USDA Forest Service
Office of International Programs
Trip Report

Mission to Support Landscape Planning in the Maringa-Lopori-Wamba Landscape, Democratic Republic of Congo[1]

January 14 – February 3, 2006

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[1] *Note: This report is a part of an ongoing technical assistance effort by USDA Forest Service (USFS) to USAID/CARPE and its partners aimed at providing guidelines for landscape level management planning. The recommendations contained in this report are focused exclusively on this particular landscape, and may contain discrepancies to recommendations made in other USFS reports for other landscapes. The USFS is currently working on producing generalized guidelines for landscape planning, based on the collective experiences of providing assistance on individual landscapes, which will be utilized to inform planning processes for any of the CARPE landscapes.*

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Summary

The purpose of the USDA Forest Service (USFS) mission to Maringa-Lopori-Wamba (MLW) Landscape in the Democratic Republic of Congo (DRC) was to assist land use planning in the Landscape. This technical assistance mission provided input to African Wildlife Foundation (AWF) on their methodologies and approaches to Landscape planning and assisted in the long process of developing management plans for the entire Landscape. Along with AWF partners, the USFS team examined whether landscape planning processes utilized in the United States could assist in the development of a template for the planning process for landscapes designated by the Central African Regional Program for the Environment (CARPE), a U.S. Agency for International Development (USAID) endeavor to strengthen biodiversity conservation and development in the Congo Basin. These landscapes are very large and have been designated in all of the countries of the Congo Basin. Often there is a unique biological feature that prompts a CARPE landscape designation. In MLW the bonobo (pygmy chimpanzee) (*Pan paniscus*), an ape endemic to DRC, is the major reason that this Landscape was established. Another reason is certainly the vast tracts of uncut tropical rain forest that exist in MLW.

DRC is emerging from several years of civil war and there remains considerable social, infrastructural, and economic disruption. Moreover, biodiversity conservation must play before a backdrop of institutional decay. Because of these disruptions, people in MLW have abandoned traditional agricultural activities and returned to the forest and to intensive bushmeat hunting, a well documented threat to African wildlife. However, hope for the future of people and wildlife in MLW springs from several sources, including the abundant willingness of the Congolese people to participate in conservation, the world's attention to DRC, the involvement of many international and local non-governmental organizations (NGOs), and the U.S. government's commitment to rain forest conservation in the Congo Basin.

Zoning emerged as the central issue of our mission. AWF and CARPE are interested in how to apportion the 70,000-km^2 MLW Landscape into the three CARPE macro zones - Protected Area Zone, Extractive Use Zone, and Community Use Zone. We found that proposed zones could be developed within a few months based upon existing information, with the view that new information could change some zone boundaries in the future. Quick development of proposed zones, especially Protected Area Zones, is necessary because of the uncertainty surrounding the future of the logging concessions that cover much of the MLW Landscape. Throughout this trip report one may sense an emphasis on Protected Area Zones because such zones are central to biodiversity conservation whether in the Congo Basin or in the United States. Indeed, biodiversity conservation is at the core of CARPE.

Under the new Forestry Code, timber concessions must be recertified and it is not known how many of the numerous concessions granted under the old forestry code will be recertified. The new Forestry Code has far more daunting requirements than the old forestry code. Companies must, for example, demonstrate their capability, develop a management plan, and carry out an environmental impact study. The old days of bribing a minister are supposedly gone. It is not known to what extent the DRC Ministry of Environment will forego some re-certifications in order to make way for the Protected Area Zones usually associated with CARPE landscapes. Timber concessions are and will be a reality in MLW. Therefore, we make numerous recommendations about the management of such concessions.

Planning is a major endeavor of the USFS in the United States. Despite many years of public land management, the agency still struggles with planning. Trials and tribulations associated with planning are to be expected, perhaps even more so in a war torn country such as

DRC. AWF carries out planning in the MLW Landscape based upon threats to biodiversity. Their activities include livestock rearing, agricultural developments, and transportation improvement, for example, with the notion that such activities will relieve the stress upon faunal populations, and also, we believe, to endear the people of MLW to AWF and the CARPE mission. We recommend that planning should not only be based upon threats but also desired conditions, such as desired forest structure, for the Landscape. What do the people of MLW, the DRC government, international community, and CARPE want MLW to look like? We make various recommendations on zoning, stakeholder involvement, and other matters including, but not limited to:

- Engaging the DRC government to the fullest extent possible
- Ascertaining from the DRC government (Ministry of Environment) the extent to which DRC will cancel timber concessions in favour of Protected Area Zones and Community Use Zones
- Engaging all stakeholders in and outside of MLW through improved communications
- Hiring staff to coordinate timber-company involvement in the planning process
- Developing a Communication Plan that quickly disseminates information not only to city-based NGOs and governmental agencies in DRC and worldwide but also to the people of major cities and villages in MLW, the actual focus of this planning endeavour
- Clarifying terminology and definitions and training AWF staff and others to use same terminology and definitions
- Accelerating the schedule for submitting MLW Landscape level land use plan to DRC government
- Refining criteria to identify proposed MLW zones
- Creating a draft map of macro zones based on existing remote-sensing imagery, data collected by AWF, and possibly the input of computer-based decision-support tools
- Presenting a draft map of macro zones to various stakeholders for feedback
- Making adjustments to map using stakeholder input
- Considering progress with timber-industry discussions before seeking additional rounds of input on macro zone boundaries
- Developing mitigations for the effects of logging on natural resources in Extractive Use Zones
- Submitting a holistic proposal of all CARPE zones and brief Landscape Plan to the central government of DRC within a few months.
- Bolstering flora and fauna surveys in both quality and quantity to inform the planning process for individual CARPE zones.

Future Forest Service Involvement in MLW

The USFS MLW team would like to remain engaged in MLW landscape planning in several ways:

- Provide helpful oversight of planning processes for the Landscape through the review of MLW documents submitted to CARPE
- Assist in the development of a strategy document that landscape leads should deliver to CARPE to demonstrate how they are moving towards a Landscape Management Plan
- Assist in the development of land-use planning guidelines or templates for the entire landscape and the landscape zones in advance of the reintroduction of logging operations to ensure sustainable use of the resources over the long term

- Assist AWF with analysis of spatial data with the aim of delineating MLW zones
- Provide technical advice on methodologies for monitoring and inventory of forest wildlife.

Introduction

CARPE is a long-term initiative by USAID to address the issues of deforestation and biodiversity loss in Congo Basin forests. In addition, the United States and numerous partners launched the Congo Basin Forest Partnership (CBFP) in 2002. The U.S. goals in this partnership are promotion of economic development, poverty alleviation, improved governance, and natural resources conservation through support for a network of national parks and protected areas, well-managed forestry concessions, and assistance to communities who depend upon the conservation of the forest and wildlife resources of the eleven CARPE landscapes (Figure 1). Such an approach moves conservation away from previous views that parks are protected *from* people to a new outlook that safeguards resources *for* people. These priority landscapes are not protected areas, but rather they represent mega zones in central Africa within which conservation activities should play a prominent role. Conservation and development will proceed by zoning various land uses including Protected Area Zones, Extractive Use Zones, and Community Use Zones, and by incorporating corridors, sustainable forestry, and community based natural resource management into these zones. Within these landscapes, whose limits are refined as new

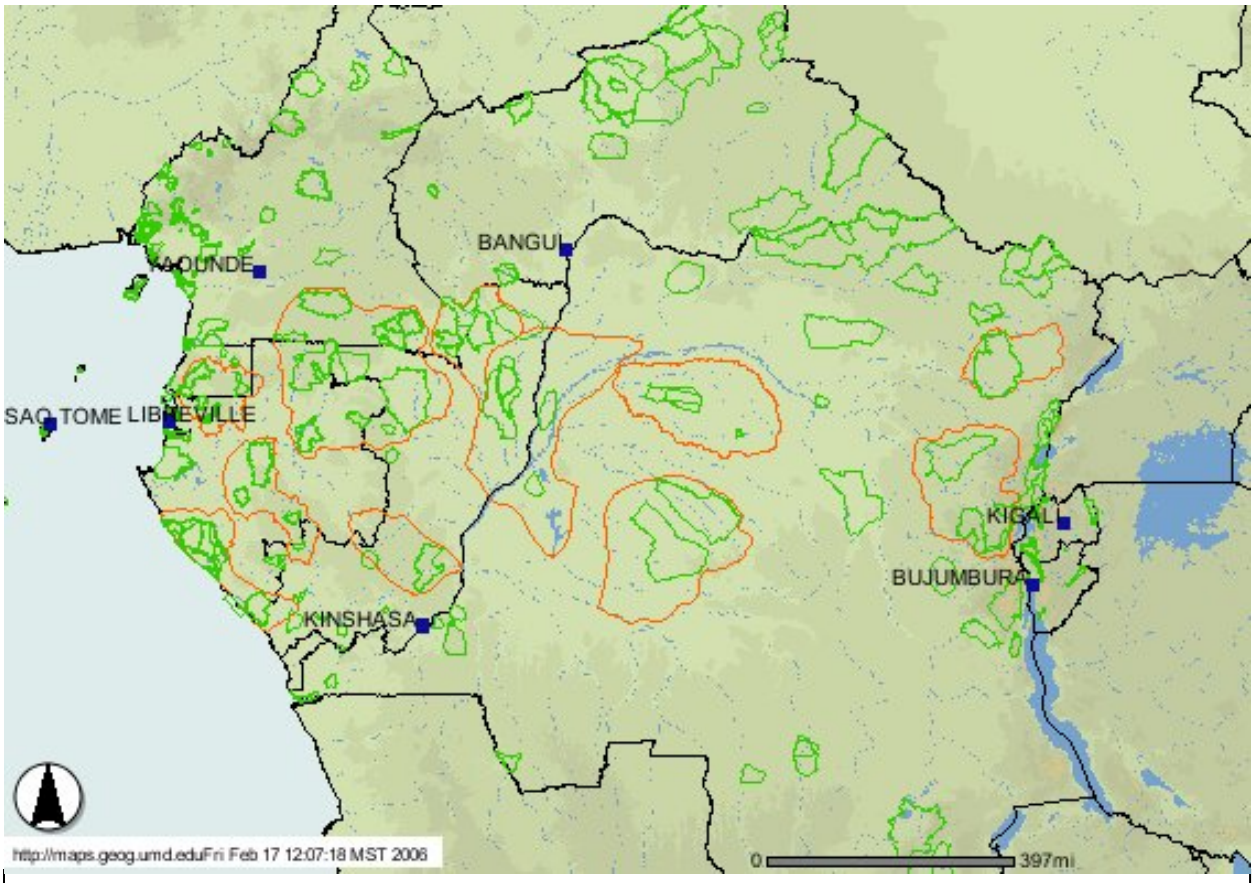


Figure 1. CARPE landscapes (orange) show the protected areas (green) within landscape boundaries. Note that the large protected area indicated for MLW (center) does not yet exist.

information becomes available, CBFP is working with a range of government and non-government organizations to conserve biodiversity and promote sustainable land use practices. CARPE strategic objectives are to be achieved through landscape leaders such as NGOs: Wildlife Conservation Society (WCS), World Wildlife Fund (WWF), Conservation International (CI), and AWF. AWF is the principal coordinator for the MLW Landscape. USAID also makes use of American federal agencies such as the USFS, our employer. Such agencies have decades experience in land management - experiences and expertise that may be adapted to management of Congo Basin forests.

Maringa-Lopori-Wamba Landscape

Much of this general description of MLW has been taken from various AWF documents and is designed to give readers unfamiliar with MLW a very general view of the Landscape and its human and natural resources. MLW is situated in the Maringa and Lopori river watersheds that merge at Basankusu into the Lulonga River (Figure 2). Wamba refers to the bonobo research site created by Japanese primatologists in the 1970's at the village of Wamba near the Maringa River (www.awf.org/heartland/congo and http://carpe.umd.edu/). The Landscape covers about 7-million ha and is situated in the Provinces of Equateur and Upper Congo, south of the Congo River. The Landscape includes four administrative territories, situated in 3 districts: Basankusu, Equateur District; Bongandanga, Mongala District; and Befale and Djolu, Tshuapa District. Territories, districts, and *secteurs* are a construct of the central government, whereas the local people recognize an ancestral construct of community organization including villages and *groupements*, a french word for an assembly or group of villages.

The tropical climate is characterized by a major rainy season, September-November, a short rainy season, March-April, and two dry seasons, January-February and June-August. The minimum mean monthly temperature is between 21.2 and 22.2°C. The maximum mean monthly temperature varies between 26.8 and 30.85°C. An estimated 2-million people inhabit the Landscape.

Biodiversity

MLW possesses a high biodiversity including a diverse avifauna and important endemic and endangered species such as the bonobo, Congo peacock, forest elephant, golden cat, and giant pangolin. The bonobo is an ape endemic to DRC and the major stimulus for defining the MLW Landscape. Human pressure, however, has caused local losses of biodiversity. Increased bushmeat hunting, habitat fragmentation, and political instability have potentially long lasting effects on the biodiversity throughout the Landscape and the livelihood of the local population. Unlike most CARPE landscapes, MLW does not contain a large protected area. The Scientific Reserve of Luo covers 628 km^2. Two major initiatives supported by local populations are the creation of the Lomako-Yokokala Forest Reserve and the Kokolopori Community Reserve. Extensive field work is necessary to better comprehend MLW biodiversity.

Human Population

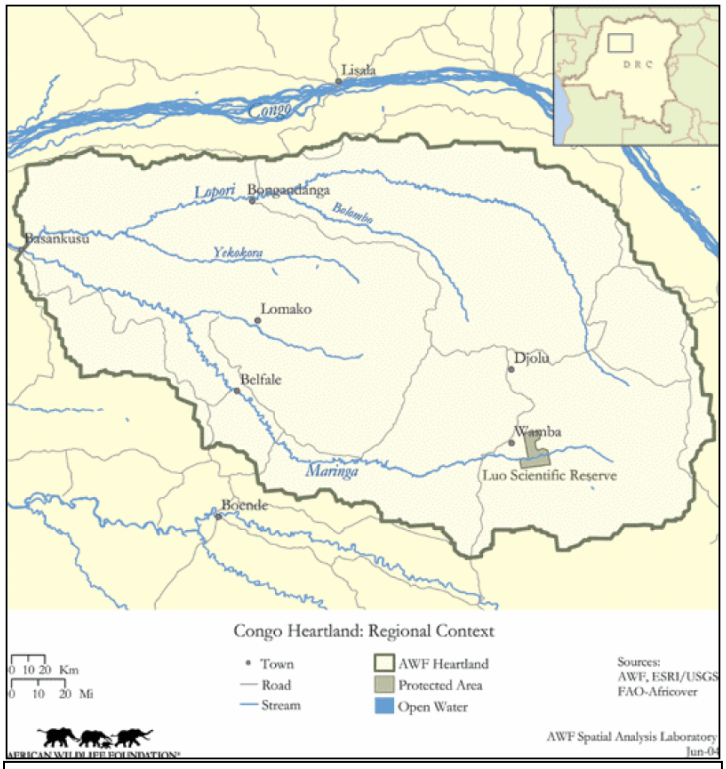


Figure 2. Maringa-Lopori-Wamba landscape in Democratic Republic of Congo.

MLW was originally inhabited by the Mongo in a broad sense. The western part is mainly Mongo and the eastern part is Mongando. Both tribes are agriculturalists. Ngombe, the other major ethnic group, have been migrating southward into Mongo areas since the arrival of Caucasians over 100 years ago. They are currently concentrated principally along the Lopori River and in the forest block between the Lopori and Yokokala rivers. Supposedly, Mongo people originally had a taboo against killing and eating bonobos whereas Ngombe consumed bonobo. However, such taboos against killing or eating bonobos are in doubt. In general, Mongo people will not oppose the more war-like Ngombe. The Landscape also harbours small groups of pygmies. A pygmy community is living between the Bolombo and Yokokala rivers and another group lives northeast of Bongandanga. Finally, an important population of Kitiwalists is living in the forest between the sources of the Lomako and Yokokala rivers. These Kitiwalists, a sect of Witnesses of Jehovah, settled in this forest block in the 1960s and are opposed to any form of government. Kitiwalists are difficult to approach and very good hunters with no taboos against bonobo consumption**.**

Socio-economics

In general, the MLW is characterized by much poverty, especially in isolated areas such as Djolu. In the 20th century, most people living in MLW earned a living through growing cash crops such as coffee, cocoa, and rubber. By the end of the 20th century, a collapsing economy, deteriorating infrastructure, and political instability destroyed agricultural activities. The connection between MLW and major commercial centers such as Basankusu, Boende, Mbandaka, and Kinshasa was disrupted. Today, many houses are filled with low quality crops long awaiting transport. Plantation work halted and people focused on increased exploitation of natural resources, primarily fish and bushmeat. Because most fauna close to the villages was depleted, families settled in the forest. Many small hunting camps are scattered throughout formerly uninhabited forest blocks. Yet, many hunters would prefer to move back to their natal villages and live close to family, opportunities for education, and health care.

Much of the Landscape is designated for logging concessions. Yet, in 2002, the Ministry for Environment, Conservation of Nature, Forest, and Water cancelled some concessions and

some timber companies forfeited their concessions due to increased taxes. Lastly, political instability stopped most logging activities. Today, there is little logging. However, some companies that abandoned their concessions retained employees with a minimum wage because of the companies' intent to return. These employees have focused on hunting and the bushmeat trade. This increased hunting pressure has caused impoverishment of fauna in several forest blocks such as between the Lopori and Yokokala rivers, and north of the Lopori River.

USFS Mission Objectives

The USFS mission to MLW was an initial visit to garner first impressions of MLW and what land use planning will be necessary. The USFS mission was not to write a management plan for MLW, but rather, to help outline key issues, identify appropriate stakeholders, and suggest necessary steps for completing a land use planning process that may span several years. The mission was to familiarize itself with realities on the ground and the challenges facing MLW. The experiences gained on this mission and insights provided by AWF and other stakeholders could inform the development of a land use planning template for other CARPE landscapes. This will take some time given the enormous area of MLW (70,000 km^2). The objectives of this initial mission to the MLW Landscape were (Appendix I):

1) Provide technical assistance to AWF on landscape level planning activities.
2) Review AWF implementation activities for the zones already tentatively identified by AWF (Appendix II), as well as the methodologies and approaches utilized by AWF thus far in identifying them and in the creation of their frameworks.
3) Provide input to AWF on the landscape planning process, along with identifying any gaps in AWF processes, and provide insight on how activities, approaches, and tools may be improved.
4) Develop a land-use planning template for landscape level planning which can be applied to other landscapes throughout the Congo Basin based on the experiences gained on this and other USFS missions and insights provided by AWF and other key stakeholders.

Summary of Activities and Itinerary

The USFS mission provided in-country assistance from January 16 to February 3, 2006. During that time we met with AWF, USAID/CARPE, government agencies, private enterprise, and local inhabitants of MLW. Preparatory meetings occurred in Kinshasa throughout the first week in order to provide us the context, scale, and details of the MLW Landscape, the status of the planning process, and our role in it.

Together with AWF, we toured MLW by dirt bike between January 20 and 30, 2006 to familiarize ourselves with the realities on the ground. We used this time to hold numerous meetings and interviews with village and *groupement* chiefs, *notability* (traditional leaders), government employees, villagers, local NGOs, ethnic/religious groups, timber companies, bushmeat hunters, and loggers (for meeting notes see Appendix XI). In addition to formal meetings at numerous villages between Djolu and Basankusu, we also stopped at random points to have informal discussions with the people. Whether in formal or informal talks, we always began by introducing AWF and USFS, explaining who we are, and why we were in MLW.

We covered like topics at all formal meetings to better understand local concerns, resource conditions, and governance, as well as share the concepts of sustainable use, land-use planning, and public participation. Translating from English to French to Lingala, and sometimes to a mother tongue, we asked questions regarding local peoples' organization, decision making, problem solving, natural resource use, and primary concerns. Their primary concern, expressed consistently where ever we went, was the emphatic request for assistance with development and improved infrastructure, such as a means of transport and communication. AWF voiced a willingness to continue partnering with them on projects to stimulate livestock production and to provide transportation of their agricultural products to market. Reminded of the assistance AWF already provided, villagers often expressed gratitude and became more open to discussion.

We found many similarities and some inconsistencies in the responses regarding leadership, decision making, and problem solving from different villages and from different people within a given village. Villages are considered the smallest unit for community-level decision making. *Groupements* consist of several villages, and *secteurs* consist of several *groupements*. There is a chief to lead each level of this organization. Chiefs were generally acknowledged as the community leaders. Village chiefs dialogue with the villagers and then represent their village to outsiders or up the hierarchy to the *groupement*. In some places, a power struggle seemed to exist among chiefs, notability, and representatives from central government. This varied between villages and appeared to depend on individuals. Often the chiefs were considered high notability, thus easing potential disputes. However, local representatives of government agencies, such as the Ministry of the Environment or Rural Development, appeared to have no effective authority and could not impose punishment when locals were found in violation of the law (e.g. illegal bushmeat hunting).

Rules regarding trespass or poaching appeared to vary between *secteurs*. If people in two *secteurs* intermarried, then encroachment of hunting camps into each other's "jurisdictions" was acceptable. Whereas if there was little or no intermarriage between *secteurs*, such activity was considered poaching, was resented, and sometimes halted. Boundaries between these jurisdictions tended to be a combination of easily recognizable limits like rivers and old logging roads.

We found that a village's familiarity with concepts like sustainable use, land-use planning, and public participation coincided with how much time AWF invested there previously. Similarly, villagers' trust levels or comfort in our presence also varied based on past contacts with AWF. Villagers usually expected that we had an ulterior motive to extract something of value from their forest. Once that concern was addressed to their satisfaction, we inquired about the condition of the faunal resource, extent of bushmeat harvest, their use of the forest, and agricultural production. We simplified questions and provided many explanations in order to communicate our ideas.

The people have very little information regarding CARPE, landscapes, conservation, or their own Forestry Code. Though AWF staff in MLW devote considerable time to the dissemination of information, more communication is needed if local people are to fully participate in conservation and development planning processes. It is incongruous that organizations based in distant Kinshasa and elsewhere have MLW information such as informative GIS maps, yet the people who actually live in MLW have almost no access to information. We were also struck by the level of poverty along the trails. There is very little for sale in the markets, reflecting that transportation is a serious problem.

Everyone hunts and eats bushmeat. In some places, hunters have to travel much farther than in the past to successfully harvest game. Reports conflicted regarding the validity of taboos against eating bonobo. However, many individuals throughout the Landscape admitted to hunting and eating bonobo suggesting that such taboos may not really exist. Most were aware of the protected status of bonobo. We explained that outside of protected species, we were not trying to halt bushmeat hunting, but rather to ensure that their children and their children's children will also have enough bushmeat to eat. This description of sustainable management was well received. We also shared concepts from the new DRC Forestry Code and from the history of the USFS, National Forest Management Act, and other regulations. We explained that their new Forestry Code requires their input through public participation. Once they grasped this idea, it was received with pleasant surprise. However, they were skeptical that the central government would heed their input. All villages agreed to continue working with AWF in the pursuit of sustainable management of wildlife and land-use planning.

We concluded our tour of MLW with a series of AWF/USFS meetings in the village of Basankusu. We explained steps in most planning processes that lead up to zoning and presented potential criteria for delineating CARPE zones across the Landscape. These criteria were discussed and modified. We conducted a zoning exercise in which individuals attempted to map CARPE zones based on a few remote-sensing images and our current knowledge of different areas. The maps we all produced were strikingly similar and highlighted areas within MLW in which further information is needed. We finally brainstormed a schedule of tasks for AWF staff, including AWF Focal Points to accomplish in the next four months. Mainly, they will meet with the chief of each *groupement* to acquire data about existing jurisdictional boundaries and further engage the chiefs in participative planning, especially to gain input from them as to where Protected Area Zones should be located. We discussed the idea that all AWF Focal Points need to use the same vocabulary and that their explanations of different CARPE zones be well rehearsed to ensure consistent understanding across the Landscape. We also discussed potential resistance from local communities in identifying Protected Area Zones; they may wish for something in return for "leaving the forest" - a local representation of Protected Area Zones.

After completing these meetings, we returned to Kinshasa to compile and present our initial assessment of the MLW planning process to USAID/CARPE, USFS/International Program, NGO landscape Leads, and other partners. We summarized our mission itinerary, described elements of the planning process, noted on-going CARPE activities in the MLW Landscape, pointed out numerous obstacles for planning in DRC, and offered draft criteria for delineating CARPE zones in landscapes. The group discussed all of these topics with substantial attention given to further defining obstacles. USAID/CARPE clarified their need for planning guidance documents as end-products from the USFS. Essentially, the USFS Team will assist in creating:

1. A template for a short strategy document to be written for each landscape that clearly documents the overall approach a landscape lead is taking to achieve CARPE objectives.
2. A guide providing clear process steps and elements of a landscape management plan.

Itinerary

16 January – Arrive Kinshasa

17 January – Meeting with AWF
Meeting with German Logging Company (SIFORCO), AWF, and WWF Germany

Meeting with USAID/CARPE, AWF, WCS, and USFS Ituri Technical Assistance Team

18 January – Meeting with Service Permanent d'Inventaire et d'Aménagement Forestier (SPIAF)
Meeting with FAO

19 January – Meeting with DGF (canceled)
Prepare for departure to Maringa-Lopori-Wamba Landscape

20 January – Travel to Djolu on AirServ
Formalities with *Secteur* Chief
Meeting with Djolu Village

21 January – Meeting on Participative Mapping in Djolu Square (*Carré* Djolu)
Meeting with representatives of the Ministries of the Environment and of Rural Development
Toured market to assess prevalence of bushmeat and other products
Travel to Lingomo

22 January – Meeting with Lingomo Village
Toured market to assess prevalence of bushmeat and other products
Travel to Yailala
Informal discussions en route and upon arrival

23 January – Meeting with Yailala Village and Kitiwalists
Travel to Ekongo
Informal discussions with Ekongo village

24 January – Travel to Botewa
Meeting with *Secteur* Chief
Travel to Bokenda
Meeting with Bokenda Village and Pygmies
Travel to Keé

25 January – Meeting with SIFORCO loggers in Keé
Travel to Songoboyo
Informal discussions in Songoboyo
Travel to ADCN pork-husbandry project
Travel to Bongandanga
Toured market to assess prevalence of bushmeat and other products

26 January – Meeting with Bongandanga Village
Depart for Basankusu (via dugout canoe)

27 January – Arrive Basankusu
Formalities with United Nations, Migration, and Police
Toured market to assess prevalence of bushmeat and other products

28 January – Meeting with AWF on Planning and Zoning

29 January – Meeting with AWF on Planning and Zoning

30 January – Meeting with AWF on Planning and Zoning
Depart for Kinshasa

31 January – Meeting with German Logging Company (SIFORCO) and AWF
Prepare slide presentation of USFS initial assessment

1 February – USFS presentations of initial assessments at Round Table Meeting with USAID/CARPE, USFS International Program, AWF, WCS, WWF, University of Maryland and other planning partners.

2 February – Meeting with USAID/CARPE and USFS for final debrief

Findings and Recommendations

Although a three-week visit to DRC may not have revealed all of the exigencies associated with MLW, we nonetheless made several observations and offer numerous recommendations here. We realize that some of our suggestions may merely underscore the excellent work that AWF is already accomplishing in MLW. We tender advice here to be helpful in facilitating Landscape planning, including the much discussed topic of zoning.

The huge uncertainty surrounding the future of DRC and its present tentative peace creates a vacuum in which industries may capitalize on extracting resources from DRC before regulations on sustainable management are in place. Hence, this transition period may well be the time of greatest risk for unmanaged exploitation to create long term impacts to natural resources. However, in the wake of the new Forestry Code (dramatically different from the previous code), other governmental reforms, and the world's attention to DRC, there is a genuine opportunity to advance biodiversity conservation. So, we recommend that AWF persevere with planning and implementation in spite of uncertainties and adopt an approach that combines reasonable proposed zoning and effective stakeholder involvement/projects to persuade DRC to establish Protected Area Zones, Community Use Zones, and Extractive Use Zones - the principal zones outlined by CARPE.

MLW Planning

Planning in MLW is essentially a process to address CARPE and CBFP tenets, that is, economic development, poverty alleviation, improved governance, and natural resource conservation through support for a network of protected areas, well-managed forestry concessions, and assistance to communities who depend upon the conservation of forest and wildlife resources. Zoning and management plans, the tools to accomplish the above tenets, often emerged during our discussions about MLW; however, there seemed to be confusion as to what should come first. There is a strong desire to establish macro zones, the three CARPE zones. How many will be established in MLW and where will they be established?

We agree that management plans are ultimately needed; however, there are no zones yet established to manage in MLW. The first order of business is the establishment of Protected Area Zones, Extractive Use Zones, and Community Use Zones. In the United States, the Congress and the President commonly establish new national wildlife refuges, national parks, national monuments, and other kinds of Protected Area Zones. They do so without any management plans in place. Upon establishment, federal agency personnel develop management plans that include, among many things, detailed zoning of each protected area. In MLW, there is a need for a brief strategy document that outlines the process for determining proposed zones in MLW. As we shall discuss, this can be a simple process of examining existing information. Once macro zones are established in MLW, micro-zoning based upon criteria and priority activities could be described in land and resource management plans for each zone as suggested for Madagascar (Appendix III). Assigning every ha of MLW to one of the three macro zones would be preferable to macro-zoning only where necessary. Such a holistic approach to macro zones would reduce the uncertainty regarding how different areas will be managed. With every ha of MLW assigned to a CARPE zone, the Landscape Plan can then more easily explain how the arrangement of different macro zones will combine for effective economic and natural resource management. The strategy to convince the Congolese government to legally establish the macro zones needs to be developed. It was not clear to us the extent to which the DRC government or *La Coalition pour la Conservation au Congo* (COCOCONGO) is waiting for AWF, CARPE, or others to deliver proposed CARPE zones so that the DRC government can establish such zones through legislation or decree.

Zoning - MLW Landscape Zone

The MLW Landscape itself is a zone, just like the other CARPE landscapes. The MLW Landscape zone encompasses any schematic representation of potential zoning in MLW (Appendix IV). Sophisticated analyses were not used to establish the boundaries of CARPE landscape zones. In fact, the major criteria used to establish CARPE landscapes, including MLW, consisted of cursory examinations of satellite images to find large areas that were sparsely populated, and contained unique species (e.g., gorilla, bonobo) or habitats, and some protected areas. In the case of MLW, the boundaries were changed once personnel, including AWF staff, visited the area and began field work.

CARPE landscapes were established to highlight important areas for conservation in central Africa. Accordingly, zoning within the MLW Landscape must fundamentally reflect CARPE and CBFP tenets. The zoning of MLW must be such that MLW looks quite different from an equivalent sized area of tropical rain forest in Congo that is not a part of a CARPE landscape. Thus, one would expect that MLW would contain more Protected Area Zones and Community Use Zones and fewer and/or better managed Extractive Use Zones (logging concessions) than a similar sized area of tropical rain forest outside of a CARPE landscape.

Zoning - MLW Extractive Use Zones

The most extensive zoning in the MLW Landscape consists of numerous forest concessions, areas akin to Extractive Use Zones (Figure 3). These concessions were established under the old Congolese forestry code. Although some forest inventory was carried out in concessions, concession boundaries were largely established in areas the least inhabited by

people. Of course, such areas would also be candidates for Protected Area Zones for a similar reason.

Many concessions have never been exploited. Under the old forestry code it was relatively easy for a timber company to lock up a large area of forest for potential exploitation. Although a few concessions have been exploited to some degree, years of civil unrest in DRC vastly curtailed timber extraction. The potential exists for some concessions to become operational within 2-3 years. However, under the new Forestry Code existing forest concessions must be re-certified. Such certification requires logging companies to meet certain criteria such as writing a management plan, conducting an environmental impact study, demonstrating capability, and other safeguards. How many concessions will be certified? Even if a company meets certification criteria, will the DRC government (Ministry of Environment) nonetheless cancel a concession to make way for Protected Area Zones and Community Use Zones? We did not ascertain, nor were we told, the position of the Ministry of Forestry on this important matter.

Because of the uncertainties in MLW regarding forestry concessions, immediate macro-zoning may be problematic. There needs to be some accounting of timber companies and their intentions, a facet of MLW planning that we did not see underway. Some timber companies have merged into very large companies, a potentially powerful lobbying entity. AWF and partners should asses the real status of these companies and concessions. Do all the timber companies intend to re-certify? Does the Ministry of Environment intend to cancel any timber concessions? There needs to be closer coordination with the Ministry of Environment to determine the intentions and procedures of the Ministry itself in the evaluation of timber concessions. In our view, the status of timber concessions will fundamentally determine the outcome of macro-zoning in MLW. AWF is collaborating with one timber company, SIFORCO, and we met with the company's director in Kinshasa and visited a part of SIFORCO's concession in MLW. The director appears willing to collaborate with AWF and CARPE in managing the concession appropriately.

We recommend creating another staff position, a timber-industry coordinator, who could benefit other DRC landscapes as well. Due to several issues, including the elevated risk that exploitation may impact natural resources during the country's transition period, the enormous proportion of land in MLW currently earmarked as timber concessions, and the high level of influence these

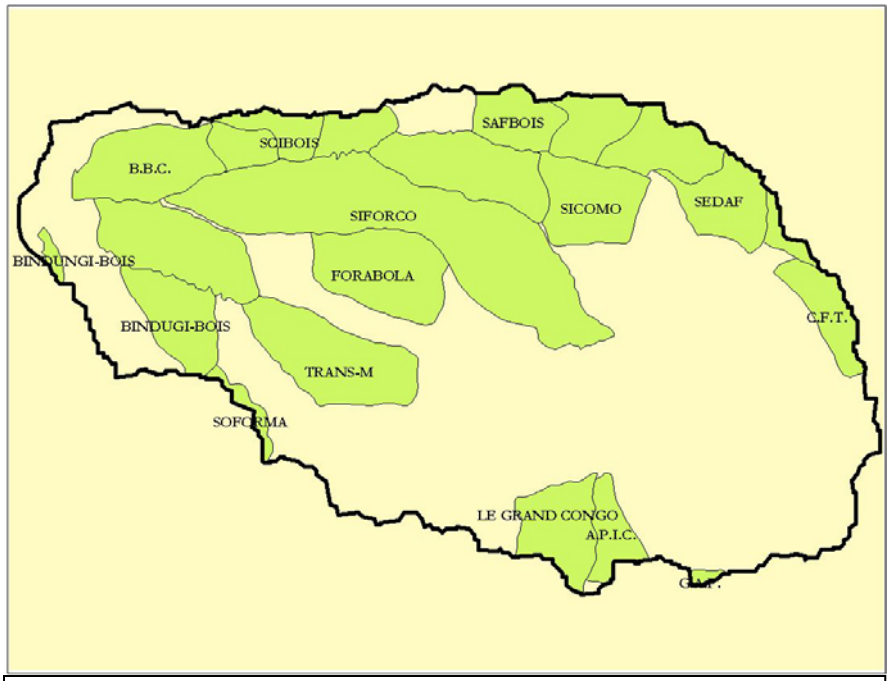


Figure 3. Timber concessions in the Maringa-Lopori-Wamba Landscape. These concessions were established long before the new Forestry Code of 2002 and appear to be the best representation of concessions, however, other concessions may exist.

timber conglomerates likely have, we expect a higher chance of success if timber companies are involved in the planning process.

AWF staff in Kinshasa already have substantial workloads to balance such that an additional staff member is necessary to address the many aspects of timber-industry involvement. The timber coordinator could either be a direct employee of AWF or a shared (cross-cutting) CARPE position that assists all landscape leads in their relations with the timber industry. Regardless, the timber coordinator should identify all timber companies with a potential stake in the landscape(s) and inquire about each company's level of interest in:

- converting and/or releasing some or all of their concessions
- cooperating with logging mitigations
- pursuing incentives such as green lumber certification
- directly assisting local communities, and benefiting from associated public relations campaigns.

Timber companies can play a unique role in stimulating transportation, education, communication, and the economy of MLW while simultaneously performing sustainable use. Companies can pay a surcharge to the local population as compensation for the impacts associated with logging. Alternatively, companies can offer to build roads, airstrips, and solar-powered energy sources that provide mutual benefit. Moreover, subsidizing school and hospital construction, teacher or medical staff salaries, or livestock programs, all could contribute to a positive public-relations campaign for individual companies. Expanding on the potential to earn a "green lumber certification" also can contribute to positive public relations and increased revenues, and therefore may increase timber companies' acceptance of logging mitigations and other conservation measures.

The new Forestry Code calls for the development of management plans for each timber concession. Although the content of management plans has not been elucidated in detail via regulations and policies, the Forestry Code indicates that a management plan will have the input from all interested parties, including the local population. Whatsmore, the plan must address sustainable management of forests, tourism, hunting, wildlife, and other natural resources. Other criteria that could be used to assess the suitability of an Extractive Use Zone include:

- Presence of marketable trees
- Presence of low/no human population
- Potential for economical extraction of products
- Available access to rivers or existing roads
- Absence of large populations or strongholds of sensitive species
- Presence of potential timber concession

These management plans are an excellent opportunity to enhance biodiversity conservation throughout MLW. Relying solely upon Protected Area Zones for biodiversity conservation is not adequate. Properly managed Extractive Use Zones could serve species conservation and ecosystem management across the Landscape by acting as corridors and additional reservoirs for species and ecosystem services.

Although at the time of our departure AWF was trying to secure funding for a third party to develop a management plan for the SIFORCO concession, AWF is more focused on immediate threats than forest management in MLW. If shortfalls in health care, livestock rearing, transportation, farming, or anything else are compromising conservation in the immediate sense, then AWF launches interventions to assist local populations. AWF's approach to planning is to build public support for conservation and development through on the ground projects that are directly meaningful and supportive of the people. All the while, AWF hopes

that such technical assistance in transportation, farming, and livestock rearing, etc. will reduce pressure on faunal populations and endear people directly or indirectly to AWF's conservation endeavors such as Protected Area Zones, Community Use Zones, and proper management of Extractive Use Zones. By working directly with villages and *groupements* on faunal, socio-economic, and other surveys, AWF again involves the people intensely. On the ground projects such as surveying the Djolu Square, developing the Lomako Forest Reserve, and negotiating elements of the SIFORCO timber concession give AWF a commanding presence and the experience to ask the right questions about conservation and development in MLW. That places AWF in a strong position when it comes to recommending Protected Area Zones, Extractive Use Zones, and Community Use Zones to the DRC government.

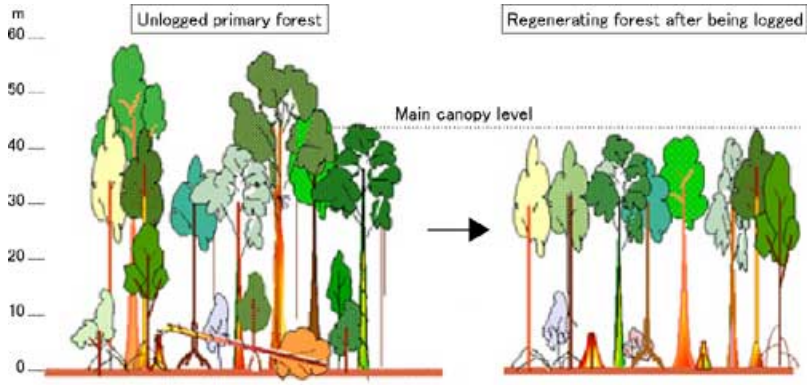


Figure 4. An unlogged primary tropical rainforest contains a certain amount of old-growth trees, some towering above the canopy. Typical logging in central Africa removes this component of forest structure, and in a relatively short period of time, a different forest structure emerges across a landscape.

However, MLW planning, indeed any kind of land management planning, involves more than just immediate threats. The fact that so much of the MLW Landscape is covered by logging concessions; the fact that the outcome of re-certification of concessions will make or break biodiversity conservation in MLW; and the fact that some logging companies may begin operations in just a few years, suggests to us that planning for forestry management is very important. We recognize that AWF activities, such as reducing intensive bushmeat hunting, strengthening of agriculture and livestock development along trails, and improving transportation are all quite important to MLW people. However, in addition to a vision for desired socio-economic conditions in MLW, there needs to be a clear vision for desired biological conditions. A hallmark of planning is addressing immediate as well as forthcoming issues. Below we discuss the necessity for desired forest conditions, especially maintaining a heterogeneous forest structure throughout MLW.

Throughout central Africa timber companies exist solely to extract trees from concessions. As indicated above, however, the new DRC Forestry Code requires timber companies to be more circumspect about the effects of their activities on all forest natural resources, and to participate fully with local people. Moreover, the timber company, despite its wealth and associated stature, is not the top authority in a concession but is required to work in close association with villages and *groupements*.

The possible extent of forest cutting in MLW is relevant to any discussion about the long range future of MLW. Clear cutting of trees is rare in a central African timber concession. Rather, trees are logged selectively. About ten species of trees are taken in any given concession. Often one can not distinguish between a selectively logged forest and an unlogged forest while flying over the forest but this appearance is deceptive. Timber companies annually extract the largest marketable trees in a small area of a concession. The following year they fell trees in the next area until, in the case of large concessions (>400,000 ha), they have taken the largest marketable trees over a 20^{+} year period. The result is a forest with few remaining old age

specimens of the targeted species, including the large emergent trees that are taller than most of the canopy (Figure 4). Some old trees may remain during logging operations because of their location in wet areas or on steep topography. As markets shift in response to diminished numbers of preferred tree species additional rounds of tree mining are likely to occur, thereby removing even more old trees. Indeed, Congo Basin forests are being further examined by timber companies for species other than choice mahoganies and other currently preferred species.

An old-growth forest is more than a stand containing old trees. It is a living ecosystem that supports numerous species of plants, wildlife, and insects that are dependent upon ecological conditions that cannot be found outside of mature forests. Without old-growth forests, old growth dependent species go extinct. When you walk through an old-growth forest, you are likely to notice mature trees of all ages, relatively few seedlings and saplings, large standing dead trees called snags, downed logs on the forest floor, large fallen logs in streams, 1000-year old trees, and little or no evidence of logging. Old-growth forests have multi-layered canopies. Many canopy gaps let light through to allow unique plant under stories. There are large diameter logs and snags that provide food and shelter for birds, mammals, amphibians, and invertebrates. Some birds such as parrots require trees that are at least 500 years old for the cavities that develop in them over a long period of time. And yet, current logging practices in Africa have such short rotation periods that they do not leave enough time for such hollows to develop.

Old-growth forests are important as much for what we cannot see and know about them as they are for what we do know and value. Because we do not know all there is to know about these ancient forests we should be very careful how we treat them. Extinctions have always been a part of evolution, but what's new is the current rate of extinction due to the rapid growth of the human population and natural habitat destruction by humans. Old-growth forests provide largely undisturbed habitat and are havens for indigenous flora and fauna. Large reserves and well managed timber concessions are needed to support these flora and fauna populations.

Some say that there have been no recorded extinctions due to logging. This claim should be treated with caution for several reasons. Forest ecosystems contain many different types of organisms and very few have been monitored for any length of time. The absence of recorded extinctions is not in itself proof that there have been no extinctions, nor does it mean that the risk of future extinction is low, especially under changing environment and management conditions. There are unknown numbers of insects and fungi species yet to be named or even discovered by scientists. When the forest undergoes a massive disturbance like logging we may be losing species whose existence was unknown to mankind.

We recognize that African forest species diversity and structure are a reflection of natural disturbances and of human disturbance such as shifting cultivation. At least small gaps in the canopy are necessary for seedling recruitment of some species. These gaps, caused by a few fallen trees or large patches of agriculture, have probably long been a feature of forest dynamics. However, canopy disturbance by local human populations almost certainly was not on the same scale as disturbances associated with modern logging operations. Required management plans for timber concessions in DRC should recognize the many silvicultural unknowns related to the regeneration of tree species. Regarding modern timber cutting in central Africa, Hall et al. (2003a) state:

> *Timber extraction, as presently being practiced in the Dzanga-Sangha region of southwestern Central African Republic and adjacent Congo and Cameroon is little more than a mining operation. There is inadequate recruitment of harvested species and evidence suggests that*

without post-harvest treatment structural changes will last several decades. Because evidence from other studies suggests that disturbance from logging leads to the disappearance of closed forest obligate species of birds and small mammals, it is an inappropriate activity in this region where strict biodiversity conservation is the priority. Nevertheless, data suggest that carefully planned, increased canopy disturbance will lead to accelerated stand recovery and improved recruitment of top quality timber species. For this reason, well managed forestry appears to be an appropriate revenue generating activity for zones adjacent to protected areas where the overriding management objective is to maintain forest structure and tree species composition over the long term.

Recall that one of the most significant reasons for CARPE landscapes is biodiversity conservation throughout landscapes and not solely in Protected Area Zones. Otherwise, there is no reason for landscapes. The science of conservation biology maintains that biodiversity conservation cannot be achieved with just Protected Areas Zones. Mindful of landscape purpose and science, the management of forest structure throughout MLW is central to biodiversity conservation in the Landscape. We suggest that more attention be paid to this matter in MLW planning documents. Conceivably, timber companies could be required to leave a certain percentage of large marketable and unmarketable trees in the area exploited annually. Furthermore, timber companies could be required to meet a certain spatial distribution of these "leave trees" (e.g., leave a minimum of one large marketable tree per five ha) to address habitat needs for species throughout a concession. Currently, we do not know what the extent of timber concessions will be after re-certification. Will the extent of concessions still resemble Figure 3? If so, then over a period of several decades - not a long period - a radically different forest would emerge with a major component of biodiversity lost forever. Responsible planning in MLW should address desired forest structural conditions.

Zoning - MLW Protected Area Zones

Although the mid-term assessment of CARPE states that CARPE should gradually focus less attention on Protected Area Zones in landscapes, and focus increased attention on addressing threats and opportunities in forest concessions and with communities, this advice applies only in part to MLW. We agree with the focus on timber concessions but we also support a large investment of time in Protected Area Zones because MLW does not yet include any such zones.

There are no officially established Protected Area Zones in MLW except the 628-km^2 Luo Scientific Reserve. This is in direct contrast to other CARPE landscapes where protected areas constitute a very large proportion of the landscapes (Figure 1). There are areas that AWF and others would like to see designated as Protected Area Zones including the Lomako Forest Reserve, long eyed by the ICCN and others for the conservation of bonobos. The matter before us is how much of MLW should be designated as Protected Area Zones, whether national park, integral reserve, or other category as listed in Article 12 of the DRC Forestry Code:

Listed (Classified) forests belong to the public domain.
The following are listed forests:

a. Integrated natural reserves.
b. Forest inside national parks
c. Botanic and zoological gardens
d. Fauna reserves and hunting domains

e. Biosphere reserves
f. Recreational forests.
g. Arboretums
h. Urban forests
i. Protected areas.

MLW contains large expanses of uninhabited and unlogged forests (Figure 5). Seventy-four percent of the Landscape is closed forest and 19% is swamp forest. Given some of the unique species that occur in MLW such as the bonobo and Congo peacock, and the ecological significance of the Landscape's large areas of tropical forest, there are ample choices in the Landscape for biodiversity conservation. A cursory examination of recent satellite imagery allows a broad determination of areas to include or further investigate for potential Protected Area Zones. Large blocks of intact forest could be color-coded red, followed by undesirable areas such as secondary forest (orange), and communities (yellow). The red areas could be examined on the ground. Aerial surveys could further locate villages, hunting camps, and other features not easily seen on satellite images. This simple process would deliver a first cut of potential Protected Area Zones. It is likely that timber companies also selected areas for concessions based upon extent of forest and level of human habitation. Some suggested criteria to identify a CARPE Protected Area Zone include:

- Presence of appropriate target, keystone, or flagship species or populations
- Presence of relatively intact tropical rainforest structure representative of the two ecoregions of MLW
- Proximity to other forests in adequate condition to provide interchange of individuals/genes
- Prevalence of people willing to cooperate with Protected Area Zone restrictions
- Presence of low/no human population
- Low hunting pressure

A major issue will, of course, be the timber concessions. The very southeast corner of the Landscape is void of concessions, is largely uninhabited, contains large tracts of primary forest, and may be appropriate for Protected Area Zones. However, most of the Landscape where Protected Area Zones could be established is covered by concessions. Again come those nagging questions from a planning standpoint: How many concessions will be converted under the new Forestry Code? How many concessions will be taken back by the Ministry of Environment in order to establish Protected Area Zones and Community Use Zones? AWF indicated that they are proceeding with their work as if concessions no longer exist except in the case of SIFORCO, a logging company with which AWF has developed a relationship. However, most of AWF's Protected Area and Community Use work has been carried out in areas where there are no logging concessions (Appendix V).

The most significant aspect of any CARPE landscape is the Protected Area Zone. Though we expect that a holistic proposal of all MLW macro zones will be more persuasive and we therefore prefer to recommend that such a proposal be presented to the government within a few months, it is essential that, at a minimum, a list of proposed Protected Area Zones be presented to the Congolese government within that timeframe. Within the government, layers of

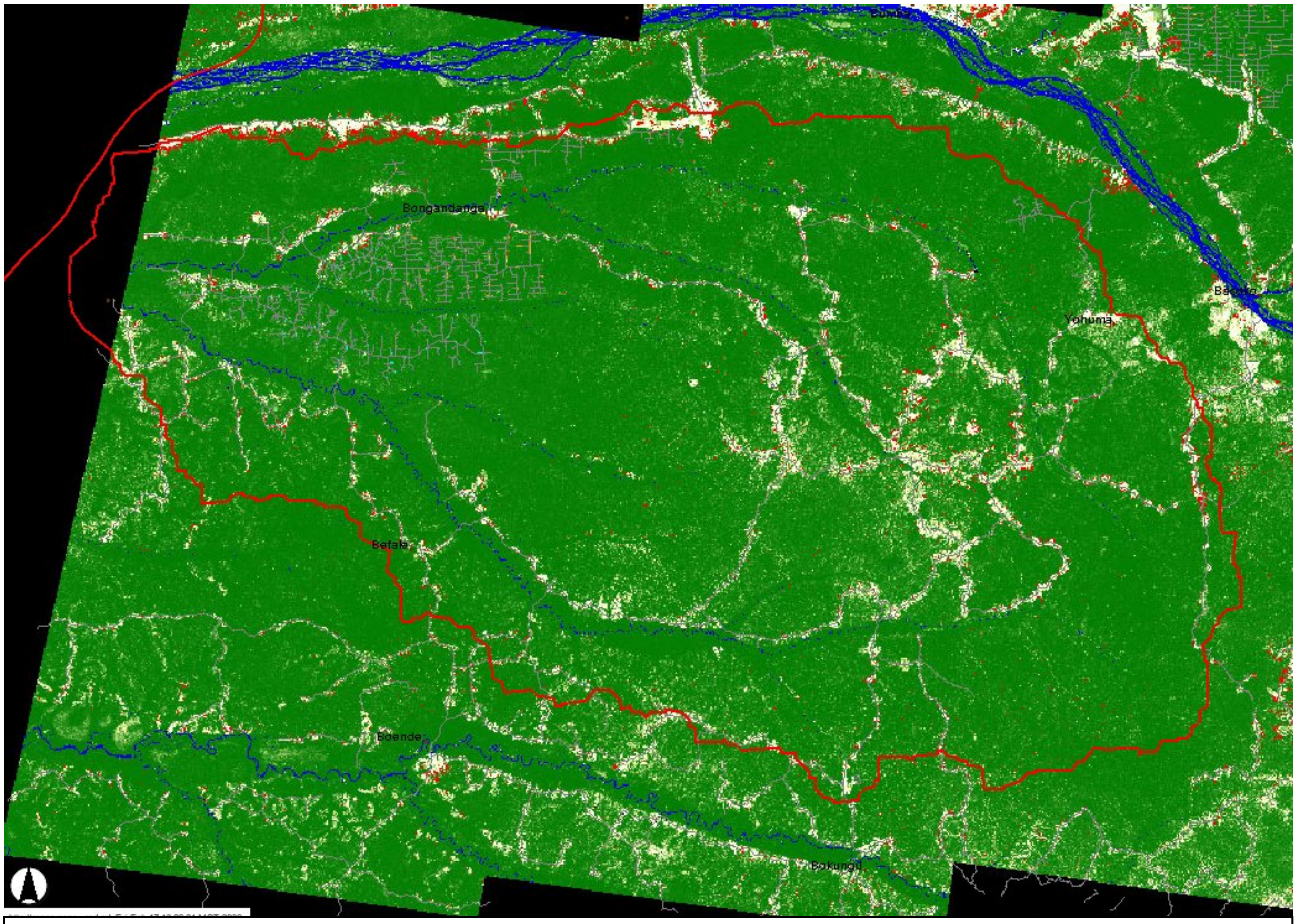


Figure 5. Satellite image of MLW. Areas of high human habitation are evident as a light color. Such areas would be avoided as Protected Area Zones or Extractive Use Zones, however, they would be candidates for Community Use Zones.

bureaucracy, poor communication, and upcoming elections all obscure which governmental positions have the authority to accept or reject a Proposed Landscape Plan delivered by CARPE. In addition, despite the signatory status of DRC as a member of the CBFP, confusion remains regarding their commitment to landscape-level land-use planning, sustainable management, and designation of official Protected Area Zones. As we have indicated repeatedly and frustratingly, it is unclear how many pre-existing timber concessions will be recertified under the new Forestry Code. Moreover, we are unsure if DRC will consider designating a Protected Area Zone for a given location in lieu of converting a qualifying timber concession. Therefore, to reduce the possibility of wasting time on proposals that will not be seriously considered by the Congolese government, we recommend that as a first priority, AWF and CARPE actively seek clarification of these issues by dialoguing with the central government and offering a CARPE vision for their consideration. It is possible that none of these questions have been resolved internally and the government may be open to advice from CARPE and its partners. In addition, there needs to be a clarification of the role of ICCN and COCOCONGO in promoting Protected Area Zones in MLW.

Zoning - MLW Community Use Zones

Activities promoting a range of sustainable forest-management practices, both within and beyond Protected Area Zones, are very significant. To simultaneously conserve biodiversity and provide tangible results for MLW's people, improved forest management will necessitate conserving high-biodiversity value forests, increasing opportunities for sustainable use of forest products, and working to mitigate extensive bushmeat hunting, deforestation, and ensuing erosion and habitat loss. Community Use Zones are vital for MLW's inhabitants. Such zones can allow a suite of traditional agricultural communities and hunters under a broad umbrella of public participation. Moreover, such zones can contribute to long-term sustainability by taking into account traditional rights, demographic realities, and national reunification.

Light colors in Figure 5 reveal those areas of MLW with the greatest concentrations of people. The people are located primarily along what used to be roads but are now, at best, narrow trails. The area near Djolu is heavily populated and it is not surprising that this area is the focus of an AWF Community Use project, the Djolu Square. The area has in effect been zoned by AWF and its partners with the hope that the government will someday declare it a Protected Area or Community Use Zone. It appears that AWF and partners used a reasonable but unsophisticated method to zone this area by bounding the zone by existing trails. Additional criteria to identify Community Use Zones could include:

- Presence of permanent dwellings and/or hunting camps
- Presence of scattered agricultural and livestock operations
- Areas adjacent to permanent dwellings designed to accommodate simulated projections of human population growth and to provide a buffer between populations and protected areas

The Djolu Square project aims to put an end to the pillage of wildlife by establishing a community-based system of sustainable wildlife use. Once established, AWF hopes to legalize the zone through the ICCN. In the interim, AWF coordinates its activities from the local level through the national level via an organizational structure comprising several committees (Figure 7). At the top of the coordinating chart is COCOCONGO, established by ICCN to promote a national strategy of conservation in reserves and protected areas and to contribute to national, regional, and local environmental, social, and, economic objectives (Appendix IX). Perhaps, a similar structure could be used to advise on potential Extractive Use Zones.

Rationale, Methods and Tools for Ecoregional Planning (zoning)

AWF desires more technical advice so as to make the best possible decisions on zoning. We were often asked by AWF staff about how zoning has been accomplished in the United States. It is worthwhile at this point to put zoning in the United States into perspective with zoning in DRC. In regards to U.S. federal public lands, most zoning, that is, establishment of national forests, national grasslands, national parks, national wildlife refuges, Bureau of Land Management lands, and other public lands occurred during the first 50 years of the 20th century. Several hundred million hectares of federal public lands now exist and additional lands, albeit small areas, are added each year. About one-third of the United States is under some kind of federal ownership. Lands owned by state governments are relatively small. Most of the United States is privately owned.

In DRC, all lands and waters belong to the State. There is no private landownership, although there is also no effective DRC management agency overseeing the lands and waters of

DRC. Since independence in 1960, DRC has occasionally established, by presidential or ministerial decree, national parks, reserves, and other protected areas. In addition, timber concessions have been granted over vast areas of Congo Basin forests. These concessions and protected areas represent current zoning of State lands and waters in DRC. The CARPE landscapes in DRC are in effect zones in which further zoning will take place at the macro and micro scale. That is, Protected Area Zones, Community Use Zones, and Extractive Use Zones may be created by DRC based on recommendations from CARPE and other partners. There are few U.S. examples that resemble a CARPE landscape in which massive areas will be holistically zoned for residential living, economic development, agriculture, timber harvest, and natural resource conservation.

The mere existence of large protected areas and other public lands should not convey the true state of biodiversity conservation. For example, despite the impressive extent of public lands in the United States there remain serious problems with the conservation of biodiversity. Past and current management practices on public lands have not always been beneficial to biodiversity. Moreover, over two-thirds of the nation is in private ownership where there are essentially no legal requirements for biodiversity conservation. In DRC, many protected areas have fallen into disarray due to war, social disruption, lack of institutional support, and so forth. Moreover, even though the lands and waters of DRC belong to the State there is virtually no management by DRC.

Recognizing the fact that biodiversity conservation spans both public and private lands, some NGOs such as The Nature Conservancy (TNC) have developed a strategic approach to conservation planning in the United States based upon ecoregions whose boundaries have been developed by TNC, WWF, and USFS. TNC conservation planning attempts to target those portions (zones) of ecoregions where biodiversity conservation is particularly important. AWF's Heartland Conservation Process (Appendix VIII) borrows from TNC's approach. In Appendix VI we summarize the TNC planning/zoning approach with the view that it may stimulate planning approaches and associated zoning in MLW.

As we discussed above, a cursory examination of MLW data and a satellite image of MLW allows one to imagine where to delineate Protected Area Zones and Community Use Zones notwithstanding the uncertainty surrounding logging concessions (Figure 6). However, there may be some existing approaches and tools that could quickly enhance zoning in MLW. Conserveonline, a forum created and maintained by TNC in collaboration with many partners, is intended to help improve the practice of site conservation across organizations and national boundaries. One objective of Conserveonline is to design ecoregional portfolios/biodiversity visions to best meet goals for all conservation targets/biodiversity elements (Appendix VII). A portfolio of conservation sites is comprised of those places that are least threatened and have the lowest cost of implementing conservation strategies. In MLW there remain vast areas of uninhabited forest and conceivably these areas would be selected through some of the tools available through Conserveonline. Conservation site-selection software (SITES, SPOT, MARXAN, NATURESERVE VISTA, EPAT, and C-PLAN), with numerous applied examples in and outside of the United States in regions rich and poor in data, is also available (http://conserveonline.org/workspaces/ecotools/; http://conserveonline.org/browse_by_category?category=Ecoregional%20Planning).

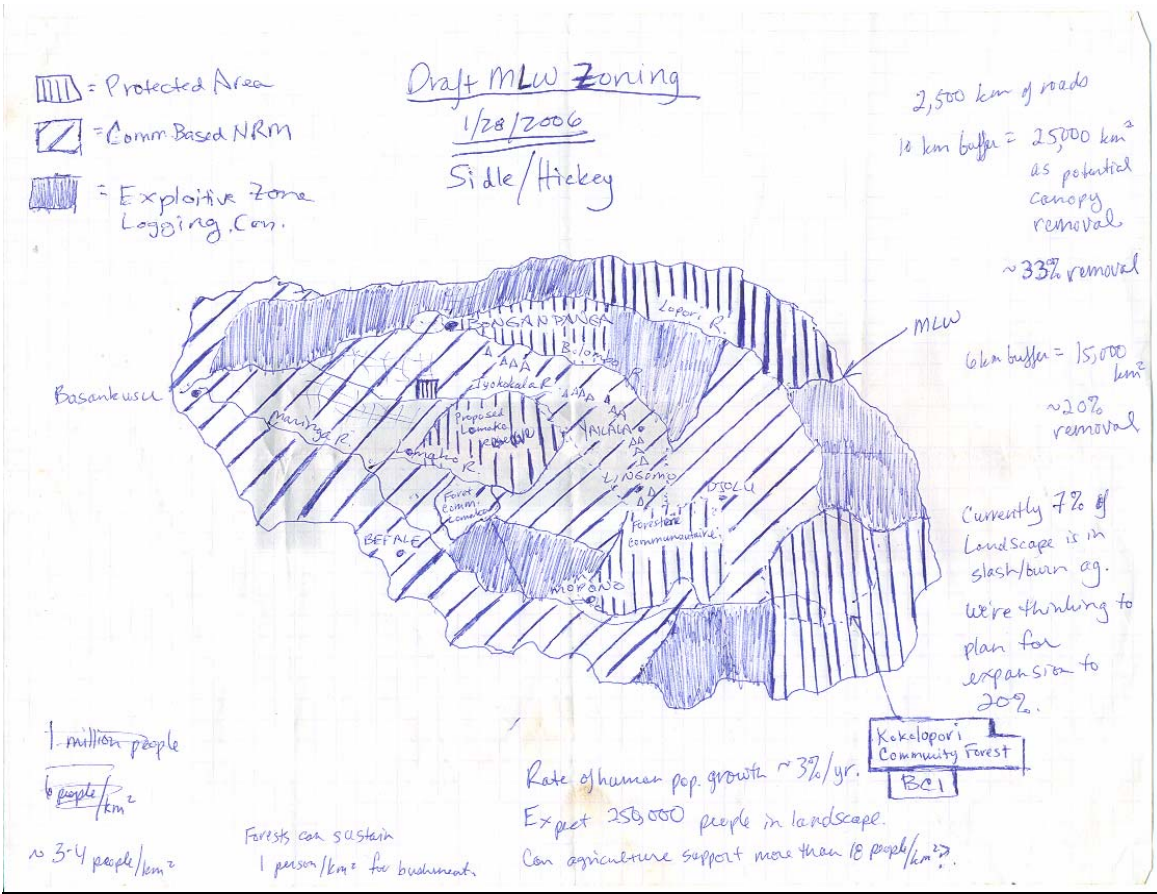


Figure 6. A zoning scenario for the MLW Landscape developed at Basankusu during our mission. Although crude in appearance, it does demonstrate that CARPE zones can be initially mapped with expert advice and already existing information.

We recommend that MLW spatial data be analyzed with some of the tools described by Conserveonline. Some of the experts associated with these tools are located in U.S. They are willing to work with us in developing an approach to zoning in MLW. Analyzing potential zoning in MLW would include but not be limited to:

- Threat-based analysis
- Understanding the pattern of land use
- Spatial representation of all information
- Existing conditions
- Projections into the future
- Synthesis of information
- Conservation values desired by CARPE
- Socio-economic outputs under different scenarios
- Ongoing or adaptive tinkering with new data
- Efficient combination of zones to maximize economic benefits while at the same time protecting biodiversity
- State of spatial data and complexity

Although it is possible to develop spatially explicit decision-support systems that assist in determining zone boundaries, their effectiveness tends to be limited by the quality of spatial data available to enter into the model. Currently, we are unsure if enough data layers exist for MLW.

We do know that enough urgency exists to finalize and submit an initial macro-zone proposal to the government that a "low-tech" approach may be advisable. The exercise we did with AWF in Basankusu demonstrated that it is possible to sketch logical boundaries of CARPE zones simply by using all of the criteria listed in this document, available remote-sensing imagery, and existing knowledge of on the ground conditions (Figure 6). There will be future opportunities to refine zone boundaries as more data is collected. A method that uses a low level of technology does not mean that it lacks sophistication. Forest Plans in the United States often incorporate an admixture of spatial data, computer models, and public participation to delineate zone boundaries. Frequently, stakeholder participation influences the outcome more than the computer models do, and the complexity of balancing conflicting human needs while maintaining ecological integrity can be challenging. More often than not, there exists limited data and the deciding official must move forward in the face of uncertainty. Ultimately, there is no single correct formula for delineating the final macro-zone boundaries. We expect that most of the boundaries for MLW can be developed through meetings and negotiations with the stakeholders in which a draft map of macro zones is adjusted based on combined stakeholder input.

Additional Comments on Planning

Desired Conditions – Fundamentally, the purpose of MLW planning is to establish the desired conditions to be achieved through the management of the lands and various renewable resources of the macro zones. Desired conditions should be the primary focus of MLW planning. Desired conditions include descriptions of the ecological, economic, and social attributes that characterize or exemplify the desired outcome of land management. They might include things such as soil, water and air conditions, flora and fauna elements, ecological processes, infrastructure, and anticipated human experiences and benefits.

Establishing desired conditions requires a fair amount of knowledge of existing conditions. Indeed, an accurate picture of existing conditions is the foundation for legitimate and reasonable desired conditions and provides the baseline to measure achievement of goals and objectives. One needs to know their starting point in order to determine success in natural resource conservation. What was species composition and abundance before landscape planning and what is it after several years of implementation? How does one determine when desired conditions have been met?

We observed and applaud AWF's extensive outreach effort to survey the human aspect of existing and desired conditions. However, we saw little evidence of rigorous or representative flora and fauna surveys underway. Though AWF plans to conduct some visual surveys of fauna in Djolu Square, and is designing a bushmeat monitoring scheme at village markets, we believe more extensive field surveys - that attempt to represent more of the Landscape - are necessary. Biotic surveys are expensive by nature, but their role in informing the planning process is essential. The USFS has experience in surveying large areas for species that are naturally rare or inconspicuous, and in the future could perhaps assist with this aspect of the planning process.

Desired conditions are expected to be achieved and maintained through implementing MLW land management plans for Protected Area Zones, Extractive Use Zones, and Community Use Zones. They are aspirational and likely to vary both in time and space. They can describe conditions both in MLW and in the area influenced by it (e.g., downstream watersheds). Land management plans for MLW should guide Congolese agencies and NGOs in fulfilling their responsibilities for stewardship of the Landscape to best meet the needs of the Congolese people

and biodiversity conservation. We recommend that desired conditions be a part of any MLW planning process and include the following approach:

- Describe the desired conditions of the Landscape, disturbance processes, and the benefits that MLW lands and waters can supply to both conservation and development. Such a description should also include monitoring measures to assess progress toward desired conditions.
- Describe how MLW intends to move toward the desired conditions.
- Bolster flora and fauna surveys in both quality and quantity to inform the planning process for individual CARPE zones.
- Explain suitability of areas and how the strategy will be monitored.
- Include a prospectus of key objectives for anticipated levels of conditions, uses, and activities.
- Provide monitoring measures of implementation.
- Describe those things required to reach the desired conditions in each Protected Area, Extractive Use and Community Use Zone.
- Describe objectives as a "prospectus" of anticipated outcome since the attainment of objectives is dependent upon the vagaries of budget, policies, environmental changes, and the like.
- Set the eventual accomplishment of desired conditions within 10 to 50 years of plan completion.
- Progress toward achieving desired conditions during the life of the plan with the ultimate intent of complete accomplishment within the 10 to 50 years.
- Permit the implementation rates to vary due to budget and other constraints outside the control of Congolese agencies and NGOs.

The content of possible desired conditions may include but is not limited to:

Watershed health
Water quality, quantity and timing
Stream flow
Riparian areas
Soils
Flood regimes
Terrestrial vegetation - composition, structure, pattern
Old growth and forest decay
Plant succession
Fine scale elements
Rare or unique communities
Invasive species
Aquatic habitat—Aquatic structure
Subsurface environments—caves
Disturbance processes
Public access
Agricultural economy
Wood product supply and condition of suitable lands
Miscellaneous products
Domestic and wildlife forage
Endangered, threatened, and sensitive species
Locatable and leasable minerals
Environmental justice and accessibility
Historical and cultural resource condition
Paleontological resources
Safety

We agree with the comments of our USFS colleagues, Chris Iverson and Oliver Pierson, who attended our meeting with AWF and others in Kinshasa. Below they try to reconcile the threat-based approach of landscape leads such as AWF with the desired-conditions planning model of USFS:

Threat Based Planning vs. Zone-based Planning: The concept of 'threat based planning' as an approach for biodiversity conservation was raised as a contrast to the USFS "desired condition and zoning" model of planning. The CARPE NGOs have been using primarily a threat-based approach for conservation planning on the CARPE landscapes. This model only addresses current threats in designing management direction. It suffers from the inability to react and consider future threats that may evolve. An alternative model utilized by the USFS for forest planning on national forests and proposed in this work shop is the 'desired condition' model that outlines overall goals and objectives for the landscape to guide all future management. It describes the desired compositional and structural characteristics of the biological and physical features desired across the landscape to achieve plan objectives. Social and economic elements are also integrated into the desired conditions. In this approach, barriers, or threats, found within different CARPE management zones, that may limit the ability of land management to achieve or move toward the desired condition, are specifically addressed in regulations or zoning concepts. The desired condition model is more flexible and adaptable to address future threats and also incorporates opportunities that land management can provide.

As mentioned, the 'desired condition' model can be applied to address specific threats. For example, take a situation where illegal bush-meat hunting occurs in a block of otherwise pristine forest on a CARPE landscape. A typical "threat based" planning response would be to identify the threat, and then perform specific actions, such as anti-poaching patrols, to address this specific threat. The desired condition approach would strive to set specific objectives for the landscape (e.g. desired population size or distribution of bonobos, elephants, etc.) that are achieved through the development of rules and implementation of management zones. These rules and zones would allow land managers to address a range of current threats and prevent new threats from developing on the landscape, such as future road construction or illegal logging. The more limited threat-based approach would not allow managers to deal with unperceived future threats, such as road construction. The USFS teams who worked in DRC and Gabon will strive to develop guidelines to successfully apply this model to planning in the Congo Basin, taking all the aforementioned challenges and limitations into account.

Engage All Stakeholders - There is an inextricable link between economic viability and healthy, sustainable ecosystems. Each is dependent upon the other. CARPE and AWF should address economies and ecosystems while pursuing Landscape-level land-use planning. In MLW, the area of interest and the primary goals (long term economic and ecological viability) have already been identified. The next step is to identify all potential stakeholders. The involvement of representatives of all interest groups is vital to any planning process and to ensuring that all aspects of economic and ecological viability within MLW are addressed.

- CARPE should attempt to cement government involvement in land-use planning in order to minimize future opposition to Landscape Plans.
- Remind the government of the CBFP that they have signed and inform them of the progress that has transpired (involvement of NGOs, local inhabitants, timber companies, etc.)
- CARPE should establish its technical credibility with central government authorities and offer assistance as needed, including the anticipated proposals for land-use planning, and the development of policies and regulations to carry out the new Forestry Code..

- Explain that the government's involvement is of paramount importance in order to ensure that MLW planning incorporates their viewpoints and is ultimately a success. Persistence may be necessary in order to identify the highest ranking government official that can contribute to this process. We expect that, at the very least, ICCN and the Ministry of the Environment should participate regularly in the process, and that AWF should formally inquire ICCN about the views of higher levels of government. If at all possible, we recommend quarterly meetings among COCOCONGO, CARPE, and AWF to ensure that the process is tracking on all levels.

The AWF Heartland Conservation Process provides excellent guidance for engaging stakeholders and we recommend that AWF follow that guidance in order to expand their stakeholder groups. List all of the known potential stakeholders (e.g., all villages, *groupements*, *secteurs*, territories, districts, provinces, ethnic/religious groups, timber companies, NGOs, government agencies, bushmeat hunters, loggers, researchers and any other group with potential interests in the MLW Landscape). Send out communications to all of these entities seeking their involvement and their input on any additional stakeholders. This approach will build on the public education and outreach that AWF has already accomplished. AWF has invested wisely in "focal point" staff positions that live in MLW. These focal points provide for a consistent interchange of ideas among AWF and MLW inhabitants. As such, they should facilitate the participation of many stakeholders, build support for AWF's involvement, and reduce the workload for AWF staff in Kinshasa. We agree with this approach as it appears to increase trust and enhance communication in an extremely challenging setting.

Develop a Communication Plan for Internal Use – The development of a brief internal Communication Plan or "stakeholder engagement plan" is relevant to MLW and governmental communications:

- Identify the final list of stakeholders and the methods of information exchange.
- Name the core participants, specifying which stakeholder group or groups they represent.
- Describe how the representatives will coordinate between AWF and their constituents, to assure that AWF receives an accurate depiction of the constituents' viewpoints and vice versa.
- Explain how AWF will interact with the representatives (e.g., individual and/or group meetings in the landscape and/or a central location) and specify which, if any, stakeholder groups will be treated differently and why.

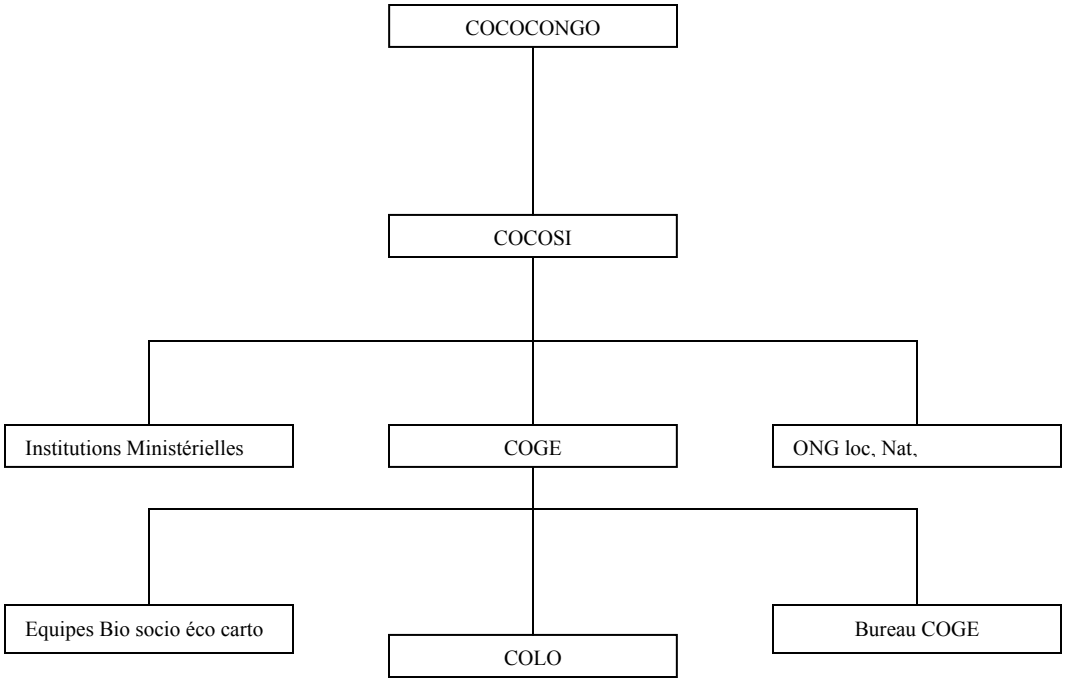
There are unique challenges presented by certain groups in MLW that require unique approaches. For instance, the Kitiwalists firmly believe that only God can impose rules or limitations upon them. Therefore, we recommend that the Communication Plan include key "talking points" to be used when working with the Kitiwalists and their neighbors. Such talking points would employ careful language that emphasizes that it is the Kitiwalists themselves, in cooperation with their neighbors, who are choosing any boundaries or rules developed in the planning process in order to properly nurture the resources that exist where they live. It may be effective to characterize sustainable management as good care-taking of the resources that God has provided humanity and to de-emphasize the role that the central government may play in parceling land.

We recommend developing specific talking points for each stakeholder group and for delivering concepts to the group as a whole. Examine these talking points and resolve any inconsistencies so that stakeholders share a similar understanding of the process. Include well defined terminology to reduce confusion in the planning process.

The Communication Plan should spell out the manner in which information will be exchanged. This is particularly important for the local inhabitants, most of whom have no access to maps, data, reports, or even the news, and many of whom are illiterate. This situation makes informed participation difficult for the local inhabitants. A certain level of caution is warranted for people relying entirely on the information provided by outside interests that enter the Landscape (e.g., timber companies, Rainforest Foundation, AWF) because there is no way for the local inhabitants to fact check the information. AWF will want to ensure that all participants have an accurate picture of the process and their role in the process.

Communication at the Local and Governmental Levels - Communication of information to people in MLW remains problematic. Although AWF makes an effort through its focal points, there needs to be a stronger dissemination of information through computers and satellites, at least to the major villages where there is some level of literacy. Local participation cannot be left to a parade of meetings but must include rapid dissemination of information such as maps and images. We recommend the development of a MLW web site and computer kiosks at major communities such as Mbandaka, Djolu, Bongandanga, Basankusu, Befori, Befale, and elsewhere. Such kiosks of information linked to a satellite and restricted at least initially to an MLW web site would give the local population a better understanding of the CARPE landscape and allow them to participate more fully in the planning process. During our visit to MLW it was apparent how little information the people possessed and yet the stakes are high for the inhabitants. Very few people in MLW have seen AWF GIS maps or understand what they signify. We recommend the wide dissemination of map and image information to the inhabitants of MLW. GIS maps, images, and other information would educate local populations about their very own region and also allow them to add their extensive knowledge. An internet link to MLW villages would allow AWF and CARPE to demonstrate their scientific and business-like approach to conservation and development in MLW.

There are many conservation activities occurring in DRC. COCOCONGO, created by ICCN, is a platform to assist in the conservation of protected and similar areas, corridors, and buffer zones (Appendix IX). It is part of an organizational structure to facilitate communication amongst the many parties, including AWF, involved in conservation matters in DRC (Figure 7). We recommend that there be a similar structure to discuss conservation and logging concessions. Such a platform could be established by the Ministry of Environment.



Légende :

- COCOCONGO = Coalition pour la Conservation au Congo
- COCOSI = Comité de Coordination du Site
- COGE = Comité de Gestion
- COLO = Comité Locaux
- BIO socio éco carto = Biologiques, socio économiques et de cartographie
- Loc, Nat = Locales, Nationales

Figure 7. The organizational structure AWF uses to interact with players on the local, regional and national level.

Accelerate Schedule for Landscape Level Land-use Plans - In order to increase the likelihood that some natural resources are effectively conserved during the transition to peace in DRC, we recommend that a proposal for MLW macro zones be submitted to the government of DRC on an accelerated schedule. Otherwise, some conservation opportunities may dissolve as extractive industries arrive prior to the approval of Landscape zones. Ideally, such a proposal would be delivered from the U.S. State Department (CARPE) to the government of DRC under the auspices of the CBFP with a request that DRC legally establish the boundaries of the CARPE zones as developed by AWF. The proposal should explain that continued data collection over the next 5-10 years will provide the rationale to make any periodic adjustments in the zone boundaries. This strategy aims for official designation of all zones proposed by CARPE and assumes such designation will reduce immediate threats to natural resources within Protected Area Zones and Community Use Zones. Achieving official designation of the CARPE zones would buy time for developing comprehensive land management plans for specific zones within MLW.

To expedite a well-reasoned delineation of Protected Area Zones and other zones, we recommend leaning heavily on existing remote-sensing data, on-the-ground knowledge of the

Landscape, and perhaps some application of computer-based decision-support tools. The primary components to consider when delineating macro zones will include the location of human populations, important wildlife populations, intact forest canopy, and likely future timber concessions. We recommend using these combined inputs to develop preliminary macro zones relatively quickly (~1 month). These preliminary macro zones will be a rough draft to show stakeholders in order to stimulate dialogue and advance the process. In many cases, AWF will have to identify the best location for a boundary based on qualitative information and their best judgment in balancing social, commercial, and biological needs.

As macro zone boundaries are adjusted, reflect on any discussions with the timber industry and Ministry of Environment regarding timber concessions. If the timber industry has shown substantial willingness to relinquish concessions in key areas needed for Community Use or Protected Area Zones, then it may be advantageous to seek timber company perspectives on draft zones. A draft plan that is backed by all stakeholders may enjoy an increased chance of success when presented to the government. AWF will have to weigh the benefit of having the support of timber companies versus the cost of any changes the timber companies may seek. We recommend being very clear about how much stakeholders can expect to influence the final proposal submitted by AWF/CARPE. It is nearly impossible to satisfy all parties in any land-use planning process, therefore preparing stakeholders for compromise may result in less opposition to the final plan. Equally important is the willingness of DRC Ministry of Environment to withhold concessions - simply not certify certain concessions because of a preference for Protected Area Zones or Community Use Zones.

We recommend using both CARPE and AWF Mission, Vision, and Goal statements to explain the logic behind various proposed zone boundaries. AWF expressed the desire to view the MLW Landscape as a blank slate, with no approved concessions or other preconceived assumptions about zone boundaries. Though this is a useful exercise and can produce an idealized version of a macro-zone map, certain features undeniably exist in the Landscape that must be acknowledged; the most obvious are human settlements. Inasmuch as it would be socially disruptive to move any concentrated human settlements and ecologically undesirable to scatter the population back into the forest, Community Use Zones will logically overlap with existing human concentrations. In addition, Community Use Zones likely will extend into a larger area around current settlements to absorb foreseeable population growth, to provide intact forest for sustainable subsistence, and as a buffer between areas of high human density and either Extractive or Protected Area Zones. This approach to designing Community Use Zones can be supported by the conservation goal of drawing pressure away from sensitive wildlife populations, keeping wild places wild, and minimizing the confounding impacts of logging in areas of human habitation (e.g., logging-road systems increase hunting pressure). Further incentives for this approach include the goals of promoting economic development and improved governance which will be more easily accomplished by building on existing concentrations of human settlements, improving living conditions in those areas, and thereby drawing scattered inhabitants into the Community Use Zones. Except for the fine tuning that stakeholder participation will provide, the rough outline of Community Use Zones can already be discerned by viewing the human footprint on satellite imagery.

Viewing the remainder of MLW as a blank slate will depend on support from either the government of DRC or the timber industry, or both. Though some concessions may not be converted under the new Forestry Code, it seems reasonably foreseeable that large areas will convert. Therefore, the portion of MLW outside Community Use Zones is partially occupied.

Again, this underscores the need to converse with central government and timber industry to gauge the likely location of future concessions. We expect that proposing a Protected Area Zone in lieu of a timber conversion may require a robust rationale.

The presence of desirable wildlife species, a substantial amount of intact rainforest, a low human population, and a position in the landscape that is essential as a wildlife corridor, would all likely be necessary to override a logging conversion. We recommend tying the rationale for protection back to the CARPE strategic objective of reducing the loss of biodiversity and the AWF mission of conserving wildlife and wild places in Africa. To further sell a Protected Area Zone, emphasize the local importance of maintaining intact rainforests. Well placed tracts of protected intact rainforest can act as "reservoirs" of wildlife that help ensure a reliable supply of fauna that may be hunted in appropriate areas. For communities largely subsisting on bushmeat, it is a wise planning objective to protect reliable sources of wildlife. Though nationally and internationally, Protected Area Zones can help trap greenhouse gases and moderate climate change, this would be true for proposed Protected Area Zones that do not overlap with future timber concessions. Therefore, this may be a less persuasive reason for DRC to select a Protected Area Zone in lieu of converting a timber concession. On the other hand, locations of proposed Extractive Zones can be justified both locally and globally by the multiple-use concept – balancing the benefits of jobs, roads, infrastructure, and wood products that are tied to logging operations with the sustainable management engineered into the Landscape Plan as a whole that provides biodiversity and ecological function to the world.

Develop Macro-zone Standards for Logging Operations - The AWF Heartland Program, of which MLW is a part, focuses on conservation of wildlife and wild places in areas of exceptional biodiversity. Therefore, the MLW Landscape Plan needs to integrate natural resource conservation into its overall design to ensure that MLW remains distinctive for its high natural resource value. Though it would appear that the new Forestry Code has safeguards for maintaining biodiversity through its requirement of Forest Management Plans and Environmental Impact Studies prior to logging, currently it is non-specific regarding the required contents of these documents and what level of environmental impacts will be prohibited. We are told that policies and regulations will be developed to flesh out documentation requirements and environmental standards but we have not seen any regulations to this effect. Therefore, we provide the following advice as a starting point for developing environmental standards in CARPE landscapes.

AWF should develop a set of Standards for each macro-zone that must be met at all times. Such Standards would constitute a minimum level of natural resource conservation across each macro-zone and would be incorporated into the initial Landscape Proposal that CARPE submits to the DRC government. Subsequent management plans for specific zones would then specify more restrictive rules, or standards, as appropriate for the goals and objectives of those areas.

For instance, because timber extraction is a reasonably foreseeable activity in Extractive Zones, minimum timber mitigations should be included at the macro scale as a first cut towards ensuring the achievement of desired biological conditions. Recently, Conservation International (CI) examined logging practices in MLW for the purpose of improving the practices of logging companies in MLW concessions. CI carried out a comparison of the current state of forestry practices in MLW against an objective, internationally recognized standard. They aimed to develop a realistically attainable standard under conditions prevailing in this landscape and to

recommend practical ways for logging companies and regulatory agencies to meet those standards. We agree with most of CI's findings and recommendations, including those for Reduced Impact Logging (RIL). Other valuable RIL references include *Low Volume Roads Engineering* (http://www.encapafrica.org/download/USFSRoadsBMPManual/index.htm) and RIL cost evaluation simulator (http://www.blueoxforestry.com/RILSIM/index.htm). We also make additional recommendations and expand on some of those offered by the above references.

We expect that the recommended coordinator of timber-industry involvement will have strong silvicultural or ecological experience and education and will help develop these mitigations. As a start, we recommend developing regulations or standards for:

- Timing of road construction
- Road density
- Road length
- Road width
- Road engineering
- Road/stream crossings
- Road seeding
- Road obliteration
- Stream buffers
- Protected set asides within concessions
- Logging in swamps
- Logging on slopes
- Felling and extraction procedures
- Inventory techniques
- Size, number and arrangement of leave trees
- Number and arrangement of protected advance-regeneration stems
- Size of canopy openings
- Inter-tree felling distances
- Silvicultural treatments other than logging
- Human population effects
- Employee food supplies
- Road access
- Bushmeat hunting using company vehicles, roads, or inventory trails
- Pre/post-harvest monitoring
- Adaptive management that responds to monitoring
- Elements of forest plans
- Transparency of forest plans

Though site-specific regulations should be applied for different concessions, general minimum standards for the above items would set a foundation for the type of forest stewardship expected in any concession.

Roads negatively impact ecological processes and wildlife populations. To minimize sedimentation of streams and rivers, road construction should occur during the dry seasons. Road density and length should be minimized because roads facilitate human colonization of remote areas and can lead to excessive hunting and eventual deforestation. Lower road density should reduce this risk. Furthermore, roads fragment the forest with potential impacts on pollination, seed dispersal, and regeneration. Some of these impacts may be attributed to the effects of roads on animal travel movements (e.g. avoidance of areas near roads), because many

species of wildlife serve as pollinators or seed dispersers such that a change in movement pattern could alter these processes. Therefore, to reduce the fragmentation effects of roads, road prisms should be minimized to a recommended maximum width of 7.5 m for major haul roads and 5 m for minor haul roads. To further reduce sedimentation, require that roads be engineered to avoid steep slopes, maintain grades less than 10%, channel water away, and minimize stream crossings. Consider requiring the application of native seed mixes along edges of active roads to help stabilize the soil and complete road obliteration when logging activity is complete. For obliteration, it may be valid to require ripping and seeding of the entire road prism as well as effective closure to vehicular use (install pits or other barriers). This should speed the rate of regeneration and shorten the interval during which roads impact wildlife and ecological processes.

Riparian areas can serve as connective corridors and sites of elevated biodiversity, yet tend to be vulnerable to logging practices. Ideally, minimum stream buffers that prohibit logging would be required for all headwaters and all perennial streams. However, tropical rainforests, particularly lowland and swamp rainforests, tend to be riddled with rivers, streams, and rivulets. Conceivably, buffering all water courses could result in little or no area for timber harvest. Therefore, we recommend experimenting with GIS hydrology layers and varying buffer widths to develop a reasonable no-logging area around water ways. Strive for a 100-m buffer on headwaters and prominent streams.

In addition to stream corridors, other forested areas within a concession should be identified for conservation of biodiversity. As mentioned before, Protected Areas can provide the backbone for natural resource conservation, but connective corridors and habitats will still be necessary in Extractive and Community Use Zones. Therefore, at least 10 percent of concessions should be set aside for their unique biotic or ecological value - be it a gallery forest, a connective corridor, or the presence of rare species. As an incentive, such areas could be subtracted from the taxable area retained by a concessionaire.

Residual damage from tree extraction depends on site conditions and methodology. To minimize impacts to the younger trees and vegetation around a harvest tree, we favor restricting logging to slopes less than 15%, prohibiting logging in swamp forests, and requiring modified RIL techniques. RIL techniques include directional felling to deliberately avoid damage to soils and vegetation and to protect the incoming tree crop. It is advisable to fell trees into existing openings and outside restricted buffers. RIL depends on a high degree of planning in which crop trees, streams, and obstacles are mapped in order to both minimize and optimize the number, length and position of skid trails. However, this approach appears to require an excessive inventory process in which thousands of meters of narrow trails are systematically cleared with machetes in order to provide the data on crop tree locations. These trails effectively open the forest to bushmeat hunters both familiar and unfamiliar with the area by facilitating their movement and navigation throughout large swaths of forest. Previously impenetrable or nearly so, these inventoried forests draw market hunters from outside the area who can reasonably expect easier and more productive hunting in the short term. In the long term, these intensive inventories lead to a drain on the faunal resource. We recommend exploring a less intensive inventory design to balance the need for planning with the need to minimize hunting impacts on wildlife.

Forest structure, as mentioned above, can be altered significantly by logging practices. Selective logging, which is most prevalent in African rainforests, can deleteriously remove the largest, most important trees from a stand and can unwittingly reduce regeneration in the tree

species most important to both commerce and wildlife. We recommend developing several minimum standards to reduce the risk of losing the large-tree component in MLW forests.

First, a minimum number of "leave trees" should be designated per unit area. AWF would need to define leave trees for industry, but the general definition might be: existing marketable species of trees that are currently greater than or equal to 50-cm dbh and that will be left undamaged in order to maintain the ecological integrity of the forest. We suggest 50-cm dbh, but AWF can determine the minimum size of leave trees which may vary by species and can include instructions that if no trees that large occur in the area the concessionaire must leave the largest available trees on site. The definition of leave trees can also include trees important to wildlife. In discussions with SIFORCO, it appears that they remove about 1 crop tree/2 ha. Therefore, AWF may identify a relatively low number of trees for retention, perhaps 1 every 5 ha. There would be little regeneration benefit to locate all leave trees to a relatively confined area or an area separate from the actual harvest areas. Therefore, AWF should identify an acceptable arrangement of leave trees within a harvest unit. We recommend something flexible like, "a minimum average of 1 leave tree every 5 hectares must be retained either grouped or scattered throughout the treated area but with no area larger than 20 ha devoid of a leave tree. When available, give precedence to selecting old-growth trees for retention." To further enhance regeneration success, AWF should specify leaving 25-50% of pre-harvest seed-bearing stems in approximately an even distribution across the harvest unit.

In order to address the varying light, moisture, and soil conditions that different tree species require to germinate and establish, AWF may want to ensure that canopy openings represent a range of sizes. Specifying a maximum size for canopy openings and requiring that a proportion of openings be significantly smaller should help provide for a mosaic of regeneration conditions. For instance, AWF may specify that half the canopy openings be ≤ 0.25 ha and half be between 0.25-1.0 ha. Such an arrangement would provide for both shade-tolerant and intolerant species and minimize impact to the canopy. Furthermore, large (marketable) trees may often be found in clumps that would be financially tempting to remove in their entirety. However, to moderate the size of subsequent light gaps and to retain large seed trees, it would be prudent to specify inter-tree felling distances (perhaps a distance equal to the average tree height) or to require that a minimum of one leave tree be retained out of any clump found. All of the above recommendations are to encourage natural regeneration. We recommend discouraging or prohibiting site preparation methods like thinning, prescribed burning or mechanical scarification of soil because of their potential to negatively impact wildlife habitat. Such methods may be experimentally pursued outside of CARPE Landscapes.

As part of both the ecological and social context in which logging occurs, standards also need to address the effects of logging on human populations. The hope of employment can lure laborers from afar to move into newly active concessions. This draw increases pressure on the local biota to feed growing numbers of people. To minimize this "boomtown" effect, timber companies should be required to hire primarily local employees and to transport non-locals back to their natal villages when their work is done. Some villages in MLW already require that loggers purchase all food from their local markets. No hunting by logging company employees is allowed in those areas. Though that stipulation helps protect the local villagers in the short term, it does not actually reduce the pressure on the resource. The situation still results in more people trying to subsist on what is grown or hunted within a relatively confined area. Therefore, timber companies should be required to supply employees with domestically cultivated food. If the local village has adequate livestock operations, then the company could arrange to purchase

meat from the village. However, buying or hunting bushmeat would be off limits for employees of the timber company.

To reduce disturbance and hunting of wildlife, road access must be addressed whole-heartedly. Trainings should be conducted for road guards and for whole communities so that the importance of road closure is understood and a certain amount of self-policing takes place. Further, the MLW Landscape should set standards that prohibit the use of company vehicles, roads, or inventory trails for bushmeat hunting. Timber companies would be expected to enforce these rules on a day-to-day basis, with periodic unannounced checks conducted by government employees to ensure compliance. This road-closure enforcement by the timber companies should continue even when concessions are inactive or the logging operations are complete because the effects of roads linger well beyond the time of active logging.

Monitoring of concessions before, during, and after logging operations should be required in order to measure compliance with environmental standards, improve our understanding of the regeneration requirements of tropical tree species and the impacts of logging on wildlife, and adapt management accordingly. AWF should require the use of permanent plots to monitor the change in vegetative composition and structure before and after logging, the establishment and growth of trees after harvest, and the faunal composition pre- and post-harvest. Post-harvest surveys should also include compliance checks to determine if seed trees, leave trees, and riparian buffers were protected. In some cases, the use of permanent photo plots may be an effective tool because they require relatively little training for proper implementation. Training of field technicians by professional ecologists, wildlife biologists, and silviculturalists should be required for the proper implementation of monitoring methods.

Finally, all of these Standards or regulations should be required elements of any Forest Management Plan within a CARPE landscape. A Project Description section within every Plan should elucidate the timing, method, and location of road construction, tree cutting and tree removal, along with any other actions associated with logging operations. Forest Management Plans and their associated Environmental Impact Studies (EIS) should have separate sections detailing how the logging concession may cause changes to the human population, impacts to wildlife and their habitat, increased erosion and sedimentation, and regeneration of desirable tree species. Each of these sections should also spell out the mitigations or Standards the timber company will use to minimize said impacts. Ideally, the Ministry of the Environment should review these Plans and EISs to ensure sufficient documentation and mitigation of potential impacts.

A transparent process is necessary to hold everyone accountable for their role in the process. Forest Management Plans and EISs should be made part of the public record in which any citizen can access and review these documents. Further, any citizen should be allowed access to logging concessions to assess the company's compliance with laws, regulations, and mitigations. Provision should be made to preclude any bushmeat hunting during such citizen visits.

Together, all of these requirements should help MLW be more than an area of concentrated parks and preserves, but actually allow it to function as an economically sound and ecologically viable landscape that supports humans and wildlife.

Checklist of Guidance for Landscape Planning

For simplified use of this report, we provide the following prioritized checklist of recommended tasks to complete over the next few months. This tool strips down the detailed explanations provided in the document as a whole, in order that CARPE and AWF may more easily track their progress. We do include some recommendations for CARPE, where we think issues require an elevated level of involvement (e.g. engaging the Ministry of Environment). This task checklist is a proposed starting point and CARPE and AWF may decide to work collaboratively to modify it and set specific due dates prior to final adoption. Numerous items may be initiated simultaneously in order to expedite the entire process.

Figure 8. Mongo boys on their way to hunt in MLW (Photo by Didier Bokelo Bile).

Prioritized List of Future Tasks for MLW Landscape Planning

1. Engage the central government
    a. CARPE & AWF should meet together with Congolese government
    b. Remind government of CBFP
    c. Establish CARPE's credibility and offer assistance
    d. Explain government's involvement is of paramount importance
    e. Ascertain from the Ministry of Environment the extent to which DRC will cancel timber concessions in favour of Protected Area Zones or Community Use Zones
    f. Clarify role of ICCN and COCOCONGO in Landscape Planning process
    g. Establish schedule to meet regularly with ICCN & quarterly with COCOCONGO
2. Engage all stakeholders
    a. List all known potential stakeholders
    b. Send out communications to all stakeholders inviting their involvement
    c. Request stakeholder input on any additional interest groups to include
3. Create a position to coordinate timber-company involvement who will ascertain timber industry's interest in:
    a. Keeping or dropping some or all of their timber concessions
    b. Cooperating with logging mitigations
    c. Achieving a green lumber certification
    d. Providing direct assistance to local communities
    e. Positive public relations related to the above
4. Develop a Communication Plan
    a. Create talking points
    b. Clarify terminology and definitions and train staff to use same terminology and definitions
    c. Determine mechanism to deliver information to landscape inhabitants, as well as other stakeholders
5. Accelerate schedule for submitting Landscape level land use plan to DRC
    a. Refine criteria to identify MLW zones
    b. Use "low-tech" method to create rough draft map of macro zones based on existing remote-sensing imagery and data collected by AWF (~1 month)
    c. For Protected Area Zones, color code satellite imagery to highlight large blocks of intact forest and if necessary, follow up with on-the-ground and aerial examinations
    d. Present rough draft map of macro zones to various participants for feedback
    e. Adjust boundaries of macro zones based on balanced review of the needs of all stakeholders – make trade-offs, cannot please everyone everywhere
    f. Over a longer period of time, use on-line decision-support tools to assist in zoning – USFS can help by working with experts in U.S.
6. Consider whether or not to seek additional rounds of input on macro zone boundaries
    a. Be clear on how much stakeholders can expect to influence the final proposal
    b. Determine if there is time and flexibility in the process to allow further input
7. Establish CARPE macro zone boundaries to cover every ha of MLW
    a. Tie the CARPE & AWF Mission, Vision, and Goal statements to the rationale for macro zone boundaries
8. Describe desired conditions for multiple resources and include in Landscape Plan
    a. Include objectives for living conditions and development
    b. Include objectives for forest structure
    c. Develop standards for logging practices and elements of Forest Management Plans in MLW
    d. Describe how MLW will move toward desired conditions
    e. Describe the monitoring measures for implementation and to gauge success
9. Submit holistic proposal of all CARPE zones and brief Landscape Plan to the central government of DRC within a few months.
    a. Though a holistic proposal of all zones may be more persuasive, at least submit a list of proposed Protected Area Zones to the central government within a few months.
10. Increase understanding of existing conditions throughout MLW
    a. Over the next year, bolster flora and fauna surveys in both quality and quantity to inform the planning process for individual CARPE zones – USFS can assist with methodologies for detecting rare or inconspicuous species.
    b. Collect data that is representative of the whole Landscape (collected over a broader area) in addition to the concentrated efforts already in place.
    c. There should be quality standards set by CARPE for all survey methodologies (social, biotic); methods should be approved by CARPE prior to implementation.

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Appendix I: Terms of Reference

USDA Forest Service
Technical Assistance in Collaboration with The African Wildlife Foundation on Landscape Planning Support for the Maringa-Lopori-Wamba Landscape

Draft Terms of Reference – August 2005

1. Background

The USDA Forest Service (USFS), through the Office of International Programs, is an implementing partner in the US Agency for International Development's (USAID) Central African Regional Program for the Environment (CARPE), providing targeted technical and capacity building assistance aimed at improving forest management in the Congo Basin. In an effort to focus this assistance in a manner which capitalizes on the relative strengths of the agency, the USFS is concentrating their efforts towards the land management planning processes of the CARPE landscapes. These landscapes were chosen for their biodiversity and conservation importance and established as foundations of regional conservation and sustainable natural resource use. These areas contain a mix of national parks and other protected areas, current or future timber and mining concessions, villages and settlements, and the neighboring forested areas on which they depend for their day-to-day resources.

The multiple-use mandate of the USFS in managing National Forests and Grasslands in the United States requires planning which integrates conservation strategies to achieve ecological sustainability as well as resource use opportunities to contribute to economic and social sustainability. Capitalizing on this experience, the USFS has been asked by USAID/CARPE to develop planning processes and management plan templates for comprehensive landscape level planning and for the three different use zones within those landscapes: protected area zones, community use zones, and extractive zones. The USFS will develop these processes and models in collaboration with the NGO landscape leads (African Wildlife Foundation, World Wide Fund for Nature, Wildlife Conservation Society, Conservation International) and host country governments.

Toward this end, the USFS will provide a technical assistance team to work in collaboration with the African Wildlife Foundation (AWF) towards the development of a landscape management plan for the Maringa-Lopori-Wamba Landscape in the Democratic Republic of Congo. This USFS team will consist of two individuals experienced in developing landscape level management plans utilizing a multiple use approach and will focus on issues impacting the landscape as a whole, but will also provide input on strategies, threats and opportunities in planning on community use and extraction zones as well. This team will travel to Congo and the MLW landscape at an as yet to be agreed upon date for a period of approximately three weeks.

2. Objectives

This USFS technical assistance mission will provide input to AWF on their methodologies and approaches to landscape planning and will inform the process of developing management

plans for the landscape as a whole. Along with AWF partners, this USFS team will adapt landscape planning processes utilized in the United States to fit the regional context and will utilize the experience gained on the MLW landscape, along with similar work on other CARPE landscapes, to craft a template for the development of a planning process for landscapes which will be applicable throughout the region. The objectives of this initial mission to the MLW landscape are:

5) Provide technical assistance to AWF on landscape level planning activities. Building on work already begun by AWF in identifying particular use zones within the landscape and creating a framework for each one, the USFS team will review suggested implementation activities for these zones, as well as the methodologies and approaches utilized by AWF thus far in identifying them and in the creation of their frameworks.

6) The USFS team will provide input to AWF on the landscape planning process, along with identifying any gaps in pre-existing AWF processes, and providing insight on how activities, approaches, and tools may be improved. This objective will rely on a technical exchange of ideas, aiming to strengthen AWF's landscape planning approach as needed. It should be noted that the USFS will not be writing a management plan for the MLW landscape, but rather, will help outline key issues, identify appropriate stakeholders, and suggest necessary steps for completing the process.

7) The USFS team will be familiarizing itself with the challenges facing the MLW landscape and the realities on the ground in the region. The experiences gained on this mission and insights provided by AWF and other key stakeholders on the landscape will inform the development of a land use planning template for landscape level planning which can be applied to other landscapes throughout the Congo Basin.

3. Tasks

#1: Recruitment, selection, and mobilization of a USFS technical assistance team:

- **a)** Recruit a specialist experienced in the development of forest management plans on a landscape level, with knowledge and familiarity of the tropical context of the region and experience working on landscapes involving a mosaic of land use practices, pressures, stakeholders and social issues.
- **b)** Recruit a social forester, experienced in tropical ecosystems, with a skill set allowing him/her to evaluate the impacts of existing land use practices and to provide mitigation strategies and potential alternatives to unsustainable land use patterns as needed.

Responsible party: USFS

#2: Provide input to AWF on the planning processes for large landscapes with multiple zones of varying use categories, considering the ecological, social, and economic context of the region. Provide insight and share experiences gained with landscape planning in the US and elsewhere.

Responsible party: USFS

#3: Review and provide input to AWF on the methodologies utilized in identifying specific use zones to date and in the creation of frameworks, or workplans of activities, for these zones. The USFS team will help identify any needed strengthening of tools and processes utilized by AWF.
Responsible party: USFS

#4: While the mission will primarily focus on landscape level planning, the USFS team will also inform, as needed, planning processes and strategies for confronting challenges and threats in managing community use or extraction zones on the landscape.
Responsible party: USFS

#5: Identify representative areas to show the USFS team, which demonstrate the variety of resources on the MLW landscape, along with the threats to these resources and the challenges facing managers of the MLW landscape. Local stakeholders and other entities operating in the landscape (local and international NGOs, logging companies, etc) should also be informed of the teams arrival and purpose of the mission, and be given an opportunity to interact with them so that the USFS team can obtain a better sense of the range of perspectives, opinions, needs, and social and economic forces acting on the landscape.
Responsible party: AWF working with other stakeholders

#6: In-country logistical support:
- **a)** Inform local DRC officials of team's arrival and purpose of their engagement in region.
- **b)** Arrange for meetings with appropriate key officials.
- **c)** Arrange for in-country transportation and necessary lodging reservations.
- **d)** Arrange for a translator to accompany the USFS team during the mission.

Responsible party: AWF

#7: Prior to the arrival of the USFS team, AWF will gather all available and relevant information on the landscape for the team to review to allow them to adequately prepare for the work to be done while in-country. As much as possible, this information should be sent to the USFS team electronically prior to their arrival. Any documents not available in an electronic format should be made available to the team upon arrival.
Responsible party: AWF

4. Deliverables

The USFS team will produce a report detailing activities during the mission and all results and findings of the work toward the accomplishment of those objectives listed above. This report will include but not be limited to:

- **a)** A discussion of the landscape planning approach recommended for the MLW landscape and an assessment of its usefulness as a model for developing similar plans on other landscapes.

b) An assessment of the state of available information on the landscape's resources and people, and the interactions between the two. This section should also propose prioritized data collection needs.

c) A prioritized list of future tasks that should be addressed in advancing the landscape planning process for MLW and the implementation of the plan, including any future role for USFS technical assistance. This section will include a discussion of any possible USFS role in providing more detailed assistance for land use planning on any community use or extraction zones on the MLW landscape.

Appendix II: AWF Objectives in MLW

The Maringa-Lopori-Wamba landscape project exists to contribute to the strategic objective of CARPE, that is, to reduce the rate of forest degradation and loss of biodiversity through increased local, national, and regional natural resource management capacity. AWF applies the Heartland Conservation Process (HCP) (Appendix F) to MLW for land use planning with the aim of completing a management plan design for specific zones within MLW. Strategies to achieve these goals rely heavily on capacity-building activities and on the establishment of monitoring and surveillance systems. Essentially the Heartland Conservation Process entails winning the confidence of the local population, collection of biological and socio-economic information, and capitalizing on opportunities for conservation. HCP includes several stages:

a) Mandate building (*building local and national support for AWF involvement*)
b) Participatory planning meetings
c) Site conservation target and goal setting
d) Socio-economic analysis
e) Threat and opportunity analysis
f) Implementation planning

Specific objectives

The specific objectives refer to the three Intermediate Results totalling 6 Indicators as indicated in the CARPE Monitoring Matrix.

Intermediate Result 1 – Natural resources managed sustainably (four indicators):

1. landscape covered by integrated land use plan
2. different use zones with sustainable management plans
3. landscape with surveillance system for illegal logging
4. landscape implementing standardized bushmeat surveillance.

Success to achieve *Intermediate Result 2* – natural resources governance (institutions, policies, laws) strengthened – will be indicated by the full participation of relevant stakeholders and residents in the development of management plans, by increased citizen partnership in the policy process, by NGO advocacy initiatives and activities, and by education and training sessions.

Indicators for *Intermediate Result 3* – Natural resource monitoring institutionalized – are the quality of the input in the annual "State of the Congo Basin Forest" report and the establishment of a landscape monitoring network.

One or more specific objectives respond to each indicator. These specific objectives correspond to the 3-year target values as listed in the MLW-USAID Performance Monitoring matrix. For each Specific Objective, there is a leading partner (AWF, CARE, CI) and where possible a leading source person. Each Specific Objective elaborates a logical framework. Here is the outline for a logical framework for objectives 1, 7, and 8. For the other specific objectives, there is referenced the related source person and logical framework.

Intermediate Result 1. Indicator 1

Specific Objective 1: Land use planning process on MLW convened.

AWF aims to work towards an integrated land use management plan via a planning process that involves all stakeholders. Existing zoning includes logging concessions and the 600 km^2 Scientific Reserve of Luo. Most logging concessions are inactive and some are probably incompatible with the new forest code. The MLW project plans to evaluate these concessions. The MLW landscape offers a unique opportunity to zone with little hindrance from existing zones. However, landscape access is difficult and very little is known about the biodiversity and the complex socio-economical conditions.

In FY05, AWF collected data across 70% of the landscape, held the first stakeholder meetings, and identified priorities. Yet, to outline a management plan design, data collection in the remaining 30% of the landscape is needed. A major deliverable will be a map with indicative macro-zoning of the landscape.

Stimulating agriculture is a landscape-wide first priority. During the last two decades, the infrastructure deteriorated and the economy collapsed, making urban markets for agricultural products in the landscape no longer accessible. People returned to the forest for bushmeat hunting and fishing, two quick-return commercial activities. Local populations insist that they prefer to work on their plantations and to live within the more comfortable social environment of their natal villages. Based on the expressed needs and interests of the local population and the potential positive impact on biodiversity, AWF has made the stimulation of agricultural production the spearhead activity. The conservation logic for this approach is to relieve the hunting pressure through alternative livelihood options thus protecting the landscape's biodiversity. An agro-economist has been hired to focus on this activity and a strategy document and logical framework have been produced.

Intermediate Result 2. Indicator 2

Specific Objective 2: Land management planning process convened and management plan design completed for the proposed Lomako-Yokokala Protected Forest (350,000 ha).

One approach for protection of biodiversity is the creation of Protected Area Zones. About 8% of the surface of DRC is protected, yet, the Congolese government desires at least 15%. The Lomako-Yokokala forest block (about 3,600 km^2) has been identified by the Congolese Institute for Nature Conservation (ICCN) as an area that should receive protected status. AWF supports the ICCN in this objective and both parties have signed a memorandum of understanding and developed a strategy document and logical framework.

Specific Objective 3: Land management planning process convened and management plan design completed for the Community Based Natural Resource Management Area (CBNRMA)-Lomako (500,000 ha?).

Specific objective 2 covers about 30% of the *Groupement* Loma (*groupement* is an administrative entity that refers to a group of villages). When 30% of the territory used by the people of Lomako becomes "protected", one has to consider effects on the remaining 70%. AWF proposes to guide the local communities towards sustainable self-management of their natural resources. While AWF has requested funding for the establishment of this CBNRMA, CARE is taking the lead on this activity.

Specific Objective 4: Land management planning process convened and management plan design completed for the CBNRMA in the Djolu area (400,000 ha).

Local NGOs from the Djolu area created an association of local NGOs. AWF and this NGO association, in close collaboration with the general population, analysed the opportunities for the establishment of a CBNRMA. An area of about 4,000 km^2, adjacent to the Wamba Committee for Bonobo Research-site, was identified for this purpose. The area is easily defined by roads, and it potentially harbours important populations of bonobos, forest elephants, and other important species. A strategy document and logical framework that describes this strategy have been developed.

Specific Objective 5: Land management planning process convened and management plan design completed for the Kokolopori area (600,000 ha).

For several years, Bonobo Conservation Initiative (BCI) has supported the local NGO, Vie Sauvage, for the creation of a community reserve. Conservation International supports BCI in its efforts.

Specific Objective 6: Land management planning process convened for a forestry concession

The MLW landscape is characterized by potentially very high coverage by logging concessions. Logging activities are known to be directly and indirectly related to habitat destruction and loss of biodiversity. AWF proposes to develop a partnership with logging concessions for the implementation of improved management practices. After having identified the logging companies that are potentially active in the MLW landscape, and after initial negotiations, AWF awaits a consultant's report on "logging concession assessment and best practices".

Intermediate Result 1. Indicator 3

Specific Objective 7: Surveillance system to detect logging outside approved concession areas in place.

Intermediate 2 refers to strengthening natural resource governance. The former SubIR 2.3. referred to the strengthening of civil society and NGO capacity to pressure the government to prevent illegal exploitation of resources. Logging will most probably remain the major industrial activity in the MLW landscape. Meanwhile, local populations express increased concerns about the approach of those logging companies. AWF plans to implement a surveillance system to detect logging outside approved concessions. This system will be developed in collaboration with local communities. For this specific objective, AWF will select a consultant who will prepare a strategy document on the implementation of a community-based surveillance system. AWF's Landscape Information System Officer will be involved in this process.

Intermediate Result 1. Indicator 4

Specific Objective 8: Standardized bushmeat data collection at a number of markets in place.

With the disruption of agriculture, and increased poverty, local communities rely mostly on bushmeat and fishing for animal protein and for trade. The implementation of a standardized bushmeat surveillance system is a major indicator of Intermediate Result 1. Before implementing a surveillance system, more research is needed on the most appropriate methodology. AWF plans a first landscape-wide surveillance of bushmeat trade in urban

markets. Simultaneously, scientific research through surveys will be carried out on the ground for validation of the implemented surveillance system and for the outline of guidelines for implementation in other landscapes. Once funding is obtained, this work will be done in partnership with the Durrell Wildlife Conservation Trust.

Intermediate Result 3

Specific Objective 9: Landscape Information System comprised of ranger-based monitoring, socio-economic monitoring, and satellite imagery.

Specific Objective 10: Integration of MLW monitoring system in regional initiatives.
Specific Objectives 9 and 10 refer to Intermediate Result 3. AWF will establish a dynamic map of the landscape that will be updated automatically as information on biodiversity, socio-economics, or information from the surveillance system, comes in. This map of linked information will be available to the public.

Appendix III: Examples of Micro Zoning and Criteria for Zoning from Madagascar

Exemple Liste des Critères de Zones

1. Type de forêt(cf loi 97/017)
Forets Ires/Galeries
Forets IIres et lambeaux Forets Ires
Forets Iires
Formations arbustives
Forets de basse altitude
Forets de haute altitude

2. Pédologie/Géologie
Sols très érosifs
Sols très fragiles
Potentiel minier

3. Topographie
Pentes
Relief (crête, talweg, vallon, etc.)

4. Hydrologie
Presence de zones humides
Presence de cours d'eau
Presence de source
Source d'eau domestique

5. Utilisations permanentes ou temporaires des ressources
(sol, sous- sol, vegetation, eau, etc.)
Pâturage
Tavy
Feux
PFNL
Exploitation locale du bois
Exploitation commerciale du bois
Champ de culture
Carreaux miniers
Site culturelle
Infrastructure
Lieu de chasse, pêche

6. Biodiversité (faune, flore)
Presence d'espèces endémiques
Presence d'especes menacées,

7. Socio- économie
Démographie
Migration
Niveau d'instruction
Besoins en bois
Pressions spécifique sur les
Ressources (Proximité de village ou hameau par rapport aux ressources, …)
Secteur d'activité
Accessibilité aux ressources (par rapport aux infrastructures)
Habitude ethnique

Zone A – Parc National

Definition : Zones gérées par ANGAP

Zone A1 – Parc National a vocation touristique
Zone A2 – Recherche
Zone A3 – Conservation de la biodiversité
Zone A4 – Zone d'Occupation et/ou d'Utilisation Contrôlée (ZO/UC)
Zone A5 – Zone de service

Zone B – Reserves Speciales

Definition : Zones gérées par ANGAP

Zone B1 – Reserves Speciales a vocation touristique
Zone B2 – Recherche
Zone B3 – Conservation de la biodiversité
Zone B4 – Zone d'Occupation et/ou d'Utilisation Contrôlée (ZO/UC)
Zone B5 – Zone de service

Zone BV: Bassin versant de régulation

Définition : zones importantes pour la régulation et ou zones sensibles à l'érosion

Zone F1 – Zone d'aménagement de BV où seule la restoration des sols est permise
Zone F2 – Zone d'aménagement de BV où seul le droit d'usage du bois est permis
Zone F3 – Zone d'aménagement de BV pour la protection des zones humides
Zone F4 – Zone d'aménagement de BV pour les pratiques agricoles durables
Zone F5 – Zone d'aménagement de BV pour approvisionnement en eau potable

Zone C – Reserves Naturelles Integrales

Definition : Zones gérées par ANGAP

Zone C1 – Réserves Naturelles Intégrales à vocation de stricte conservation
Zone C2 – Réserves Naturelles Intégrales à vocation de recherche

Zone D – Site de Conservation

Definition : Zones concues et identifiées par le Groupe Vision Durban

Zone D1 – Site de Conservation à vocation de stricte preservation
Zone D2 – Site de Conservation à vocation d'utilisation locale durable
Zone D3 – Site de Conservation à vocation touristique
Zone D4 – Recherche

Zone E – Ecologie hors AP et SDC

Définition : Zone écologique importante au niveau regional

Zone H1 – Zone écologique pour la conservation de la biodiversité
Zone H2 – Zone écologique pour les habitats et la diversité (Reproduction, migration, etc...)
Zone H3 – Zone écologique pour la presence d'especes importantes
Zone H4 – Zone écologique pour la recherche
Zone H5 – Zone écologique pour le piegeage de carbone
Zone H6 – Zone écologique a vocation touristique
Zone H7 – Zone écologique pour les zones humides et les systèmes ripicoles

Zone H8 – Zone écologique pour la restoration
Zone H9 – Exploitation des Produits Forestiers Non Ligneux (PFNL)

ZONE F – Forêt classée et Réserve forestière

Définition : Forêt mise en réserve
Zone J1 – Zone réservée pour l'exploitation forestière
Zone J2 – Zone réservée pour l'Ecotourisme
Zone J3 – Zone réservée pour les Sites de conservation
Zone J4 – Zone réservée pour la Conservation de la biodiversité
Zone J5 – Zone réservée pour la Protection du Bassin versant
Zone J6 – Zone réservée pour l'exploitation des PFNL

Zone FP – Forêt piège

Définition : Surfaces intensivement aménagées entre les localités et les forêts
Zone E1 – Zone de forêt piège sur les Tanety
Zone E2 – Zone de forêt piège avec une large composition de forêt secondaire
Zone E3 – Zone de forêt piège a vocation de reboisement

Zone P– Production

Définition : zone d'exploitations des ressources forestières
Zone G1 – Zone de production pour l'utilisation locale des PFNL
Zone G2 – Zone de production pour l'exploitation du pâturage
Zone G3 – Zone de production pour la gestion communautaire (TGRN)
Zone G4 – Zone de production pour l'exploitation commerciale du bois

Zone R – Reboisements et RFR

Définition : Reservés au reboisement (P.R.R)
Zone I1 – Reboisement pour l'utilisation locale
Zone I2 – Reboisement pour l'exploitation commerciale
Zone I3 – Reboisement pour la protection de BV
Zone I4 – Exploitation des PFNL
Zone 15 – Zone dénudée réservée aux reboisements

ZONE S – Station forestière

Définition : Sites forestiers à vocation spécifiques
Zone K1 – Récréation et écotourisme
Zone K2 – Recherche
Zone K3 – Piégeage de carbone
Zone K4 – Exploitation forestière
Zone K5 – Exploitation des PFNL

Zone SP – Zone privée

Définition : Zone appartenant à des privés

Pour mémoire: * Site du patrimoine mondial

Matrice No 1

Critères de zones pour la localisation sur le terrain

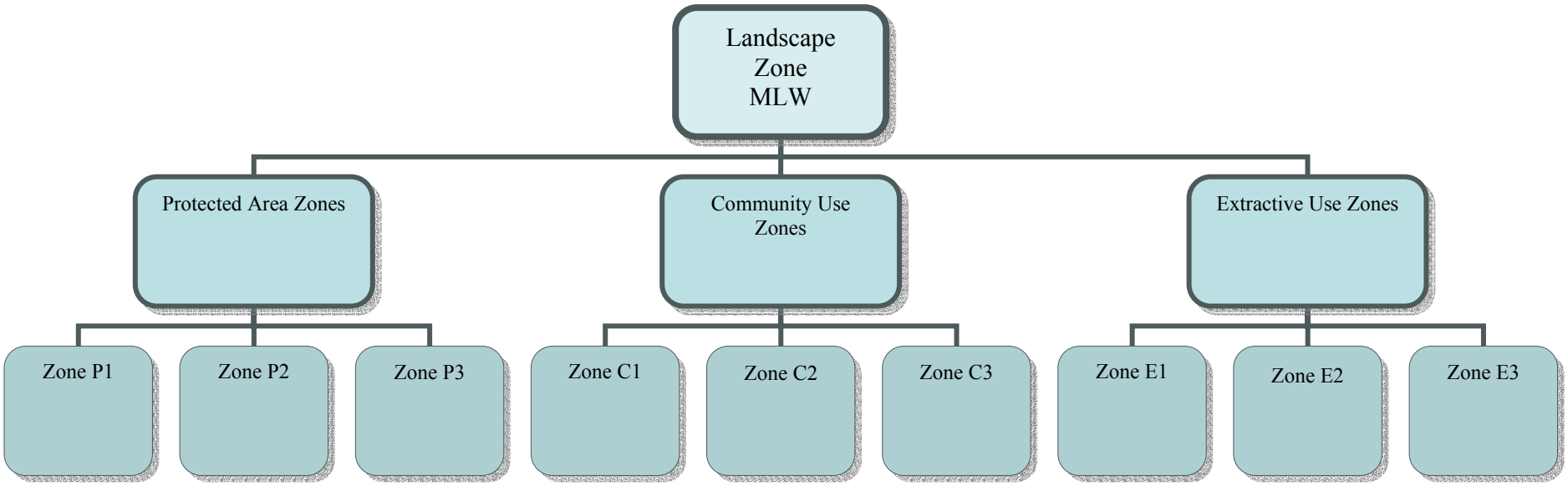
Criteres	Zone A Parc	Zone B R S	Zone C R N I	Zone BV	Zone D Site de Conserv	Zone E Ecologie	Zone F Forêt classée	Zone FP Forêt piège	Zone P Production
Type de forêts									
Forêts Ires/Galeries									
Forêts IIres et lambeaux Forets Ires									
Forêts IIres									
Formations arbustives									
Forêts de basse altitude									
Forêts de haute altitude									
Pédologie/Géologie									
Sols très érosifs									
Sols très fragiles									
Potentiel minier									
Hydrologie									
Présence de zones humides									
Présence de cours d'eau									
Présence de source									
Source d'eau domestique									
Utilisations de resource									
Pâturage									
Tavy									
Feux									
Utilisation des PFNL									
Exploitation locale du bois									
Exploitation commerciale du bois									
Riziculture									
6.Biodiversité (faune, flore)									
Présence d'espèces endémiques									
Présence d'espèces menacées									
Socio- économie									
Haute densité de population									

Matrice No 2

Exemple de Tableau de clarification des activités prioritaires des zones

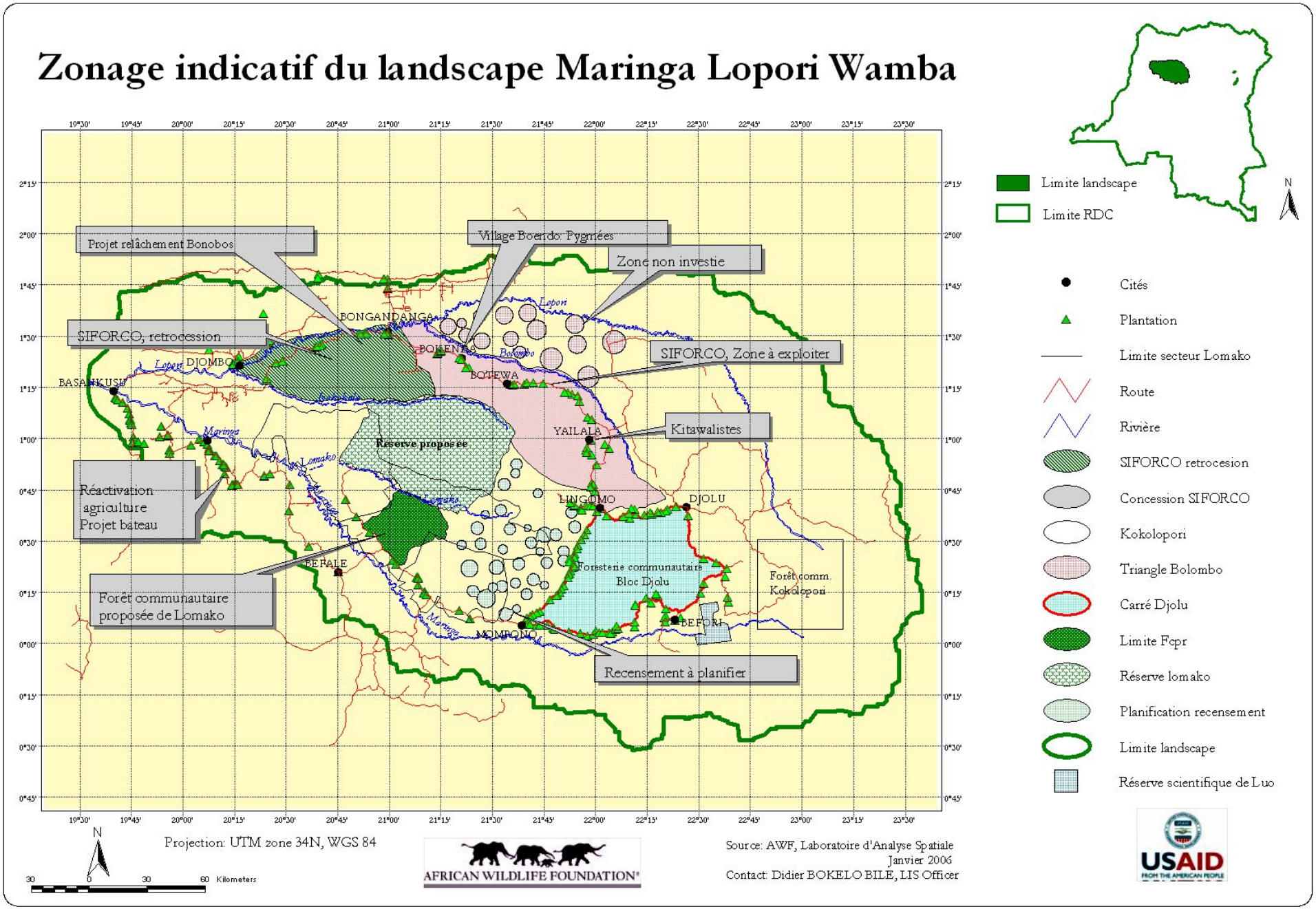
Classe d'activités	Zone B Réserves Spéciales	Zone BV Aménagement de BV	Zone P Production	Zone E Ecologie	Zone R Reboisement
Biodiversité	Primaire	Secondaire	Secondaire		
Piégeage de Carbone	Primaire	Secondaire	Secondaire		
Ecotourisme	Primaire	Tertiaire	Tertiaire		
Recherche	Primaire	Primaire	Primaire		
Bois de construction	Interdit	Primaire	Secondaire		
Bois d'energie	Secondaire	Primaire	Secondaire		
PFNL	Secondaire	Primaire	Primaire		
Protection du sol	Primaire	Secondaire	Primaire		
Protection de BV	Primaire	Secondaire	Primaire		
Hydrologie	Primaire	Secondaire	Primaire		
Paturage	Tertiaire	Primaire	Secondaire		
Mine	Interdit	Secondaire	Tertiaire		
Agriculture	Tertiaire	Primaire	Tertiaire		
Route	Secondaire	Secondaire	Secondaire		

Appendix IV



A simple schematic representation of potential zoning in the Maringa-Lopori-Wamba landscape. The landscape zone has already been established by CARPE and presumably approved by DRC. The immediate priority is to delimit the boundaries of proposed Protected Area Zones, Community Use Zones, and Extractive Use Zones. Such zones would then have to be legally established by the DRC government. Once established by law or ministerial decree, management plans would be developed for each Protected Area Zone, Community Use Zone, and Extractive Use Zone (for Extractive Use Zones, the timber company would have to prepare a management plan prior to certification). Each management plan would further define zoning. For example, one type of Protected Area Zone is a national park. A national park in MLW could be zoned into tourist areas (Zone P1), biodiversity conservation areas (Zone P2), and controlled utilization areas (Zone P3), to name just a few potential zones.

Appendix V: Principal areas in MLW where AWF is engaged in protected areas, community use areas, and extractive use areas.



Appendix VI Ecoregional Planning by The Nature Conservancy in the United States

The ecoregion represents TNC's *strategic* level of conservation planning. Within each ecoregion TNC identifies and prioritizes the sites that TNC will work on over the coming years. TNC further subdivides these areas of relatively homogeneous climate, topography, geology, and vegetation into smaller units. This allows the stratification of each ecoregion internally to ensure adequate representation and variability of each targeted biological element, as well as coarser filter ecological systems and ecological land units. Ecoregions are very large in North America as well as Africa. MLW resides within the Central Congolian Lowland Forests ecoregion and Eastern Congolian Swamp Forests. Although CARPE conservation planning is based upon landscapes rather than entire ecoregions, the TNC planning approach nevertheless can be applied to MLW.

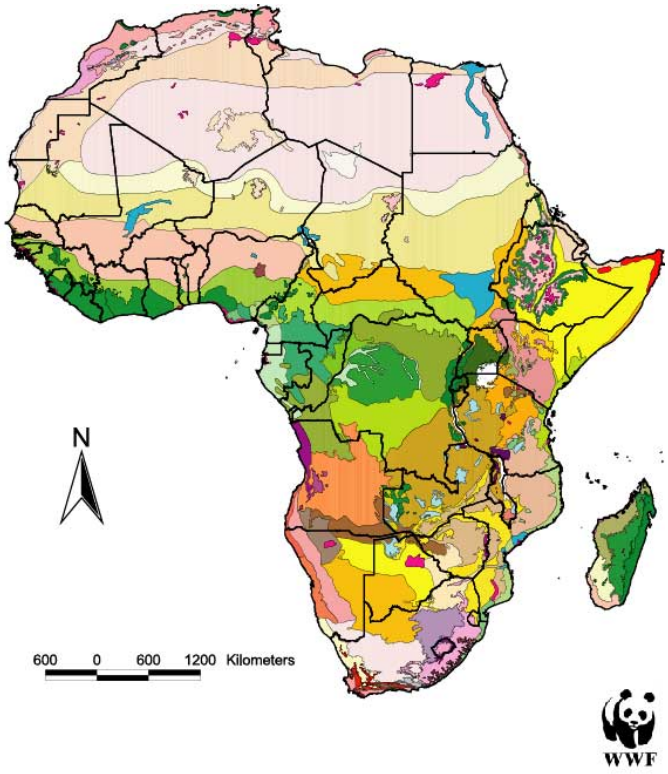


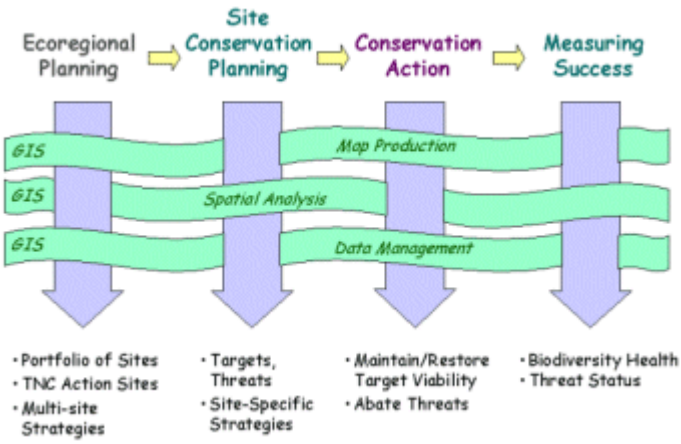
Figure 6. Ecoregions of Africa

Planning information in the U.S. includes species and habitat occurrences, satellite images, land use/land cover, ownership, water bodies, watersheds, roads, elevation, landforms, political boundaries, census data, and geology maps - data similar to what AWF has been collecting. Unlike in MLW, most of these data sets exist and can be easily obtained. However, even with limited data it may be possible to develop zoning scenarios for strategic long term decisions in MLW.

TNC analyses data layers and selects sites, or, for the purposes of MLW, Protected Area Zones, Extractive Use Zones and Community Use Zones. The next step is site conservation planning, the *tactical* level of planning, where TNC identifies and prioritizes the conservation actions that will be conducted at each portfolio action site through the "**Five-S**" approach to site conservation planning. One could label this micro-zoning.

- **Systems** - Planning teams view the locations of conservation targets (i.e. species and habitat occurrences) occurring at a site, as well as features representing the natural processes that maintain them. Spatial and statistical analyses are conducted to determine relationships between targets and other features, thus providing a scientific understanding of the systems at a given site. Predictive models can also be developed to identify potential locations in which to find or restore particular species, communities, or processes.

- **Stresses** – Planning teams analyze the extent of habitat destruction, degradation, or impairment afflicting the systems at a site, including fragmentation, pollution, hydrologic alteration, and invasive species.
- **Sources** - The agents generating the stresses, such as incompatible land and water use are identified. Historic and current land use, mining, timber harvesting, and roads are mapped, as well as the ownership, zoning, and administrative boundaries that affect the location of stressors.



Ecoregional planning (zoning) by The Nature Conservancy in the United States.

- **Strategies** - Conservation activities are selected to abate stresses and to maintain, enhance, or restore the systems. The site (e.g., MLW) is zoned to delineate specific areas to receive various types of protection and management, regulatory controls, or compatible economic development.
- **Success Measures** - Conservation actions are expensive and are often planned and implemented in a context of change and uncertainty. Therefore, conservation strategies can be modified to achieve greater success. Efficient monitoring schemes are developed to optimize field work and data collection.
- **Protection and Stewardship** - Conservation action, the implementation of protection and stewardship, is the next step. With strategies in place and zones defined, the where, why, and how of biodiversity conservation becomes clear.
- **Uncertainty** - The concept of Adaptive Management has been embraced by many agencies and NGOs, including AWF in MLW. Adaptive management recognizes the complexity and dynamic nature of ecosystems, and seeks to conduct, evaluate, and refine management activities over long time periods despite scientific uncertainty and changing conditions. Monitoring data are used to assess trends in ecosystems and conservation targets and to evaluate the success of management

Appendix VII – Conserveonline Ecoregional Planning Tools

Standard 11 Unit

Standard 11: Design ecoregional portfolios/ biodiversity visions to best meet goals for all conservation targets/ biodiversity elements, using the principles of efficiency, representation, irreplaceability, and functionality. [plan]

Rationale

Ad-hoc conservation is blind investment and lacks context. A comprehensive vision (portfolio) should identify a suite of places that contains occurrences of biodiversity targets/elements that are necessary to conserve biodiversity representative of an ecoregion. This vision/portfolio should ensure that the relative contributions of an investment strategy are understood in a regional context. Conservation assessments need to be current to define the present arenas for actions in a comprehensive yet efficient way to inform our actions and those of partners and stakeholders given the changing landscape of biodiversity patterns, threats, and conservation opportunities. In addition, visions/portfolios are the framework for measuring conservation progress within an ecoregion.

Recommended Products

- *Description of design goals, criteria, approach, methods, assumptions, tools and rationales.*
- *Assessment of the conservation management status of lands and waters (e.g. IUCN protected/managed area categories, management strategies such as fire and sustainable water management, invasive species control, etc.).*
- *Approaches and tools used to generate vision/portfolio (e.g. expert workshops, optimization tools such as SITES, SPOT, MARXAN, EPAT) and rationales.*
- *For cases where optimization tools have been used, clear descriptions and rationale for inputs and values such as cost surfaces.*
- *Shape files and maps of areas of biodiversity significance and patterns of threats. Include alternative risk and updated scenarios where available.*

--Standards for Ecoregional Assessments and Biodiversity Visions

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Guidance

One of the final products of an ecoregional assessment/vision is a set of areas of biodiversity significance which define a solution set to most efficiently and effectively conserve the biodiversity of an ecoregion. These areas are collectively called a portfolio or a vision. These areas are not conservation sites in the sense that they define the places where all strategies need to be implemented. They do not provide accurate boundaries for protected area design, or for maintaining corridors and functional landscapes. These are products of more detailed, finer-scale assessments. The areas that are mapped are locators for the places that contain the things we are interested in conserving. We refer to them as *areas of biodiversity significance.*

The portfolio is one version of a solution set to represent comprehensively, the biodiversity of an ecoregion in an efficient and effective manner. Portfolios are designed to best achieve the conservation goals set for targets in the least number of places and areas of lands and waters. Current conservation and resource management practices, land ownership, levels of threats, and costs of implementing conservation actions are all considered when selecting geographic priorities for a portfolio.

Portfolios are created to focus conservation actions on those places that will make the greatest contribution to the comprehensive conservation of the biodiversity of the ecoregion. They create a common focus to galvanize actions among many conservation and resource management partners. Portfolios are not merely maps. They include all of the underlying data that provide information on the species, communities, ecological systems and other targets that reside in the area of biodiversity significance. Portfolios contain information on target location, ecological processes maintain targets, and target viability/integrity. Additionally, they contain information on the scope and severity of threats among the area of biodiversity significance, current levels of protection, stewardship and management. Collectively, this data is helpful for informing priorities for actions, development of area-based and multi-area strategies, and measuring success.

Designing ecoregional portfolios or visions requires understanding:

- The principles of portfolio/vision development
- The general process to create a portfolio/vision
- Multiple scenarios
- Conservation outside of the portfolio/vision
- Integration of marine, freshwater and terrestrial portfolios
- Updating and revising portfolios/visions
- Tools for designing portfolios/visions

Principles of Portfolio Development

There are several elements that we consider an integral part of portfolio development. Portfolios should be assembled to maximize effectiveness, representation and efficiency, integrate marine, freshwater and terrestrial targets and minimize implementation costs. These elements are defined as:

Effectiveness- Represent the greatest number of viable occurrences of all fine- and coarse-scale targets in the ecoregion that either achieve or make progress towards numerical conservation goals. Effectiveness can be achieved by selecting areas based on coarse-scale targets first and then fine-scale targets, or vise-versa. Since they are not expected to be correlated, the steps in the process should not matter.

Representation- Capture multiple examples of all conservation targets across the diversity of environmental gradients appropriate to the ecoregion in accordance with distributional goals (e.g., ecoregional section or subsection, ecological land unit (ELU), ecological drainage units, zoogeographic sub-units or some well defined biological or physical gradient).

Efficiency- Capture the most viable occurrences of targets in the least number of places and in the smallest area across the ecoregion. This results from selecting areas that contain multiple targets, often at multiple scales, such as ecological systems, communities and species targets in the same place.

Integration- Give priority to sites that contain high-quality occurrences of terrestrial, marine and freshwater targets. This could be considered efficiency.

Cost- Design the portfolio to be comprised of those places that are least threatened and the lowest cost of implementing conservation strategies.

The General Process to Create a Portfolio

Portfolios are generally derived from a set of processes that define a number of alternative outcomes and reviews and refinements of them. These outcomes are intended to most efficiently and effectively make progress towards conservation target goals. When there are many options for where to identify lands and waters that contain different combinations of species, communities and ecological systems, the viability/integrity of targets, the degree of threats to them, their proximity to each other, their inclusion or proximity to existing protected lands and waters, and the importance that different targets are given, all play into the solutions that are generated.

Areas of biodiversity significance and the portfolio as a whole are developed using information on targets and their occurrences. Different weight is often given to different target types or targets with different attributes. For instance, highly threatened and endangered species with a G1 ranking might be given a higher weight than a G3 species. An endemic ecological system may be given a higher weight than a common and widely distributed one. This does not mean that the lower weighted targets are not included in the portfolio. When using optimization programs, targets that have higher weights are put into the portfolio first, and other targets are selected to fit their context in an efficient and effective manner.

Landscape information on threats is generally used to create a cost layer for portfolio design. This informs scenarios to create a portfolio that takes into account the potential risk and cost of conservation actions, in addition to the efficiency and effectiveness of capturing conservation targets. One of the major threats to biodiversity is global climate change. The Nature Conservancy's Climate Change Initiative has recently developed data and methods to incorporate the potential impacts of climate change into portfolio design. While not wide spread, this information should be taken into account when developing portfolios. An example is presented as a case study.

Another important source of information on cost is protected and managed areas. It is often assumed that protected areas and many managed areas already confer sufficient or significant conservation protection to biodiversity targets and therefore have no, or very low cost associated with them. Using these as "seed" areas allows initial focus for portfolios by including target examples that are already protected, and provide opportunities to build upon them as core conservation areas. The process of using this information is analogous to conducting a GAP

analysis, where the types of conservation targets and the number of examples that exist in protected areas, in well managed areas for biodiversity conservation, or are under some form of conservation management are assessed, and additional areas are identified to fill in the "gaps" in conservation. The process used to develop a portfolio takes it one more step by using the current areas that confer conservation management and using them to influence the design of the portfolio.A great need which has lacked focus and development has been designing ecoregional portfolios using design goals to create and maintain functional areas of biodiversity significance and landscapes within ecoregions. Integrating the needs of targets for connectivity, natural disturbance regimes, environmental heterogeneity and other landscape processes and patterns has been lacking in most ecoregional portfolios. Many conservation planners suggest that design goals are a second phase akin to site conservation area planning, and require more detailed information and assessments. This may be true, but there is room for initiating the process at the initial portfolio design state.

A last component that has been lacking in most ecoregional portfolios is restoration areas. In highly impacted ecoregions, restoration is the only option to achieve conservation goals for many targets. Defining the specific places to implement this strategy can provide much needed focus for conservation investment. Careful evaluation of restoration potential and target needs is necessary to develop this component of a portfolio. See links to restoration guidance in the resource section.

Multiple Scenarios

It is not uncommon in relatively intact landscapes to have many solution sets, or scenarios for portfolios. Another situation which generates multiple solutions is the use of varying goal scenarios based on different levels of risk. Generally, multiple risk scenarios with different solutions in fragmented landscapes build upon a basic set of areas, as opposed to multiple scenarios in intact landscapes where there are a multitude of target occurrences to choose from. In each of these cases, optimization programs are generally used to generate scenarios which are reviewed by experts to refine and generate a portfolio. In some cases, multiple sets of portfolios for the same ecoregion are generated.

In highly fragmented landscapes, there are often few if any alternatives for a portfolio. Many portfolios in these landscapes are generated without the assistance of portfolio assembly programs. However, the same expert input and review are required and underlying data exist in these portfolios as well.

Conservation Outside of the Portfolio

Multiple portfolios can create confusion when discussing sets of priorities for conservation actions. However, many stakeholder's priorities may not be included in a given portfolio even if they contain examples of many of the targets. This situation can arise for many reasons. The examples of those targets may not have the highest viability/integrity ranks, or have the lowest levels of threats affecting them. At the scale of an entire ecoregion, these examples might not be the most efficient places to work. They may be places that contain single species, as opposed to having those species in areas where many other target species occur. The portfolio does not

preclude incorporating the contribution of conservation actions on lands and waters that are not in the portfolio.

Many stakeholders are limited where they can work, and are already conducting actions outside the portfolio. The ultimate measure of conservation progress is the extent of the effective conservation of viable target examples in relation to goals, and there are often examples that are not within the portfolio which can contribute to this. This situation is not uncommon and can be dealt with in several ways. When developing portfolios, optimization outputs are not seen as the ultimate portfolio. Including areas that have viable target examples that are under management or actions of partners and stakeholders that are probably going to implement conservation actions can be included in the portfolio. Another approach is to generate scenarios based on current and potential future conservation actions. This allows real-time portfolios/visions to be generated based on alternative courses of actions. These portfolios can be tailored to specific partners and stakeholders, and create a custom portfolio which provides a focus for a sub-set of the partners and stakeholders in the ecoregion. The most important aspect of any of these approaches is that the contribution of any conservation actions to viable target examples is tracked, and the impact to potential future portfolio design is assessed.

Integration of Marine, Freshwater and Terrestrial Portfolios

Portfolios are commonly created separately for freshwater, terrestrial and marine targets. Strength in this approach is that the optimal solution for each realm is not compromised by other realms. A technical issue is that terrestrial, freshwater and marine ecoregions are distinct polygons, and developing portfolios for targets based on the separate ecoregional frameworks stays true to the ecology and the abundance and distributional (stratification) goals set for the taxa that comprise the different realms. Results from separate portfolios are overlaid and a grand portfolio for a region can be generated.

Alternatively, integrating these different realms from the beginning can result in a more efficient portfolio, and provide a better ability to focus conservation actions which integrate terrestrial, freshwater and marine ecosystems much more effectively. This approach is probably best taken in more intact landscapes where there are options for terrestrial, freshwater and marine priorities, and integrated options can be achieved without compromising the targets of any realm.

Updating and Revising Portfolios

Portfolios/visions should be updated when there are new data available, or review and partner or stakeholder input that suggest potential for changes in the focus of conservation actions. These data include new information on viability, threats, protected/managed areas, conservation actions, biodiversity surveys and other information. The time frame for updating information and evaluating a portfolio/vision is dependent on the degree of change in the patterns represented by the data, and their potential impact to change the foci for conservation actions. Updates to portfolios/visions should not necessarily require the level of analyses conducted to generate the first iteration of the portfolio, but they may. Areas of biodiversity significance can be added when data identify additional examples of targets that meet criteria for inclusion. These examples may arise from discovery of new examples or examples that have had their viability and threats

change to levels that meet criteria for inclusion. Areas may be omitted because the examples of targets have had their viability and threats change to levels that no longer meet criteria for inclusion. The amount of new information and degree of change in ecoregions will ultimately determine the degree of analyses that should be conducted.

Tools for Portfolio Design

Portfolio design techniques range from solely engaging expert knowledge and opinion to using computer assisted algorithms to solve complex calculations. All approaches provide a set of options that should be reviewed by and acceptable to partners and fulfill the principles of portfolio design.

Expert workshops engage scientists who have knowledge regarding species, ecosystems and geographical areas. Virtually all ecoregional assessments and biodiversity visions are developed with the supporting knowledge that experts provide, regardless of the extent of reliance on computer algorithms. Some assessments rely more heavily on experts to provide information on conservation targets or to help define the important areas that should be part of the portfolio of sites.

There are a variety of computer-assisted portfolio development tools. Each one has its strengths and weaknesses and different levels of complexity. However, the computer-assisted tools use the same principles and produce comparable results. The choice of tools should be based on information availability and the level of complexity being addressed. The Conservancy has used computer-assisted portfolio development and optimization tools such as MARXAN, SITES, SPOT and to a lesser extent, EPAT and C-PLAN. EPAT is a computer-assisted portfolio design tool that keeps track of the targets that have been incorporated into the portfolio. The other four tools are optimization programs that have been used for point, linear and polygon representations of targets. Regardless of the specific tool chosen, the best results occur when computer algorithms are combined with expert knowledge.

Expert workshops

Portfolios developed with expert knowledge as the primary or secondary source of information on the biodiversity have certain caveats. Experts may be biased towards certain taxonomic groups or limited to very specific geographical areas. However, in situations where data is limited or not very reliable, experts not only provide data on conservation targets, goals, condition, distribution, ecological processes, viability but also aid in the portfolio design itself and evaluating the results.

The Nature Conservancy has developed over 40 ecoregional assessments with expert workshops as a primary tool for portfolio development. Most of these workshops were supported by GIS data analyses prior, during and after the workshops (overlays, buffers, biodiversity index, etc.). At the workshops, experts are asked to provide geographical distribution of conservation targets, the condition of these targets, potential threats to the conservation target, among other information. Once the information on conservation targets has been analyzed, experts review the proposed portfolio and may provide additional information to support site Conservation Action

Planning input on site-specific threats, opportunities and strategies. This step is more common when there is a limited amount of data that need the review of experts. GIS analysts and data managers must work closely with the experts to ensure that all data is captured and appropriately stored for further analysis.

Other teams use expert workshops to derive their entire portfolio by consulting experts and requesting them to draw the areas they consider important on paper maps or GIS layers. These expert-derived drawings are later digitized and analyzed with available data to confirm that the portfolio achieves the principles of portfolio design. This step is more common when conservation target data is virtually non-existent and/or when resources (GIS experts, GIS equipment, data acquisition, etc.) are scarce.

Expert workshops are an opportunity to have peers and partners provide not only information regarding targets and their condition, but also the opportunity to provide input and refinement to the development of the portfolios which may be at the stage of an optimization output from a computerized algorithm. Data management of the information that is gathered during these workshops is critical to further update the portfolios when more data is available.

Portfolio Selection Software

What follows is a description of the most frequently utilized software programs used to assist the portfolio design process for ecoregional assessments. Choosing the best tool for portfolio design in any ecoregion requires the consideration of the condition of the landscape, data availability, and desired outcomes. Further information pertaining to each of these tools can be found in the Case Studies, Tools and Resources sections of this document.

SITES

Sites 1.0 is a customized ArcView project that facilitates designing and analyzing alternative portfolios. The software in Sites 1.0 to select regionally representative areas of biodiversity significance for the conservation of biodiversity is called the Site Selection Module (SSM). It is a streamlined derivative of SPEXAN 3.0 (Spatially Explicit Annealing) that was developed by Ian Ball and Hugh Possingham. SPEXAN was originally developed as a stand-alone program with no GIS interface for displaying portfolios and ancillary spatial data. The model was applied in two TNC ecoregions--the Idaho Batholith and the Northern Sierra Nevada.

12 TNC assessments in the US and abroad have used this tool.

SPOT

SPOT is a newly coded software based on SITES using the same methodology and criteria to develop the optimization. In SPOT, only the simulated annealing algorithm is used and has been improved by re-writing the code using LANGUAGE, instead of SITES LANGUAGE. Annealing is the more accepted of the algorithms (PUBS). SPOT is completely integrated in a GIS (ESRI's ArcView 3.x) as a menu with functions that include the creation of analysis units and development of conservation target lists. The integration in ArcView has enabled this tool to

become very streamlined and in addition, because of some tools to assess results will produce quality controlled and comparable results. SPOT version 1.0 was rolled out in 2003. No comprehensive testing or comparisons have been developed, but some ad-hoc tests comparing SPOT, SITES and MARXAN have revealed that further testing needs to be completed, but have also pointed out that the accuracy and reliability of the tool is acceptable. The programming team has tested the tool extensively and has fixed a first set of bugs that are detailed in the tool installation and licensing text. The Nature Conservancy's Conservation Systems Office holds the comprehensive development product package delivered by the programming team.

MARXAN

MARXAN is software that delivers decision support for reserve system design. MARXAN finds reasonably efficient solutions to the problem of selecting a system of spatially cohesive sites that meet a suite of biodiversity target goals. Given reasonably uniform data on species, habitats and/or other relevant biodiversity features and surrogates for a number of planning units (as many as 20,000) MARXAN minimizes the cost (a weighted sum of area and boundary length, Possingham, Ball and Andelman 2001) while meeting user-defined biodiversity targets.

EPAT

The Ecoregional Portfolio Assembly Tool (EPAT) is a decision support tool for assembling an ecoregional portfolio. It is best used in regions where conservation options are somewhat limited. EPAT has a number of features that indirectly support the portfolio assembly methodology, including the display of GIS data, information management enhancements such as integration with the Conservation Planning Tool, and a number of reports that give meaningful insights into the results of the assembly process. EPAT is a standalone application written in and requiring Microsoft Access 2000. It uses CPT data stores as a source for all data. When connecting to a CPT dataset for the first time, EPAT will make some modifications to the table structure to enable the storage of EPAT-specific data as well as GIS information, which CPT is not normally capable of storing. EPAT uses Map Objects to provide integrated mapping capabilities, and is able to use geographic data from a number of sources and integrate it tightly with CPT's tabular data model.

C-PLAN

Developed by New South Wales National Parks and Wildlife Service, C-Plan is a system designed to support conservation planning decisions.

C-Plan is a windows based software package that when linked to a GIS can display the relative contribution (Irreplaceability and other measures) of land areas (sites) towards a predefined conservation goal. These contribution measures are derived from a biological database containing modeled species or forest distributions and/or actual survey results. The conservation goal takes the form of targets assigned to individual biological entities (features) within the landscape.

C-Plan is interactive in the sense that it can recalculate and redisplay these measures when one or more sites are earmarked for protection (by selecting sites on the GIS). All recalculations take any changes into account (sites that are selected or deselected for protection) and the result is mapped back onto the GIS to display a new pattern of options. The level of protection assigned to an area can be varied (note that this is still being developed to incorporate zoning for different land use zones).

Opportunities to Innovate

Ecoregional portfolios are solution sets. In some highly altered ecoregions there are not many alternatives. In more intact landscapes, there are potentially many. Using alternative risk scenarios for multiple goal setting results in several solutions. There is room for figuring out how to best portray and implement multiple solutions while keeping track of progress, and maintaining focus on a set of priorities, while presenting multiple portfolios as solution sets.

We need to better integrate marine, freshwater and terrestrial targets while maintaining the ecological integrity and meaningful goals set within the different ecoregional frameworks. A great need which has lacked focus and development has been designing ecoregional portfolios using design goals to create and maintain functional areas of biodiversity significance and landscapes within ecoregions. Integrating the needs of targets for connectivity, natural disturbance regimes, environmental heterogeneity and other landscape processes and patterns has been lacking in most ecoregional portfolios. Many conservation planners suggest that design goals are a second phase akin to site conservation area planning, and require more detailed information and assessments. This may be true, but there is room for initiating the process at the initial portfolio design state. In addition, there is a need to develop restoration portfolios in ecoregions that are highly altered where restoration is the only option for meeting goals for many targets.

Case Studies

- **Scenario Building in the Utah High Plateaus Ecoregion**. Six potential portfolios were produced using three sets of conservation goals and two cost surfaces. These scenarios were then integrated into a final portfolio.

- **Using SITES 1.0 and expert review to create a portfolio of sites for the Southern Rocky Mountains Ecoregion.** This case study details the use of SITES from deriving the data necessary for input to the final selection of areas of biodiversity significance using expert workshops.

- **Automated Integration of Aquatic and Terrestrial Conservation Areas in Conservation Planning: A New Method.** This new approach is called vertical integration, which allows planners to analyze aquatic and terrestrial targets simultaneously by using separate layers of assessment units, crafted to match the natural boundaries of the targets being assessed, with suitability indices incorporating impacts specific to those targets. This approach has been piloted in the Pacific Northwest Coast and the Alaska-Yukon Arctic bioregions.

- **Priority Sites and Spatial Variability for the Carolinian Marine Ecoregional Assessment**. Marxan automated site selection algorithm was employed to enable a dynamic decision support system (DSS) using target data and a suitability index derived from 11 indicators of anthropogenic threat to the system and its targets.

- **Establishing connectivity in the Southwest Amazon.** A model was used to estimate the cost of migration between existing and potential priority areas in the Southwest Amazon ecoregion. This cost surface was used to establish connectivity among priority areas.

- **The final biodiversity vision for the Southwest Amazon.** This case study presents the finished biodiversity vision for the SW Amazon ecoregion and outlines implementation considerations.

Further examples of Ecoregional Assessments using software tools for portfolio design:

Some of the first assessments to use SITES:

- Northern Gulf Coast (80) - http://www.conserveonline.org/2001/02/b/gulf

- Middle Rockies - Blue Mountains (8) - http://www.conserveonline.org/2002/05/b/ERP_with_appendices

Some of the most recent assessments to use SITES:

- Willamette Valley - Puget Trough - Georgia Basin (2) - http://www.conserveonline.org/2004/06/g/WPG_Ecoregional_Assessment

- Apache Highlands (22) - http://www.conserveonline.org/2004/04/t/Apache_Highlands_Report

Assessments completed using SPOT

- Selva Maya Ecoregional Assessment- ongoing as of summer 2005

- Utah High Plateaus- ongoing as of summer 2005 (see case study above)

Assessments completed using MARXAN

- Greater Caribbean Basin Ecoregional Assessment draft methods available

Assessments completed using EPAT

- Federated States of Micronesia - http://conserveonline.org/docs/2004/03/MicroPg1-47_main.pdf

- Edwards Plateau- http://conserveonline.org/docs/2005/08/Edwards%20Plateau%20Biodiversity%20and%20Conservation%20Assessment.pdf

Further examples of Ecoregional Assessments with integrated portfolios:

Assessments that integrate terrestrial and freshwater portfolios

- Apache Highlands- http://conserveonline.org/docs/2004/04/Apache_Highlands_Report.pdf
- Southern Rockies - http://conserveonline.org/docs/2002/02/SRMreport.pdf
- Great Lakes - http://conserveonline.org/coldocs/2001/06/Summdoc.PDF

Assessments that integrate terrestrial, freshwater and marine

- Willamette Valley- Puget Trough-Georgia Basin- http://conserveonline.org/docs/2004/06/WPG_Ecoregional_Assessment.pdf
- Cook Inlet- http://conserveonline.org/docs/2004/09/Cook_Inlet_Ecoregional_Assessment.pdf
- Chesapeake Lowlands - http://conserveonline.org/docs/2005/03/CBYplan.pdf

Further examples of Marine or Freshwater portfolios:

Marine

- Northern Gulf - http://conserveonline.org/docs/2001/02/gulf.pdf
- Bering Sea - http://conserveonline.org/docs/2004/04/Ecoregion-Based_Conservation_in_the_Bering_Sea.pdf

Freshwater

- Upper Mississippi River Basin - http://conserveonline.org/docs/2003/08/UMRB_report.pdf
- Southeast Assessment (Tennessee/Cumberland, Mobile, Mississippi Embayment, Mid-Atlantic) - http://conserveonline.org/docs/2003/08/se_biodiv_assess.pdf

Tools

SPOT- SPOT: The Spatial Portfolio Optimization Tool by Dan Shoutis (2003) is a technical document on the tool. A general power point presentation is available here. Contact Ecoregional Assessment data manager for technical resources (programming documentation) at era@tnc.org

MARXAN can be downloaded from http://www.ecology.uq.edu.au/index.html?page=29780.

The EPAT Draft Users' Guide can be viewed here.

Resources

Websites

Sites: An Analytical Toolbox for Ecoregional Conservation Planning. The University of California at Santa Barbara has a website available at:
http://www.biogeog.ucsb.edu/projects/tnc/toolbox.html

A Practical conservation tool review from the Pacific North America Regional office, with a description on **Sites** is available at: http://conserveonline.org/2004/08/p/CPT_final_7-04_32_pp (January, 2003)

MARXAN-- A Reserve System Selection Tool has a complete website at
http://www.ecology.uq.edu.au/index.html?page=27710

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Appendix VIII

--DRAFT--

Heartland Conservation Process (HCP)

A framework for effective conservation in AWF's African Heartlands

July, 2003

AWF HEARTLAND CONSERVATION PROCESS (HCP)

Background

The African Wildlife Foundation's (AWF) *African Heartland* program is a collaborative, landscape-level management approach to conserving Africa's unique wildlife resources. Heartlands are large landscapes of exceptional wildlife and natural value where AWF works with a variety of partners, including local people, governments and other resource users to fulfill our mission of conserving wildlife and wild places in Africa. AWF believes that Africa's wildlife can only be saved in large, coherent conservation landscapes that are prioritized for conservation and made viable ecologically and economically. Because Africa's wildlife cannot be conserved everywhere, the great majority of AWF's resources and efforts are invested in these Heartlands.

Heartlands comprise land units under different management and ownership regimes--national parks, private land and community land in a single ecosystem ranging in size from one million acres to over 40 million acres. Some Heartlands fall within a single country; many extend across the borders of two or more countries. AWF's initial planning horizon for work in a Heartland is 15 years.

This document describes the Heartland Conservation Process (HCP), by which AWF first prioritizes and selects Heartlands, then plans and implements activities in these priority landscapes, and adapts when and where necessary. AWF uses a science-based planning process developed with help from The Nature Conservancy to establish conservation goals for each Heartland, identify threats and to design interventions to address these threats. The HCP process was developed for AWF's use in African Heartlands.[2]

The stages of the HCP are the following:

1. **Priority Setting**
    a) a. Analysis of landscape value
2. **Heartland Selection**
    a) a. General review using selection criteria
    b) b. Initial scoping
3. **Heartland Conservation Planning**
    a) a. Mandate building
    b) b. Participatory planning meetings
    c) c. Site conservation target and goal setting
    d) d. Socio-economic analysis
    e) e. Threat and opportunity analysis
    f) f. Implementation planning
4. **Implementation, Evaluation, Adaptive Management**
    a) a. Implementation and learning

[2] In the early stages of developing the HCP, AWF borrowed heavily from The Nature Conservancy's SCP process as described in, "Site Conservation Planning: A Framework for Developing and Measuring the Impact of Effective Biodiversity Conservation Strategies, April 2000".

1. PRIORITY SETTING

As AWF considers the range of landscapes in Africa that merit our investment, it is clear that AWF and our partners simply cannot work everywhere there is wildlife. This reality necessitates strategic prioritization of high value landscapes for conservation action. Good prioritization work at continent level has been conducted by other conservation organizations active in Africa (e.g., World Wildlife Fund's ecoregions, Conservation International's biodiversity hotspots, Birdlife International's important bird areas). AWF has built on this prior work, focusing on issues of scale. Our research has revealed that while much prioritization work has been done at continent scale, or conversely at the scale of an individual protected area, little work has been done to prioritize for investment at landscape scale. AWF's prioritization efforts, therefore, seek to address this gap and implement landscape conservation programs at a scale that we consider appropriate for effective management intervention. Furthermore, when prioritizing areas for consideration as a Heartland, AWF establishes the overall landscape value of a site in relation to regional and global biodiversity values.

2. HEARTLAND SELECTION

A. General review using selection criteria

In order to select potential Heartlands, AWF conducts a general review of areas that merit our investment as a priority conservation landscape in Africa. Working roughly from WWF's eco-regions and other colleague prioritization efforts, AWF applies a set of selection criteria that yield a suite of biologically outstanding landscapes where, with partners, we can put in place an operational conservation program geared to achieving real impact. These selection criteria are divided into three categories: biological; feasibility; and innovation and learning. The questions applied to these criteria are the following:

Biological

- Is there an ecologically intact core?
- Is there high potential to enhance ecological function by restoring or maintaining connectivity?
- Is there high biological value based on species diversity and endemism?
- Are there endangered and/or declining species currently or historically present on the landscape? (AWF species theme)
- Does this add a different habitat type(s) to AWF's landscape portfolio?

Feasibility

- Is there an appropriate niche for AWF?
- Are there appropriate partners with whom to work?
- Can conservation, social and economic and/or commercial benefits be generated that will abate threats in a heartland, and in cost-effective ways?
- Can AWF and partners raise the necessary funds?
- Are there insurmountable political barriers to success?

Innovation and Learning

- Will conservation actions offer scope for innovative solutions and methodologies?
- Does this allow AWF to replicate accumulated expertise in abating certain multi-site threats (e.g., human-wildlife conflict; livestock-wildlife disease etc.)?

These selection criteria yield a Heartland short list. According to the strategic priorities of the organization as a whole, AWF then ranks this short list, and when funding becomes available for initial scoping of new heartlands, a multi-disciplinary team initiates this process.

B. Initial scoping

Before a site becomes a Heartland, a clear strategic vision must be articulated on why the site has been chosen as a potential Heartland. This scoping phase is conducted quietly through literature review and through site visits. Field visits are undertaken to gain a better understanding of the operational context and feasibility of starting a Heartland program at the site. AWF must analyze and profile the biological, social, political, legal, administrative, macro-economic and enterprise qualities of the Heartland and determine the added value that AWF investment will contribute towards sustainable conservation of resources in this landscape. Initial mapping should be completed during this stage with preliminary Heartland boundaries demarcated, depending on a variety of factors including land use/land cover, species' ranges and habitats, protected area boundaries, human settlements, and management authorities that are present in the landscape. Furthermore, we must determine the initial scope and direction of an AWF program in the potential Heartland.

In order to assess the potential success of investment in a site, AWF must review the financial and human resources available and determine resources needed to implement an effective program. AWF will decide on the scale of investment that is needed at the site and if it warrants being declared a Heartland. This includes determining the minimum staffing requirements and what the staffing structure of the Heartland should be. Adequate funding for the site should be identified at this stage for a minimum of 3-5 years. Also, a suite of potential long-term donors for the Heartland should be identified.

3. HEARTLAND CONSERVATION PLANNING

A. Mandate building

AWF has learned that in early planning phases, it is critical to build support for its involvement, particularly at sites where AWF has no implementation history. Without a mandate and acceptance of AWF by local stakeholders, opposition can make working in the landscape difficult. This phase allows a multi-disciplinary AWF team to get to know partners and stakeholders, and to prepare communities for the next step, the participatory planning meetings. For this step a Heartland coordinator is hired, who begins to understand the conservation issues as well as the socio-economic and political context within which s/he will manage AWF's implementation strategy with partners.

The Heartland coordinator and team develop a stakeholder engagement plan to guide introductions and foster the cultivation of reciprocal relationships with stakeholder groups, partners and key individuals. At this stage AWF may not be fully aware of whom the key stakeholders are, and should be careful to be diplomatic, flexible and positive with all parties. Over time, relationships should be built up and managed strategically and reciprocally. Steps to be undertaken include:

- Engagement with key stakeholder leaders: (1) public sector (e.g. wildlife, water, fisheries, natural resources, environment, tourism, local government); (2) community sector and private landowners (civic and customary leadership, resource user and women's groups); (3) private sector (tourism associations and operators); (4) NGOs and donor agencies; (5) others, such as independent research teams, universities;
- Identify and manage stakeholder perceptions of AWF and expectations of the HCP methodology;
- Identify key issues, actual and potential conflicts and synergies and develop strategies to manage them.
- Support preparation for participatory planning meetings (see next step).

It is essential that all key stakeholders participate in, and send well-briefed representatives to, the participatory planning meetings. This may require substantive preparatory work and active relationship management with some stakeholders. Practical experience in many sites in Africa has shown that decisions made without stakeholder participation or an adequate grasp of the human context can create misunderstandings with local communities and other key resource users, governments, local authorities and private sector – which can ultimately undermine site-based conservation over the long-term. The participation of key stakeholders and local communities in the Heartland Conservation Process can ensure their responsible role in efforts to promote sustainable resource use at a site, and ultimately the success of the conservation plan's implementation.

B. Participatory planning meetings

This step of Heartland planning is an iterative process of participatory meetings with stakeholders to develop a shared implementation vision for the landscape. From these meetings we gather the information needed to undertake the next four steps of HCP i.e.

- Site conservation target and goal setting
- Socio-economic analysis
- Threat and opportunity analysis
- Implementation planning

These planning meetings are generally kicked off with a participatory scoping meeting, which officially marks AWF's entrance into a landscape. This important meeting with stakeholders and partners begins the process of scoping out landscape level conservation priorities and develops indicative strategies. Generally, AWF co-hosts this first meeting with one or more partners in the region to help ensure buy-in to our presence in the landscape. The way AWF plans for and executes this meeting in individual Heartlands will vary depending on whether it's a new site for AWF or one where we've worked previously. However, the basic objective and outline of the meeting remain consistent across Heartlands. Members of the AWF team must ensure that all participants feel welcome and involved and that community participants feel actively engaged in the process.

The primary objective of the initial scoping meeting is to agree upon an overall operational framework and to build momentum towards a common vision for conservation in the Heartland. With our partners at this meeting, we develop a shared vision for the landscape by getting clarity on: what we're trying to protect (conservation targets); threats to these targets; opportunities, and indicative strategies. Initial zoning and mapping is also undertaken at this early meeting, in order to start determining priority areas of intervention based on spatial factors (threats) affecting

the health of conservation targets. At this meeting we jointly investigate, and try to reach initial agreement on the following core elements[3]:

- *Targets:* the elements of biodiversity at a site, and the natural processes that maintain them, that will be the focus of Heartland planning and around which strategies will be developed. The intent of target identification is to develop a short effective list of species, communities, or large-scale ecological systems whose protection will capture all the biodiversity at the site.
- *Threats[4]:* the types of degradation and impairment afflicting a target(s) at a site.
- *Source of Threat:* the proximate agents generating the threats to conservation targets.
- *Opportunities:* conditions that lead to improving production potentials through better land management; we aim to develop opportunities that exist and depend on the conservation of various natural resources e.g. wildlife, trees, water.
- *Strategies:* the types of conservation interventions that can be implemented to abate threats to conservation targets, or to take on opportunities.

Additional participatory planning meetings, not necessarily involving the full range of stakeholders, are then arranged in order to gather more detailed information and take forward consultation on specific targets, threats, opportunities and strategies, as well as to support the development of an implementation plan.

C. Site conservation target and goal setting

In this step we finalize and assess the viability of site conservation targets, and establish baselines for targets in terms of quantity, quality, distribution and other indices of biodiversity health. The viability of focal conservation targets will depend upon maintaining the natural processes that have supported them in the past, the careful setting of conservation goals to maintain those processes, and the definition of boundaries for conservation action based on the targets' ecology and biological needs. The following steps are useful in assessing the viability of conservation targets.

(C1) Assess the size, condition, and landscape context of each focal target at the site. Three factors – size, condition, and landscape context – should be considered in characterizing viable occurrences of the focal conservation targets. These can be assessed quantitatively, but categorical assessment (very good, good, fair, poor) may be more appropriate given the uncertainty of precise features of long-term viability for a given target.

(C2) Rank the focal conservation targets for viability.

The viability of a conservation target is a function of the size, condition, and landscape context of the target, as described above. Based upon the best available knowledge and expert judgment, target viability is assigned to one of four viability classes (Very Good, Good, Fair, or Poor)

[3] These elements were partially derived from TNC's Site Conservation Planning methodology.

[4] AWF has adapted TNC's terminology in some cases. In TNC parlance, the term 'stress' is synonymous with AWF's 'threat' and TNC's 'source of stress' is the same as our 'source of threat'. AWF has found when working both with partners and internally, that the stress/source terminology has been problematic, thus we have adapted the terminology for our own use.

based strictly on its *current* size, condition, and landscape context. The Nature Conservancy has developed a useful tool (the "Measures of Conservation Success" Excel workbook) for assessing viability and documenting the careful thinking used in its assessment. AWF has adapted this tool and uses it as part of its HCP.

(C3) Determine "Biodiversity Health" of the site.

The biodiversity health of the site can be determined using the "Measures of Conservation Success" methodology. Assessing the cumulative biodiversity health of a site is helpful when evaluating overall program or project impact and helps us to make effective decisions for biodiversity conservation.

(C4) Set Conservation Goals and Establish the Ecological Boundaries of the Site.

Conservation Goals move conservation action toward the desired future condition of a target—a goal specifies the characteristics for a viable occurrence. It should be recognized that conservation of a target may not be sustainable unless actions occur at scales appropriate to maintain the size, condition, and landscape context dictated by the ecology and natural history of the target.

D. Socio-Economic Analysis

Through team research and participatory meetings we aim to build up a socio-economic profile of the site. Though not necessarily directly linked to the identification of targets and goals, a clear understanding of the social and economic status of local human populations and the dynamics of human use of site resources are essential at this stage in HCP[5]. Understanding these features will be critical to successful threat analysis. But also these features may present opportunities for successful conservation interventions that are not necessarily identified through threat analysis.

The AWF team should undertake the following process steps to build its socio-economic profile of the site:

- Assess communities' existing wildlife and other natural resource assets (e.g. land ownership, use rights, quality of wildlife resources, access to enterprise opportunities) and asset building opportunities. These can be usefully categorized using the DFID sustainable livelihoods matrix that distinguishes financial, natural resources, environmental, social (institutional) and human (skills and knowledge) assets.
- Assess existing community capacity to undertake community based wildlife management and enterprise development, and any constraints to supporting and building that capacity

[5] The social and economic impact on communities of an AWF intervention can be assessed by measuring the improvements in the productivity of communities' assets and the consequent impact on their livelihood security and sustainability. Improved management of shared assets can arise through more effective management of shared resources manifested through conservation business ventures. Background information on the following is essential: (1) Land tenure and settlement; (2) demographic profile of the site; (3) human/wildlife conflicts; (4) social and political organization of communities; (5) "on farm" and "off farm" contribution to livelihoods; (6) the potential for common property systems to enhance material and non-material benefits (unity, identity and purpose as well as employment and income).

(e.g. policy, institutional development)

- Assess and prioritize natural resource enterprise development to date, and future opportunities:
    - What is the economic base of this area dependent on? (Agriculture? Out-migration? Small industry?), and where is potential future local economic development likely to come from?
    - What types of enterprise are successful in this area?
        In terms of products (e.g. photographic tourism, hunting, handicrafts, honey making, medicinal plants); and
        Type of enterprise (Small? Large? Community owned? Partnerships with private sector?).

There are many tools that may be useful in undertaking this analysis. Maps can be a powerful tool, and are readily put together in participatory meetings e.g. stakeholder maps indicating the range of players, their influence and their relationships e.g. GO, NGO, CBO and private sector groups.

These steps should enable AWF to:

- Describe the socio-economic landscape e.g. the 'what' and 'why' of livelihood security strategies, including description of community assets by land management unit.
- Better identify and understand the threats to conservation targets rooted in land and resource use patterns (see next step).
- Prioritize intervention options, and identify opportunities and options by area and by threat.
- Identify clear conservation logic for socio-economic intervention options.
- Build and initiate a stakeholder engagement strategy that prioritizes which parties to engage and for what purpose.

E. Threat and opportunity analysis

In this step an inter-disciplinary team, supported by further participatory meetings if needed, analyzes the biological and socio-economic factors underlying threats to the site conservation targets, in order to develop strategies for achieving conservation impact in the landscape. This step is fundamental in determining the strategic direction for conservation intervention in this landscape. It may also involve subjective decision making based on professional judgment, as many cause-effect relationships cannot be known with certainty.

This step can be time consuming and should be undertaken by the heartland coordinator and team using the most appropriate means available, be it through large meetings or through individual consultations with partners, and, where necessary, using consultants to acquire and analyze data to fill critical knowledge gaps. The heartland coordinator will need to consult with area scientists, enterprise specialists, community leaders and others to acquire the information needed for effective heartland planning. The objectives of this step are several:

- Identify threats and sources of threats.
    - Develop baselines for threats (their scale and strength).
    - Establish understanding of threat dynamics: their sources, influences and trends, the likely future trend in threats under different scenarios.

    - Determine proximate and ultimate threats and those that are driven or fuelled by policies/legislation or conflicting ones.
- Undertake integrated mapping of threats (and possible zoning); identify priority information gaps and ways forward.
- Identify intervention strategies.
    - Identify the range and effectiveness of intervention strategies tried to date.
    - Identify optimum strategic intervention opportunities, and AWF's role in implementation.

(E1) Identify threats and sources of threat

A threat leads to the impairment or degradation of the size, condition, or landscape context of a conservation target, which results in reduced viability of the target. Two important steps should be considered in understanding and evaluating the factors that impair conservation targets:

Identify Threats to the Conservation Targets

When identifying the major threats to conservation targets, consider the following important points:

- The threats afflicting *each* focal conservation target need to be identified.
- It is important to be as precise as possible in identifying the threats; this will help focus the subsequent identification of sources of threat, and facilitate development of ecological management and restoration goals and strategies designed to improve biodiversity health.

Rank the Threats

The relative seriousness of a threat is a function of two factors:

- *Severity of damage*. What level of damage to the conservation target can reasonably be expected within 10 years under current circumstances?
- *Scope of damage*. What is the geographic scope of impact to the conservation target expected within 10 years under current circumstances? Is the stress pervasive throughout the target occurrences, or localized?

Based upon the best available knowledge and judgments, the threats to each priority conservation target are ranked (Very High, High, Medium, or Low). The threat ranking should be based on the explicit assessment of severity and scope of the stress.

Identify Sources of Threat

For each threat afflicting a given conservation target, there may be one or more causes or *sources of the threat*. In order to define the strategies that relieve the stresses from our priority conservation targets, we must determine the factors that cause the destruction or degradation of those priority targets at the site.

Most sources of threat are rooted in incompatible human uses of land, water, and natural resources that are ongoing or have occurred in the past but continue to have impact. There are several points to consider when identifying sources of threat to conservation targets:

- When multiple sources all contribute to a given threat, focus threat abatement strategies on the source or sources that are most responsible for the threat.
- Focus on those sources that, if allowed to occur at a site, will have a long-term duration, and

thereby cause long-term impacts.
- The sources of threat to consider should be happening now, or have high potential to occur in the near future—do not consider past sources that no longer cause stress to the system.
- Identify the proximate sources (e.g., poaching) and ultimate sources (e.g., human population growth) of each threat. Concentrate intervention strategies on the proximate sources, as sources that are several steps removed from the impacts on targets will not bring us to realize direct, feasible conservation strategies. However, strategies (such as policy influencing) to address ultimate sources must also be considered, as the ultimate sources determine the sustainability of our interventions.

Rank the Sources

The relative seriousness of a source is a function of the following factors:

- Degree of *contribution* to the stress. The contribution of a source, acting alone, to the full expression of a threat (as determined in the threat assessment), assuming the continuation of the existing management/conservation situation. Does the particular source make a very large or substantial contribution to causing a threat, or a moderate or low contribution?
- *Irreversibility* of the threat. The reversibility of the threat caused by the source. Does the source produce a threat that is irreversible, reversible at extremely high cost, or reversible with moderate or little investment?

It is critical that investments in conservation strategies at sites be focused on the abatement of the most critical threats. The findings of threat analysis should be synthesized to identify the critical threats to the conservation targets at a site and allows effective prioritization of interventions.

For each critical threat, collect baseline data, mapping it where possible, to indicate the scale and strength of the threat. This will enable threat monitoring under the AWF PIMA monitoring system.

(E2) Map threats

With clarity on conservation targets and threats to those targets (including socio-economic driving factors), the Heartland team undertakes detailed spatial mapping of targets and strategies (e.g., conservation zoning). Through zoning, the aim is to clearly identify 'hot spots' in the landscape and priority habitats and resources which if not conserved will result in severe consequences for the entire conservation landscape. This step calls for clear identification of priority conservation areas for wildlife, important hydrologic features, critical forests, and other areas that require priority conservation interventions.

Mapping is a powerful tool that can be used to provide the spatial distribution of the selected targets and the processes that sustain them, delineating the functional conservation site—the area necessary to maintain the viability of the conservation targets overtime, including the natural patterns and processes that sustain the targets. The distribution of threats can be mapped to determine the location of the threats in relation to distribution of the target and the resources required for continued viability. Together this information can be utilized to further refine the strategies and

interventions proposed as well as define the priority areas for conservation interventions.

(E3) Identify range of intervention options

In this step we identify and evaluate the range of intervention options to address threats or exploit opportunities. For each threat we should identify:

- Who are the main actors?
- What is their motivation and reward?
- What interventions have been tried/are being tried, and how successfully?
- What options are most likely to deliver future threat reduction?
- Which agencies can/must be involved in implementation of priority options? What role should AWF play?

The identification of priority intervention options is a potentially highly subjective process. There are many unknowns in understanding and predicting human-ecological dynamics. An intervention that is a clear anti-poaching priority may have unforeseen consequences on timber extraction. Supporting the establishment of community tourism businesses may increase incomes and the values attached to wildlife by local people, but may encourage in-migration, especially in areas with high mobility of local populations (e.g. pastoralists). The quality of AWF's work in this stage of HCP will be driven by the experience, approach and communication skills of the HCP team, and through active collaboration with our partners in the landscape.

F. Implementation planning

This phase allows AWF to refine and consolidate outputs of participatory planning and threat/opportunity analysis. At this point, a Heartland strategy is developed and agreed with partners, and the conservation logic and targets for the proposed interventions are clearly articulated.

This component of the HCP involves pulling together all previous pieces of the HCP into a coherent plan. This plan, that will evolve as AWF and partners move forward with implementation contains important baseline information, and represents a tool for managing across a matrix of land ownership to achieve a landscape level vision, target by target. This plan is used by AWF and other partners to: fundraise; develop annual implementation plans; and clarify team roles and responsibilities. In this section, critical areas and priority activities should be identified and clearly articulated for use by heartland coordinators.

4. IMPLEMENTATION, EVALUATION, ADAPTIVE MANAGEMENT

A. Implementation and learning

At this stage of the HCP, AWF is ready to implement the conservation program that has been designed through its rigorous planning process. The heartland coordinator will guide and facilitate implementation of priority interventions that were agreed upon through the participative planning process. These strategies will be implemented with the appropriate partners to ensure ongoing stakeholder collaboration towards the strategic goals of the heartland program.

Once the program is underway, it is incumbent on the heartland coordinator to regularly analyze the

progress that has been made in the implementation of strategic activities. The analysis and synthesis of results should be regularly undertaken through AWF's monitoring system, its Program Impact Assessment (PIMA) system. AWF has developed this system for measuring th
impact of its program in Africa, more specifically to assess the conservation impact of its African Heartlands. This essential management tool is a set of carefully selected and regularly implemented measures that provide us with an objective assessment of our performance and impact to date.

PIMA measures are taken each year and should provide valuable information on progress being made in a heartland. The results from PIMA should inform of program successes and failures and lead to adaptation of the five-year strategies and annual workplans as needed. PIMA is designed to measure both ecological and socio-economic impacts which are essential in demonstrating AWF's ability to achieve its mission.

Conclusion

AWF's Heartland Conservation Process is an iterative process that is currently in different stages across our Heartlands depending on a range of factors in a landscape. The process is not necessarily undertaken in a step wise fashion but is applied adaptively depending on AWF's management presence in a landscape, site context, funding availability, and the level of stakeholder involvement at a site. In many instances, we have found that with our own understanding of the landscape, along with stakeholder inputs, implementation work can proceed as detailed threat and opportunity analyses are undertaken. The implementation strategies are then regularly evaluated and adapted as site planning continues throughout our involvement in each heartland. In sum, the Heartland Conservation Process provides a useful framework for effective conservation in AWF's African Heartlands.

Appendix IX

COALITION POUR LA CONSERVATION AU CONGO « COCOCONGO »

TERMES DE REFERENCE & REGLEMENT INTERIEUR

Septembre 2003

Préambule

Conformément à la loi n° 75-023 du 22/07/1975 portant Statut de l'ICCN et celle n° 69-041 du 22/08/1969 relative à la Conservation de la Nature en R.D.C.;

Consciente de l'importance des Aires Protégées et de la nécessité de promouvoir une coopération soutenue pour assurer leur gestion durable, la R.D.C. a ratifié les Conventions Internationales relatives à l'Environnement et à la conservation, notamment la Convention sur la Diversité Biologique (1994) et la Convention du Patrimoine Mondial (1975).

Considérant le nombre de plus en plus important des partenaires sur terrain, ainsi que la reprise de la coopération internationale en R.D.C.;

l'ICCN a jugé utile la création d'une plate-forme appelée "Coalition pour la Conservation au Congo" en sigle CoCoCongo.

Soucieux d'assurer une meilleure collaboration au sein de ladite plate forme, les membres adoptent le Règlement Intérieur dont la teneur suit :

CHAPITRE I. NATURE - SIEGE

Article 1er
La Coalition pour la Conservation au Congo (CoCoCongo) est une plate-forme d'appui à la conservation des Aires Protégées et apparentées, corridors et zones tampons en R.D.C..

Article 2
Le Siège Social de la Coalition pour la Conservation au Congo est situé à la Direction Générale de l'ICCN sise avenue des Cliniques n° 13, Kinshasa/Gombe, B.P. 868 Kinshasa I., Tél. 34213 – 34180 – 34195 – 33401, E-mail : pdg.iccn@ic.cd.

CHAPITRE II. MISSIONS

Article 3
CoCoCongo a pour missions de :

- promouvoir la stratégie nationale de la conservation dans le réseau d'Aires Protégées et apparentées ;
- renforcer les capacités de l'ICCN à gérer effectivement ledit réseau ;
- faire en sorte que des activités efficaces de conservation soient entreprises dans tous les sites à travers une stratégie holistique en temps de conflit et d'instabilité ;
- permettre la réhabilitation des zones de conservation prioritaires ;
- contribuer aux objectifs nationaux, locaux et régionaux de développement visant la réduction de la pauvreté ;
- contribuer à la réduction des conflits et à la construction de la paix au niveau sous-régional et régional.

CHAPITRE III. DES MEMBRES

Article 4
Sont membres de la Coalition pour la Conservation au Congo :

1. Le Comité de Gestion de l'Institut Congolais pour la Conservation de la Nature ;
2. Les partenaires de l'ICCN ;
3. Les Chefs de Sites.

Article 5
Pour être membre, les Organisations Partenaires doivent remplir les critères ci-après:

- Avoir un accord ou contrat formel avec l'ICCN ;
- Avoir un programme de terrain avec l'ICCN ;
- Contribuer financièrement aux coûts directs de l'ICCN ;
- Se rallier aux principes et aux procédures d'opération de CoCoCongo et en particulier à la transparence et à la coordination ;

Article 6
Aux termes du présent règlement intérieur, l'ICCN joue son rôle traditionnel de leadership dans le domaine de la conservation de la nature.

Dans le cadre de CoCoCongo, l'ICCN s'engage à faciliter la réalisation des programmes des partenaires sur terrain.

CHAPITRE IV. DE L'ORGANISATION ET DU FONCTIONNEMENT

A. ORGANISATION

Article 7
Les organes de CoCoCongo sont les suivants :

- L'Assemblée Générale;
- Le Comité de suivi;
- Le Comité de coordination du Site (CoCoSi).

Article 8
L'Assemblée Générale est l'organe de conception de la politique de CoCoCongo. Elle est composée de l'ICCN, des partenaires et des Représentants des Institutions de Recherche.

Elle se réunit en session ordinaire une fois l'an au cours du quatrième trimestre.

Elle pourra se réunir en session extraordinaire sur convocation du Président du Comité de suivi ou à la demande des 3/4 des membres.

L'Assemblée Générale adopte le programme d'activités de CoCoCongo.

Elle évalue les activités des intervenants dans les sites.

Article 9

Le Comité de suivi est composé de :

- Un Président qui est l'Administrateur Délégué Général de l'ICCN ;
- Un Secrétaire exécutif qui est le Chef de Bureau d'appui attaché à la Direction Générale de l'ICCN ;
- Un Conseiller Technique qui est le représentant des partenaires.

Article 10
Le Président du Comité de suivi est le garant de la philosophie et de la politique de CoCoCongo.
Il convoque et préside les réunions ordinaires ou extraordinaires;
Il cogère les ressources financières de CoCoCongo avec le Conseiller Technique ;
Il assure le suivi et l'exécution des décisions de l'Assemblée Générale.

Article 11
Le Secrétaire exécutif est l'organe d'exécution des programmes de CoCoCongo.
Il coordonne les activités quotidiennes de CoCoCongo.
Il dresse un rapport trimestriel des activités de CoCoCongo.
Il prépare l'ordre du jour des réunions de l'Assemblée Générale.
Lors des réunions ordinaires ou extraordinaires, il joue le rôle de Secrétaire-rapporteur.

Article 12
Le Conseiller Technique est le porte-parole des partenaires.
Il assiste les membres pour la réussite de la mission de CoCoCongo.
Il cherche les financements auprès des bailleurs des fonds.

Article 13
Le Comité de Coordination du Site (CoCoSi) est une structure de gestion du Site placée sous l'autorité de l'ICCN.

- Il exécute toute tâche cadrant avec la biodiversité du site ;
- Il tient les réunions de programmations et d'évaluations une fois l'an, associant la DG – ICCN et les personnes ressources extérieures selon le cas.

Il est composé de :

- Un Coordinateur qui est le chef de Site ;
- Tous les chefs de Station et leurs adjoints ;
- Tous les partenaires opérant dans le Site.

Article 14
Le Coordinateur a pour rôle de :

- Convoquer et présider les réunions de programmations et d'évaluations ;
- Convoquer et présider les réunions ordinaires tous les trois mois ;
- Présider les réunions extraordinaires convoquées soit par lui, soit à la demande des 3/4 de membres ;
- Faire trimestriellement un rapport de l'état d'avancement de ses activités de CoCoSi à la hiérarchie ;
- Encourager les échanges d'expérience avec les autres sites ;
- Gérer la base des données du site ;
- Canaliser les demandes d'interventions d'éventuels bailleurs ;
- Veiller à l'harmonie des relations entre partenaires dans le site ;
- Identifier les besoins et activités prioritaires nécessaire pour la conservation du Site ;
- Assurer le suivi du plan d'opération.

Article 15
Les Chefs de station ont pour rôle d'accompagner le Coordinateur dans la réalisation de ses missions vis-à-vis de CoCoSi.

Article 16
Le rôle des partenaires au sein de CoCoSi est défini par rapport aux objectifs assignés dans les Contrats de Collaboration conclu entre eux et l'ICCN.
Ils contribuent financièrement aux dépenses relatives aux réunions de CoCoSi.

B. FONCTIONNEMENT

Article 17
Tous les organes de CoCoCongo doivent fonctionner dans le respect de la hiérarchie de manière à ne pas interférer ni empiéter sur les compétences des uns et des autres.

Article 18
En cas d'absence ou d'empêchement du Secrétaire-rapporteur, le Président de séance désigne un secrétaire de séance parmi les membres présents.

Article 19
Pour toute réunion de CoCoCongo, le quorum est au moins la majorité absolue (moitié + un) des membres qui doivent prendre part aux travaux.

Article 20
Lorsqu'au début d'une réunion, valablement convoquée, les membres présents constatent que le quorum de travail n'est pas atteint, la réunion est remise à une date fixée, séance tenante, de manière à permettre une intense publicité de cette deuxième convocation.

Article 21 A la date fixée par cette 2ème convocation, les membres présents siègent valablement quelque soit leur nombre.

Article 22
Toute réunion de CoCoCongo est sanctionnée par un Procès-verbal dressé par un Secrétaire-rapporteur.
Ce Procès-verbal contenant la synthèse des thèmes débattus et signé conjointement par le Secrétaire-rapporteur et le Président de séance.

CHAPITRE V. DES FINANCES

Article 23
Les ressources financières de CoCoCongo proviennent de :
- Subventions publiques (dotation du Gouvernement de la R.D.C. et de l'ICCN);
- Apports des partenaires;
- Dons et legs.

Article 24
L'exercice budgétaire de CoCoCongo débute le 1er janvier de chaque année.
Le budget de l'exercice, les comptes et les rapports d'activités sont arrêtés au 31 Décembre de chaque année.

Article 25
Les entrées et les sorties des fonds sont autorisées par le Président du Comité de suivi.
La tenue des statistiques de CoCoCongo est assurée par le Secrétaire Exécutif.

CHAPITRE VI. : DU REGIME DISCIPLINAIRE

Article 26
Conformément au présent Règlement Intérieur, les partenaires sont appelés à la stricte observation des dispositions contenues dans les accords ou contrats qui les lient à l'ICCN, sous peine de se voir écarter de CoCoCongo.

CHAPITRE VII. DES DISPOSITIONS FINALES

Article 27
Chaque membre de CoCoCongo peut formuler et motiver des propositions d'amendement au Règlement Intérieur.

Article 28 La proposition d'amendement est déposée au Secrétariat Exécutif qui la transmet à la plénière.

Article 29
Le présent Règlement Intérieur ne peut être modifié que par l'Assemblée Générale à la majorité de 2/3 au moins des membres.

Article 30
Le présent Règlement Intérieur entre en vigueur à la date de sa signature.

Appendix X: Some of the People Contacted that are Associated with the MLW Landscape

AWF:	Jef Dupain, Camille Likondo Lokonga, Valentin Omasombo w'otoko, Maxime Nzita, Justin Belani, Didier Bokelo Bile, Faustin Tokate
FAO:	Franck Kapa Batunyi
GACC:	Botamba Esombo
SPIAF:	Jérôme Mabiala-ma-khete
University of Maryland:	Chris Justice
USAID/CARPE:	John Flynn, David Yanggen, Nicodème Tchamou
U.S. Embassy:	Gregory S. Groth
WCS:	Richard Tshombe, John Hart, Teresa Hart, Emanuel Kayumba
WWF:	Bruno Perodeau
WWF Germany:	Uwe Klug
Our Moto Drivers:	Yopie Isononga, Masanga, Mort

Appendix XI: Technical Assistance on the Creation of a Land Use Planning Strategy

Trip Notes of Meetings between
USDA Forest Service (USFS), African Wildlife Foundation (AWF),
Government Administration, Private Enterprise, and Local Participants in the
Maringa-Lopori-Wamba Landscape, Democratic Republic of Congo (DRC)
January 16 – February 3, 2006

17 January 2006 – Meeting with AWF

Attendees: Jef Dupain, AWF
John Sidle, USFS
Jena Hickey, USFS
Camille Likondo Lokonga, AWF
Maxime Nzita, AWF
Didier Bokelo Bile, AWF
Christophe, AWF

AWF described their activities in MLW to reduce pressure on wildlife as a source of animal protein by improving agricultural options. AWF strives to improve the transportation infrastructure in order to distribute agriculture products to markets. This provides an incentive for inhabitants to cultivate crops for cash that then can be used to increase their protein options.

AWF described their current conceptualization of zoning as intuitive and requested feedback from us. We discussed "desired future conditions" as a planning tool. They identified their current objective of improved biodiversity through reduced pressure on resources. This is AWF's threat-based approach to planning.

We discussed our itinerary and the entities we could expect to interview. In Kinshasa, the agencies we planned to meet included the Ministry of Environment, DGF, FAO, and ICCN. The people we would meet in the field, included NGOs, notabilities (traditional leaders), and government authorities. AWF listed the topics we could anticipate covering in the field, such as participative mapping in Djolu Square and the new Forestry Code.

We discussed the new Forestry Code, which requires public participation and noted that the new Wildlife Code is not yet complete. The Nature Conservation Code is in progress and planned to be published in June 2006.

Within the group of CARPE Landscape Planning partners there are about 10 NGOs; some are recognized by the government and some are not.

University of Maryland provides satellite photos in the form of LANDSAT imagery through the USAID/CARPE partnership. These images are then used by the AWF Landscape Information Officer, Didier Bile.

AWF outlined their staff members and their respective roles:

- Camille – Community Forestry
- Maxime – Zoning Lead
- Valentin Omasombo W'otoko –
- Didier – Landscape Information Officer
- Justin – Reactivate private sector, agriculture
- Christophe – Socioeconomic surveys, located in Basankusu

AWF expressed a need for a specialist in indigenous rights and complexities because normally inhabitants are relocated when an area becomes protected. An expert, rather than an activist, would be the most effective specialist for this position.

17 January 2006 – Meeting with German Logging Company (SIFORCO), AWF, and WWF Germany

Attendees: Dieter Haag, SIFORCO, Jef Dupain, Uwe Klug (WWF), Jena Hickey, John Sidle
We discussed the desire to conduct landscape-level land-use planning in MLW and to eventually zone the area. The sheer vastness of the landscape was highlighted (70,000 km^2). The SIFORCO concession is also very large at approximately 7,000 km^2. Though the new Forestry Code declares that concessions shall be without human inhabitation, the reality is that people live in timber concessions. However, SIFORCO may relinquish the north part of their concession, where the highest roadside human population exists, back to the government. Within the remainder of the concession are diverse stakeholders including the Kitiwalists, who were described as a religious sect, pygmies, Ngombe people from the north and Mongo people who may be seen as the traditional local people. A high level of illiteracy prevails amongst all groups of communities in the Landscape.

We discussed the planned borders of the SIFORCO concession. SIFORCO seemed willing to acknowledge the as yet unofficial Protected Area called the Lomako Reserve (3,000 km^2). AWF mentioned the data they want to collect to support this land-use planning including faunal surveys, socioeconomic surveys, agricultural conditions, and locations of hunting camps. A bonobo release program was mentioned.

SIFORCO plans to start logging in MLW in about 2-3 years. They usually harvest about 3 cubic meters/ha or about 1 tree/2 ha. After first entry, SIFORCO usually has a 25-year rotation before re-entry. Their current method for prospecting timber anticipates only one year out – they inventory for marketable trees one year and harvest the next.

Community Forestry was discussed. This endeavor has apparently failed in some areas. The operation was chaotic and it proved more fruitful to have logging companies execute the harvest. Rather than thinking of Community Forestry as locals producing timber products, the idea was reframed as communities managing the forest.

We discussed a bushmeat monitoring system. We would aim to have bushmeat used only for local subsistence with no bushmeat export from logging concessions.

17 January 2006 – Meeting with USAID/CARPE

Attendees: John Flynn, CARPE – Program Manager for CBFP
David Yanggen, CARPE – Deputy Program Manager
Nicodème Tchamou, CARPE – GIS
John Sidle, USFS
Jena Hickey, USFS
Becky Nourse, USFS
David Fournier, USFS
Richard Tshombe, WCS
Jef Dupain, AWF – MLW Landscape Lead

We reviewed the history of CARPE and the Congo Basin Forest Partnership (CBFP). CBFP really is a program for U.S. NGOs. There are 29 members of CBFP, some of which are non-contributing partners. CBFP is a "Type II" Partnership which means it can be very loose; it is not a government to government partnership. Landscape leads are expected to create landscape zonal management plans. The idea for NGOs as landscape leads is that they provide overall leadership and direction yet also recruit expertise from other sources where they are lacking. An external evaluation of CBFP was recently conducted on how to proceed through 2011.

Warfare and civil unrest caused several agencies and partners located in Central Africa to withdraw from the area. According to the new Constitution of DRC all natural resources are owned by national government. There is very weak protection of local indigenous peoples. Though the Forestry Code mentions local peoples, the wording is weak. A decree is required to convert previous timber concessions so that they are legally recognized under the new code. Currently, governors are not elected by the local people, instead they are appointed by the central government in Kinshasa. Therefore, there is limited representation of the local peoples' views or needs.

The USFS will be useful in applying the multiple-use concept to the planning process. CARPE needs templates for preparing and writing land management plans. They are sending the two USFS Technical Assistance teams to two widely different landscapes, the Ituri and the Maringa-Lopori-Wamba. When the teams return, they would like us to work together to produce planning models. They want input on resource issues and a unified vision for all landscapes. The USFS should help the NGOs with the PROCESS of land-use planning keeping in mind the circumstances existing in the landscape. CARPE would like the USFS to produce a "Strategy Plan" – a brief 'how to' document that becomes the landscape leads' workplan. The document should specify data needed, people to consult, costs, and suggestions on who will ultimately fund it. A strategy document should help NGOs develop an operational plan for each landscape. There may be a need for financial models that could be built by graduate students.

We reviewed U.S. Embassy expectations of us while in DRC and the still unsettled state of a country with a transitional government composed of various militia representatives

18 January 2006 – Meeting with SPIAF

Attendees: Jerome Mabiala Makhete, Director Chief of Service
Didier, AWF
Justin, AWF
John Sidle, USFS
Jena Hickey, USFS

The roles of AWF and the USFS Technical Assistance team were briefly explained.

SPIAF uses satellite images and aerial photography of parts of Congo to assess DRC forests. A major Canadian assistance during the 1980s inventoried Congo forests but the information is not yet in digital form. There are images of the areas around Djolu, Basankusu, and Bowendi. Some of the data has been interpreted. The role of SPIAF is technical in nature. They have no people out in the field. They are technical advisors, for example, of how to measure trees and apply taxes for logging prospects. We believe that it would be useful for AWF to acquire SPIAF data for appropriate forestry planning in MLW.

18 January 2006 – Meeting with FAO

Discussed zoning and roughly how the government of DRC decides who to give a timber concession and where it should be located. Also compared DRC to Cameroon where they at least have the theory of logging well worked out, but no law enforcement.

20 January 2006 – Meeting with Djolu Village

Attendees: Jef Dupain, Maxime Nzita, Didier Bokelo Bile, AWF
John Sidle, USFS
Jena Hickey, USFS
Djolu Chief
Groupement Chief
Djolu Government Authorities
Djolu Minister of the Environment
Djolu Minister of Rural Development
Representatives of different Djolu NGOs
Numerous Djolu locals

We introduced ourselves to all and described what we hoped to do there. We describe land-use planning and their new Forest Code. We offered our assistance with their land use planning after briefly explaining the long history of forest planning that the USFS has – some of which may be helpful to them. Some of their responses included that, "they cannot save for tomorrow if they are not satisfied today" and to "please, work on development first."

The village expressed some suspicion that we just wanted them to show us their forest so we could learn what is there and take it. The village admitted that there were rumors that NGOs are meeting with AWF/USFS to sell their forest. We reminded them that it is their own national

government that has decided to create Forest Plans prior to timber harvest, and that local participation is a required element of Forest Plans. We were only there to provide our experience with participative planning. We asked if they choose to participate.

The village said they could not answer until AWF/USFS explained zoning. Some members still expressed a lack of understanding of purpose of the project and of AWF. So, we further explained sustainable management and examples of problems in other parts of the world that we do not want to see happen to them. We talked about conservation.

The village mentioned that the AWF boat project did not completely work because there are no roads for them to transport their agricultural goods to the boat.

Villagers mentioned that it seems AWF/USFS think the villagers do not know how to manage our own forest. We explained that they are the experts and know their forest the best. That is why we came so far to talk with them and to learn from them, and perhaps to work together with them. We can offer them what we have learned from mistakes made in other places.

The village asked for grants to support local students as they study forestry. However, they also mentioned that they want AWF to be here and have a place to stay.

21 January 2006 – Presentation on Participative Mapping in *Carré* Djolu

Presented by: Botamba Esombo, GACC (Great Ape Conservation Coalition)
Attendees: Jef Dupain, AWF
John Sidle, USFS
Jena Hickey, USFS
Camille Likondo Lokonga, AWF
Maxime Nzita, AWF
Didier Bokelo Bile, AWF

As part of AWF's Landscape Planning Process, Botamba Esombo (of GACC) will lead the *Carré* Djolu (Djolu Square) participative mapping effort. U. S. Fish and Wildlife Service is funding *Carré* Djolu, partly because it is in an area of high bonobo density and bonobos are a globally protected species. U. S. Fish and Wildlife Service administers the Great Apes Act, a source of funding for ape conservation. *Carré* Djolu is 4,000 km^2 in size and they will conduct a faunal survey across the entire area. (Though *Carré* translates literally as "square" the shape of the area is actually a complex polygon). As part of this project they will also monitor what is available as bushmeat in the market and compare what is available in the forest with the quantities of meat that are sold or traded in the villages. Camille is the AWF lead on the bushmeat monitoring portion of the project.

Botamba explained that participative mapping will focus on hunting because hunting is an important means of addressing the inadequate protein here. In the Djolu area, they eat very little fish. Participation implies involving the local people, so his role is to facilitate their involvement so that when Forest Planning begins, zone boundaries can be adjusted based on the feedback they derive from participation.

To conduct their work, they have 1 technician who is supported by different assistants in each location. These assistants live in the area where they work and expand the network of trained people that can explain the project to locals and increase public outreach ("sensibilisation"). The technician asks the locals to decide who is to assist the technician. Often the Village Chief, educated locals, NGO representatives, or representatives of the *secteur* act as the assistants.

Carré Djolu intersects with many organizational boundaries including 2 territories, 4 *secteurs*, and 20 *groupements*. As they survey the *Carré*, they plan to work on two levels, separately asking the village elders and the village elders and then the young village hunters the same questions. As part of the analysis, they will compare the answers of the elders with the youth to ascertain if any changes appear to have occurred throughout the recent past with regards to hunting and quantities of wildlife in the forest. Villagers will also be asked if any types of hunting boundaries exist, and if so, where those are perceived to be. In addition, the project will collect GPS locations of all family hunting camps to include in the mapped end-product. Talking to the local people about hunting hopefully will bring them into the process.

We discussed that frequently locals do not have a strong sense for estimating distances on maps, so it is important to listen to how they describe areas and names of areas, rather than relying solely on their ability to read maps. Furthermore, the local terminology for species often differs from ours. As an example, what we call a bongo they refer to as a giraffe. In addition, locals have been known to affirm that they have seen a given species in their local area, even when asked about species that are known not to inhabit the entire region or vegetation type. Therefore, AWF and GACC must take care to ask numerous follow up questions to ensure the capture of accurate information.

AWF and GACC plan to cross check the results with neighboring *groupements* to ensure that everyone agrees with the representation of limits or zones. Potentially, they may have to work collaboratively to come to a common understanding where villages or *groupements* view boundaries differently.

We discussed the kinds of zones already used regularly by the people. They mentioned Hiding Zones in which they hide from both civil and tribal warfare. They have Caterpillar Zones that designate where different villages have the rights to collect caterpillars when in season. They clarified that Caterpillar Zones could be the same as, or partially overlap with, that same village's Hunting Zone.

We noted that *Carré* Djolu relies on roads to delineate the project area, and yet the roads cut through the middle of *groupements*. We discussed that there may be a problem leaving out the portions of the *groupements* outside the project area from the participative process. We contemplated expanding the "participative mapping" to include the entirety of each *groupement* that overlaps the *Carré* Djolu.

We discussed that *Carré* Djolu is largely a social survey based on questions and that there is a science to asking questions. AWF has not involved a statistician in developing the methodology though John Hart of WCS has collaborated with them and, apparently, Botamba has taken at

least some classes in this topic. We discussed the need to prepare a list of all the information that will be collected and interview questions that will be asked at each *groupement*. We stressed the need for careful wording of questions and consistently using the same questions across the Landscape. The need to not pressure the villagers to identify limits or boundaries that do not currently exist was emphasized. Rather, the project will strive to accurately document how people actually use the forest today.

We discussed the amount of time currently budgeted for interviews and data collection at each *groupement*. With 60 days to complete the task, and 17 *groupements*, there will hardly be time for 3 days at each *groupement*. We discussed the need to stay longer at larger *groupements*, and that generally, 3 days was insufficient. They probably need 1 day for discussion, 1 day for training, 2-4 days for collecting data, plus travel time. They realize they actually need about 10 days per *groupement* and 6 months rather than 2 months to conduct this study. Adding teams to speed up the process would be cost prohibitive, so we discussed the possibility of reducing the amount of information that they gather. Perhaps they will limit their question to village hunting, which would appear to limit or eliminate faunal surveys – a very important component to the planning process.

21 January 2006 – Meeting with the Ministers of the Environment and of Rural Development, Djolu

Attendees: Bruno Mbele Bobinda, Ministry of the Environment
Daniel Bolanga Lokongo, Ministry of Rural Development
Josephine Bolombo, Ministry of Social Work
Jef Dupain, AWF
John Sidle, USFS
Jena Hickey, USFS
Maxime Nzita, AWF
Didier Bokelo Bile, AWF

We discussed the ICCN, listed species, wildlife protection, and the difficulties they face in enforcing rules or in conducting public outreach. We discussed that the role of ICCN is not limited to protected areas, but also protected species where ever they are located. They requested a bicycle to travel around the area and provide technical assistance for rural development. Their needs, indeed simple needs to do their work, underscore the dire lack of logistical support given to governmental employees.

The representative of the Ministry of the Environment has 4 permanent agents working for him and he uses the high frequency radio in Djolu to communicate with the Ministry in Kinshasa. Bruno cited 10 infractions against protected species in the last year, including the yellow backed duiker. Also, some locals apply a certain fruit juice in the streams as a toxin to harvest fish. The role of the Ministry of the Environment in Djolu is to notify the authorities of any infractions; the Ministry has no means to enforce laws. The authorities then decide whether and what punishment to impose. Generally, if a punishment is imposed it is in the form of a fine. They charge 2,000 Congolese Francs per animal that is illegally taken, and 20,000 Congolese Francs specifically for killing a bonobo. The Ministry of the Environment was not able to produce

documents of the infractions to show us. Bruno mentioned that they are not monitoring infractions right now because they are waiting for direction from higher levels on how to monitor them properly. A discussion followed regarding the absolute need to maintain accurate records. Bruno was unsure if there is a permit system for legalizing commercial hunters or the use of firearms when hunting. He recalled that there was such a system before the war. Bruno expressed a need for assistance. His position with the Ministry of the Environment only pays $8 U.S./month.

Josephine Bolomba, Ministry of Social Work, explained that her role is to help orphans and disabled people. She, too, requested a bicycle for moving about the communities. Daniel Bolanga Lokongo, Ministry of Rural Development, is responsible for building latrines and creating potable water for the community.

22 January 2006 – Meeting with Lingomo Village

Attendees:
Jef Dupain, AWF
John Sidle, USFS
Jena Hickey, USFS
Maxime Nzita, AWF
Didier Bokelo Bile, AWF
Michel Mptesi, Notability
Ilema Antoin, Notability
Isalang Mpoli, Notability
Jose Batu, Notability
Nkolo-Ba-Kumba, Notability
Batuafa-Isepuesy, Notability
JP Botoko, hunter
Antoine Adjibouti, hunter
Ekombo Lolombo, Association of Women
Maman Muzi, Association of Women
Bofalaz Nedo, farmer
Bolonga Dido, farmer
Pastor
Secteur Chief
Post Chief

We gave our normal introductions, describing who we are, what our expertise is, and our reason for being here; mainly to discuss sustainable management, planning, zoning, and public participation. Then we discussed the complete lack of a market in Lingomo and the unavoidable dependence this village must have on the flora and fauna of the forest. The *Chef de Poste* asked which species of flora and fauna we want them to protect. So we described the concept of an ecosystem and that ecologically, all things depend on each other. We explained that we do not want to prevent hunting; rather, we simply want everything maintained for long term use. We explained that AWF is not here to force the villages to do anything. Our approach is similar to the new Forestry Code which says to talk to everyone and to consider traditional rights and needs.

The notabilities were concerned that after completing all of this participative work, the government would still sell off their forest. They wanted some assurance from AWF that they would not let the government do this. We explained that AWF is not the State, but AWF does have expertise in conserving wildlife and forests.

The *Chef de Poste* expressed that they do not have much power here, because the forest is often given to people with money. The village gave the example of SIFORCO (logging company) showing up one day with all of their heavy equipment. No one notified the locals of their impending arrival nor was there any kind of local involvement. The village expressed the desire to have white people here and to stimulate development, but they do not necessarily want timber industry.

There was some discussion regarding the new Forestry Code and its requirement that logging companies complete a management plan that involves the local inhabitants prior to approval of a timber concession. We acknowledged that there is a chance that people with money may come to the area and log. However, the new Forestry Code requires that before logging occurs, the views of the local people must be addressed. We explained that we were there to begin to address their views by learning how folks use the forest and to eventually be able to relay local needs to DRC officials.

We then asked about their local organization and how they decide where boundaries between *groupements* are determined and where pastures will be located versus intact forest for hunting. Boundaries between *groupements* were determined long ago by their ancestors and appear to be well accepted. They consider the forest available for everyone in the village community to hunt or trap. However, people from other communities need to pay per day of use if they want to come here and hunt or trap. They use natural limits like rivers and artificial limits like the road to distinguish village "jurisdictions" within the forest. They noted that some forested areas between villages are not used, but even so, it still belongs to a particular village community. They mentioned that there sometimes were conflicts with people hunting in each other's areas.

We inquired about the relationship between the village and the logging concessions. They described that in a different village, Basankusu, the logging company (SIFORCO) got permission from locals before cutting, but that has not happened here.

We showed the village some maps of the area depicting logging concessions and villages. In listening to some of the village translations, we noticed that AWF was misrepresented as "allowing" the logging company to come to the area. AWF corrected this perception by clarifying that AWF is not in a position to allow/disallow logging. AWF is merely showing them a map and letting the village know that the government has mapped a potential logging concession in their area.

The village notability noted that they use the forest for housing, hunting, to hide, to eat, to make chairs – for everything, and that, for them, there is no sacred forest. They expressed concern that there is something of value here that we want to exploit (like diamonds). We let them know that

we could understand why they were concerned, since that is what other people have done in the past, and we recounted examples when locals in other areas feared the same thing.

A discussion followed regarding the power of information and the need for local inhabitants to have access to maps, satellite photos, and other relevant information as part of this planning process. The village requested phones for direct communication with Kinshasa because letters get lost.

The village asked how micro-enterprises like art, crafts and caterpillar collections fit into a management plan. We mentioned that in the U.S., we try to include all of those values in a given plan. That actually, that is why we want to ask the village questions about how they use the forest – to try to be sure that all values are represented and protected for future use.

23 January 2006 – Meeting with Yailala Village and Kitiwalists

Attendees: Jef Dupain, AWF
John Sidle, USFS
Jena Hickey, USFS
Maxime Nzita, AWF
Didier Bokelo Bile, AWF
Groupement Chief
6 Local Chiefs
Pastor of the Kitiwalists
Numerous villagers and Kitiwalists also present

We started with same introduction of why we are here, the new Forestry Code, the requirement for public participation and management plans prior to timber harvest. We mentioned the experience the USFS has with public participation, sustainable management, and planning. We mentioned that we are biologists in favor of sustainable use of resources so that they last for future generations to use.

A group of 44 Kitiwalists live in the forest near Yailala. Kitiwalists are a sect of Jehovah's Witnesses that has rejected current Government entirely and does not recognize its authority whatsoever. They moved into the boundary area between Yailala and next village about 38 years ago.

The village immediately demanded why AWF wants to go into their Forest and noted that people have killed each other over these kinds of issues. We explained that we do not want to enter the forest and that we just want to talk with them. AWF explained that, in the future, if they develop a partnership with this village, like they have in other locations, then the local hires of AWF may want to go into the forest to work on that project. However we assured them that we do not want to take anything from them. We want to learn from them - learn about the things they use in the forest in order to live. Then we will try to represent their needs back in Kinshasa. We explained that we would try to encourage Kinshasa to protect the things they need

We then went through the formalities of showing our official authorization letter from Kinshasa.

A discussion regarding administrative limits followed that seemed to imply that the Kitiwalists know where the limits are, but ignore them, since they do not acknowledge any government authority. The Kitiwalist Pasteur expressed their view that God owns all, He gives it to all, and what God provided, the government cannot take away. He reiterated that what God did not remove, they will use. He shared a verse from the bible (Act 17:26) that paraphrased states that all men came from one God, and all people came from one ancestor. He explained their perspective that humanity then spread all over the earth and everyone depends on the resources within their territory. He emphasized that if we want to help them, then we cannot impose any restrictions. Then he asked us to tell SIFORCO not to cut here.

24 January 2006 – Meeting with the *Secteur* Chief at the Headquarters of the *Secteur*, Botewa

Attendees: Jean-Pierre, *Secteur* Chief
Jef Dupain, AWF
John Sidle, USFS
Jena Hickey, USFS
Maxime Nzita, AWF
Didier Bokelo Bile, AWF

We discussed agricultural production, hunting, and the preferred foods of the people. More meat than fish is eaten here (which seems to be true everywhere except in the riverside town of Bongandanga). They are able to hunt monkeys both near and far from the village. However, bonobos are in higher densities farther away. Hunters live in rotation in which they stay in the forest to hunt for a period of time and then come out to village to sell or trade their meat. If no one buys their goods here, they can take their goods to other *secteurs*. They do have cartridges for guns and the hunters need a permit to use firearms while hunting. A permit is also required for commercial hunting. In general, when hunting without a firearm for subsistence use, no hunting permit is required. The Minister of Environment gives out the permits; however, the *Secteur* Chief does not know how many commercial hunters there are in the area. Most commercial hunters come from outside the *secteur* and bypass the Chief, which he resents. He expressed a need for some control by the State to stop these commercial hunters from poaching. We noticed that this particular *Secteur* Chief considers it poaching when hunters from other *secteurs* hunt in his jurisdiction. (Whereas last night at the village of Ekongo, people said it was okay for hunters from the next *groupement* to hunt in their area because they inter-marry.)

They grow many different crops in their plantations including corn, manioc, gourds, a little rice, peanuts, and coffee. They used to have large plantations of coffee for commercial productions, but the war ruined the transportation system so there was no way to get the coffee to market. Hence, they ceased commercial production of coffee. They consume mostly corn, manioc, and bushmeat. They are restarting animal husbandry, to produce pork as an alternative animal protein from bushmeat. In addition, they use other forest products including honey, caterpillars, mushrooms, baia, and medicinal plants.

We discussed the AWF boat project, which was geared towards stimulating transport of goods to market. They did know about the project and were disappointed when the boat was not able to come this way. They could not sell the corn that they had grown for the project.

We discussed the other local communities like the pygmies and the Kitiwalists. Intermarried pygmies and Bantu live nearby, as do large numbers of pygmies. Kitiwalists come in and out of the forest, but want nothing to do with the State. Kitiwalists have their own doctrine. According to their religion, they serve god and do not take orders from the government. According to the *Secteur* Chief that is why they hide in the forest. He noted that Kitiwalists have their own government. Even when soldiers try to visit the Kitiwalists, the soldiers have to disarm before they enter the Kitiwalist area. Kitiwalists do not kill. You can go visit them in the forest and you will receive a warm welcome, but try to impose a rule on them, and you will find it impossible.

He clarified that Kitiwalists exist in many places, not just in the area near Yailala. We asked what will happen if the logging company does come into their concession where the Kitiwalists live. The *Secteur* Chief assumed that the Kitiwalists would have to leave. Kitiwalists supported the first Prime Minister, Patrice Lumumba, a Nationalist with whom they concurred. He described common conflicts that occur over hunting between the village and the Kitiwalists. In addition to hunting, the Kitiwalists farm and they take their goods as far as Basankusu to sell and trade. The size of the Kitiwalists colony is increasing. There are no Jehovah's Witness priests doing missionary work here or in Bongandanga, but there are some in Lingomo.

The *secteur* chief confirmed that they are in contact with the pygmies. They have a point of contact assigned to communicate with the pygmies and they also invite the pygmies to come to the headquarters to discuss things. They have no real conflicts with pygmies. Pygmy communities are stationary now, they are no longer nomadic. He estimated that there are about 100 pygmies in the big group nearby and hybrids live in a separate area. Some pygmies choose to assimilate into villages.

24 January 2006 – Meeting with Bokenda Village

Attendees: *Groupement* Chief of Bokenda
Notability
3 Pygmy Representatives
Jef Dupain, AWF
John Sidle, USFS
Jena Hickey, USFS
Maxime Nzita, AWF
Didier Bokelo Bile, AWF
Numerous villagers

We started with our usual introduction and mentioned Faustin Tokate, the AWF Focal Point located in Bongandanga who has been there since November 2005. We mentioned that we hope to bring together development and conservation goals and that Faustin will assist with the process. Bokenda serves as both a village and the headquarters of the *groupement*. Boundaries

of *groupements* appear more loosely defined here. The boundaries are identified by seeing hunting camps from the next *groupement*, at which point they know that they are at the boundary. There are hunting camps but no villages inside the forest around here.

Only one person from Bokenda works at the SIFORCO logging camp 45 km down the road in the Village of Keé.

The Rainforest Foundation (UK) held a one-week symposium for pygmies here in Bokenda in September, 2005. Villagers wondered "Why only pygmies? We use this forest, too." The people eat bonobo and there really are no taboos against such consumption. There is considerable doubt if there ever were any taboos. There is no such thing as an animal here that is taboo to eat. They hunt/eat elephant, but it is very difficult to hunt them. They commonly interact with the Ngombe people, although the population here is not in agreement about contact with Ngombe people.

Bush pig is the favorite food of most/all people interviewed. They also like porcupine, pangolin, bongo (called giraffe).

The chiefs were concerned about the number of meetings that AWF holds. What aid is AWF really going to provide? AWF needs to state their vision. It seems that development is primary for this village. They indicated that SIFORCO brings non-locals in – many people are out in the Forest that AWF is not in contact with and they are doing things that the *groupement* doesn't like.

The reality is that the region is isolated, so it is very complex. It will take a long time and AWF does not want to err and forget any of its MLW partners. Local participation is needed according to new Forestry Code. It's now required to talk to local populations before logging.

AWF reminded the people of what AWF has already done; pork husbandry, various AWF Focal Points, other projects up and down the road, and the work that went into sending the barge up the river to get their goods to market (everything went well except that the military delayed the barge for a while).

The chief of the *groupement* wants the hunting camps that don't belong in the surrounding forest to be forced to leave. They are strangers, not from here at all, Ngombe as well as Mongo. The chief indicated that if a management plan would control this problem then he would accept it. The chiefs of *groupements* now meet frequently because, unlike before when there were few problems, there are now many problems associated with exploitation. Now that they understand about natural resources, they see there is a conflict and they need to meet. Now they might have more flexibility because the new Forestry Code recognizes the role of local people. Thanks to AWF, they now know about the new Forestry Code. The government did not tell them.

AWF explained that it does not produce a management plan and force it upon you. Rather, AWF work with the people to develop a management plan that makes sense to the people.

They expressed concern that a national plan of some kind would forbid hunting everywhere. They want a plan with only a limited amount of restricted areas. They wanted to work with pygmies and other users on a management plan (3 pygmies were present). One pygmy indicated that they, the pygmies, already have an idea of areas that are pygmy and areas that are Bantu, almost as if they had already done some zoning. One female pygmy stated that they are here on the territory of the Bantu Chief. She agrees with the chief of the *Groupement*. They consider the Bailailai (?) their area. They work with the villagers here (Pygmies and villagers inter-marry. They all have to live together. (Basically, she pledged her allegiance/respect to the Bantu Chief – it is hard to know if this is really what most pygmies think/believe or if it is a politically wise statement for her to make in front of the Bantu Chief.)

AWF simply reminded the people that AWF seeks a participative process in which everyone can share their opinion whether it is "yes, no, maybe, whatever". AWF does not want to cause conflict because as the woman (female pygmy) said, we all have to live together. AWF is also asking SIFORCO if they're interested in this participative process, because it is so complex with so many users, and not just Bantu/Pygmy, but also National and International issues.

There was a village dispute about AWF giving money to the chief for meetings and it stays with the Chief. None of the money goes to the young people.

The people at this village stop were the most agitated that we had encountered.

25 January 2006 – Meeting with SIFORCO Logging Company Workers at Keé. (They are Congolese, but mostly from outside this specific area – and were drawn in by the opportunity for employment). As a side note, we must have written permission for everything we want to do, including entering a timber concession. Permission must come from authorities in Kinshasa that the local authorities identify with. It seems strange that such detailed permission is required by distant Kinshasa whose government is unable to manage truly important issues such as the management of bushmeat hunting and enforcement of other laws.

We discussed conservation issues with a large group of workers who received a minimum amount of money to simply look after the facilities in anticipation of the return of active SIFORCO operations.

One logger stated that our ancestors hunted, and we must hunt to live. If you protect the forest you will make it impossible for us to live, he said. We simply stated that we're not anti-hunting. It's just a question of management, rules, and regulations, because across the world hunting has caused the loss of species. Here is part of the exchange we had at Keé:

Sidle - Are there any hunting rules here?

Logger - No rules. They know we talked to Dieter Haag (president of SIFORCO in Kinshasa). People came from all over to work for the logging company. Once it pulled out, they stayed and had to clear fields and hunt to live.

Sidle - Aren't there government laws about hunting?

Logger – True. There's no hunting allowed in April. They know there are laws about certain protected or sensitive species. We didn't come here to hunt. We came here to log. But the company left. So we must hunt to live.

Dupain - We agree about the need for folks to live and survive. If you're going to live here in the future, you need to find a way to hunt sustainably. Dieter Haag and SIFORCO are timber specialists. Dieter needs us for our expertise on sustainable management of wildlife. When we met with Dieter Haag in Kinshasa, he agreed with our interest in finding out how folks use the forest.

Loggers – We are sick of waiting for SIFORCO. Why don't you hire us to do conservation work?

Dupain - Thanks for the idea. We have no ideas for specific projects at this time. This meeting is just a first contact. We do have Faustin Tokate who is our main contact with you. I'm happy with this first meeting because now we are getting to know each other. The work we do, in part with the government, does not currently have a specific task that needs numerous employees like a logging concession does. However, we can keep meeting together as the country reconstructs itself and as elections occur. Then we can see if there is some work we can accomplish together.

Loggers – Regarding conservation and forest exploitation, please explain how to do both.

Jena - As an example, we might try taking 60-70% of marketable trees instead of all of them.

Sidle - At the same time, we would regulate hunting. How many of you hunt?

Sidle - How many commercial hunters are there?

Loggers – None – we hunt to feed ourselves.

Dupain - Consider the Forest *Secteur* of Bongandanga: How are we going to hunt in future generations, if we already have ~10,000 people in Bongandanga *Secteur*? In Cameroon, we've successfully developed rules to allow sustainable hunting. Now, imagine Bongandanga *Secteur* gets another logging concession and more loggers come in. How is it going to work for the original inhabitants and the new loggers all to live in the same area? How do we make sure there is enough fauna to hunt for everyone?

Loggers – For example, in concessions in Bomba, the local community forbade hunting or farming by loggers. Loggers had to buy all their food from the locals.

Dupain - Why isn't the Keé Community organized similarly?

Loggers – The rules apply only when the logging concession is active. This idea of submitting to the same rules came up only after the war.

Jena's Sidenote: Logging plans need to address how to deal with increased human pressure from incoming loggers (perhaps maximize use of local inhabitants as employees and minimize the number of employees hired from outside immediate area – also perhaps have a plan to transport employees back to their natal villages once the timber company pulls out…)

Sidle - Is there a conflict now between locals and loggers?

Loggers – No. (Note: we got a different answer later the same day from local villagers.)

Sidle - How far do they have to go to be able to hunt fauna?

Loggers – Bushpig is within 1 km, but bonobos are more than 5 km (Note: difficulty with distance estimates.)

Sidle's Sidenote -When he worked in Ituri he asked where are the animals? Folks said they had to walk 2 days to find fauna.

Dupain - Has the situation pushed any of them to become commercial hunters?

Loggers – Yes. They use the money to buy shirts or smokes. They go as far as Basankusu to get goods and people come here for meat. (Note contradiction: earlier they said that they were not commercial hunters; that they only feed themselves. Now they say they do sell their bushmeat.)

Sidle: When SIFORCO was active, did they use the company's roads and vehicles to hunt?

Loggers – Yes.

Jena: Do strangers from elsewhere come here to hunt commercially?

Loggers – Yes. From all over. Even the Kitiwalists come here to hunt.

Sidle - What kind of hunting is done?

Loggers – All kinds: trapping, arrows, guns….

Sidle - Do they have cartridges?

Loggers – Yes. 500 francs per cartridge, so not much pressure with guns.

Sidle sidenote: Expensive cartridges translate to lower pressure on bonobos and other wildlife.

Loggers - Want AWF's Faustin Tokate to keep them abreast of situation. They want to do this sustainable hunting.

Dupain - Promised to meet with Dieter Haag and deliver their message and begin to work together on this Plan to develop sustainable hunting.

25 January 2006 – Songoboyo, Impromtu meeting with Local Community near Keé.

Discussion near SIFORCO/Keé. The people considered it a disadvantage to have SIFORCO here. SIFORCO put logging camp on top of a local hunting camp without any compensation. The people do inter-marry with people from logging camp. When SIFORCO went inactive, commerce dropped to near nil. One advantage of SIFORCO was the increased opportunity for transport, work, and trade. There are too many benefits to resist SIFORCO if they want to come back; the locals will accept it. The people pointed out that "If we don't have what we love, we love what we have." SIFORCO can come back as long as they respect the new Forestry Code; they should use the forest little by little, not destroy the whole forest. Also, SIFORCO needs to consult locals as required by the Forestry Code.

25 January 2006 – ADCN – Action Development and Conservation of Nature

We visited the pork husbandry project that was bankrolled by AWF by awarding a small grant to ADCN. They are building pens for raising hogs to supply the community with some much needed animal protein and to thereby reduce pressures on the wildlife that are currently harvested as bushmeat. We ask about the level of hunting pressure by asking about Colobus monkeys, Mangabies (both fairly large monkesy) and yellow duikers all of which are sensitive to hunting.

26 January 2006 – Bongandanga Village Meeting (This major village is situated on the Lopori River and is influenced by SIFORCO activities)

Maxime Nzita (AWF) did the usual introduction. To resolve problems in the forest we first need to know how the forest is used. We need all levels of society represented in this meeting. We need to find out how the people are organized to solve problems? We want to see what potential there is; see if methods in the US can be used here. We want to consider all levels of society when problem solving.

Villagers – They have observed for a long time that AWF is not associated with exploitation of this forest. All the previous exploiting companies just came here and took without asking. Village really had to organize and work hard to get anything from the logging company. The village wants to work with us. Before the village can give up the forest, they want to reiterate what they need. This is not the first time that they have expressed their needs to International NGOs. They have said it over and over. Yet, they still don't get the support they need. This time, because of AWF's presence, they will repeat what they want before they give up the forest. They want means of transport, means of communication, and companies to invest in the area. This is the most isolated area of DRC so communication will really help. Also they need direct help for various programs. Do this and they will leave the forest. They hope after this time, we

will do something. Why so many meetings with no specific outcome? They are willing to entertain a proposal from us.

(Sidenote: Discussion that we don't want anyone to leave the forest; we just want to help them develop sustainable management plans so that there will be bushmeat and livestock to eat for their children and their children's children. They just use that terminology "leave the forest" but they mean reduced bushmeat hunting. It would be wise to clarify this repeatedly and with every village so that there are no misunderstandings.)

Sidle - What are some specific issues they have with SIFORCO?

Village - The *groupements* don't have conflict; they know the limits. They have a single notability leading all the *groupements*. SIFORCO previously took timber without consulting them or consulting them.

Maxime – Described management plans that would be developed under the new Forestry Code.

Village - We try to pressure SIFORCO to satisfy us and then we let them cut.

Jena - How are you organized to make decisions among *groupements*?

Village - Each *groupement* has 1 chief, 2 Notables, 1 Administrative Office with 1 President, 1 VP, 1 Secretary, 1 treasurer, many members, 1 Management Advice Committee to assist the Chief of the *groupement* where exploitation is occurring. Each time there's a gift, they come together to decide how to divide the gift. But the *groupement* where the exploitation occurs gets double. There is a difficulty with difference in power between SIFORCO and village. Example: SIFORCO signed contract to pay notability $2000 US per month. SIFORCO still owes $6000 US. They think the new Forestry Code will protect them.

Maxime – What is the relationship between notability and civil society? (note: confusion because civil society does not translate well). How are notabililty selected? → Tradition, a bit like royalty. Are women in the notability? How do women contribute to problem solving decisions?

Village - Notability = oldest in clan and depends on his properties and his capabilities; some say this process of selection cannot be questioned. Yes, women can be in the notability. A female *Chef de Groupement* stands to be recognized. There are 3/13 female *Chefs* de Village.

Jena - Do notables consult the village members before making decisions?

Village - When notables go to represent the village, they first meet with the village to understand what they want.

No rules yet for hunting. People hunt for food and $.

Commercial hunting – depends on what each person needs/wants. Some may hunt for 1-2 months at a time.

Sidle - How many commercial hunters are there? (Sidenote: We probably did not adequately define commercial hunters as evidenced by the different answers we have received)

Village - No more than 5 commercial hunters per g*roupement*. (This refers to no large scale commercial hunting). If AWF succeeds in providing them with other animal protein (pork project), then they will hunt bushmeat less.

Sidle - Hunting is less important for food in the U.S. because there is a lot of animal husbandry there.

Village - They are already submitting complaints about non-resident hunters poaching off their forest. And they've successfully removed some poachers from the forest. No conflicts between farmers and hunters (yet) because the forest is so big and there's enough room to slash and burn to make room for farmers.

Maxime – If forest is so big, why do the villagers chase poachers out?

Notability - Because it's not their forest and they are breaking the rules. In Cameroon, the power starts in the family. There, each NGO can just ask the family. Here, you must consult notability.

Maxime – Then it seems that notability are acting as Government. What's the role of the *Chef de Groupement* if the notability is acting as Government?

Village – *Chef de Groupement* is the lead notability.

Maxime – Then that means talking with the Chief = talking with the notability. (He's implying that you shouldn't have to double check with other notability, if you've consulted with the Chief).

28 January 2006 – Basankusu Meeting with AWF

We concluded our tour of MLW with a series of AWF/USFS meetings in the village of Basankusu. Central to everyone's thinking is how long is it going to take to do zoning and what criteria and techniques should be used to zone MLW. What level of sophistication should be used to develop proposed zones? CARPE and AWF desire that some proposal be submitted to the government in the near future. Essentially, it came down to zoning MLW based upon the three CARPE zones, Protected Area Zones, Community Use Zones, and Extractive Use Zones. We explained steps in most planning processes that lead up to zoning and presented potential criteria for delineating CARPE zones across the Landscape. These criteria were discussed and modified. We conducted a zoning exercise in which individual AWF and USFS staff attempted to map CARPE zones based on a few remote-sensing images and our current knowledge of

different areas. The maps we all produced were strikingly similar and highlighted areas within MLW in which further information is needed. We finally brainstormed a schedule of tasks for AWF staff (Focal Points) to accomplish in the next four months. Mainly, they will meet with the chief of each *groupement* to acquire data about existing jurisdictional boundaries and further engage the chiefs in participative planning, especially some input from them ass to where Protected Are Zones should be located. We discussed that all AWF Focal Points need to use the same vocabulary and that their explanations of different zones be well rehearsed to ensure consistent understanding across the Landscape. We also discussed potential resistance from local communities in identifying Protected Area Zones; they may wish for something in return for "leaving the forest" - a local representation of Protected Areas.

CARPE ZONES:

- Protected Area Zone
  - Game refuges
  - National parks
  - Community forest
- Community Use Zone
  - Roads
  - Villages
  - Slash/burn agriculture
  - Animal husbandry projects
  - Intact forest used for bushmeat, honey, caterpillars, etc
- Extraction Zone
  - Timber sales can occur within these
  - Timber sales need to employ mitigations
  - Timber sales need to address the human immigration that they cause
  - Not expecting 100% extraction of marketable timber throughout these
  - Community-based NRM can be used as a tool in parts of EZ

Discussed the criteria that were used to define Lomako Reserve boundaries:
Essentially:

- Biodiversity
- Natural boundaries
- Research there since the 1970s

Guided Brainstorm on Criteria for Protected Area

- Presence of biodiversity
- Endemic species
- Easily identified boundaries
- Represents ecoregions of DRC
- Can be within current "potential" timber concessions, if they find a biological value to protect

Maxime – What do Jena and John recommend to make already identified zones function as intended – to function well?

- Natural barriers
- Corridors
- Consider different rules adjacent to protected areas (e.g. lower density roads in concessions adjacent to protected areas)
- Etc.

Maxime – Considering what we know so far, how do we complete the zoning?

- Biodiversity –
  - Bushmeat
  - Endemics
  - Flagship species

- Socio-economics –
  - Peoples' means of living
  - Potential for agriculture

- Participative
  - Ask locals what they think of development and conservation
  - How do they conceive of development and conservation?
  - What is there input on these ideas?

- Government involvement
  - Minister of the Environment
  - Minister of Rural Development
  - Ministersof Agriculture

- Mapped Human Population/Villages
  - GPSed polygons of village footprints
  - Road layer
  - Canopy-loss polygons (slash/burn)

- Involve Private Sector Businesses
  - Industrial plantations (minimal)
  - Timber industry

- Flora/Fauna GIS Layers
  - Polygons of Dry and Swampy Forest
  - Canadian flora/fauna data
  - Logged/not logged forest
  - Consider homogeneity of fauna populations
  - Consider forest structure and loss of old trees

Discussion:

Jef doesn't feel need to go into the details of vegetative communities. Says the Canadians did flora surveys, but it's not summarized or easy to use. Forest inventories were not used.

Jena – CONCERN HERE. CBFP is based on Natural Resource Conservation. They may not have time to conduct vegetation surveys now, but it would cost considerably less to read existing data from 1980's Canadian study.

Jef/Didier – Ask experts to assit WCS/ or FRM with dynamics of logged/non-logged forest

Jef – Has good familiarity with effects of logging on flora/fauna "LIFE AFTER LOGGING" = a literature review that he recommends

A Community Forest – as per DRC Forestry Code

- A local community can obtain title to a forest concession in part or in whole; or it an get an entire Protected Forest if it is among those Forests that are regularly/customarily used (by local community)

Community-based Natural Resource Management – as per AWF

- A local community manages the resources (flora/fauna, but not timber) in a given area

Jena - What % of the MLW landscape should be exploited for timber extraction?

ICCN - at least 15% of country will be protected (we need to rectify terminology, did ICCN mean protected in the same manner as the Forest Code – which allows for timber extraction in what they term "protected areas" or did ICCN mean a stricter set of rules to ensure natural resource conservation?)

15% of MLW	=	10,500 km^2
Lomako	=	3,600 km^2
Community Hunting Reserve	=	3,600 km^2 (Would qualify as ICCN protected area?)
Remaining to Designate	=	3,300 km^2 (Or more, if landscapes should exceed)

Jef - Find out what ecosystem is not yet represented by MLW protected areas and put a PA in that ecosystem

Sidle - Use satellite images to select areas with minimum human populations

Jef - And use rivers as boundaries
Maybe pick swampy forests for additional protected areas since the proposed Lamako Forest and hunting reserves are both representing terra-firma rainforest.

Sidle - Only 2 ecoregions in DRC:
Central Congolian Lowland Forests
Eastern Congolian Swamp Forests

Jef - Pick areas on other sides of rivers, to ensure protection of disparate populations

NE part of MLW has some true swamp forest; potential problem is there's already illegal logging there

Jena - If swamp forest is difficult to log, then perhaps the part we want to protect is distinct from the part that is illegally logged

29 January 2006 – Basankusu AWF Meeting

Focal Pt. – task schedule for next 4 months

Jef - Focal Pts. Will go to each *Chef de Groupement* to discuss zoning

Sidle - Recommends that all Focal Points need to use the same language, they need to be well-rehearsed when explaining the different zones to the local communities. What is a protected area? Etc.
AWF may find resistance from local communities when trying to identify protected areas

Communities may want $ or something in return

Jef - No, they only want agriculture and transport development in return

Jef's example:

Lamako Protected Area:

Mongo People – supposed to be in Lamako area thus far and they are willing to leave if development is forthcoming.

Gombe People – not supposed to be there. May need to be "chased out"

Jena sidenote: need to research and publicly scope the history of the two ethnic groups in the Lamako area and clarify who "should be where." Perhaps it's too late to say that the Gombe people do not belong… just like the Kitiwalists may now have carved a niche for themselves in the Yailala area.

Both groups need to leave Lamako Reserve, no more agricultural fields, no more hunting camps, no more living in there. No more fishing and hunting in there.

Generally, ask people who must leave forest stands because they are zoned Protected Areas, what is sufficient trade to make them leave? Transportation system?

1 February 2006 – Meeting with CARPE in Kinshasa

We simply present here the write-up by Chris Iverson and Oliver Pierson who were also present at the meeting with CARPE:

Democratic Republic of Congo
Landscape Planning Debrief Meeting (Feb. 1, 2006): The two USFS teams that traveled to CARPE landscapes to initiate work on developing a methodology for landscape planning in the Congo Basin gave debriefings on the results of their field missions to a large group of CARPE and DRC government partners on February 1, 2006. John Sidle and Jena Hickey traveled with AWF to the Maringa-Lopori-Wamba landscape, and David Fournier and Becky Nourse traveled to the Ituri Landscape with WCS. Both teams gave presentations that described the overall CARPE activities on the landscape, reviewed planning activities to date within individual CARPE management zones or at the broader landscape level, and presented ideas and concepts for planning at the landscape scale. The teams also made reference to planning concepts used by the USFS for landscape-level work, including the new planning rule, the "NEPA Triangle," principals for incorporating public participation, and the role of data for decision making.

Following each presentation, there was reaction and discussion from CARPE partners. The following issues were raised:

- How do you plan at the CARPE landscape level, when the CARPE landscapes have no legal significance, and the capacity of the governments to enforce laws in these areas is extremely limited?
- How does planning address population growth?
- How do you reconcile threat-based planning, used by CARPE NGOs, with "desired condition" style of planning, used by the USFS.
- What is the difference between planning and zoning, and how does one plan to steer threats toward zones that can respond to them?
- Does the new DRC constitution clarify issues of who has ownership and use rights over forested areas? What about laws and forestry codes in other CARPE countries?
- How do you develop plans that are flexible and adaptable enough to take major shocks, such as refugee fluxes, into account?
- How do you plan amidst an environment of very confusing land tenure rights?
- How do you deal with landscapes that straddle two or more nations?
- What is the process for approving a landscape level plan? Who needs to be involved in drafting it?
- Are there any examples of USFS planning principals applied successfully in Africa? If so, what are they?

Clearly, this afternoon meeting did not answer all these questions. The USFS reports from these two missions will address some of these points, particularly how to apply USFS planning principals into the CARPE context. At the end of the meeting, CARPE Director John Flynn clearly laid out his expectations for USFS support to CARPE land use planning objectives. Mr. Flynn requested that USFS provide technical input to help CARPE partners develop two products:

1. A Template for a short strategy document for each landscape that will clearly document the overall approach that the landscape lead is taking to achieve CARPE objectives on that landscape
2. A guide providing clear process steps and elements of a landscape management plan that can be executed, including how to do it, who should be involved, what is needed, and how much it will cost.

Both of these documents need to be consistent and standardized across the CARPE landscapes, must be measurable, and must provide adequate flexibility to take the diversity of geographic, political, legal, social and biological dynamics of CARPE-land into account.