions: none.

### **Gome (10)**

Otherwise known as:

Goma (UICN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 366532 1708222

The forest of Gome is situated on the right bank of the Niger just north of Akka, between two small lakes, receiving water from the river. It used to host large heron colonies, but was completely destroyed during the droughts of 1973-1985, mainly to chase away the granivorous weavers (*Quelea quelea*). In recent years, however, spontaneous re-growth of trees is seen, indicating a decrease in grazing pressure.

During the May 2005 mission, more than 50 young trees were seen, mostly *Acacia seyal* and *Acacia albida*.

If re-establishment of trees can be further stimulated, there is a potential for recovery.

Recommended actions: none.

### **Doundewal (11)**

Otherwise known as:

Kerdial (IUCN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 339335 1701827

The forest is located about 25 km west of Youvarou, near the village of Kerdial. This is or was a medium-dry type of flood forest, *Acacia nilotica* being the dominant species, surrounded by vast areas of degraded dry forest. Other species are *Acacia seyal* and *Balanites aegyptiaca*. The wetter part, which received water from Lac Debo, through a channel near the Ghana forest. Doundewal hosted colonies in the past, at least certainly between 1960 and 1968, but as in many other cases, the forest and its colonies were destroyed during the droughts of 1973-1985.

Doundewal is managed by two villages: Wario, and Goumboumba.

Since 1994, spontaneous re-growth of *Acacia nilotica* is seen, indicating a decrease in grazing pressure, and a potential for recovery.

Recommended actions: none.

## **3.2 Central part of the delta**

### **Akkagoun (12)**

No other names

Co-ordinates (UTM):

14 points taken, describing the outer shape of the forest (see appendix 2), the N, E, S and W limits being:

30P	364774	<b>1704403</b>	North
30P	<b>367493</b>	1701813	East
30P	367180	<b>1701253</b>	South
30P	<b>364774</b>	1704403	West

This is one of the two showcases of successful flood forest regeneration, initiated by IUCN in 1985 (together with Dentaka). Thanks to restrictions in use, agreed between the villages involved, the forest has increased in size from only a few hectares in the 1980's (about 7 ha), to about 180 ha today, and large numbers of assorted colonial large waterbirds are nesting. The forest is in a healthy state, and regrowth of young *Acacia kirkii* can be seen at many places.

Akkagoun is managed through a local management committee, with representatives of various stakeholder groups from the villages of Homboloré (Youvarou), Ouro (Youvarou), Akka, and Konon Daga.

Although the management has been very successful so far, there is an increase in problems with outside groups who come and use the area, without recognising the agreements between the villages directly involved. It is doubtful whether the exploitation of the colony is sustainable. The Cattle Egrets moved their colony from one end of the forest to the other end twice already, and the Cormorants left the forest altogether as a breeding species, as a result of too frequent disturbances.

Recommended actions: continued contacts with, and support of the management committee, by IUCN, WI, or both.

## Sobesaba (13)

Otherwise known as:

Sobesaga (Skinner *et al.* 1987)

Co-ordinates (UTM):

10 points taken, describing the outer shape of the forest (see appendix 2), the N, E, S and W limits being:

30P	371862	<b>1697525</b>	north
30P	<b>376507</b>	1695138	east
30P	374455	<b>1694345</b>	south
30P	<b>371193</b>	1697114	west

The forest, located on the Grand Banc in the middle of Lac Debo, north of the main channel of the Niger, was known from old aerial photographs, but had already completely disappeared in 1985 (Skinner *et al.* 1987). The forest was cleared to chase away granivorous weavers (*Quelea quelea*).

In recent years, spontaneous re-growth of *Ziziphus amorphia* is seen. The trees are still widely dispersed, but growing in size and numbers. Daytime roosting by cormorants already occurs, so if this development continues, night roosting and even nesting may occur in the future.

Recommended actions: none.

## **Baringissé (13a)**

Otherwise known as:

Barangasse (Skinner *et al.* 1987)

This site, not mentioned by IUCN (1986) appears as a lost forest in the lists of Skinner *et al.* (1987) and Van der Kamp *et al.* (2002), on the west side of Lac Debo, south of Youvarou.

The general consensus among people interviewed, is that the name does (or did) not indicate a specific site, but refers more generally to forests (or former forests) surrounding Lac Debo.

Recommended actions: the name Baringissé has to be removed from the list of flood forests.

## **Gourao (14)**

Otherwise known as:

Simaye (local information IUCN)

Co-ordinates (UTM):

30P      395000    1695700

This is an *Acacia kirkii* forest, covering 664 ha, in the commune Déboye, Ouroubé Doundé and Korombana, cercle de Youvarou. This area includes 225 ha of relatively dense forest (more than 40% cover), and 112 ha of treeless bourgou fields.

The forest is the only local source of firewood, which is mostly collected from dead wood. However, the occurrence of dead wood is greatly influenced by cutting branches for goat grazing by other user groups.

Since 2004, IUCN facilitates the process of negotiations between the villages implied, to come to a mutual understanding and agreement about sustainable use of the forest, through the formation of a local management committee. Apart from the obvious forest regeneration, the project focuses on issues like diversification of income sources, and conflict management.

The Gourao forest is managed by the villages of Gourao Fulbé, Gourao Sarré, Gourao Bozo, Guidio Sarré, Guidio Ouro, Doko, Sangui, and Diémé.

Recommended actions: continuation of present activities.

## Korientzé (15)

Not seen

No GPS position taken, as the site was not visited. The position was estimated relative to the village of Korientzé.

Estimated co-ordinates (UTM):

30P 413282 1695128

Skinner *et al.* (1987) mention an isolated group of 10 trees in Lac Korientzé, which in the past ever hosted some nesting herons. No attempt was made during the May 2005 mission to establish the former location of these trees.

Recommended actions: none.

## Kota (16)

No other names

Co-ordinates (UTM):

9 points taken, describing the outer shape of the forest (see annex 2), the N, E, S and W limits being:

30P	377538	<b>1687890</b>	north
30P	<b>377538</b>	1687890	east
30P	376208	<b>1686179</b>	south
30P	<b>376025</b>	1686247	west

The Kota forest is a loose patch of *Acacia kirkii* and other tree species, in the Walado-Debo floodplain, just NW of the village of Dentaka. There is much open space between the trees, which is largely filled with *Mimosa pigra* vegetation. The forest was mostly cut between 1970 and 1972, to create agricultural fields.

The forest is managed by the village of Dentaka. The people of Dentaka propose to plant eucalyptus in the Kota forest for their daily supply of wood, to decrease the pressure on the Dentaka forest.

Recommended actions: none.

## Dentaka (17)

No other names

Co-ordinates (UTM):

23 points taken, describing the outer shape of the forest (see annex 2), the N, E, S and W limits being:

30P	375114	<b>1683263</b>	north
30P	<b>375114</b>	1683263	east
30P	372935	<b>1678619</b>	south
30P	<b>372740</b>	1678758	west

Together with Akkagoun, this is the other showcase of successful flood forest regeneration, initiated by IUCN in 1985. In the 1980's, this forest had almost completely disappeared, and only a small colony was still present. The forest, mostly consisting of *Acacia kirkii*, has been guarded by local people, and has grown to a size of about 240 ha, and the colony has grown to the largest colony of West Africa, and perhaps even the largest colony of Africa, with 60,000 pairs of 16 different species of large waterbirds.

Dentaka is managed through a local management committee with representatives of various stakeholder groups from the villages of Dialloubé and Dentaka (Diakankoré). In a dialogue with local populations and the technical governmental services implied, IUCN helped establish a management agreement between the different stakeholder groups, which will be actualised.

Recommended actions: continuation of contacts with, and support of the local management committee, by IUCN, WI, or both.

## Bora Bora (18)

Not seen

No GPS position taken, as the site was not visited. The position was roughly estimated relative to Mbouna or Képagou.

Rough estimate of co-ordinates (UTM):

30P 392300 1676500

This site is probably located on the Mayo Raneo, not far to the NW from the Timisobo-Képagou flood forest complex near Bouna on the Niger. This area around the Mayo Raneo is enclosed between the Niger and the Mayo Dembé. It was therefore concluded that the site could not be visited during the May 2005 mission, as neither Niger, nor Mayo Dembé can be crossed safely by car.

Recommended actions: visit the site by pirogue during the flood season.

## **Timisobo (19)**

No other names

No GPS position taken, as the site was not visited. The position was roughly estimated relative to Mbouna or Képagou.

Rough estimate of co-ordinates (UTM):

30P 397000 1673500

This site is a twin site with the forest of Mbouna (site nr 20), also known as Képagou. Skinner *et al.* (1987) mention that these two sites were never simultaneously occupied by nesting birds, but the birds used either the one or the other, depending on water levels.

There is much confusion about the names and locations of Timisobo and Képagou. Skinner *et al.* (1987) and Van der Kamp *et al.* (2002) place them on either side of the river, Képagou on the right bank, and Timisobo on the left bank, near the village of Mbouna (or Bouna). In 1984, IUCN started talking about restoration of these forests (as they did with Akkagoun, site 12, and Dentaka, site 17), with the people of Mbouna and other stakeholder villages, but had to abandon this for political reasons. In 2004 IUCN re-opened the consultation with the people of Mbouna, but then the names Timisobo and Képagou appeared not to mean much to the local people. They preferred to talk about the Mbouna forest, and placed it entirely on the left bank, using Sassimba and Képagou as synonyms. There is no trace of a forest left on the right bank.

During the 2005 mission, we did not visit the two sites, but if we follow the recent findings of IUCN, we locate Képagou on the left bank and call it Mbouna forest (see next site), and consequently place the lost Timisobo site on the right bank. As IUCN concentrates on restoring Mbouna, which is covering quite a large area, there is not much perspective for also regenerating an additional forest at the lost Timisobo site.

Recommended actions: for the time being none, but when in the future the Mbouna site develops, it may be advisable to start regeneration at this site too, because of the alternating functioning as suitable nesting site, as mentioned by Skinner *et al.* (1987).

## **Mbouna (20)**

Otherwise known as:

Képagou (IUCN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Sassimba (local information IUCN)

Co-ordinates (UTM):

30P 395000 1666900

This forest lies in the proximity of the village of Mbouna, on the left bank of the Niger, and opposite the village of Sassimba, after which the forest is named alternatively. In the past, this forest formed a twin site with Timisobo, on the other side of the river. There has been confusion about names and locations of these two sites, see the previous site description (Timisobo, site 19).

The largely degraded Mbouna forest covers an area of 1117 ha, including 271 ha of open lakes. The main species is *Acaia kirkii*, which is used for firewood, mostly by collecting dead wood. The lakes are used for fishing. Grazing is regulated by the dioro's of Ninga and Koubi, but the general feeling is that grazing pressure is too high.

Since 2004, IUCN facilitates the process of negotiations between the villages implied, to come to a mutual understanding and agreement about sustainable use of the forest, through the formation of a local management committee. Apart from the obvious forest regeneration, the project focuses on issues like diversification of income sources, and conflict management.

An issue of special concern is the continuous battle against granivorous birds (like quelea's) which damage the rice fields, because trees are often cut to prevent these birds from settling down.

The Mbouna forest is managed by the villages of Mbouna and Sassimba, and the dioro's of Ninga and Koubi.

Recommended actions: continuation of present activities.

### 3.3 Southern part of the delta

#### Amanangou (21)

Otherwise known as:

Aman Nangou (IGN map)

Koumbé Niasso (UICN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

15 points taken, describing the outer shape of the forest (see annex 2), the N, E, S and W limits being:

30P	316439	<b>1624056</b>	north
30P	<b>316699</b>	1623795	east
30P	315835	<b>1622908</b>	south
30P	<b>315760</b>	1623225	west

This forest was formerly known as Koumbé Niasso, but it appears that although during floods the boat entrance to the forest is closest to Koumbé Niasso, the people of this village are not involved in the management of this forest. This used to

be one of the largest flood forests of the delta, and in 1985 it hosted by far the most important colony of the delta. Today, the forest is severely degraded, but the local people wish to restore it. Therefore, the forest is included in the restoration plans of Wetlands International. A local management committee has been installed in 2003, and restoration is in progress. The management committee has visited Akkagoun, to see an example of successful flood forest regeneration. Seeds of *Acacia kirkii* have been obtained and sown in two experimental plots in the Amanangou forest. During the 2005 mission, a proud guide from the village showed healthy seedlings.

The site is presently used as a night roost by very large numbers of egrets, and it is possible that birds still do nest occasionally, so there is a great potential for recovery as a colony.

Together with the forest of Longuel, the forest is managed by Amanangou, Katiala, Longuel, and Niasso Tildé.

Recommended actions: continuation of the restoration activities.

## Longuel (22)

New site (or previously known as part of Koumbé Niasso)

Co-ordinates (UTM):

16 points taken, describing the outer shape of the forest (see annex 2), the N, E, S and W limits being:

30P	316782	<b>1621346</b>	north
30P	<b>316979</b>	1620788	east
30P	316723	<b>1620080</b>	south
30P	<b>316355</b>	1620414	west

A narrow, loose band of *Acacia kirkii*, bordering a few meanders of the Mayo selewaye, which runs through the Amanangou forest to Koumbé Niasso. The forest lies about 2 km south of the Amanangou forest, but used to be connected to it in the past. It is presently used as a roost, mainly by night herons, and has great potential for recovery as a nesting site. There still are a few birds nesting, as isolated recently used nests have been found.

The forests of Longuel and Amanangou are managed by Amanangou, Katiala, Longuel, and Niasso Tildé.

Recommended actions: continuation of the restoration activities.

## **Idole Diouguba (23)**

Otherwise known as:

Toguéré Kouumbé (IUCN 1986)

Co-ordinates (UTM):

30P 332346 1651992

The site is situated on the left bank of the Diaka, just east of the village of Dagada, about 5 km NE of Toguéré Kouumbé.

This was a riverine forest, mainly consisting of *Ziziphus mucronata*, covering about 300 x 1500 m, along the left bank of the Diaka, hosting colonies of herons and cormorants. The forest was destroyed during the droughts of 1973-1985, but the colonies had already disappeared, due to disturbance by people, being situated on the edge of one of the major shipping routes of the delta. This situation seems not suitable for recovery.

Recommended actions: none.

## **Tiayawal Fufu (24)**

New site

Co-ordinates (UTM):

10 points taken, describing the outer shape of the forest (see appendix 2), the N,E, S and W limits being:

30P	324745	<b>1625268</b>	north
30P	<b>324879</b>	1625053	east
30P	324695	<b>1624753</b>	south
30P	<b>324421</b>	1624923	west

Although the site has not been visited by outsiders before, the presence of a colony has been suspected, as there have been rumours of fishermen taking darter chicks here, to raise them in captivity.

The site is a fringe forest of *Ziziphus mucronata*, forming a semi-circle around a circular lake south of the Diarennde, about 7 km east of Kouumbé Niasso. In its whole setting, the forest and its colony encircling the lake, very much resembles Simion, but the colony is much less developed (or more degraded). Several hundred used nests were estimated to be present, but far less than 1000 in total. Like Simion, the place was littered with dead bodies of cormorants.

It is not clear which villages are implied in the management of the site. Grazing is regulated by the distant Dioro of Dialloubé. In June 2005 a special management committee has been formed in Kouumbé Niasso to regenerate bourgou in the lake.

The colony of Tiyawal Fufu has potential for growth, and a strategic position in the 'empty' centre of the delta.

Recommended actions: identify stakeholders, and start the process of raising awareness.

## Djoulali (25)

New site

Co-ordinates (UTM):

10 points taken, describing the outer shape of the forest (see appendix 2), the N,E, S and W limits being:

30P	343764	<b>1633827</b>	north
30P	<b>343864</b>	1633591	east
30P	343606	<b>1633039</b>	south
30P	<b>343296</b>	1633503	west

Although the site has not been visited by outsiders before, the presence of a colony has been suspected.

The site is a fringe forest of *Ziziphus mucronata*, around a circular lake south of the Diarennde, about halfway Walo and Serendou, just opposite 'Campement Kadidja', named after the late 'maîtresse d'eau' in this area. It is also less than 10 km NW of Simion. In its whole setting, the forest encircling the lake, very much resembles Simion and Tiyawal Fufu, but the colony is much less developed (or more degraded). Several dozens of used nests were estimated to be present, totaling perhaps 100. Like in Simion and Tiyawal Fufu, there were dead bodies of cormorants.

At present, it seems that there are no villages implied in the management of the site. Grazing is regulated by the distant Dioro of Dialloubé.

The colony of Djoulali has potential for growth, and a strategic position in the 'empty' centre of the delta.

Recommended actions: identify stakeholders, and start the process of raising awareness.

## Simion (26)

New site

Co-ordinates (UTM):

8 points taken, describing part of the outer shape of the forest (see appendix 2), the E, S and W limits being:

30P	<b>348701</b>	1625014	east
30P	348588	<b>1624801</b>	south
30P	<b>347720</b>	1625102	west

The northern limit of the forest was not established due to an error in the field work. A point taken in the densest part of the forest (close to the northern edge) was accidentally taken as the northernmost point of the circle. The position of this point is:

30P      348146      **1625461**

The actual northern limit is a few hundred meters further north, at the most.

The forest is situated near the village of Simion, about 7 km north-northeast of Kadial.

This forest has a circular shape, fringing a low-lying lake, which is flooded every year. The forest circle varies in density, and is most dense on the north side (see GPS readings). In this part, many hundreds (more than 1000, possibly up to 2000) used nests were seen in large specimens of *Ziziphus mucronata*. The colony was littered with dead bodies of waterbirds. Most corpses were Long-tailed Cormorants, but African Darter, Cattle Egret, and other egrets were also found. The forest consists almost exclusively of *Ziziphus mucronata*, which is said to be less palatable to ruminants, and therefore is not cut by the goat herders.

The forest and its bird colonies are managed, and cherished by the village of Simion. The Chef de village personally takes pride in protecting the colony against intruders. The lake, surrounded by the colonies, forms a prime fishing area for the village. The colony has been there as long as the Chef de Village can remember.

This colony has not been known by outsiders before, and deserves our full attention in the future, as it is strategically situated right in the middle of the 'empty' centre of the delta.

Recommended actions: searching future contact with the village of Simion, and other stakeholders (Peulh communities, Dioro of Dialloubé), and try to raise interest for the establishment of a local management committee, following the examples of Akkagoun, Dentaka, and Amanangou. Maintenance of the colony now very much depends on the personal interest of the present Chef de Village, and there is always a risk that his future successor may think differently. It is therefore desirable to come

to a more formal structure to guarantee future management of the site. The site certainly has potential to increase in importance.

## **Tenakaye (27)**

Otherwise known as:

Kadial (Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 346556 1617666

The site is located about 2 km southeast of Kadial, east of the Mayel Kotia. In the past, there was an extensive flood forest with large bird colonies, but like elsewhere, the forest was destroyed to create agricultural fields, during the droughts of 1973-1985.

In its present state, there are only a few remnants of dispersed *Ziziphus mucronata* stands, bordering a low-lying lakebed. There is a potential for recovery, if the interest of the people of Kadial can be raised. If the forest can be restored, it has a strategic position in the 'empty' centre of the delta. There is a possibility to (re)introduce *Acacia kirkii* too.

Recommended actions: search future contact with the people of Kadial, identify other stakeholders, and start the process of raising awareness of the people involved.

## **Nelbel (28)**

New site

Co-ordinates (UTM):

30P 353809 1615695

Nelbel is situated about halfway Mopti and Kadial, and is part of the extended area of comparatively dense brousse, which is traversed by the piste Mopti-Kadial. Within this dry forest area, Nelbel forms a depression, surrounding a lake which in the past used to be filled with water every year. Around the lake, the trees were lined with waterbird colonies, including cormorants, various heron species, and pelicans. The colonies were lost during the drought periods of 1973-1985, and flooding has remained very irregular ever since, even in the wet years since 1994. It is possible that failing of the floods in recent years is caused by silting up of alimentary channels. Nelbel has essentially changed into a dry forest, rich in tree species, like *Ziziphus mucronata*, *Acacia nilotica*, *Acacia albida*, *Acacia seyal*, *Ptilostigma reticulata*, and *Guiera senegalensis*. Nelbel borders Boudouol, which has a similar history. Without sufficient water, there is little potential for recovery of wet flood forest, but as a dry forest it

can keep or improve its value as a resource for the local people. Nelbel and Boudouol are managed by the village of Kadial.

Recommended actions: none.

### **Boudouol (29)**

New site

Co-ordinates (UTM):

30P 354325 1613453

Boudouol is situated about halfway Mopti and Kadial, and is part of the extended area of comparatively dense brousse, which is traversed by the piste Mopti-Kadial. Within this dry forest area, Boudouol forms a depression, surrounding a lake which in the past used to be filled with water every year. Around the lake, the trees were lined with waterbird colonies, including cormorants, various heron species, and pelicans. The colonies were lost during the drought periods of 1973-1985, and flooding has remained very irregular ever since, even in the wet years since 1994. It is possible that failing of the floods in recent years is caused by silting up of alimentary channels. Boudouol has essentially changed into a dry forest, rich in tree species, rich in tree species, like *Ziziphus mucronata*, *Acacia nilotica*, *Acacia albida*, *Acacia seyal*, *Ptilostigma reticulata*, and *Guiera senegalensis*. Boudouol borders Nelbel, which has a similar history. Without sufficient water, there is little potential for recovery of wet flood forest, but as a dry forest it can keep or improve its value as a resource for the local people. Nelbel and Boudouol are managed by the village of Kadial.

Recommended actions: none.

### **Wilibana (30)**

No other names

Co-ordinates (UTM):

30P 371427 1603308

The site was situated about 5 km N of Mopti, on the right bank of the Niger. The forest was completely cleared after 1972, when the whole area was converted into rice fields (Opération Riz Mopti). The forest consisted of *Acacia kirkii*, and hosted colonies of herons and cormorants.

Possibilities for recovery are zero.

Recommended actions: none.

## **Ngomi (31)**

No other names

Co-ordinates (UTM):

30P 362703 1594465

The site was situated 7 km SW of Mopti on the right bank of the Niger. The forest was completely cleared to make place for rice fields between 1972 and 1985. The forest consisted of *Acacia kirkii*, and hosted colonies of herons and cormorants.

Possibilities for recovery are zero.

Recommended actions: none.

## **Konosoro (32)**

New site

Co-ordinates (UTM):

30P 365010 1591710

The site is situated about 5 km SW of Ngomi, and 12 km SW of Mopti, 1 km south of the village of Daka Koma on the right bank of the Niger. This forest has appeared spontaneously after 1985, and was left alone by the people to grow, because they regretted the destruction and loss of the Ngomi forest. The new forest consists of relatively dense stands of *Acacia kirkii*, 4 m or higher, covers 100-200 ha, surrounded by various lakes, and already serves as a roost since 15 years. Nesting also started 15 years ago, according to the local people. There are white herons and cormorants nesting. The colony serves as a source of proteins for the people, as they take young birds from the nests (mostly done by children). It is possible that further regeneration of the forest is now hampered by over-grazing, as during the mission no seedlings were seen. In the forest no dead birds were found, and the people did not mention any unusual mortality.

The forest is managed by four villages Ngomi, Tendaka, Tie, and Denla, and the camp of Daka Kono.

This forest has a great potential for further development, as it is strategically positioned relatively to the other existing colonies in the delta. As it is so close to Mopti, there is also a potential for ecotourism from Mopti.

Recommended actions: search further contact with villages implied and other stakeholders to build the necessary organizational structure to guarantee future sound management.

## **Tiayawal Tomona (33)**

Otherwise known as:

Djibitaga (Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 370062 1593115

The site was situated just S of Mopti, a few km north of the village of Djibitaga, on the right bank of the Bani. The forest was completely cleared to make place for rice fields after 1985. The forest consisted of *Acacia kirkii*, and hosted colonies of herons and cormorants.

Possibilities for recovery are zero.

Recommended actions: none.

## **Ndiakoye Nelbi (34)**

Otherwise known as:

Tilembaya (IUCN 1986), Tilembay (Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 290010 1570175

The site is situated in the SW corner of the central part of the delta, between the Diaka and the Niger, close to the point where these two separate. It lies about 10 km NE of Diafarabé, and some 5 km NE of the village of Tilembaya. The whole area is covered with comparatively dense forest of the drier types. Within this forest, the site itself surrounds a low lake basin, very much like Nelbel and Boudouol east of Kadial. In the past, the trees surrounding the lake were lined with bird colonies, but these disappeared with the droughts of 1973-1985. Since then, like in many of the other semi-wet forests, there has been a recurrent shortage of water, also in the wet years since 1994. In wet years nesting of waterbirds was reported to occur, but it appeared that these cases did not refer to colonial waterbirds, but to ducks and geese. With a regular shortage of water, the potential for recovery seems low.

Recommended actions: none

## Pora I (35)

Otherwise known as:

Kouakourou (IUCN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

53 points taken, describing the outer shape of the forest (see appendix 2), the N, E, S and W limits being:

30P	335019	<b>157116</b>	north
30P	<b>335166</b>	1570974	east
30P	332800	<b>1569604</b>	south
30P	<b>332708</b>	1569886	west

This forest is enclosed in the triangle between the three Pora villages: Pora Bozo, Pora Somono, and Pora Nogonontoi. The forest used to host a healthy colony in 1985 (Skinner *et al.* 1987), but is now severely degraded, and has been reduced to a semi-circular fringe around an open centre. *Acacia kirkii* is dominant in most of the forest, except the southeastern corner, where *Ziziphus* spec is more common. The forest is no longer dense enough for safe nesting, as during the flood it is possible to navigate with small boats between the treetops. There are no birds nesting anymore, but the site is still used as a night roost by large numbers of egrets, cormorants, and ibises. This forest is included in the restoration plan of Wetlands International, in agreement with the wishes of the local people. However, due to political problems, the activities of Wetlands International had to be suspended between 2003 and 2005.

The three forests of Pora are being managed by the villages of Pora Bozo, Pora Somono, Pora Nogonontoi, and Manga Peulh.

The site has a great potential for recovery, and the re-establishment of a healthy colony.

Recommended actions: continuation of the consultation and the process of raising awareness, establishment of a local management committee, to manage this forest together with Pora II.

## Pora II (36)

Otherwise known as:

Kouakourou (IUCN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

10 points taken, describing the outer shape of the forest (see appendix 2), the N, E, S and W limits being:

30P	330261	<b>1569800</b>	north
30P	<b>330674</b>	1569256	east
30P	330600	<b>1569203</b>	south
30P	<b>329998</b>	1569620	west

This is a small, rather isolated forest, situated to the west of the Pora villages, on the other side of the river branch. It is a rather dense patch of *Acacia kirkii*, and it still has a colony of several dozens of pairs, including at least cormorants, cattle egrets and squacco herons. This forest is included in the restoration plan of Wetlands International, in agreement with the wishes of the local people. However, due to political problems, the activities of Wetlands International had to be suspended between 2003 and 2005.

The three forests of Pora are being managed by the villages of Pora Bozo, Pora Somono, Pora Nogonontoi, and Manga Peulh.

The site has a great potential for recovery, and further expansion of the colony.

Recommended actions: continuation of the consultation and the process of raising awareness, establishment of a local management committee, to manage this forest together with Pora I.

### **Pora III (37)**

Otherwise known as:

Kouakourou (IUCN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

18 points taken, describing the outer shape of the forest (see appendix 2), the N, E, S and W limits being:

30P	334255	<b>1573600</b>	north
30P	<b>336664</b>	1572378	east
30P	333487	<b>1571462</b>	south
30P	<b>333123</b>	1571740	west

This is the largest, and the most degraded of the Pora forests. Only scattered trees of *Acacia kirkii* remain, in an area otherwise mostly converted into ricefields. The local people do not wish to restore this forest, as they need the ricefields and pastures. Therefore, this forest has not been included in the restoration plans of Wetlands International.

Like the other two Pora forests, this site is managed by the villages of Pora Bozo, Pora Somono, Pora Nogonontoi, and Manga Peulh.

Recommended actions: none.

### **Soro (38)**

Otherwise known as:

Tomina (IUCN 1986, Skinner *et al.* 1987, Van der Kamp *et al.* 2002)

Co-ordinates (UTM):

30P 361519 1541714

The site is situated in the far southern corner of the delta, in the Bani floodplain. It lies just east of the Bani river, close to the edge of the dry hill country. About 20 km east of Djenné, and about 15 km SW of Sofara, a few km NE of the village of Tomina, and only 5 km from the paved road Sévaré-San. The forest consist of loose stands of *Acacia kirkii*, bordering a lake, Mar de Niambolo, which still held water in May-June during the mission. Actually, the lake can be seen on the right hand side when driving by car from Sévaré to San. The forest used to host heron colonies in the past, but these were lost when the forest was degraded too far during the droughts of 1973-1985. There are still many good specimens of *Acacia kirkii*, but too far apart to serve as safe nesting site. There were many signs of intensive cutting.

The forest is managed by the people of four villages: Tomina, Koumalo, Massaba, and Dinkele. Grazing is regulated by a Dioro in Sofara.

With the (semi)permanent presence of the lake, this site has a great potential for future development as a roost and a colony, also because of its strategic position in the southern corner of the delta, relatively far from other colonies. It is also a site of great scenic beauty, and because it is so close to the main road, it has a potential for eco-tourism.

Recommended actions: search future contact with the people from Tomina, Koumalo, Massaba, Dinkele and Sofara, and other stakeholders, and start the process of raising awareness.

## 4 A strategic plan for flood forest management in the Inner Niger Delta

A strategic plan for the restoration, development, and future management of the flood forests of the Inner Niger Delta rests on the voluntary co-operation of local populations in the delta, who, even without any help or financial support from the outside world, want to restore and maintain their flood forests for their own benefit. Apart from the successful recovery of the flood forests of Akkagoun (site 12) and Dentaka (site 17), we have now seen at least two cases where flood forests, and their bird colonies, have been protected, managed, and restored by local people without any interference from outside: the case of the Simion forest, personally guarded by the Chef de Village of Simion (site 26), and Konosoro (site 32), near Ngomi, where the people let spontaneous re-growth of *Acacia kirkii* happen, and let a completely new forest develop, because they regretted the destruction of the former Ngomi forest in the past. The fact that local people today realise that the large scale destruction of flood forests during the last half century has not done them any good, and that restoration is for their own profit, forms a solid basis under our future efforts to help restore a strategic network of flood forests in the Inner Niger Delta, in a community based programme.

When developing management plans for flood forests, with the surrounding villages using the forests, aspects of food security should be taken into account. It was the lack of food security during the 1970's and 80's, which led to the destruction of most of the forests in the first place. And it was lack of food security again, which more recently led to over-exploitation of bird colonies in the restored forest of Akkagoun. Therefore, management plans should also address socio-economic issues outside the forests in an integrated way, including the cultivation of rice and bourgou.

The various functions of a flood forest with a bird colony, operate at different scales. At the local scale (within the limits of the forest), the forest provides firewood, utility wood, herbs, and additional protein (eggs and chicks). At a slightly larger scale, beyond the limits of the forests, the colony provides excellent fishing, through fertilisation of the waters. This is particularly evident in cases where the forest forms a ring around a deeper lake, like in the case of Simion, but it is equally true around forests where this is less easily visible. At the largest scale, up to 15 or more km away from the colony, the cattle egrets (which make up 90% of the colonies) help control locusts and other insects harmful to agriculture. Ideally, there should be a network of colonies, spaced in such a way, that the entire delta is covered by their feeding areas. At present, there is a strong focus on the central part of the lower delta, with the two large colonies present in Akkagoun and Dentaka. To build a strategic network, it is necessary to re-establish flood forests and colonies all over the area.

In the lower part of the central delta, around Lac Debo and Walado, the coverage is good. We already have Akkagoun and Dentaka, and UICN has now started the process of awareness raising around the forests of Gourao (site 14), and Mbouna

(site 20). If these efforts are going to be successful in the future, that part of the delta is completely covered by feeding areas of the various colonies. Further south, WI is active around the forests of Amanangou (site 21) and Longuel (site 22) near Koumbé Niasso, and around the Pora's near Kouakourou (site 35-37). This leaves wide open spaces in the most extensive wet parts of the delta, and everywhere south of the Niger between Diafarabé and Mopti (the Bani floodplain). To fill these spaces, we have to look at the site list using two criteria: Potential for recovery, and strategic position relative to other forests. The potential for recovery of the various sites has already been summarised in table 1.

When looking at strategic position, and limiting the efforts to sites with a large potential, there are three main areas of interest:

1. The 'centre vide' (empty centre) around Kadial, where the main focus has to be on the maintenance and re-inforcement of Simion (site 26), but where further development of Tiayawal Fufu (site 24) and Dioulali (site 25), and restoration of Tenakaye (site 27) may also be very rewarding.
2. The area near Mopti, with focus on Konosoro (site 32), also taking into account the potential for eco-tourism.
3. The southern part of the Bani floodplain, with focus on Soro (site 38), also in relation to eco-tourism.

It is tempting to also re-establish forests and colonies in the northern part of the delta, north of the Debo-Walado area, but presently, none of the known sites has a potential for recovery. In theory, it is possible to start the development of an entirely new forest in a location where there has never been one, providing the physical conditions are allright. This would involve a lot of preliminary studies and extra effort. It seems therefore advisable, in a first stage, to concentrate on the three core areas mentioned above. If the developments in these areas prove to be successful in the future, and need less input and attention, it is possible to look again at the northern delta. Fig. 2 gives an impression of the coverage of the Inner Niger Delta by the birds foraging from the colonies, if all sites included in the strategic plan develop satisfactorily.

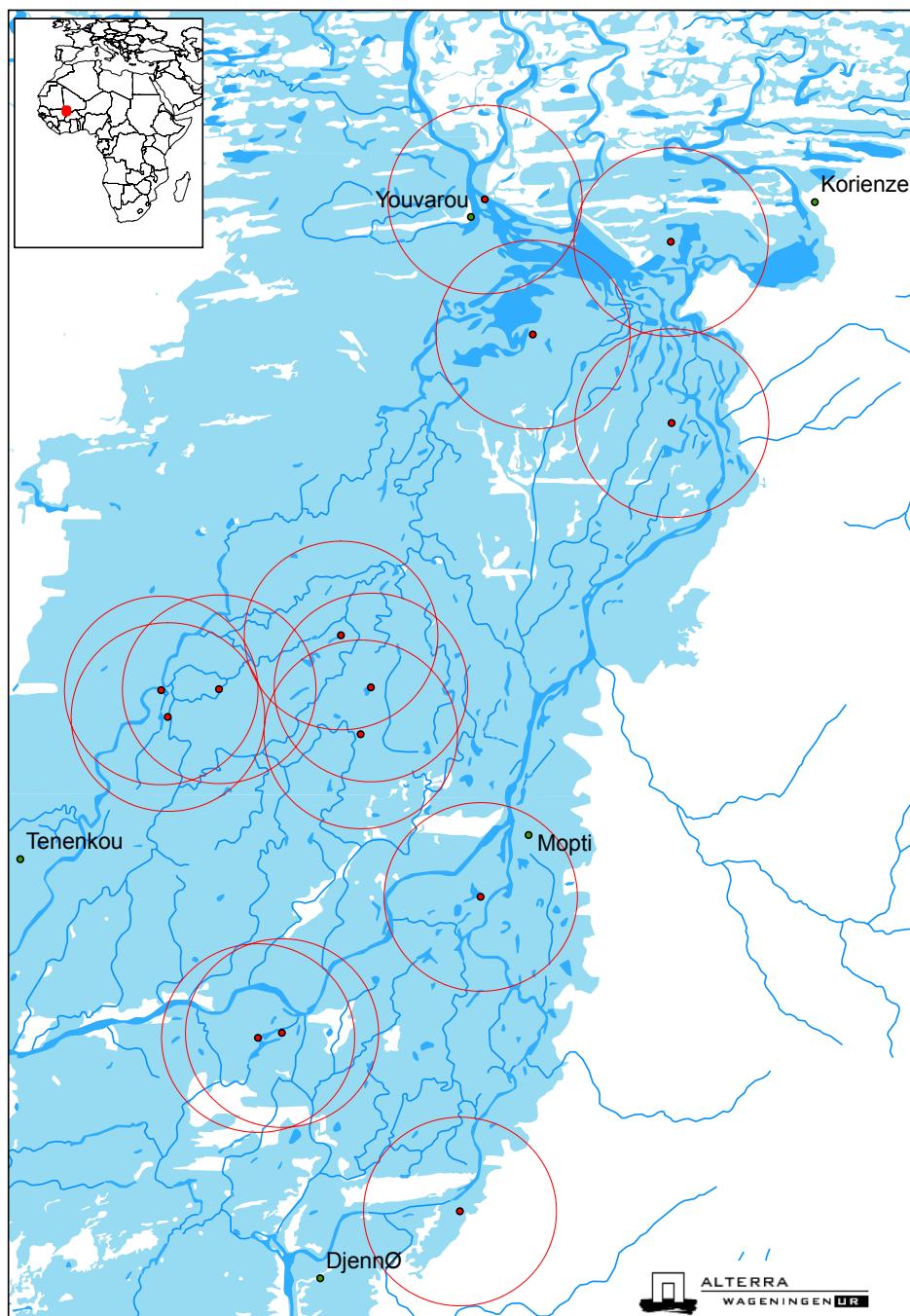


Figure 2 Coverage of feeding areas of colonial waterbirds in the Inner Niger Delta, if the restoration of flood forests is effectuated according to the Strategic Plan



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## Appendix 1. Index to site numbers

*Index to site numbers of Van der Kamp et al. 2002, Skinner et al. 1987, and UICN 1986, and UTM co-ordinates in Appendix 2. In the column 'GPS first', either the only point measured is given, or the first point of a series describing the outer limits. In the latter case, 'GPS last' identifies the last point of the same series.*

Site nr	Site name	Wym	Skin	Uicn	GPS first	GPS last	GPS source
1	Toya (not visited)				estimate-D		
2	Djelika (Kourioume)			24	505023		
3	Kabara				505024		
4	In Tarouel (Goundam)	6	13	13	505022		
5	Legual Poural	7	14		505007		
6	Konso Souma	3	10	10	505003		
7	Toga (not visited)				estimate-A		
8	Toba	4	11	11	505006		
9	Bama	2	9	9	505005		
10	Gome	5	12	12	505008		
11	Doundewal	1	8	8	505019		
12	Akkagoun	12	7	7	Akka01	Akka14	W.I.
13	Sobesaba	14	16	15	505009	505018	
14	Gourao (not visited)	10	4	4	iucn01		IUCN
15	Korientze (not visited)	16	21		estimate-B		
16	Kota	13	15	14	Kota00	Kota08	W.I.
17	Dentaka	11	5	5	Dent01	Dent23	W.I.
18	Bora Bora (not visited)	17	24		estimate-C		
19	Timisobo (not visited)	8	2	2	estimate-E		
20	Mbouna (not visited)	9	3	3	iucn02		IUCN
21	Amanangou	18	1	1	Ama01	Ama15	W.I.
21-a	Amanangou-transect				505066	505075	
22	Longuel (not visited)				Long01	Long16	W.I.
23	Idole Diouguba			23	505058		
24	Tiayawal Fufu (Diarendé)				505037	505046	
25	Djoulali (Diarendé)				505048	505057	
26	Simion				505029	505036	
27	Tenakaye	25	25		505027		
28	Nelbel				505025		
29	Boudououl				505026		
30	Wilibana	21	18	17	605038		
31	Ngomi	22	19	18	605042		
32	Konosoro				605041		
33	Tiayawal Tomona	24	23		605039		
34	Ndiakoye Nelbi	23	22	22	505076		
35	Pora I	19	6	6	505105	505157	
36	Pora II	19	6	6	505095	505104	
37	Pora III	19	6	6	505077	505094	
38	Soro	20	17	16	505158		



## Appendix 2. UTM co-ordinates of flood forests in the Inner Niger Delta

UTM co-ordinates of flood forests in the Inner Niger Delta. Positions taken during the 2005 mission have a 6-digit identification code. The last three digits of this code give the sequence numbers generated by the GPS receivers. These numbers are not unique because two different receivers were used. Therefore, three preceding digits have been added. Codes starting with 505 refer to GPS points taken with one receiver in May 2005 (5-05), those starting with 605 were obtained with another receiver in June. Codes starting with abbreviated site names (3 or 4 letters) refer to positions which had already been taken before the mission by Wetlands International, codes starting with iucn have been taken earlier by IUCN. In five cases (estimate-A – estimate-E) co-ordinates were not obtained using GPS, because the site could not be visited, but estimated using map positions relative to nearby known sites.

Identification code	Site name	Position within site	UTM co-ordinates			Remarks
505003	Konso Souma	centre	30P	395816	1712745	
505005	Bama	centre	30P	407004	1705278	
505006	Toba	centre	30P	402965	1707686	
505007	Legual poural	centre	30P	373338	1723707	
505008	Gome	centre	30P	366532	1708222	
505009	Sobesaba	limit	30P	371862	1697525	
505010	Sobesaba	limit	30P	371193	1697114	
505011	Sobesaba	limit	30P	371962	1695134	
505012	Sobesaba	limit	30P	372847	1694411	
505013	Sobesaba	limit	30P	374455	1694345	
505014	Sobesaba	limit	30P	374952	1694357	
505015	Sobesaba	limit	30P	376213	1694884	
505016	Sobesaba	limit	30P	376507	1695138	
505017	Sobesaba	limit	30P	375358	1695750	
505018	Sobesaba	limit	30P	374117	1696833	
505019	Doundewal	centre	30P	339335	1701827	
505020	Kota	centre	30P	374835	1686787	
505022	In Tarouel	centre	30Q	440652	1808631	
505023	Djelika (Kourioume)	centre	30Q	497440	1842243	
505024	Kabara	centre	30Q	501360	1847628	
505025	Nelbel	centre	30P	353809	1615695	
505026	Boudouol	centre	30P	354325	1613453	
505027	Tenakaye	centre	30P	346556	1617666	
505029	Simion	limit	30P	348146	1625461	
505030	Simion	limit	30P	348701	1625014	
505031	Simion	limit	30P	348588	1624801	
505032	Simion	limit	30P	348083	1624876	
505033	Simion	limit	30P	347821	1624985	
505034	Simion	limit	30P	347720	1625102	
505035	Simion	limit	30P	347724	1625220	
505036	Simion	limit	30P	347803	1625376	
505037	Tiayawal Fufu	limit	30P	324587	1624789	
505038	Tiayawal Fufu	limit	30P	324695	1624753	

505039	Tiayawal Fufu	limit	30P	324810	1624858
505040	Tiayawal Fufu	limit	30P	324879	1625053
505041	Tiayawal Fufu	limit	30P	324797	1625114
505042	Tiayawal Fufu	limit	30P	324745	1625268
505043	Tiayawal Fufu	limit	30P	324689	1625222
505044	Tiayawal Fufu	limit	30P	324551	1625197
505045	Tiayawal Fufu	limit	30P	324428	1625021
505046	Tiayawal Fufu	limit	30P	324421	1624923
505048	Djoulali	limit	30P	343309	1633324
505049	Djoulali	limit	30P	343433	1633087
505050	Djoulali	limit	30P	343606	1633039
505051	Djoulali	limit	30P	343773	1633153
505052	Djoulali	limit	30P	343838	1633386
505053	Djoulali	limit	30P	343864	1633591
505054	Djoulali	limit	30P	343764	1633827
505055	Djoulali	limit	30P	343646	1633742
505056	Djoulali	limit	30P	343496	1633676
505057	Djoulali	limit	30P	343296	1633503
505058	Idole Diouguba	centre	30P	332346	1651992
505066	Amanangou	transect 1	30P	315667	1624870
505067	Amanangou	transect 1	30P	316069	1624548
505068	Amanangou	transect 1	30P	316453	1624207
505069	Amanangou	transect 1	30P	316845	1623846
505070	Amanangou	transect 2	30P	316552	1623443
505071	Amanangou	transect 2	30P	316159	1623753
505072	Amanangou	transect 2	30P	315757	1624050
505073	Amanangou	transect 3	30P	315492	1623647
505074	Amanangou	transect 3	30P	315919	1623386
505075	Amanangou	transect 3	30P	316331	1623105
505076	Ndiakoye Nelbi	centre	30P	290010	1570175
505077	Pora III	limit	30P	334255	1573600
505078	Pora III	limit	30P	333471	1572671
505079	Pora III	limit	30P	333123	1571740
505080	Pora III	limit	30P	333487	1571462
505081	Pora III	limit	30P	334319	1571902
505082	Pora III	limit	30P	334479	1572029
505083	Pora III	limit	30P	334591	1572228
505084	Pora III	limit	30P	335381	1572373
505085	Pora III	limit	30P	335620	1572203
505086	Pora III	limit	30P	336006	1571743
505087	Pora III	limit	30P	336447	1572047
505088	Pora III	limit	30P	336664	1572378
505089	Pora III	limit	30P	336573	1572883
505090	Pora III	limit	30P	336359	1572865
505091	Pora III	limit	30P	336127	1572850
505092	Pora III	limit	30P	335599	1572767
505093	Pora III	limit	30P	335443	1572960

505094	Pora III	limit	30P	334597	1573378
505095	Pora II	limit	30P	330261	1569800
505096	Pora II	limit	30P	329998	1569620
505097	Pora II	limit	30P	330067	1569312
505098	Pora II	limit	30P	330266	1569243
505099	Pora II	limit	30P	330402	1569256
505100	Pora II	limit	30P	330600	1569203
505101	Pora II	limit	30P	330674	1569256
505102	Pora II	limit	30P	330542	1569502
505103	Pora II	limit	30P	330484	1569630
505104	Pora II	limit	30P	330353	1569758
505105	Pora I	limit	30P	335022	1570106
505106	Pora I	limit	30P	335011	1570043
505107	Pora I	limit	30P	334924	1569944
505108	Pora I	limit	30P	334832	1569905
505109	Pora I	limit	30P	334677	1569898
505110	Pora I	limit	30P	334566	1569868
505111	Pora I	limit	30P	334514	1569815
505112	Pora I	limit	30P	334360	1569772
505113	Pora I	limit	30P	334068	1569756
505114	Pora I	limit	30P	333962	1569739
505115	Pora I	limit	30P	333707	1569638
505116	Pora I	limit	30P	333542	1569617
505117	Pora I	limit	30P	333380	1569618
505118	Pora I	limit	30P	333073	1569747
505119	Pora I	limit	30P	332963	1569667
505120	Pora I	limit	30P	332800	1569604
505121	Pora I	limit	30P	332793	1569778
505122	Pora I	limit	30P	332708	1569886
505123	Pora I	limit	30P	332794	1570031
505124	Pora I	limit	30P	333069	1570155
505125	Pora I	limit	30P	333227	1570193
505126	Pora I	limit	30P	333329	1570148
505127	Pora I	limit	30P	333495	1570181
505128	Pora I	limit	30P	333477	1570263
505129	Pora I	limit	30P	333559	1570365
505130	Pora I	limit	30P	333732	1570507
505131	Pora I	limit	30P	333963	1570859
505132	Pora I	limit	30P	334080	1570802
505133	Pora I	limit	30P	334136	1570822
505134	Pora I	limit	30P	334134	1570879
505135	Pora I	limit	30P	334143	1570930
505136	Pora I	limit	30P	334221	1570920
505137	Pora I	limit	30P	334313	1570941
505138	Pora I	limit	30P	334472	1571008
505139	Pora I	limit	30P	334555	1571055
505140	Pora I	limit	30P	334541	1571061

505141	Pora I	limit	30P	334618	1571094
505142	Pora I	limit	30P	334931	1571086
505143	Pora I	limit	30P	335019	1571116
505144	Pora I	limit	30P	335160	1571044
505145	Pora I	limit	30P	335166	1570974
505146	Pora I	limit	30P	335107	1570905
505147	Pora I	limit	30P	334894	1570809
505148	Pora I	limit	30P	334650	1570611
505149	Pora I	limit	30P	334592	1570504
505150	Pora I	limit	30P	334522	1570514
505151	Pora I	limit	30P	334407	1570335
505152	Pora I	limit	30P	334401	1570285
505153	Pora I	limit	30P	334573	1570348
505154	Pora I	limit	30P	334668	1570352
505155	Pora I	limit	30P	334806	1570224
505156	Pora I	limit	30P	334855	1570185
505157	Pora I	limit	30P	334952	1570187
505158	Soro	centre	30P	361519	1541714
605038	Wilibana	centre	30P	371427	1603308
605039	Tiayawal Tomona	centre	30P	370062	1593115
605041	Konosoro	centre	30P	365010	1591710
605042	Ngomi	centre	30P	362703	1594465
Akka01	Akkagoun	limit	30P	367180	1701253
Akka02	Akkagoun	limit	30P	366499	1701569
Akka03	Akkagoun	limit	30P	366158	1701818
Akka04	Akkagoun	limit	30P	365916	1702190
Akka05	Akkagoun	limit	30P	365786	1702413
Akka06	Akkagoun	limit	30P	365643	1702723
Akka07	Akkagoun	limit	30P	365440	1703398
Akka08	Akkagoun	limit	30P	365200	1703643
Akka09	Akkagoun	limit	30P	364774	1704403
Akka10	Akkagoun	limit	30P	365434	1703978
Akka11	Akkagoun	limit	30P	366179	1703412
Akka12	Akkagoun	limit	30P	366480	1703129
Akka13	Akkagoun	limit	30P	366797	1702725
Akka14	Akkagoun	limit	30P	367493	1701813
Ama01	Amanangou	limit	30P	315953	1623730
Ama02	Amanangou	limit	30P	316122	1623876
Ama03	Amanangou	limit	30P	316337	1623859
Ama04	Amanangou	limit	30P	316439	1624056
Ama05	Amanangou	limit	30P	316552	1623935
Ama06	Amanangou	limit	30P	316699	1623795
Ama07	Amanangou	limit	30P	316627	1623610
Ama08	Amanangou	limit	30P	316560	1623477
Ama09	Amanangou	limit	30P	316435	1623255
Ama10	Amanangou	limit	30P	316281	1623265
Ama11	Amanangou	limit	30P	316165	1623021

Ama12	Amanangou	limit	30P	316007	1622987	
Ama13	Amanangou	limit	30P	315835	1622908	
Ama14	Amanangou	limit	30P	315829	1623051	
Ama15	Amanangou	limit	30P	315760	1623225	
Dent01	Dentaka	limit	30P	375114	1683263	
Dent02	Dentaka	limit	30P	374114	1681503	
Dent03	Dentaka	limit	30P	373981	1681296	
Dent04	Dentaka	limit	30P	373855	1680983	
Dent05	Dentaka	limit	30P	373757	1680835	
Dent06	Dentaka	limit	30P	373559	1680396	
Dent07	Dentaka	limit	30P	373419	1680062	
Dent08	Dentaka	limit	30P	373327	1679584	
Dent09	Dentaka	limit	30P	373171	1679049	
Dent10	Dentaka	limit	30P	372935	1678619	
Dent11	Dentaka	limit	30P	372740	1678758	
Dent12	Dentaka	limit	30P	372861	1679133	
Dent13	Dentaka	limit	30P	373049	1679647	
Dent14	Dentaka	limit	30P	373046	1680278	
Dent15	Dentaka	limit	30P	373075	1680837	
Dent16	Dentaka	limit	30P	372982	1681012	
Dent17	Dentaka	limit	30P	373011	1681218	
Dent18	Dentaka	limit	30P	373230	1681559	
Dent19	Dentaka	limit	30P	373399	1681724	
Dent20	Dentaka	limit	30P	373594	1682011	
Dent21	Dentaka	limit	30P	373861	1682444	
Dent22	Dentaka	limit	30P	374093	1682548	
Dent23	Dentaka	limit	30P	374780	1682758	
estimate-A	Toga	centre	30P	393998	1711512	estimated
estimate-B	Korientze	centre	30P	413282	1695128	estimated
estimate-C	Bora Bora	centre	30P	392300	1676500	estimated
estimate-D	Toya	centre	30Q	495190	1841374	estimated
estimate-E	Timisobo	centre	30P	397000	1673500	estimated
iucn01	Gourao	centre	30P	395000	1695700	
iucn02	Mbouna	centre	30P	395000	1666900	
Kota00	Kota	limit	30P	377538	1687890	
Kota01	Kota	limit	30P	376158	1686294	
Kota02	Kota	limit	30P	376204	1686225	
Kota03	Kota	limit	30P	376223	1686203	
Kota04	Kota	limit	30P	376208	1686179	
Kota05	Kota	limit	30P	376181	1686179	
Kota06	Kota	limit	30P	376098	1686199	
Kota07	Kota	limit	30P	376025	1686247	
Kota08	Kota	limit	30P	376070	1686309	
Long01	Longuel	limit	30P	316782	1621346	
Long02	Longuel	limit	30P	316853	1621149	
Long03	Longuel	limit	30P	316979	1620788	
Long04	Longuel	limit	30P	316853	1620590	

Long05	Longuel	limit	30P	316639	1620611
Long06	Longuel	limit	30P	316631	1620419
Long07	Longuel	limit	30P	316714	1620299
Long08	Longuel	limit	30P	316905	1620165
Long09	Longuel	limit	30P	316723	1620080
Long10	Longuel	limit	30P	316536	1620321
Long11	Longuel	limit	30P	316355	1620414
Long12	Longuel	limit	30P	316427	1620640
Long13	Longuel	limit	30P	316615	1620736
Long14	Longuel	limit	30P	316738	1620710
Long15	Longuel	limit	30P	316819	1620808
Long16	Longuel	limit	30P	316720	1620964