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INTERACTIVE FORESTRY ATLAS OF CAMEROON

VERSION 2.0

An Overview



INTERACTIVE FORESTRY ATLAS OF CAMEROON

(VERSION 2.0)

AN OVERVIEW



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A WORLD RESOURCES INSTITUTE REPORT PREPARED IN COLLABORATION WITH THE CAMEROON MINISTRY OF FORESTRY AND WILDLIFE

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FOREWORD

With more than 19.5 million hectares of tropical rainforest (slightly less than half of Cameroon) excluding gallery forests, the Cameroonian forestry sector contributes significantly to the local and national economy by creating employment opportunities, generating tax revenue and contributing directly to the construction of roads, schools, and health centers.

The government of Cameroon, through the Ministry of Forestry and Wildlife (*Ministère des Forêts et de la Faune* - MINFOF), is faced with the difficult task of managing and regulating the national forestry sector, and has invested significant means in order to monitor activities in the sector with the support of partners and donor institutions. These wide-ranging initiatives and collaborations indicate the commitment of the Cameroonian government to improving governance and management of the forestry sector. This strong commitment and substantive reform efforts have resulted in significant improvements over the last decade, making Cameroon a regional model for the implementation of sustainable forest management.

In the interest of promoting transparency and combating illegal logging MINFOF has chosen to develop multiple partnerships, particularly in the monitoring and evaluation domain, to improve the planning and sustainable management capacity of the forestry sector. In this context, a memorandum of understanding (MOU) was signed in June 2002, between the Cameroonian Ministry of the Environment and Forestry (*Ministère de l'Environnement et*

Forêts - MINEF) and World Resources Institute's Global Forest Watch (WRI-GFW). This MOU was subsequently renewed in June 2005 between MINFOF and WRI. These initiatives are based on Remote Sensing (RS) and geographic information system (GIS) applications to develop a cartographic and statistical database for forest resource managers and practitioners in government. Increasingly powerful computer-based applications such as RS-GIS allow for significant advances in quality control and access to forestry sector information in support of sustainable forest management. This database will serve as a reference tool for MINFOF and facilitate monitoring of the forestry sector in support of pursuing sustainable forestry management.

The publication of the first version of the Cameroon Interactive Forestry Atlas in 2005 was one of the main outcomes of the close collaboration between MINFOF, WRI and all collaborating institutions in pursuit of sustainable management of the nation's forests. This initiative is unique because it combines previously unlinked and difficult to access forestry data and information in a user-friendly format.

The improved access to this updated and more accurate information allowed for the Ministry to support a number of activities—notably the precise definition of boundaries of forest titles put up for public bidding in 2005 and 2006, surveillance activities on the ground, accompanying forest concession and protected area classification procedures,

and the resolution of certain conflicts regarding overlapping forest titles.

In order to remain relevant, the forestry atlas must be regularly updated so that it contains the most recent and objective information available on the Cameroonian forestry sector. Following this reasoning, the second version was developed allowing for the user to access both updated existing sets of information as well as essential new information relevant to sustainable management of the sector.

In contributing to this atlas, the Government of Cameroon reaffirms its engagement to transparency and good governance in forest management and making the information produced through this partnership easily accessible to the public online through both the sites of WRI and the MINFOF.

For the success and important resulting products of this initiative, I would like to thank WRI-GFW and their network of partners, as well as the international donor organizations which supported this work – particularly the Central Africa Regional Program for the Environment of the United States Agency for International Development (USAID-CARPE).

Yaoundé, le 15 Novembre 2006
LE MINISTRE DES FORETS ET DE LA FAUNE

The nation of Cameroon is setting an important example by taking practical actions to address illegal logging and sustainable management of forest resources. These issues are at the forefront of a number of international negotiations.

This second version of the Interactive Forestry Atlas of Cameroon is a practical tool for understanding and working within Cameroon's forest sector. It demonstrates the power of a committed partnership between civil society and government.

The Atlas, a first of its kind, demonstrates a commitment to transparency in Cameroon's forest sector by ensuring that all stakeholders have equal access to accurate forest management information. It is the result of five years of collaboration among partners including the Cameroon Government, the World Resources Institute's Global Forest Watch program, Limbé Botanical Gardens, Cameroon Environmental Watch, the forest industry, international donor agencies and countless civil society groups and individuals both in Cameroon and abroad.

Each partner had an important role to play in producing this updated and improved version of the Atlas. Local partners digitized and updated logging title boundaries; the Cameroon Government integrated their separate databases on forest taxes, species, harvesting levels and production; and several companies helped to verify concession and production data and provided feedback on earlier drafts. The World Resources Institute's Global Forest Watch team trained users across the country on the first version of the Atlas, and revised it to produce this second version.

The benefits of this collaborative effort to foster transparency will be multiple and far reaching. Increased transparency in the forest sector helps stabilize and reduce business risk, attracting investment and improving Cameroon's economy. Transparency empowers Cameroon's citizens, by strengthening the power of the public to participate in decision-making and hold decision-makers more accountable. Transparency also helps the Cameroon Government manage its vast forest resources

more effectively. It improves information flow and effective cooperation among government branches, reduces conflict, and allows both public and private actors to focus their resources more effectively to achieve solutions.

The World Resources Institute is committed to moving human society to live in ways that protect the Earth's environment for current and future generations. Through Global Forest Watch, we are proud to have been a part of this important achievement, and we look forward to a bright future for Cameroon's people and its forests.

**Jonathan Lash, President
WORLD RESOURCES INSTITUTE**

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Preparation of this second version of the *Interactive Forestry Atlas of Cameroon*—including data collection, quality control, and other activities—benefited from the support of a number of private enterprises, such as the *Groupeement Filière Bois au Cameroun* (GFBC), and from organizations and institutions, such as the Central Africa Forests

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Special recognition goes to the Central Africa Regional Program for the Environment (CARPE) of the United States Agency for International Development (USAID) for its critical financial support to this project. The contents of this atlas are the responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government. The Environmental Systems Research Institute (ESRI) and Leica Geosystems (ERDAS) also supplied significant support by providing our Cameroonian partners with reduced-price licenses for use of their software.

We would also like to thank WRI staff in Washington, D.C. for their assistance in the production of this second version of the atlas. Pierre Méthot of WRI played a leadership role in its conception and development as well as helping to guide its implementation. David Jhirad, Bradley Kinder, Lars Laestadius, and Janet Nackoney reviewed draft versions of the atlas text and provided constructive comments. Diane Davies and Minnie Wong gave

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ACRONYMS

AAC	Annual harvestable area (<i>Assiette annuelle de coupe</i>)	FLEGT	Forest Law Enforcement, Governance and Trade	PEPF	Forest products exploitation permit (<i>Permis d'exploitation des produits forestiers</i>)
AEB	Timber removal permit (<i>Autorisation d'enlèvement des bois</i>)	FMU	Forest Management Unit (see UFA)	PFD	Permanent Forest Domain
ANAFOR	National Support Agency for Forest Development (<i>Agence nationale d'appui au développement forestier</i>)	FORCOMS	Independent Forest Concession Monitoring System for Central Africa	PSFE	Forest and Environment Sector Program (<i>Programme Sectoriel Forêts Environnement</i>)
AFLEG	Africa Forest Law Enforcement and Governance	FSC	Forest Stewardship Council	PSRF	Forestry Revenue Enhancement Program (<i>Programme de Sécurisation des Recettes Forestières</i>)
APC	Personal logging permit (<i>Autorisation personnelle de coupe d'arbre</i>)	GFBC	<i>Groupement Filière Bois du Cameroun</i>	RS	Remote Sensing
ARB	Timber recovery permit (<i>Autorisation de récupération de bois</i>)	GFW	Global Forest Watch (WRI)	SDFC	Sub-Department of Community Forests (<i>Sous Direction aux Forêts Communautaires – under MINFOF</i>)
ATO	Africa Timber Organization	GIS	Geographic Information System	SDIAF	Sub-Department of Forest Inventories and Management (<i>Sous Direction des Inventaires et Aménagements Forestiers – under MINFOF</i>)
CAR	Central African Republic	GPS	Global Positioning System	SGS	<i>Société Générale de Surveillance</i>
CARPE	Central Africa Regional Program for the Environment (USAID)	GTZ	German Technical Cooperation (<i>Gesellschaft für Technische Zusammenarbeit</i>)	SIGIF	Automated Forestry Information Management System (<i>Système Informatisé de Gestion des Informations Forestières</i>)
CBFP	Congo Basin Forest Partnership	INC	National Institute of Cartography (<i>Institut National de Cartographie du Cameroun</i>)	SSV	Sales of Standing Volume (see VC)
CEFDHAC	Central Africa Conference on Dense and Humid Forest Ecosystems (<i>Conférence sur les écosystèmes des forêts denses et humides de l'Afrique centrale</i>)	ITTO	International Tropical Timber Organization	TLTV	Timber Legality and Traceability Verification
CETELCAF	Forest Mapping and Remote Sensing Center (<i>Centre de Télédétection et de Cartographie Forestière</i>)	MINFOF	Ministry of Forestry and Wildlife (<i>Ministère des Forêts et de la Faune</i>)	TNS	Sanga Tri-national
CEW	Cameroon Environmental Watch	MINEF	Ministry of the Environment and Forestry (<i>Ministère de l'Environnement et Forêts</i>)	TRIDOM	Tri-national Dja-Odzala-Minkébé
CIFOR	Center for International Forestry Research	MINEP	Ministry of Environment and Protection of Nature (<i>Ministère de l'Environnement et de la Protection de la Nature</i>)	UFA	<i>Unité Forestière d'Aménagement</i> (see FMU)
COMIFAC	Central Africa Forests Commission (<i>Commission des Forêts d'Afrique Centrale</i>)	MOU	Memorandum of Understanding	USAID	United States Agency for International Development
DFA	Department of Wildlife (<i>Direction de la Faune – under MINFOF</i>)	MSSG-LER	Multi-Stakeholder Support Group for Legislative Environmental Representation	WRI	World Resources Institute
DRC	Democratic Republic of Congo	NFD	National Forest Domain	WWF	World Wide Fund for Nature
ERDAS	Leica Geosystems	NGO	Non-Governmental Organization	VC	<i>Vente de Coupe</i> (see SSV)
ESRI	Environmental Systems Research Institute	nPFD	Non-Permanent Forest Domain	ZIC	Hunting zone (<i>Zone d'intérêt cynégétique</i>)
		OLB	Origin and Legality of Timber (<i>Origine et Légalité du Bois</i>)	ZICGC	Community managed hunting zone (<i>Zone d'intérêt cynégétique à gestion communautaire</i>)
		OSFAC	Central Africa Forest Satellite Observatory (<i>Observatoire Satellital des Forêts d'Afrique Centrale</i>)		
		PEBO	Timber exploitation permit (<i>Permis d'exploitation de bois d'oeuvre</i>)		

EXECUTIVE SUMMARY

The tropical forests of Cameroon generate important economic, social, and environmental benefits for the country. Given the vast, remote nature of these forests, the Government of Cameroon has made significant commitments to monitoring forest-based activities to help support planning and management for sustainable forest use. This commitment has spawned various programs aimed at producing and/or compiling forest-monitoring data, creating an opportunity to bring relevant information together in a single, Geographic Information System (GIS)-based decision-support tool.

As part of a series of efforts aimed at improving forest monitoring, the Ministry of Forestry and Wildlife of Cameroon (MINFOF) and the Global Forest Watch (GFW) initiative of the World Resources Institute (WRI) have formally partnered to develop an interactive atlas of Cameroon's forests. The MINFOF-WRI collaboration aims to enable better decision-making by improving the quality and availability of geographic information relevant to the forest sector.

This report provides an overview of the second version of the *Interactive Forestry Atlas of Cameroon*. The first version of the atlas, published in 2005, has been distributed to and used by a wide variety of institutions to engage with issues related to sustainable forest management in Cameroon. Through this updated and expanded version, MINFOF and WRI seek to continue to provide current, relevant, and accessible spatial data and information on the forest sector to be used by government, industry, and the public.

Five new specific products are contained in the *Interactive Forestry Atlas of Cameroon* (V2.0) CD-ROM:

1. The welcome and user's guide – provides instructions for installation and viewing the atlas and its contents.
2. The *Interactive Forestry Atlas of Cameroon* – includes a map-viewing application that allows users to view maps in detail, pan and zoom to areas of interest, view data layers individually or in combination, query datasets, and print maps of their choice. Free, easy-to-use map-viewing software (ESRI ArcReader) is also included.
3. The GIS data and metadata – includes original shape files and attributes, along with information on how the datasets were created and/or data sources. (See Appendix 1 for a list of datasets found in this atlas.)
4. This overview report – provides a synopsis of the new and updated content in version 2.0 of the atlas, legal definitions and status of forest titles and classifications, and a discussion of actual and potential applications for key decision-makers and technicians in government, industry, and civil society organizations.
5. Poster – presents the overall situation in 2006 concerning forest exploitation in Cameroon.

For reference, the overview and technical roads reports for Version 1.0 that provide descriptions of

the methodology used to create the atlas datasets, including background information and examples of potential applications are also included.

By using this interactive atlas, decision-makers and stakeholders are able to easily access and manipulate the most current information on forest monitoring. Through the MINFOF-WRI collaboration, this atlas contains up-to-date, verified information on the Cameroonian forest sector, including the boundaries of timber extraction areas and useful data on their attributes, such as the status of management plans, the year in which logging titles were allocated, and annual timber-production volumes. Information is also presented on biodiversity and wildlife protection as well as other land use classifications. New information in the second version includes forest concession boundaries and associated volumes of harvested wood, boundaries of annual harvestable areas (AACs) within forest concessions, location and capacity of sawmills, and hunting zone boundaries for northern Cameroon.

Examples of actual and potential uses of the updated atlas discussed in the following report include:

- Supporting the prioritization of field missions for monitoring and enforcement of forest laws and regulations;
- Helping to prevent and resolve conflicts by providing a source of objective information on the boundaries of various forest zones, such as Forest Management Units (FMUs), Sales of Standing Volume (SSVs), council forests, community forests, and protected areas;

- Informing the application process for new logging titles, including assisting local communities in their efforts to identify areas available for establishing and harvesting timber from community forests, thus minimizing the confusion that has previously plagued this process;
- Supporting the key local authorities (e.g., Ministry of Agriculture, Ministry of Public Works, local councils, and members of parliament) in their land use and regional planning activities, including the identification of roads critical to travel and market access for remote rural communities; and,
- Supporting relevant authorities and partners in the design of new protected areas and conservation corridors.

The *Interactive Forestry Atlas of Cameroon* also supports ongoing efforts of non-governmental organizations (NGOs), donors, intergovernmental organizations, research institutes, and forestry companies towards improved forest governance and management. Training sessions tailored to the needs of various user groups have been, and will continue to be, conducted in order to ensure maximum awareness of the atlas and its potential applications. More specifically, the atlas and related

products can support many regional programs and processes, notably the Africa Forest Law Enforcement and Governance (AFLEG) process, execution of the Plan of Convergence of the Central Africa Forests Commission (COMIFAC), the Conference on Humid and Dense Forest Ecosystems of Central Africa (CEFDHAC), the efforts of the International Tropical Timber Organization (ITTO) and the Africa Timber Organization (ATO) to promote sustainable forest management, and the activities of the Congo Basin Forest Partnership (CBFP).

This overview report for version 2.0 of the *Interactive Forestry Atlas of Cameroon* is designed to complement the overview report produced with version 1.0 of the atlas, as well as its accompanying technical roads report and other relevant resources on the Cameroon forestry sector. Interested readers will benefit from referring to discussions in version 1.0 that provide more detailed context on the Cameroonian forest sector, including the basic framework and structure of forest sector legislation, forest zoning, logging permits, and forest management, as well as relevant forest statistics.

While this atlas presents the latest forest sector data that could be located, created, and/or provided by MINFOF, it does have certain limitations. Un-

fortunately, due to technical, financial, and time constraints, an updated roads layer could not be produced in time for publication with this version of the atlas. An updated roads layer is anticipated for the publication of version 3.0 of this atlas. In general, this atlas should be understood as a work in progress that will evolve and improve with further updates and/or expansion of the scope of the data. Evidence drawn from this atlas should not be considered sufficient for a definitive judgment of legality or illegality of specific activities, which can only be determined with further field investigation by MINFOF.

To promote transparency and accessibility, versions 1.0 and 2.0 of the atlas are available online, at www.globalforestwatch.org and www.minef.cm. Likewise, CD-ROMs are disseminated to key decision-makers and other forest-sector stakeholders.

INTRODUCTION

Current Situation

With more than 20 million hectares (ha) of tropical rainforest, constituting slightly less than half of total national land area, the Cameroonian forestry sector contributes significantly to the local and national economy by creating employment opportunities, generating tax revenue, and supporting the construction of roads, schools, and health centers. The difficult task of managing and regulating the national forestry sector is largely the responsibility of the government of Cameroon, which, with the support of partners and donor institutions, has invested considerable resources in monitoring activities in the sector. These wide-ranging initiatives and collaborations indicate the government's commitment to improving governance and management of the forestry sector. Associated substantive reform efforts have produced important improvements over the last decade, making Cameroon a regional model for the implementation of sustainable forest management.

In spite of these successes, recent publications, evaluations, and audits indicate that considerable challenges remain in managing the Cameroonian forestry sector. These obstacles could potentially block progress in otherwise positive movements towards increased transparency, improved governance, and the implementation of sustainable forest management. Examples of further required improvements include:

- Updating the Automated Forestry Information Management System (*Système Informatisé de*

Gestion des Informations Forestières - SIGIF) and its link with the forestry tax collection system (i.e., Forestry Revenue Enhancement Program/*Programme de Sécurisation des Recettes Forestières - PSRF*);

- Overcoming difficulties in the implementation of a decentralized forest revenue distribution system and addressing the resulting impacts on local populations;
- Collecting information pertaining to community forests and exploitation of *petits titres* (see Box 1 for an overview of types of logging titles in Cameroon); and,
- Revising the competitive bidding criteria for allocation of forest concessions.

It is worth noting that the Cameroonian government, primarily through its commitment to the Forest and Environment Sector Program (*Programme Sectoriel Forêts Environnement - PSFE*), is already addressing several of these issues.

In addition to its significant contributions to the national economy, the forest industry plays an important role in the use and management of Cameroon's forests. In pursuit of more sustainably managed forests and market differentiation, a number of logging companies have already committed themselves to improved forest management through the implementation of concession management plans, chain-of-custody reporting, and Forest Stewardship Council (FSC) certification standards.

Nevertheless, private-sector actors vary considerably in terms of their individual contributions to national economic growth, conservation, and responsible use of leased forest resources. A large gap exists between progressive forestry companies committed to legal and sustainable forest management and timber extraction, and those disrespectful of local well-being, forest resources, and national laws.

Complicating the situation with respect to Cameroon forests is the large role played by the informal sector in supplying local timber markets. As the informal sector is largely unregulated, very little is known about the true scale and source of supply of its timber production. Further complexity is introduced by considerable grey areas in legal regulation of the formal forestry sector, especially related to logging on smaller forest tracts, such as community forests or *petits titres* (see Box 2 for an overview of forest zoning and classification of logging titles in Cameroon).

These challenging factors have helped to create a number of serious problems, including illegal timber harvesting, unsustainable exploitation of forest resources, and failure to distribute among local populations an equitable share of benefits generated by the forest sector. Fortunately, a considerable increase in recent years in the percentage of forest concessions under sustainable management (i.e., according to a management plan approved by the Ministry of Forestry and Wildlife - MINFOF¹) should significantly improve the sector's potential for sustainable exploitation.

Box 1. Summary of Logging Titles in Cameroon

FMU – Forest Management Unit: Created under the 1994 forest code, FMUs are forest management units zoned within the Permanent Forest Domain (i.e., forests that are zoned for biodiversity conservation and sustainable management). They are allocated by a competitive bidding process for a 15-year period and require a forest management plan approved by the relevant administrative authority. (The corresponding term in French for FMU is *Unité Forestière d'Aménagement* – UFA.)

Forest Concessions: Singly managed units, which may include one or more FMUs, not to exceed 200,000 ha.

SSV – Sales of Standing Volume: SSVs are typically zoned within the Non-Permanent Forest Domain (i.e., forests zoned for timber extraction, agricultural, mining, and other uses), but they can also be allocated to nationals within the Permanent Forest Domain. SSVs are allocated by a competitive bidding process for a maximum of 3 years, are not to exceed 2,500 ha, and do not require a management plan. (The corresponding term in French for SSV is *Ventes de Coupe* – VC.)

Community Forests: Established under the 1994 forest code, community forests are areas within the Non-Permanent Forest Domain zoned for use by village communities. With technical assistance from the Ministry of Forestry and Wildlife's (*Ministère des Forêts et de la Faune* – MINFOF) Community Forestry Unit (*Sous Direction aux Forêts Communautaires* - SDFC), a village community seeking a forest title identifies a zone not exceeding 5,000 ha and drafts a simple management plan for approval by MINFOF. Proceeds from community forest management are used for community development projects.

Council Forests: Areas zoned within the Permanent Forest Domain and managed according to an approved management plan. The objectives of a council forest, along with its final boundaries, are established during the official classification process. Once allocated, these forests become the private property of a council; however, the commune must abide by the management plan in order to retain title to the forest area.

Licenses (Licences): Allocated prior to implementation of the 1994 forest code, licenses were in effect a type of concession that did not include some of the more advanced forest management requirements (e.g., approval of a management plan) put in place by the 1994 code and supporting regulations. As of 2000, all of these licenses had expired.

Petits Titres: A loosely related category, encompassing a grouping of smaller-volume logging permits, designated to cover situations not described in other titles. These include forest products exploitation permits (PEPFs), timber recuperation permits (ARBs), timber removal permits (AEBs), and personal logging permits (APCs). As a group, *petits titres* are zoned in the Non-Permanent Forest Domain, reserved for Cameroon nationals, and have a maximum duration of 1 year. Officially suspended in 1999, these titles were reinstated in March 2006.

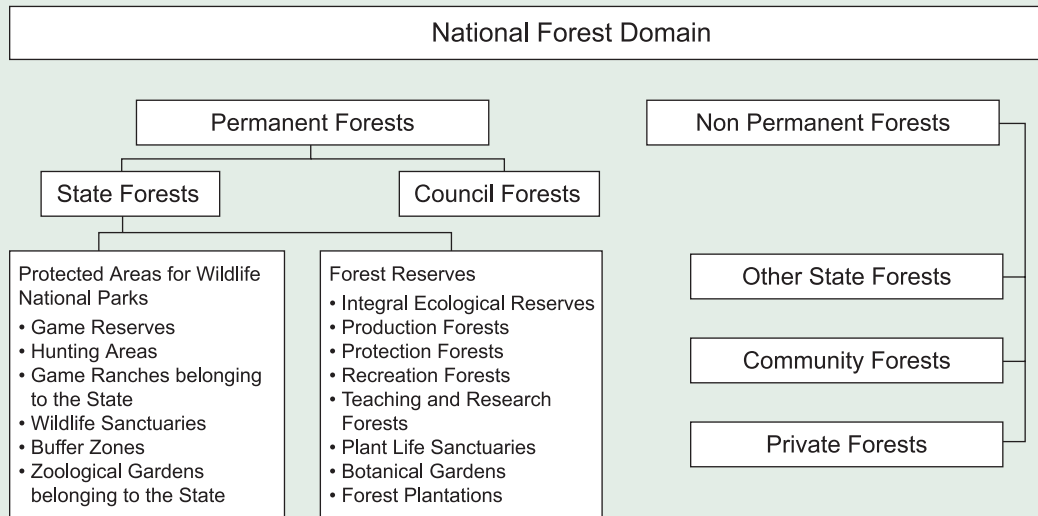
Sources: Bikié, H., J. G. Collomb, L. Djomo, S. Minnemeyer, R. Ngoufo, and S. Nguiffo. 2000. An Overview of Logging in Cameroon. Global Forest Watch / World Resources Institute. Washington DC.; Law 94/01 of January 20, 1994; Decree 94/436 of August 23, 1994; Circulated Letter n°0131 LC/MINFOF/SG/DF/SDAFF/SN of March 29, 2006.

Box 2: Overview of Forest Legislation, Zoning, and Classification in Cameroon

In 1994, Cameroon adopted forest legislation that introduced major innovations, both with respect to previous national law and in the context of forest legislation in place elsewhere in the region. The Cameroonian Forest Code—Law n° 94 of January 20, 1994, in conjunction with its application text n°95/531/PM of August 23, 1995—defined the territorial distribution of the National Forest Domain (NFD), designated various land-use categories, and outlined management regimes for these categories. Among the new policies introduced with the 1994 legislation were: zoning of the forest domain; allocation of forest concessions through a competitive bidding process; requirements for development and approval of forest management plans by forest concessionaires; requirements for local processing of logs; distribution of forest revenue to local populations; and, novel forest titles, such as council and community forests.

The diagram at right depicts the architecture of the forest zoning system in Cameroon, as defined in the 1994 Forestry Code. Under Article 22, the Permanent Forest Domain (PFD) must cover at least 30 percent of the national territory, represent ecological diversity, and be managed sustainably according to management plans approved by the relevant administrative authority. The Non-Permanent Forest Domain (nPFD)—including communal forests, community forests, and private forests—is zoned for other purposes and uses.

Some 14 million hectares of forested area were designated under the 1995 zoning plan for southern Cameroon (where most of the country's forested areas are located). Beginning in 2006, all remaining zoning phases were placed under activities in the Forest and En-



vironment Sector Program (*Programme Sectoriel Forêts Environnement - PSFE*).

Following zoning, individual forest zones go through a classification process in order to legislatively define their boundaries and land-use designation. Once an area is classified, its extent or designation cannot be changed without going through the proper legislative channels, thus making its status much more permanent.

The 1994 Forest Code calls for all commercial logging to be regulated under designated forest concessions. Before they can be legally logged, areas slated for timber production are allocated to timber operators under a defined selection process. For example, areas within the PFD classified as FMUs are allocated by public auction.

Prior to the auction, public notices (*avis au public*)—including, among other details, the initial boundary and area descriptions—are issued to invite offers.

The classification process should be completed prior to this allocation process; however, that has not normally been the case. For most FMUs, the classification process begins after allocation, during which MINFOF provides the technical information necessary for a commission directed by the Prime Minister to make the final classification decision. This decision may result in final FMU boundaries that differ from the initial public notice (*avis au public*).

Source: Forestry Code 94/01 of January 20, 1994.

Objectives and Content

The publication of the first version (V1.0) of the *Interactive Forestry Atlas of Cameroon* in 2005 was one of the main outcomes of the close collaboration between the World Resources Institute (WRI), Cameroonian forestry authorities, and cooperating institutions in pursuit of sustainable management of the nation's forests. The atlas was unique in that it combined previously unlinked and difficult-to-access forestry data and information in a user-friendly format.

This second version (V2.0) of the atlas builds on both the content and structure of atlas V1.0, as well as experiences and lessons learned in its development and application, to present expanded as well as updated information. In preparing atlas V2.0, the collaborating institutions had three specific objectives:

- Addressing technical and operational limitations, including those that were already known when V1.0 was published as well as those that have since been discovered through its application;
- Updating existing information contained in atlas V1.0 ; and,
- Improving the relevance of the atlas by integrating novel information.

The following overview report is in four sections. Immediately following this introduction, the report's second section presents a brief survey of the lessons learned from and the impact of atlas V1.0. This section features concrete examples of how the atlas has been used as well as descriptions of training and outreach activities carried out (as of December 2006) to encourage and inform its use .

The third section of this overview report introduces atlas V2.0, highlights the new elements contained in this updated and expanded version of the atlas, and outlines improvements made to address technical or content limitations identified since publication of V1.0. In the fourth section, we discuss the use of the information in atlas V2.0 to analyze recent developments in the forestry sector and the current situation of sustainable forestry management in Cameroon. (Note that this section does not, however, attempt to present an exhaustive analysis of the forestry situation or discuss in detail the obstacles and challenges related to sustainable natural resource management in Cameroon.)

ATLAS VERSION 1.0: EXPERIENCES AND PERSPECTIVES

Atlas V1.0 constituted an important innovation in that it linked together, for the first time and in a user-friendly format, key information pertaining to forest management and governance in Cameroon. This information was compiled from disparate data sources, including new data and older data that had not previously been made publicly accessible, as well as already published data that remained relevant. Atlas V1.0 was structured around several core themes:

- The first-ever map compilation layer for forest roads in Cameroon, developed around a subset of new information on the location and usage of these roads. This data layer was created specifically for this atlas, primarily through interpretation and digitization of satellite imagery, which was then appended to an existing dataset on public roads.
- Five other data layers, not previously made public. Developed using a database obtained from MINFOF, these five map layers included the distribution of timber extraction zones, timber permit allocation year and volume harvested, the status of Forest Management Unit (FMU) management plans, and zones designated for biodiversity protection and wildlife management.
- Data layers on vegetation and basic map features (e.g., populated areas, water bodies, etc.) developed from a publicly available database.

Integration of these different map layers made atlas V1.0 a complete source of up-to-date information on the Cameroonian forestry sector. (For a detailed description of the methodology used to compile

data and develop the atlas, see the overview report for atlas V1.0, included on the CD-ROM or online.)

Distribution of Atlas V1.0 and Associated Training

Following its publication in 2005, atlas V1.0 was widely distributed in Cameroon, as well as to a more targeted audience in the Congo Basin region and internationally. Dissemination in Cameroon was complemented by several informational and training workshops designed to ensure that the atlas would be used appropriately and to its full capacity. Distribution and training efforts were aimed at promoting a stepwise integration of the atlas, as a decision-support tool, into the decision-making process of various actors in the forestry sector, such as the provincial and central administrations of MINFOF, members of parliament, NGOs, research and training institutes, and the private sector.

Workshops organized in collaboration with the central and provincial branches of MINFOF have been held in each of the forested southern provinces of Cameroon (the provinces of *Est*, *Sud*, *Centre*, *Littoral*, *Ouest*, *Sud Ouest*, and *Nord Ouest*). The first series of workshops catered to a wide array of participants in each of the provinces. Besides MINFOF staff, local NGOs and regional administrators (e.g., mayors and provincial governors) actively participated in the workshops. In addition, targeted workshops were organized for the private sector, members of parliament, and research and training institutes.

These training sessions and workshops resulted in significant improvement in capacity to produce and manage information generated through use of the atlas. For example, MINFOF technicians, specifically those at the Forest Mapping and Remote Sensing Center (*Centre de Télédétection et de Cartographie Forestière - CETELCAF*), developed a better definition of the boundaries and attributes of forestry titles in the process of being either created, classified, or allocated. Workshop attendees also helped identify gaps and limitations in V1.0 of this atlas.

In addition to providing training workshops on the use of the atlas, WRI carried out more advanced technical training sessions in using geographic information systems (GIS) and remote sensing (RS) data. These trainings typically targeted not only MINFOF technical staff responsible for the collection and updating of the information found in the atlas, but also staff from the Cameroon National Institute of Cartography (*Institut National de Cartographie du Cameroun - INC*), the National Support Agency for Forest Development (*Agence Nationale d'Appui au Développement Forestier - ANAFOR*), and NGO partners.

WRI also worked to promote the atlas to an even broader audience (i.e., beyond those participating in the aforementioned workshops) by participating in various conferences (primarily in Yaoundé), continually stressing the necessity of making this tool and associated information publicly available.

Use and Impact

Several examples illustrate the importance of the atlas as an integrated tool in the decision-making processes of various actors in the forestry and environment sectors. These examples encompass the direct application of atlas V1.0 as well as the use of its products by the forestry administration and other forest-sector actors. For MINFOF staff, both in Yaoundé and the provinces, the atlas facilitated access to up-to-date and more accurate information, which in turn allowed them to strengthen monitoring of forest activities, development of implementation plans, and regulation of ongoing monitoring activities on the ground.

Examples of application of atlas V1.0 and associated products include:

- Defining the new forestry concessions put up for public bidding in 2005 and 2006 (evaluation of current conditions, definition and demarcation of concession limits, evaluation of concession potential, etc.);
- Forest permit evaluation at the request of MINFOF (zones available for sales of standing volume - SSVs, community forests, council forests, and *petits titres*) and precise demarcation of these titles;

- Accompanying timber exploitation titles and protected area development, classification, and management procedures;
- Resolving conflicts (e.g., overlapping titles in a given zone) through a more precise identification of the problem area, planning missions in the field, and identification of complementary (substitute) zones for involved parties; and,
- Supporting MINFOF field missions through use of the atlas and available satellite imagery during planning and ground patrols.

International organizations such as the Central Africa Forests Commission (*Commission des Forêts d'Afrique Centrale* - COMIFAC), the World Bank, and other collaborating institutions benefited significantly from atlas V1.0. The integrated information contained in V1.0 enabled them to refine and/or increase their knowledge of the forest sector, strengthen environmental education programs, and support the monitoring and/or evaluation of the impacts of ongoing activities and projects in Cameroon.

Among the many examples of the application of atlas V1.0 by local, national, and international organizations are cases in which the atlas was used to:

- Support the creation and development of community forest maps;
- Help develop planning maps for rural districts;
- Support the preparation of zoning maps (at the departmental or provincial levels);
- Facilitate environmental education and media outreach;
- Support the implementation of the *Model Forest* process;
- Define boundaries of logging titles and agroforestry zones;
- Support the execution of environmental impact studies;
- Disseminate information to members of parliament (and others) and provide support to the Multi-Stakeholder Support Group for Legislative Environmental Representation (MSSGLER) initiative; and,
- Improve understanding and evaluation of the state of the forestry sector within a framework of development, implementation, and/or evaluation of projects carried out by national and international partners.

As a result of atlas V1.0 and its ability to produce customized maps, key decision-makers and stakeholder groups in the forestry sector are now able to access, analyze, and create maps to fit their specific needs, using the most recent information available. The *Interactive Forestry Atlas of Cameroon* has helped government agencies, NGOs, donors, intergovernmental organizations, research institutes, and private-sector companies in their respective efforts to improve governance in the forestry sector. These various user groups benefited as well from training sessions designed to address their specific needs in familiarizing them with the atlas tool and its potential uses.

Despite significant capacity-building efforts (including training workshops on atlas V1.0) conducted by a wide range of institutions, considerable obstacles remain in implementing forest monitoring activities based on new mapping and information management technologies, such as RS, GIS, and the Global Positioning System (GPS). While these technologies have considerable capacity to meet information needs in the forestry sector, very limited funding has thus far been made available nationally or internationally to help expand or enhance their reach.

A prime example of such limitations is the difficulty experienced in attempting to acquire national satellite imagery coverage of Cameroon. Another difficult challenge has been in obtaining financial support to update national topographic maps, which serve as the cartographic reference base for a number of sectors. These maps are now decades old and consequently contain significant errors.

ATLAS VERSION 2.0: STRUCTURE AND CONTENTS

Atlas V2.0 represents a significant advance over V1.0, building on both the content and structure of the previous version and drawing on experiences and lessons learned in its development and application. The following section highlights novel content introduced in atlas V2.0 as well as outlining improvements made to address technical or operational limitations, including those that were known at the time of publication of V1.0 and those that have since been identified through its application and use. Table 1 provides a list of atlas V2.0 themes and content.

Improvements Relative to Atlas V1.0

Atlas V1.0 concentrated on data relating to forest roads and extraction zones, specifically in the FMUs, SSVs, and community forests. However, information on several of these zones, particularly community forests and SSVs, could not be integrated into V1.0, due to lack of available official information. Atlas V2.0 includes data on all valid SSVs as of 2006 and all community forests with a simple management plan approved by MINFOF as of June 2006.

Atlas V2.0 also contains more information on protected areas and hunting zones, both official hunting zones (*Zones d'intérêt cynégétique* - ZIC) and community-managed hunting zones (*Zones d'intérêt cynégétique à gestion communautaire* - ZIGC). Such information was limited in 2004 and hence could

Heading	Data Layers	Scale
Roads	Public roads and railways	1:200,000
	Logging roads (for logging seasons 1999–2000, 2000–2001, 2001–2002, and 2002–2003) — characterized by date of origin, type, and intensity of use	1:200,000
Zoning plan — Timber extraction*	Forest Management Unit (FMU)	1:200,000
	Forest concession (FMU or group of FMUs)	1:200,000
	Annual harvestable area (AAC)	1:200,000
	Sales of Standing Volume (SSV)	1:200,000
	Council Forest (FC)	1:200,000
	Community Forest (Fcom)	1:200,000
Wood transformation	License (historical concessions)	1:1,000,000
	Sawmill	1: 200,000
Zoning plan — Biodiversity protection, wildlife management and forest reserves	Wildlife protected areas	1:200,000
	Hunting zones	1:200,000
	Forest reserves	1:200,000
Vegetation	Forest stratification — MINEF vegetation type classification	1:200,000
	Global Land Cover 2000 Database	1:1,000,000
Basic map features	Settlements (national, provincial, and district capitals, and villages)	1:200,000
	Map pages — topographic map grids	1:200,000
	Administrative boundaries	1:200,000
	Water bodies (coastline, national, regional, and detailed rivers, and other water surfaces)	1:200,000

*Refer to Box 1 for further description of terms used.

not be included in its entirety in atlas V1.0. In collaboration with the wildlife department of MINFOF, efforts are underway to collect official data and information relating to these zones from partners on the ground and improve the management of col-

lected data. While still incomplete, the inclusion of collected data in atlas V2.0 responds to a number of needs expressed by those operating in the sector.

Updated Information

Atlas V2.0 contains three types of updated information: modified geographic boundaries of existing themes; additions to existing datasets; and, updated attributes for these entities.

The modification of geographic boundaries occurs specifically during the classification process of FMUs, community forests, forest reserves, and wildlife sanctuaries. Among other titles, these modifications include SSVs subject to relocation. Analysis of recent legislative decrees relating to classification of FMUs, council forests, and national parks is ongoing and will result in continued updating of these geographic boundaries. Any obstacles identified during this process will be communicated to MINFOF.²

Notably, among the additions to previously included datasets is information on protected areas newly created in 2006 (e.g., la Vallée du Mbéré National Park and Kilum-Ijim Wildlife Sanctuary) or in the process of being created (e.g., Deng Deng and Ebo Reserves). Atlas V2.0 also includes additions of updated information on FMUs, community forests, and council forests created or proposed since the publication of atlas V1.0.

Updated quantitative and qualitative information contained in atlas V2.0 is based on data obtained from the attribute tables of these cartographic entities. Appendix 1 provides a list of themes and their sources. The data were last updated on June 30, 2006.

New Datasets and Attributes

Besides updates to existing information, atlas V2.0 contains new information designed to improve functionality and utility. This new information was integrated primarily in response to capacity needs expressed by MINFOF and other project partners. In general, these improvements consist of integration of new datasets (i.e., new layers of information) as well as expansion of the attribute tables (i.e., insertion of new fields/columns).

Specifically, four new datasets have been integrated into atlas V2.0: forest concession boundaries and attributes (in addition to FMU boundaries); annual harvestable areas of managed forest concessions; sawmills and their relevant attributes; and, hunting zones from northern Cameroon.

Forest concession boundaries

The inclusion of forest concession boundaries and associated attributes in atlas V2.0 allows for a more comprehensive presentation of commercial logging permits and logging statistics produced by SIGIF. A forest concession is a logging unit managed by a single company and may be composed of one or more FMUs (see Box 1). For concessions composed of more than one FMU, data are aggregated at the scale of the overall forest concession. The management plan of an operating timber company covers the entire forest concession.

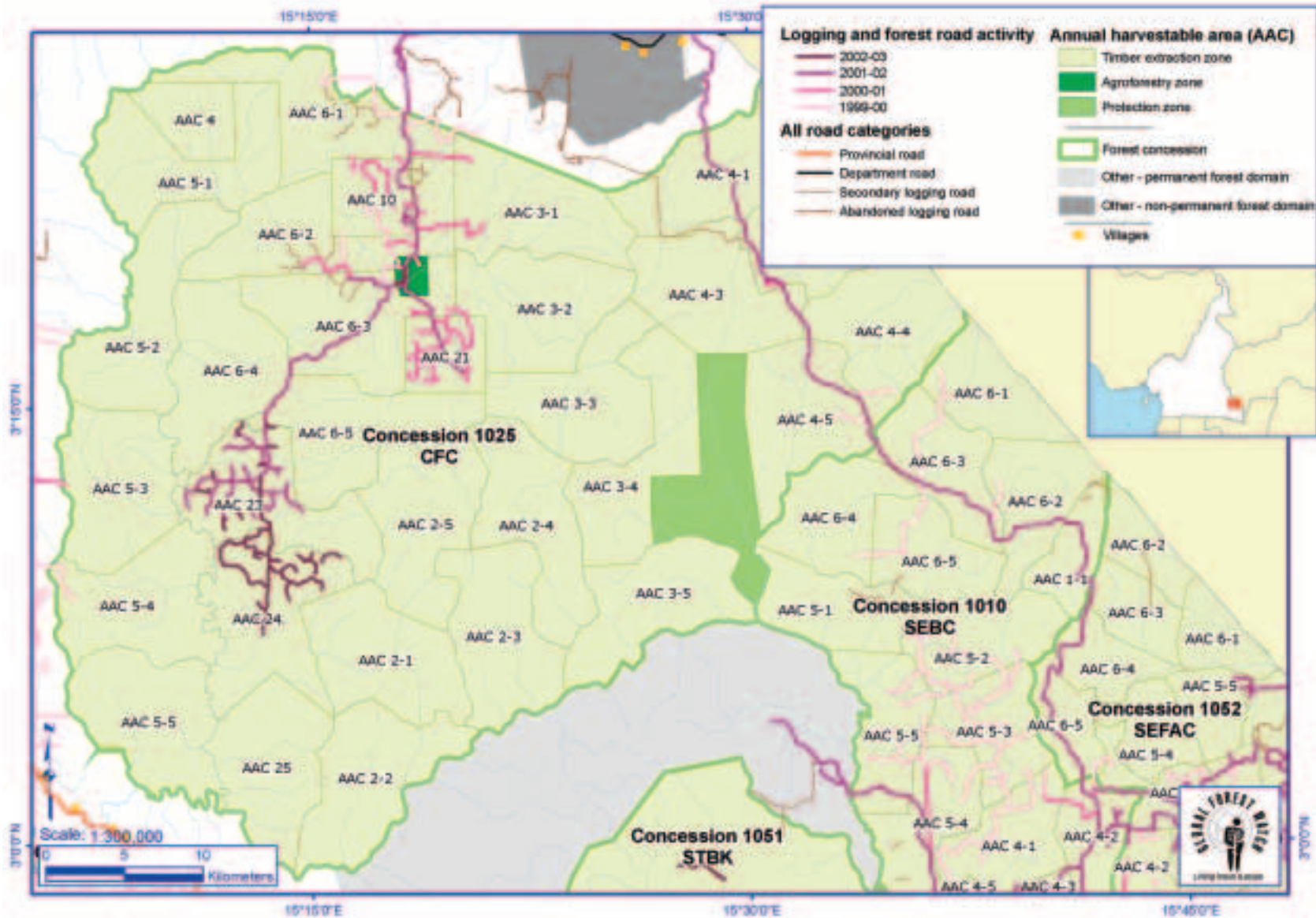
Annual harvestable area (AACs)

Atlas V2.0 also contains a new dataset on annual harvestable areas (*Assiettes annuelle de coupe* - AACs) of forest logging concessions. Access to cartographic information on AACs allows for the precise identification of specific active regions for a given logging company. Map 1 presents an example of information on AACs displayed in the context of forest concessions and logging road activity.

Each forest concession with a MINFOF-approved management plan is divided into 30 logging parcels (i.e., AACs), which are integral to the 30-year logging rotation that is at the heart of the sustainable forest management process. AAC boundaries are defined during the development of a management plan and must be subsequently authorized by MINFOF prior to logging in each respective year.

Atlas V2.0 includes information on AACs from officially managed forest concessions only (i.e., with a management plan approved by MINFOF). To ensure data accuracy, the original data (in digital format) were requested from the forest concessionaires. For forest concessions in which concessionaires did not provide the requested information, mapped information on AACs was obtained from relevant management plans and digitized. Atlas V2.0 also contains information on all AACs designated by SIGIF since the initial allocation of each concession.³ The source of cartographic information is provided in the attribute table of each respective concession as well as in Appendix 2.

MAP 1 Forest Concession Annual Harvestable Area (AAC)



As part of their management plan, forest concessionaires are required to parcel out their concession into annual harvestable areas (Assiettes annuelle de coupe – AACs) based on a 30 year rotation cycle. Within each concession, companies are also required to set aside a percentage of the more ecologically important or sensitive habitat in a “protection” zone to be exempt from logging. In addition to presenting the boundaries and sequence of AACs for concessions with MINFOP approved management plans, the atlas allows the user to track road construction through 2003 and volume logged through 2006.

The new dataset on AACs could be useful to various actors in the forest sector, including the Department of Wildlife (*Direction de la Faune - DFA*), conservation NGOs, and research institutes. Access to mapped information that identifies the companies working in a specific region could help facilitate collaborative projects and activities, as well as providing evidence useful for enforcement, litigation, and other purposes.

Sawmills and their attributes

A third new dataset included in atlas V2.0 relates to wood processing plants (sawmills) and their attributes. In recent years, the number and capacity of sawmills has grown significantly. This growth is due in large part to Cameroon's requirement that commercial logging companies process a certain percentage of their harvested timber within the country, a policy aimed at increasing the forestry sector's contribution to the national economy.

WRI conducted a survey of existing sawmills during 2005–06, resulting in a preliminary sawmills dataset included in atlas V2.0. This dataset includes information on the location, operator, and capacity of each of the surveyed sawmills. Map 2 presents relative annual harvest volume by concession, with associated capacity of identified sawmills. This study remains ongoing and a complete set of operating sawmills and their relevant attributes is anticipated for atlas V3.0.

Hunting zones for northern Cameroon

Atlas V2.0 contains information on hunting zones (ZIC) in the northern region of Cameroon. This information complements data on hunting zones (ZIC and ZICGC) in southern Cameroon, included in atlas V1.0. This map layer contains the name, reference code, area, managing party, and management type attributes for each ZIC/ZICGC.

New attributes

Atlas V2.0 also contains new attributes for themes present in V1.0. For the theme on forest concessions and FMUs, examples of novel attributes include information on the classification and current use status of a given title, both provisional and definitive (measured using GIS) surface area figures, as well as a company's status regarding chain-of-custody reporting and/or certification of their concession. Other themes with novel attributes include protected areas and council forests.

Limitations of Atlas V2.0

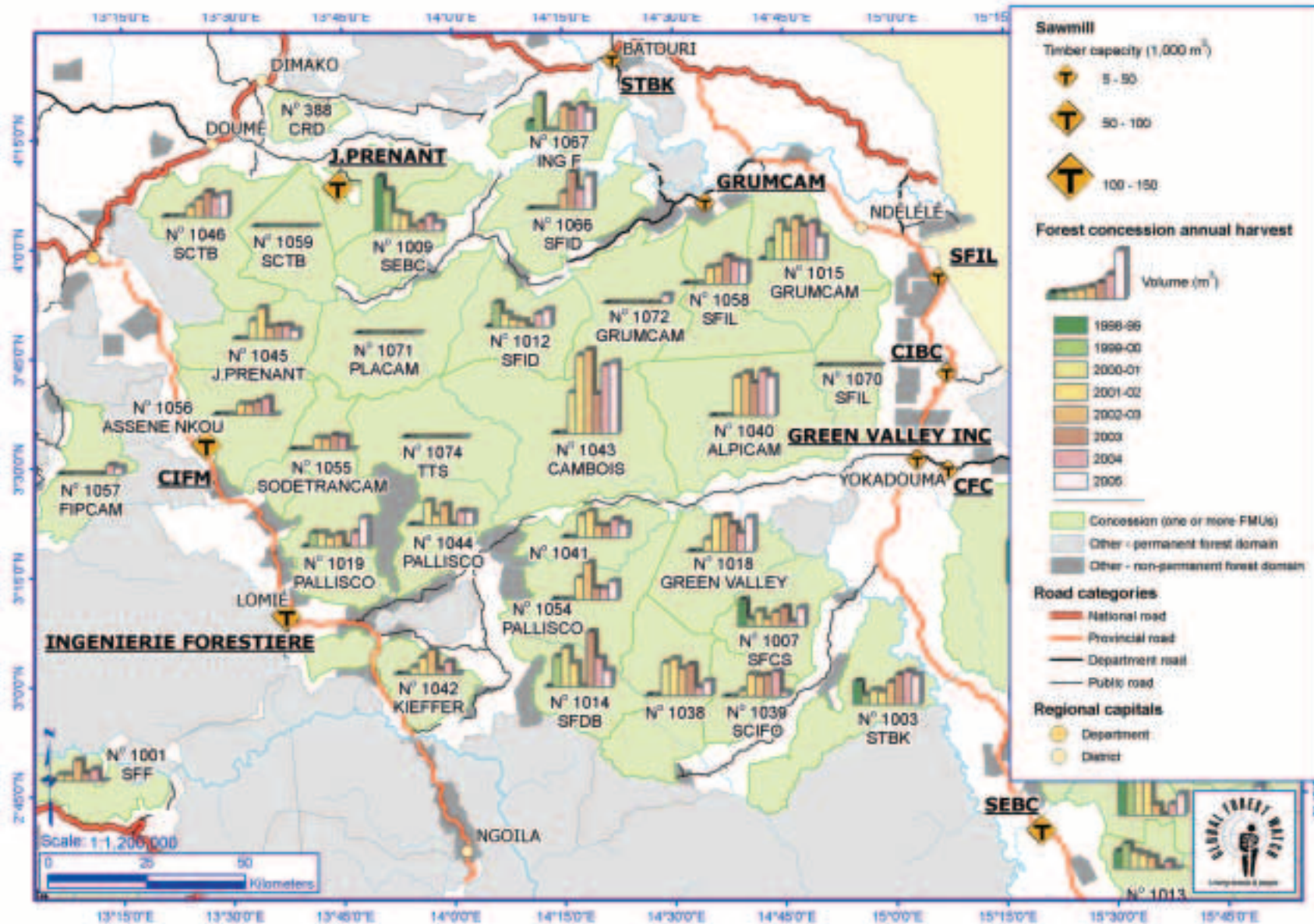
The geographic information contained in atlas V2.0 is based on official topographic maps at a scale of 1:200,000. (An exception is the forest roads layer, which is mapped from available, higher-resolution satellite images.) These official maps are outdated and known to contain certain inaccuracies, which limits the spatial resolution of all maps and data layers that incorporate this information. This recurrent problem affects much more than just this atlas, and overcoming this limitation will require undertakings that extend significantly beyond the scope and resources of this project.

In line with recommendations coming out of a workshop on “Logging in Cameroon: Current situation and major challenges,” WRI will soon launch a working group on cartographic and spatial information, with the aim of encouraging a more serious discussion of the need for updating the reference maps used in Cameroon. This working group will focus on developing synergies between the forestry and other related sectors in harmonizing approaches and pursuing potential co-financing for procurement of reference data, such as satellite imagery.

Another key limitation encountered by the developers of atlas V2.0 deals with updating the forest roads layer. Forest roads may either be digitized using an RS application or tracked on the ground using a GPS unit. For atlas V1.0, the forest roads layer was developed primarily from available satellite imagery, in combination with GPS tracking field verification.⁴ For atlas V2.0, we were not able to update the roads layer, due primarily to the lack of availability of new satellite imagery for Cameroon at an appropriate, cost-effective level of resolution (see Box 3), as well as logistical and financial constraints in tracking all forest roads with GPS.

In December 2005, a multi-organizational partnership led by WRI initiated a program aimed at acquiring recent (December 2005–February 2006) satellite imagery for the entirety of Cameroon. This effort is made possible by the availability of new satellite imagery (specifically from DMC International Imaging) as well as increased awareness of the importance of such information for natural resource management in the Central African region. Given the lag time between acquisition and processing of these images, it was not possible to incorporate updated information from these new

MAP 2 Concession Timber Harvest and Processing Capacity



Timber operators are required by law to process a certain percentage of their logs in country — this has been in large part responsible for the increase in the number of sawmills across Cameroon. The atlas V2.0 contains information on the location, operator and input capacity for these sawmills, in addition to the volume of wood logged from each forest concession annually. Presented here are forest concessions with annual timber volume logged from 1998–2005, along with identified sawmills and their corresponding timber processing capacity.

Box 3. Availability and Acquisition of Satellite Imagery for Cameroon: Current Status

Advanced RS and information management technologies are important tools to support decision-making in the forestry and environmental sectors of Cameroon. Given the vast and remote nature of Cameroon forests, RS is a cost-effective means to complement field-based surveillance in providing the information needed for sound decision-making, better governance, and improved management of these resources. Integrating RS data with GIS applications enables the creation of decision-making tools that provide accurate, objective, pertinent, and up-to-date information that is relevant to forest management and spatially linked to active logging areas.

Recent years have brought significant changes in the availability of satellite imagery for Central Africa. Since 2003, technical problems with Landsat (historically, the principal source of satellite data for the Central African region) have left users searching for alternative data sources. A number of new sources of satellite imagery—such as SPOT4, SPOT5, DMC and ASTER—have become available at a range of costs and levels of resolution. Relevant characteristics of these systems include:

- A range of levels of spatial resolution, from 1:50,000 to 1:200,000;
- A range of acquisition costs, varying from 0.02 to 0.8 euros per sq km; and,
- The ability of some satellites (including SPOT and

DMC) to be programmed for repetitive coverage of a given site.

However, frequent cloud cover remains a significant constraint to the availability of satellite imagery for the forested region of the Congo Basin.

A recent WRI survey of available, medium-resolution SPOT and ASTER satellite imagery for Central Africa's forested zones indicated enormous gaps in coverage, including many critical or priority sites. In the case of Cameroon, only ten high-quality SPOT images are available for the entire country, with the majority covering the forest/savanna transitional zone. (Note that this analysis did not consider available high-resolution satellite imagery, such as IKONOS or Quickbird, as their high costs and relatively small area of coverage per scene limit their usefulness and applicability to national- and regional-level forest monitoring.)

In response to this lack of satellite imagery, a multi-partner initiative was launched in December 2005 to acquire DMC imagery, in collaboration with the German Technical Cooperation (*Gesellschaft für Technische Zusammenarbeit - GTZ*). DMC images are only acquired through special order: the satellite is able to be programmed at user request, allowing it to obtain images on a 4-6 month delay (subject to satellite schedule and cloud cover). The resulting images are currently undergoing processing.

satellite images in atlas V2.0. This information will, however, be incorporated in the next version of the atlas (V3.0).

Atlas V2.0 also does not contain information related to *petits titres*, the recently reinstated, special category of forest permits falling outside the principal logging titles (see Box 4).⁵ This is due either to the complete absence of information on such permits in the SIGIF database, or the lack of officially recognized, associated spatial references. (Note that the Interactive Forestry Atlas of Cameroon contains only officially recognized data.) If officially sanctioned spatial data on *petits titres* were made more accessible, future atlases would be able to provide a more complete presentation of the forestry sector in Cameroon.

Although all possible efforts have been made to locate and collect the most recent and complete information on the Cameroonian forest sector (as identified by MINFOF), this interactive atlas, including V2.0 as well as V1.0, has certain notable limitations. This tool must always be seen as the product of an ongoing process to portray an ever-evolving forestry situation. As such, the atlas will require continual updating and modification as new data and information become available. Additionally, any results or analyses derived through use of data in this atlas should never be considered sufficient in their own right in determining the legality (or illegality) of any specific forestry activities. This can only be done through additional field verification by MINFOF agents.

Box 4. *Petits Titres*

In order to cover timber harvesting falling outside of the principal logging titles, Cameroon law has defined an ensemble of specific permits referred to as *petits titres*. As a group, these permits are issued only to Cameroon nationals, are limited to a duration of 1 year, entail a competitive bidding process, and stipulate that resulting harvested timber may not be exported.

After being suspended in 1999 (Decision No. 0944/D/MINEF/DF) due to widespread concerns about corruption and lack of sustainability, these permits were reinstated in 2006 by ministerial decision (No. 0124/D/MINFOF/SG/DF/SDAFF/SAG) and accompanying circular letter (No. 0131/LC/MINFOF/SG/DF/SDAFF/SN).¹ Four specific categories of permits are recognized in this group:

1. Forest products exploitation permit (*Permis d'exploitation des produits forestiers* – PEPF)²
 - Authorization to exploit or harvest defined forest products from a specified zone within the National Forest Domain, council forests, or community forests
 - Up to 500 m³ of timber under a timber exploitation permit (*Permis d'exploitation de bois d'oeuvre* – PEBO)
 - A fixed quota on special authorized forest products (such as ebony, medicinal plants, etc.) as defined by an interministerial commission
 - Firewood and other indicated forest products are granted by mutual agreement (*gré à gré*)
2. Personal logging permits (*Autorisation personnelle de coupe d'arbre* – APC)
 - Designated for timber harvested for personal use (e.g., firewood, woodworking crafts, and personal construction)

- Timber volume cannot surpass 30 m³
 - Granted by mutual agreement (*gré à gré*) for 3 months, non-renewable
3. Timber recovery permit (*Autorisation de récupération de bois* - ARB)
 - Allocated for timber to be harvested from an area slated for development (road, agriculture, construction, etc.)
 - Not to surpass 1,000 ha or extend more than 100 m from a road
 - Requires prior MINFOF-verified environmental impact study and timber inventory
 - Also referred to at times as *coupe de sauvetage* or AEB
 - In addition to the initial bidding price, operators are required to pay a felling tax based on timber declarations (DF10)
 4. Timber removal permit (*Autorisation d'enlèvement des bois* - AEB)
 - Designated for timber abandoned in logging concessions, along the road, or on the beach, as well as illegally harvested wood that has been seized
 - Most of this wood is sold through a public auction

¹A more detailed discussion of the history of these permits, as well as an assessment of some associated problems in their issuance and exploitation, can be found in the final report (March 2005–February 2006) and report n° 031/OI/REM (2006) of the Independent Observer.

² Article 56, Law 94/01 of 20 January 1994.

USING ATLAS V2.0 TO ASSESS CURRENT SITUATION AND TRENDS

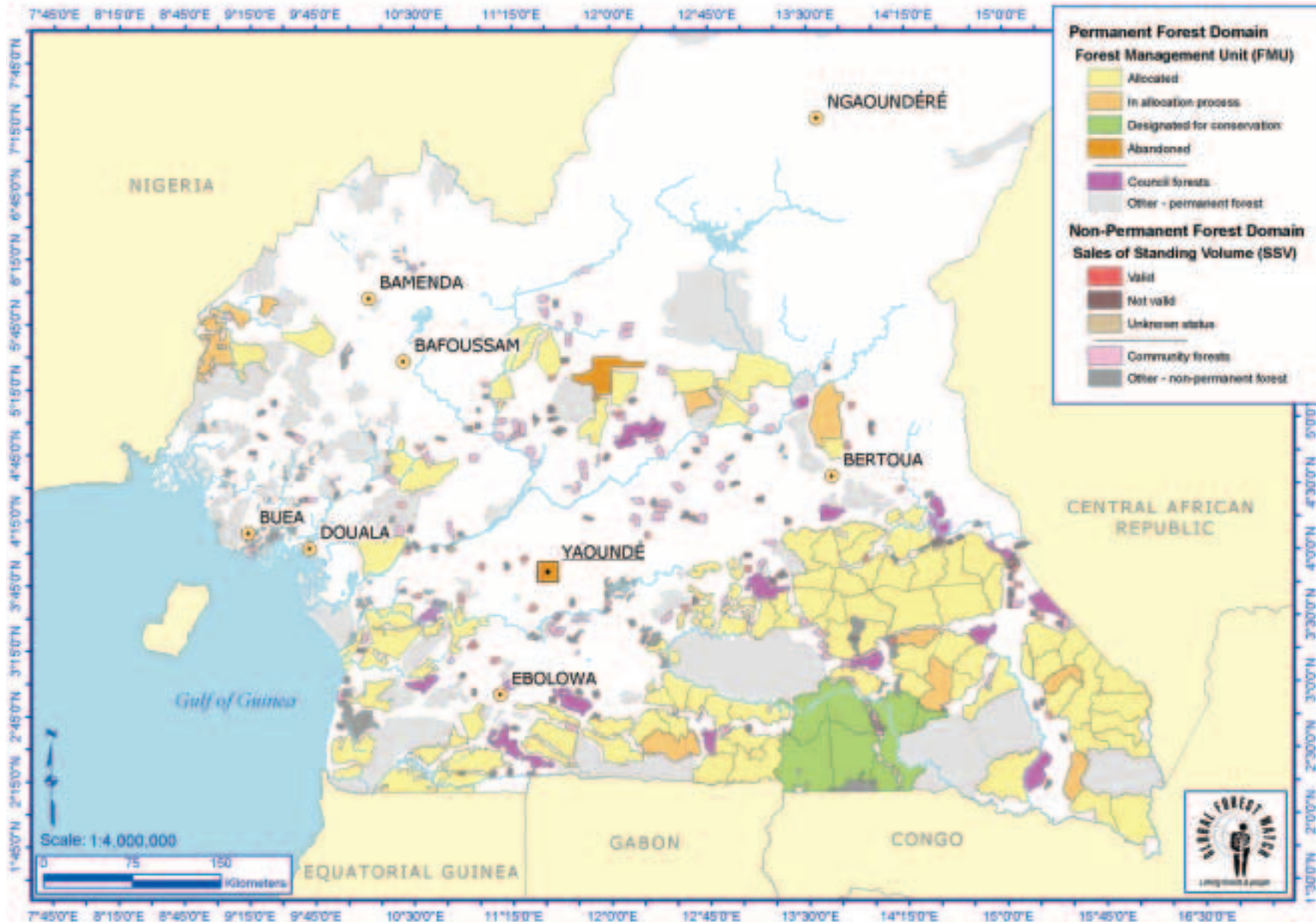
Atlas V2.0 is intended to serve as a powerful tool for analyzing conditions and trends in Cameroon's forestry sector. To illustrate its usefulness for this purpose, the following section presents a discussion of the current situation in Cameroon's forests as well as recent developments in logging and forest classification. Based on information contained within the atlas, complemented by contextual content where appropriate, the discussion covers six topics, including trends in: area allocated and logged, by permit type; volume of timber production, by permit type; allocation of forest concessions, by title holders; status of management plans for forest concessions; timber processing; and, areas dedicated to biodiversity conservation and wildlife management.

Area Allocated and Logged, by Permit Type

Atlas V2.0 allows the user to investigate the current status of and recent historical trends in allocation of forest areas by permit type, including FMUs, SSVs, and community forests. Additionally, for both the FMUs (under forest concession AACs) and SSVs, information is available on the annual area allocated for timber harvesting. Below is an analysis, based largely on content from atlas V2.0, of recent trends in allocated and logged forest area, according to permit type. Table 2 presents the breakdown of forested area in Cameroon by designation (Note that, in this atlas, information on land use designa-

Domain	Category	Number ⁽¹⁾	Area (ha)		
National Forest Domain	Forest Reserve			Notes 1. Number of forest concessions (merged FMUs) in parentheses. 2. Including protection forests, integral ecological reserves, recreation and research forests, and reforestation areas. 3. This figure encompasses all council forests (3 classified and 15 in progress or proposed through public notice). 4. Surface area not included, due to certain ZIC/ZICGIC overlapping other forest zones (e.g. FMUs, protected areas). 5. Sales of standing volume valid and operational in 2006. 6. Data not available or incomplete. 7. The extractive mining zones and agro-industrial plantations do not constitute integral parts of the nPFD but allow for a better definition of the nPFD surface area available for specific allocation (e.g. logging permits). 8. Estimation based on the southern Cameroon zoning plan described by MINFOF-FAO (2005). 9. Total does not include the considerable area zoned for agroforestry.	
	FMU allocated	90 (79)	5,558,917		
	FMU in allocation process	10 (9)	563,549		
	FMU unallocated	1 (1)	78,871		
	Conservation FMU	9	867,009		
	Other production forest (non FMU)	29	609,713		
	Other forest reserve ⁽²⁾	57	931,398		
	<i>Sub total</i>		8,609,458		
	Council Forest⁽³⁾	18	413,622		
	Wildlife Protected Area				
	National Parks	15	2,733,232		
	Wildlife reserves	5	777,372		
	Wildlife sanctuaries	4	254,342		
	Zoological and botanical gardens	3	⁽⁶⁾		
	Hunting zones	52	⁽⁴⁾		
	<i>Sub total</i>		3,764,946		
	Total PFD		12,788,026		
	Non permanent Forest Domain (nPFD)	National Forest Domain			
		Sales of standing volume (SSVs) ⁽⁵⁾	21		55,356
Community forest		115	415,212		
Other logging permits (ARB, AEB, etc)		⁽⁶⁾			
Others					
Private forest		⁽⁶⁾			
Extractive mining zone ⁽⁷⁾			717,726 ⁽⁸⁾		
Industrial agriculture zone ⁽⁷⁾		199,831			
Total nPFD		1,388,125 ⁽⁹⁾			

MAP 3 Status of Logging Titles in 2006



tions and associated surface area covered are based solely on legally recognized forest zoning.)

Currently, there are a total of 110 designated FMUs in Cameroon, covering an area of more than 7 million ha. Some 90 of these FMUs, covering 5.6 million ha, have been allocated to forest concessions. In May 2006, a public offering was announced for another 10 FMUs designated for forest concessions, representing more than 540,000 ha. The remaining ten FMUs include one unallocated FMU and a regrouping of 9 FMUs located between the protected areas of Dja and Boumba-Bek, which is designated for conservation. Map 3 presents an overview of the total area under various types of logging title (e.g., FMUs and SSVs) and their status as of 2006 (e.g., allocated, in allocation process, designated for conservation, etc.).

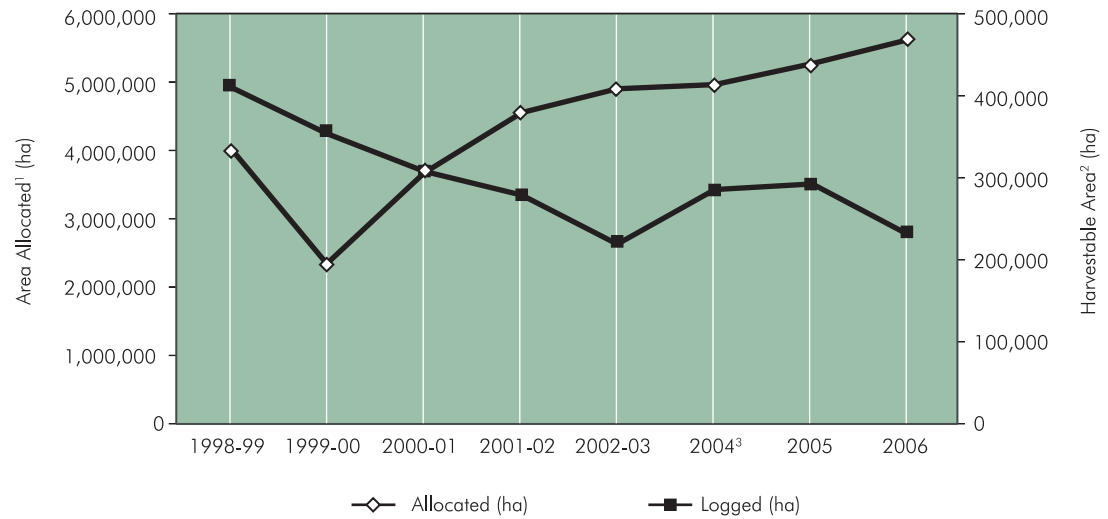
Licenses

Prior to the introduction of forest concessions under the 1994 Forestry Code, logging permits were granted under a system of *licences* (licenses). As part of the transition away from the old system and toward progressive adoption of the forest concession method of allocating logging permits, the 1994 law authorized the exploitation of licenses through the year 2000.

As recently as 1998–99, valid licenses accounted for just over 2 million ha of Cameroon’s forests, of which about 145,000 ha were allocated to AACs. By 1999–2000, however, only three valid licenses remained, covering an area of just under 265,000 ha, of which 22,500 ha were allocated as AACs.

By the end of 2000, all licenses had been officially converted to FMUs or other land use designations.

Figure 1. Allocated Logging Titles and Harvestable Area



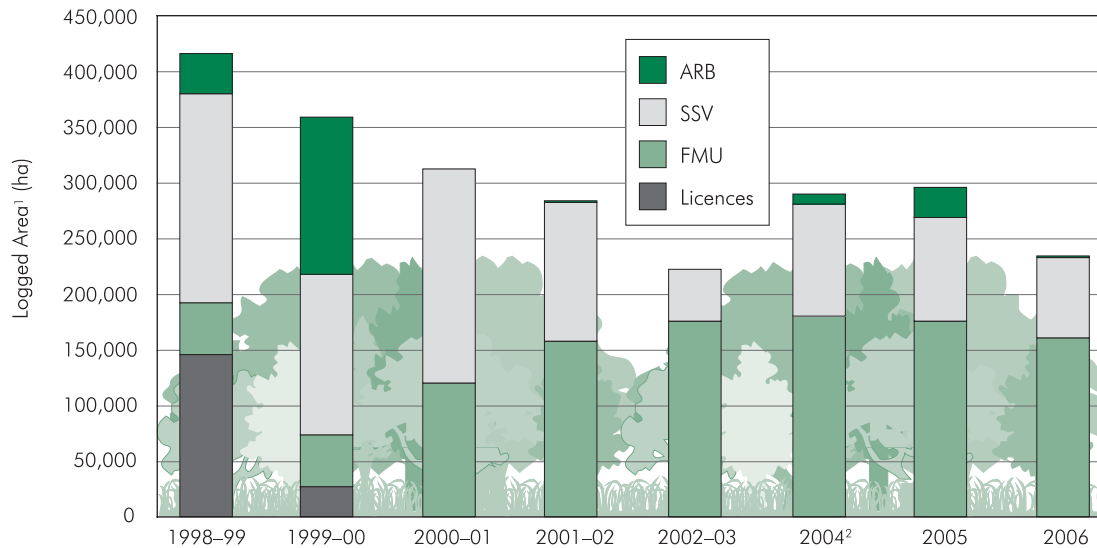
1. Figures do not take into consideration FMU allocations processed in 2006 (last public offering in May 2006).
2. Figures do not account for AACs processed after May 2006.
3. SIGIF began reporting logging statistics based on a 12 month calendar year in 2004 (Jan.–Dec.); previously this has been fiscal year based (Sept.–Aug.).

The first of Cameroon’s forest concessions (three concessions, regrouping seven FMUs) were allocated in 1996 through a binding mutual agreement (*gré à gré*).⁶ The following year, 20 FMUs were allocated through a competitive bidding process. In 1998, these 27 FMUs represented a total of more than 1.8 million ha, of which about 47,000 ha were designated as AACs. With the expiration of licenses in 2000, the area allocated to FMUs increased to 2.3 million ha, with about 360,000 ha (16 percent) actively logged in AACs. The allocation of FMUs over the following years brought the area in forest concessions to its present-day level of around 5.6 million hectares (Figure 1).

Trends in total forest area logged (i.e., AACs, SSVs, and *petit titres*) indicate a slow, steady decline between 1998 and 2003, decreasing from almost 418,000 ha in 1998 to about 219,000 ha in 2003 (Figure 2). This decline can be explained by a combination of factors, including the:

- Expiration of old licenses by 2000;
- Progressive allocation of FMUs, which increased the total proportion of productive area under strictly authorized limits on annual harvestable area from 11 percent to 60 percent during this period;

Figure 2. Area Logged by Permit Type



1. Figures do not take into consideration FMU allocations processed in 2006 (last public offering in May 2006).
2. SIGIF began reporting logging statistics based on a 12 month calendar year in 2004 (Jan.–Dec.); previously this has been fiscal year based (Sept.–Aug.).

- Rapid decline in area granted as SSVs, from 45 percent (189,200 ha) of the total productive area in 1998 to 9 percent (47,500 ha) in 2003.

The overall decrease in area logged indicates a progressive weakening of pressure on forest resources, even as the total allocated production area continued to expand. This lessening of pressure has been brought about essentially through the implementation of managed forest concessions and adherence to approved AACs, which are limited to only 3 percent of the surface area of concessions.

However, the trend toward declines in total area logged began to reverse in 2004, due primarily to a significant increase in the allocation of smaller forest titles, such as SSVs (2,500 ha) and community forests (5,000 ha), as well as the reintroduction of *petits titres*. This represents a phenomenon of increasing fragmentation in the forest sector, with a growing proportion of logging activity taking place outside the forest concession framework, which in 2006 accounted for more than 80 percent of national timber production. It is important to mention again that the information available on *petit titres* (PEPFs, ARBs, AEBs, and APCs) issued by MINFOF over the past several years is incomplete

and does not allow proper estimation of their total area or volume logged.

Available information indicates that the area allocated to community forests totals some 380,000 ha (as of 2006); however, it is difficult to accurately assess how much of this is logged annually. Official figures list 9,025 ha in 2002/2003, 11,024 ha in 2004 and 15,000 ha in 2005 (MINEF 2004).

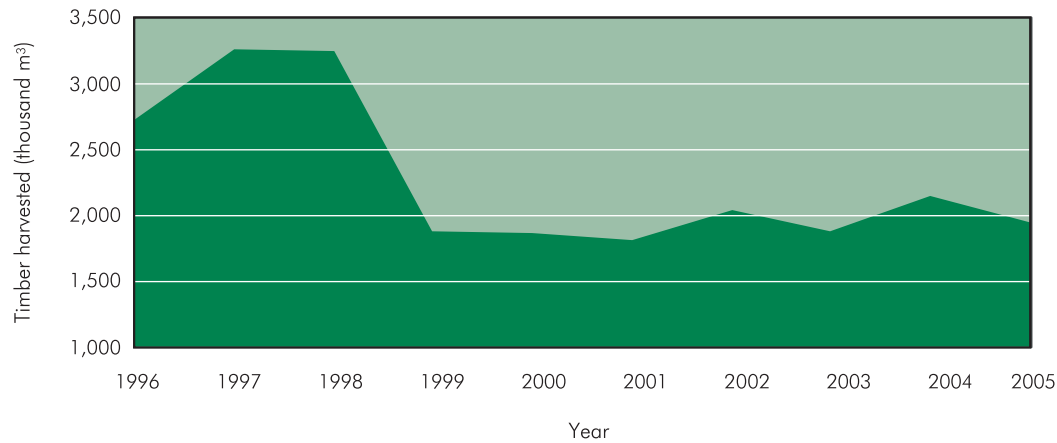
Timber originating from these smaller logging permits may be targeted towards either local markets or export, depending on the species harvested and the availability of timber brokers.⁷ Note that council forests (averaging 25,000 ha) are recorded as forest concessions once they are classified.⁸

Volume of Timber Production, by Permit Type

Information in atlas V2.0 allows users to access data and statistics on the total volume of timber production per unit of area, according to type of logging permit. These data, issued by SIGIF, have been updated for the period 1998–2005 and pertain to forest concessions, logged council forests, and SSVs.⁹ (Note that accurate statistics for timber extraction in community forests or *petits titres* are currently unavailable.) With the integration of data on AACs, V2.0 enables users to determine or estimate annual timber production output for specific areas in individual forest concessions.

MINFOF and other stakeholder groups will be able to use geographic information accessed through atlas V2.0 for general surveillance of timber extraction. This might include such applications as, for

Figure 3. National Annual Timber Harvest



Source: 1999–2005 (SIGIF); 1996–1998 (MINEF figures reported by Cerutti and Tacconi 2006).

instance, detecting anomalies in actual versus forecasted volumes of timber harvested from a given zone. Given MINFOF’s financial constraints, such information could help in prioritizing enforcement interventions in the field.

Overall, timber harvesting statistics show a continuous increase in production during the 1980s and much of the 1990s. During the early 1990s, this increase was facilitated by the devaluation of the national currency,¹⁰ with upward production trends peaking in 1997–98, at around 3.5 million m³ (Figure 3). However, in 1999, timber harvest fell sharply, declining by more than 1 million m³ relative to 1998 levels. This rapid decline coincided with the imposition of a partial ban on log exports as well as the official suspension of *petits titres*.

In recent years, production trends have been relatively stable, characterized by small gains and

losses from year to year. For instance, volume harvested rose slightly to 2.2 million m³ in 2004, only to fall back to less than 2.0 million m³ in 2005.

Figure 4 illustrates the origin of commercial timber, by type of logging permit. With the progressive phaseout of licenses, forest concessions have accounted for a rapidly rising share of national timber production, increasing to about 85 percent in 2005 from a level of only 27 percent in 1998–99. The share of timber harvests from SSVs and ARBs, which accounted for more than 50 percent of national timber harvest in 1999–2000, diminished to nearly zero in 2003, but rebounded slightly in 2004 and 2005 in officially recorded figures.

As indicated previously, atlas V2.0 combines spatial information on area under timber extraction with statistics on logging. Integration of these two types of information enables users of atlas V2.0

National Forest Domain Logging

Within the **Permanent Forest Domain**, the majority of logging is carried out in forest concessions and council forests. Under certain conditions, timber extraction may also occur in this domain through the granting of SSVs.

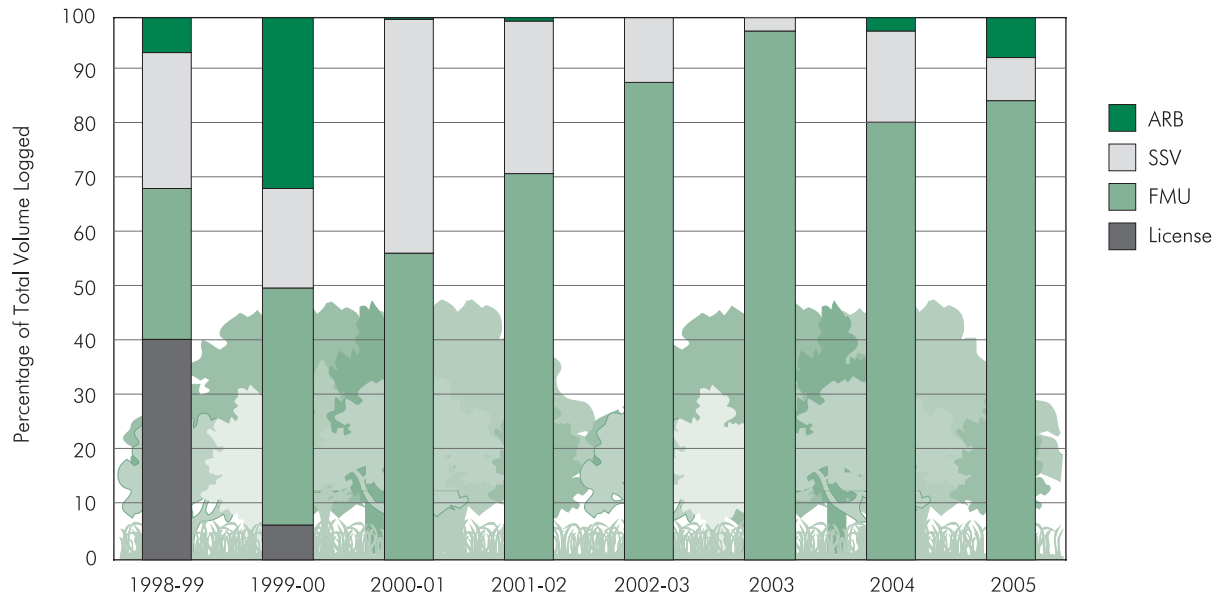
In the **Non-Permanent Forest Domain**, logging is authorized through SSVs, community forests, or *petits titres* (e.g., PEPFs, ARBs, AEBs and APCs).

to analyze timber output by surface unit—that is, to examine spatial relationships between active logging areas and rates of timber production in specific locations. While forest concessions currently account for more than 85 percent of total production reported by SIGIF, they represent only 60 percent of currently logged area (Figure 2). Thus, per hectare rates of timber production for forest concessions are much higher than—in fact, nearly double—those of other types of timber extraction permits, such as SSVs.

Over the first 4 years following implementation of forest concessions (i.e., 1996–2000), per hectare timber yields increased significantly. Since 2000, average timber yields from forest concessions have remained steady at around 10 m³ per hectare, with values ranging from 9 to 11 m³ per hectare per year between 2000 and 2005.¹¹

Production statistics by species are also available through SIGIF, but were not integrated into this atlas. However, timber production in Cameroon continues to concentrate on a few economically

Figure 4. Timber Volume by Permit Type



Source: SIGIF.

valuable species, such as Sapelli and Ayous. In spite of recent trends towards diminished focus on these species, they still account for more than 50 percent of total timber production. Whether these species are harvested in a sustainable manner within forest concessions is difficult to assess, due in part to the lack of detailed silvicultural data at a

national scale. Moreover, logging companies do not always include these species in the list of “managed species” provided in their forest management plans, leaving a dearth of information on harvesting and regeneration rates. (For further discussion of this issue, see the discussion below on concession management plans and sustainable forestry.)

Allocation of Forest Concessions, by Title Holder

Table 3 presents information on allocated forest concessions, by title holder. As of 2006, some 82 percent of all forest zones designated as FMUs had been allocated. The distribution of forest concessions by title holder has changed over time, primarily through the merger, transfer, or abandonment of concessions, as well as contracting a third party to carry out logging of some forest concessions.

- As of 2006, nine transfers had been recorded, representing an area of 616,000 ha, or more than 10 percent of the total surface area of allocated concessions. The legal transfer of concession operations consists of handing over the entirety of the concession from the current operator to the applicant.¹² In the case of a transfer, all the timber extraction clauses and conventions of the previous title holder are passed on to the new operator.
- Five concessions have been abandoned (as of 2006), representing a total area of 294,000 ha. These concessions were incorporated into the latest competitive bidding process in May 2006, accounting for over half of the area to be allocated. A request to abandon a forest concession must be justified by the title holder and approved by the appropriate MINFOF authority.
- Some 28 forest concessions—representing an area of more than 1.5 million ha, or close to a third of the total area of allocated concessions—were being logged (as of 2006) by a third party under a sub-lease agreement.

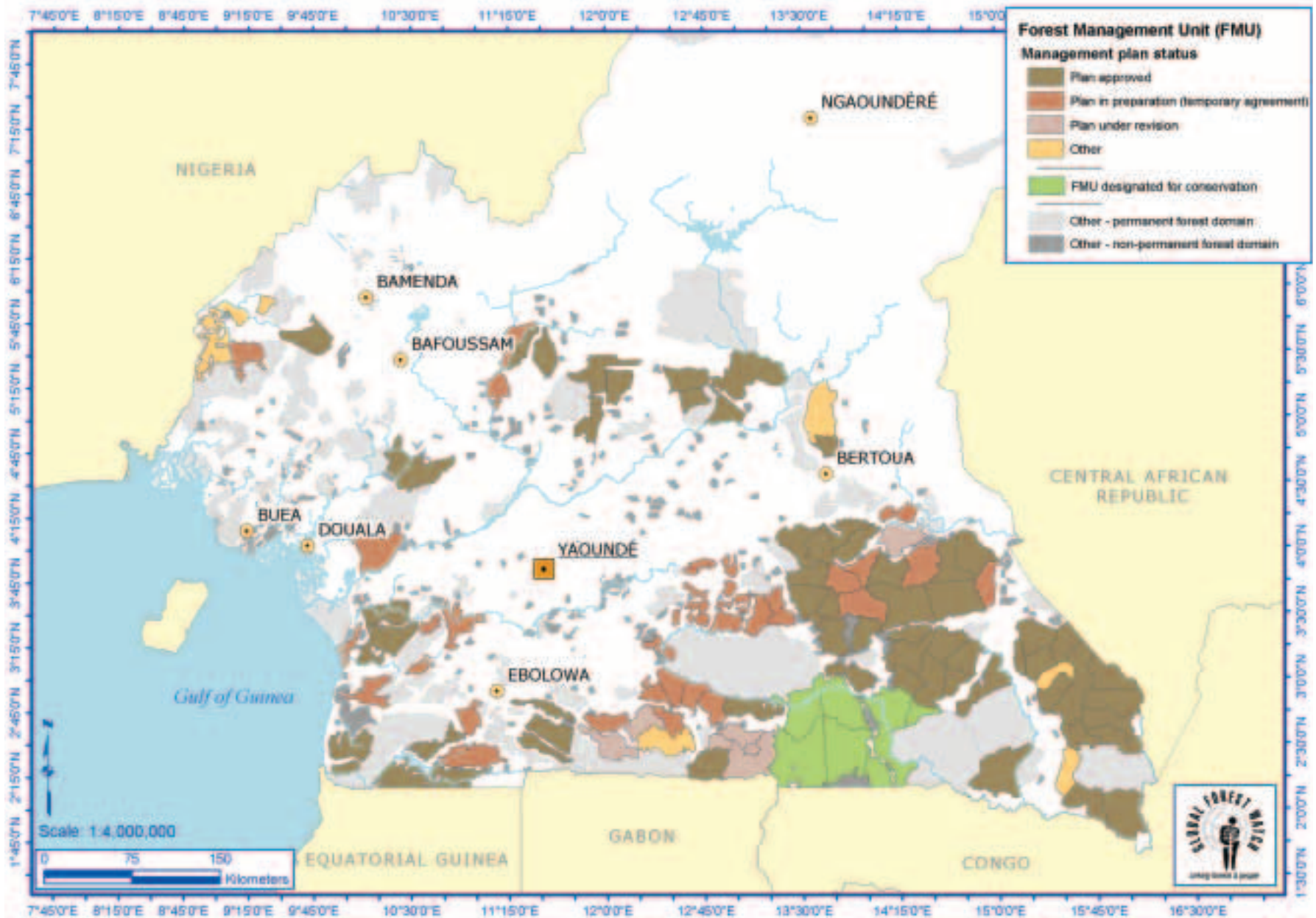
Table 3 also presents data on the size of allocated FMUs in Cameroon, which averages about 73,000 ha. This is relatively small compared to the size of forest concessions in other countries in the Congo Basin region, notably the Republic of Congo and the Central African Republic (CAR), where concessions average more than 200,000 ha.

The smaller average size of forest concessions in Cameroon has some negative implications for timber operators, in terms of efficiency of timber production and forest management. In order to enhance profitability and improve economies of scale, some companies have established partnerships, whose holdings encompass multiple concessions. These partnerships have developed through subsidiaries, sub-contractors, or privileged partners and revolve around the harvesting and/or transformation of timber. Formation of such partnerships allows a significant merger of area under the management of companies originating from the same foreign-owned parent company.

As indicated in Table 3, these partnerships control from as few as three FMUs to as many as ten FMUs, covering anywhere from about 190,000 ha to more than 660,000 ha. In fact, just six partnerships account for almost half of the total area under forest concessions. Moreover, several parent forestry companies (e.g., Vicwood and Rougier) operating in Cameroon have sought to increase their productive efficiency in the Congo Basin sub-region by concurrently logging forest concessions in neighboring countries, including the Republic of Congo, the CAR, and Gabon.

Table 3. Distribution of allocated FMUs by partnership				
Group or Privileged Partnership	Nationality of Majority Shareholder	Number of FMUs	Area (ha)	Percentage of Total Area
Vicwood (CIBC, CFC, SAB, SEBC, J.Prenant, Kieffer)	China	10	663,288	12
Rougier (CAMBOIS, LOREMA, MPACKO, SFID, SOCIB)	France	9	555,103	10
SEFAC (SEFAC, SEBAC, Filiere Bois)	Italy	5	411,872	7
Wijma (Wijma, CFK, CUF)	Netherlands	8	383,407	7
Patrice Bois (COFA, GAU SERVICES, SFF, SF Bojongo)	Italy	6	367,282	7
Alpi (ALPICAM, GRUMCAM)	Italy	4	366,344	7
Pasquet (PALLISCO, ASSENE NKOU, SODETRANCAM)	France	5	301,387	5
Reef (TRC, SEPFCO)	Netherlands	4	253,805	5
Khoury (EFMK, RC CORON, SN COCAM)	Cameroon	4	238,192	4
TTS (SFB, SFCS, TTS)	Italy	3	189,014	3
Decolvenaere (SFIL, SOTREF, Green Valley)	Belgium	3	187,034	3
Fokou (SCTB)	Cameroon	3	170,572	3
Danzer (MMG)	Germany	1	162,268	3
Panagiotis Marelis	Greece	1	148,642	3
FIPCAM	Italy	3	146,256	3
ING F (ING F, SCIFO)	Cameroon	3	136,465	2
STBK	Cameroon	2	134,762	2
SIM (SIM, INC, SFDB)	Italy	3	131,598	2
PLACAM	Italy	3	120,062	2
CPPC	Cameroon	1	91,489	2
SCIEB	Cameroon	1	88,276	2
PMF WOOD	Cameroon	2	71,518	1
Bubinga	Cameroon	1	58,220	1
CCIF	Cameroon	1	47,170	1
STJJY	Cameroon	1	44,975	1
SIBM	Cameroon	1	35,035	1
SEEF	Cameroon	1	29,365	0.5
EFFA JBP	Cameroon	1	25,517	0.5
TOTAL		90	5,558,918	100%
Source: SIGIF.				

MAP 4 Forest Concession Management Plan Status by FMU



Status of Forest Concession Management Plans—Implications for Sustainable Forestry

Using the information in atlas V2.0, users can get an overview of the management status of allocated forest concessions in Cameroon. This information often is difficult to access or interpret; thus, presenting such information in an interactive, map-based format will likely prove useful to MINFOF (e.g., the Sub-Department of Inventories and Forest Management/ *Sous Direction des Inventaires et Aménagements Forestiers - SDIAF and brigade de contrôle*) and associated collaborators.

Under Cameroonian law, concession holders have three years to develop a forest management plan and submit it to MINFOF for approval. During this period, forest concession holders have the right to log their concessions under a temporary agreement (*convention provisoire*) based on a provisional timber-harvest outlook. (In contrast, regulations governing community forests and council forests require approval of a simple management plan (in the case of community forests) or a forest management plan (in the case of council forests) before timber can be extracted.) Following approval of a forest management plan and classification of the concession, the title holder signs a 15-year renewable lease agreement with MINFOF.¹³

As of 2006, some 54 concessions—representing an area of more than 3.8 million ha or about 70 percent of the total area allocated as forest concessions—were under an approved management plan (Table 4). Seven more management plans, representing an additional area of 374,000 ha, were in the revision process. Map 4 displays the current status of FMU management plans.

Due to delays in the FMU classification process, there is still no concession operating under a final lease agreement (*convention définitive*) with MINFOF. In total, 38 forestry concessions are currently classified, representing almost 2.9 million ha¹⁴. Of these, 31 had an approved forest management plan in 2006, and a significant number should be operating under final agreements in the near term. Figure 5 provides the relative number of areas classified by designation, while Map 5 presents the distribution and status of specific areas.

The share of forest concessions operating under an approved management plan in Cameroon (i.e., 54 of 90, or 60 percent) is higher than anywhere else in the sub-region. On the surface, this trend appears to be quite positive. However, recent studies have called into question the quality of some of these management plans and their potential impact on forest ecosystem sustainability. These concerns stem from reports indicating that under existing regulations, management decisions contrary to sustainable forestry standards could be legally implemented.¹⁵

Table 4. Allocated FMU Management Plan Status

FMU Management Status ¹	Number	Area (ha) ²	Percentage of Total Area
Plan approved	54	3,833,200	69
Plan in preparation (temporary agreement)	29	1,350,100	24
Plan undergoing revision	7	374,000	7
TOTAL	90	5,557,200	100%

1. Due to delays in the FMU classification process there was no concession operating under a final lease agreement as of May 2006.
2. Surface areas were rounded to the nearest 100 ha. To avoid confusion the actual total was included in this table rather than the sum of the rounded values.

In conjunction with moves toward improved forest management, some timber companies have voluntarily enrolled in programs of timber certification or chain-of-custody reporting. Once a chain-of-custody system is put in place, it can be monitored by an independent organization, verifying the legal origin of wood. In Cameroon, two systems are currently available to forestry companies: Origin and Legality of Timber (*Origine et Légalité du Bois – OLB* by BVQI-Eurocertifor), and Timber Legality and Traceability Verification (TLTV by *Société Générale de Surveillance—SGS*). As of 2006, 21 FMUs—representing more than 1.3 million ha, or approximately 25 percent of the total allocated area—had obtained one of these certificates (Table 5).

MAP 5 Forest Classification Status in 2006

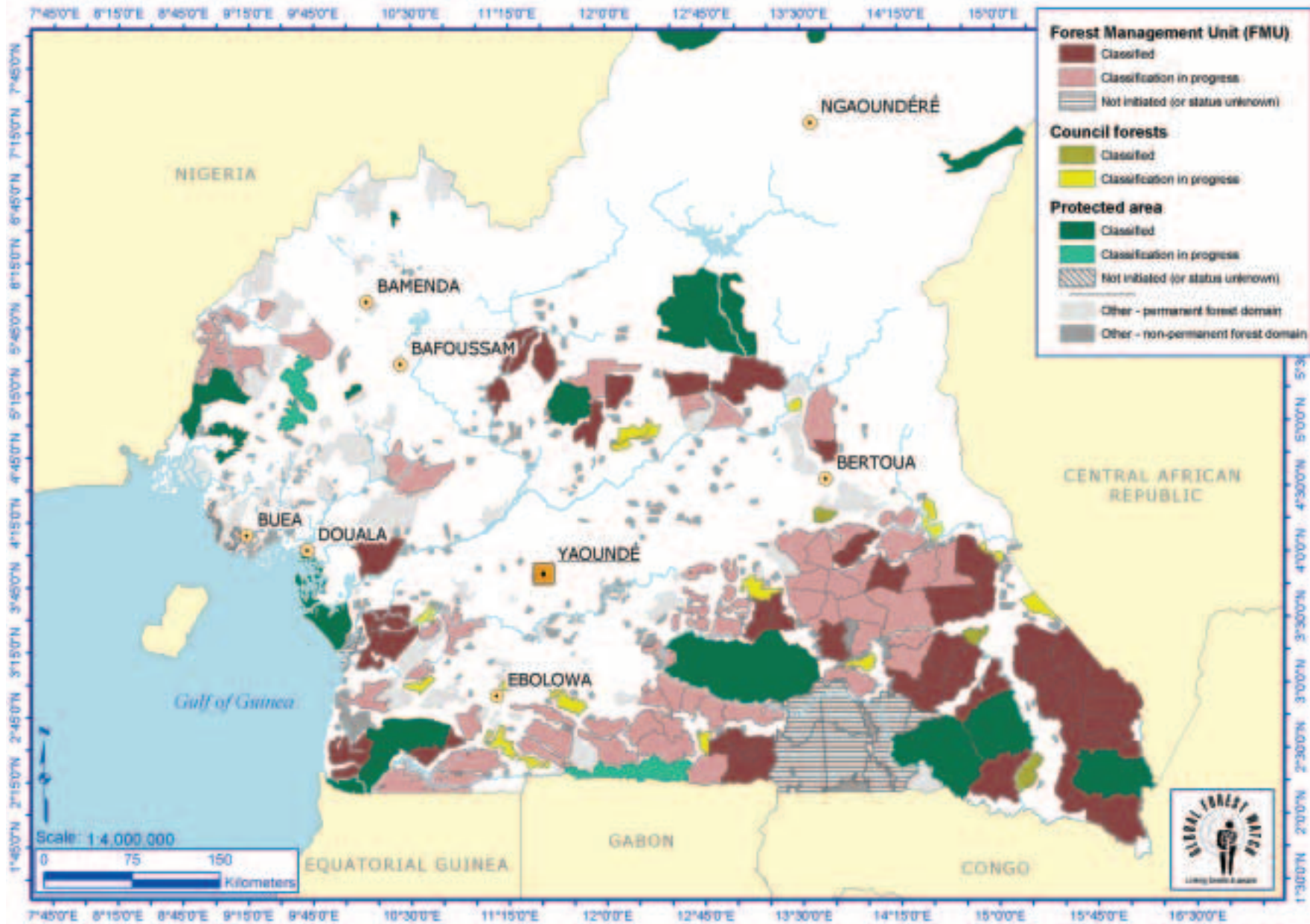
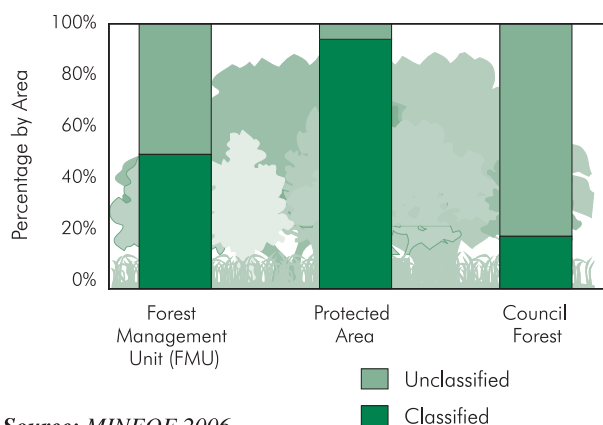


Figure 5. Forest Classification Status



Source: MINFOF 2006.

In some cases, companies are motivated to develop and test these chain-of-custody systems in order to fulfill requirements of a sustainable forestry certification process. Atlas V2.0 contains information on forestry companies and concessions in possession of a chain-of-custody legality certificate or a FSC certification (where available). The first FSC certificate in Cameroon was granted in 2005 through the certification of a forest concession (representing 42,800 ha) operated by the company Wijma. Since then, several other companies (including Pallisco, Decolvenaere, TRC, and SEFAC) have launched initiatives in pursuit of FSC certification (Table 5).

It is worth noting that, at present, the international community seems more interested in pursuing systems that are less ambitious than full-fledged certification. Instead, considerable effort is being invested in researching options (e.g., the Forest Law Enforcement and Trade - FLEGT and AFLEG processes, and the independent Forest Concession Monitoring System for Central Africa - FORCOMS) that appear more realistic and focused on legality alone.

Table 5. Allocated FMU Certification and Chain of Custody Status¹

Process	FMU Status ²	Number	Area ³ (ha)	Percentage of Total Area
FSC Certification	Certified	1 ⁴	42,800	1
	Pre-audit complete	15	1,100,500	20
	Not engaged	74	4,413,900	79
TOTAL	Allocated	90	5,557,200	100%
<hr/>				
Chain of Custody Verification	OLB ⁵ verified	11	704,500	13
	SGS ⁶ verified	10	663,300	12
	Not engaged	69	4,189,500	75
TOTAL	Allocated	90	5,557,200	100%

- Several FMUs fall under both FSC certification and chain of custody processes.
- Certification and chain of custody verification occur at the concession level.
- Surface areas were rounded to the nearest 100 ha. To avoid confusion the actual total was included in this table rather than the sum of the rounded values.
- Wijma Group, concession n° 1006.
- Origine Légale du Bois from BVQI-Eurocertifor.
- Société Générale de Surveillance through its Timber Legality and Traceability (TLTV) program.

Timber Processing

Atlas V2.0 contains information on wood processing plants (sawmills) throughout Cameroon, based on preliminary results of a survey of 39 sawmills operated by 22 companies. In order to obtain this information, research was carried out in 2006 in partnership with the Center for International Forestry Research (CIFOR) and LBG and in collaboration with MINFOF and the *Groupement Filière Bois au Cameroun* (GFBC). The research consisted of a 2005 survey of operating companies, site visits and a review of the annual logging-activity reports submitted to MINFOF by timber companies.

Analysis of the collected data reveals that:

- The 39 surveyed sawmills had a combined wood-processing capacity of about 2.2 million m³. Extrapolating from this figure to the 51 sawmills operating in Cameroon in 2005 yields an estimate of total national wood-processing capacity in the neighborhood of 2.4 million m³;
- On average, the sawmills surveyed were running at 63 percent of capacity;
- Overall, the sawmills received raw input of greater than 1.5 million m³ of logs, generated an output of more than 510,000 m³ of sawn lumber, and exported upwards of 150,000 m³ of logs; and,
- Seven of the surveyed companies (32 percent) are engaged in the FSC certification process, while 12 (55 percent) have implemented a chain-of-custody tracking system.

Area Designated for Biodiversity Conservation and Wildlife Management

Atlas V2.0 contains the most recent information available on the various zones dedicated to biodiversity conservation and wildlife management in Cameroon. Table 6 presents information relating to the number, geographic area, and management status of each zone, including national parks, reserves, wildlife sanctuaries, hunting zones, and community-managed hunting zones. Areas designated as protected areas, forest reserves, and hunting zones are indicated in Map 6.

Overall, wildlife protection areas (i.e., national parks, wildlife sanctuaries, and reserves) encompass an area of 3.7 million ha—nearly 30 percent of the Permanent Forest Domain (PFD) and 8 percent of national territory. In addition, conservation areas within FMUs and forest reserves (protected, recreation, education, and research forests as well as integral reserves) represent another 1.8 million ha (867,000 ha for conservation areas within FMUs and 925,000 ha for forest reserves). However, the conservation status of these zones is not yet assured; conservation areas within FMUs are not under permanent protection status and thus are subject to future exploitation, while many of the forest reserves are not yet permanently classified within the PFD.

More than 500,000 ha have been proposed as future protected areas (see Table 6, “Zones in development”). Among these, public notices have already been published for certain larger reserves, such as Ebo and Takamanda. Note that several of these proposed protected areas are currently classified as

protected forests and in the future will no longer be counted in this category.

Protected areas are required by law to operate under an approved management plan. In general, protected areas are managed under one of four arrangements: unique State control, co-management by the State and an NGO, private management (for certain hunting zones), or local community management. The current trend is toward improved integration of input from concerned stakeholders via participatory resource management systems. In future versions of this atlas, we aim to include expanded attributes on protected areas, including more detailed information on the status and content of their management plans.

Another land-use designation related to wildlife management are hunting zones (ZIC), some of which are to be managed by local communities (ZICGC). A total of 52 hunting zones (33 ZIC and 19 ZICGC), have been created — primarily in the East and North provinces. Another ten sites are at a fairly advanced stage in their creation. (For more discussion of hunting zones and related legislation, see Box 6 in atlas V1.0.)

Within the framework of sub-regional collaborations, Cameroon has also engaged in a transboundary natural resource program in conjunction with the governments of Gabon and Congo through signing the Dja-Odzala-Minkébé Tri-national (TRIDOM) and the Sangha Tri-National (TNS) accords. This transboundary initiative fits within a context of increasing harmonization of natural resource management in the sub-region, attempting to promote synergy between bordering countries towards more effective conservation of biodiversity and large swaths of intact critical forest habitat.

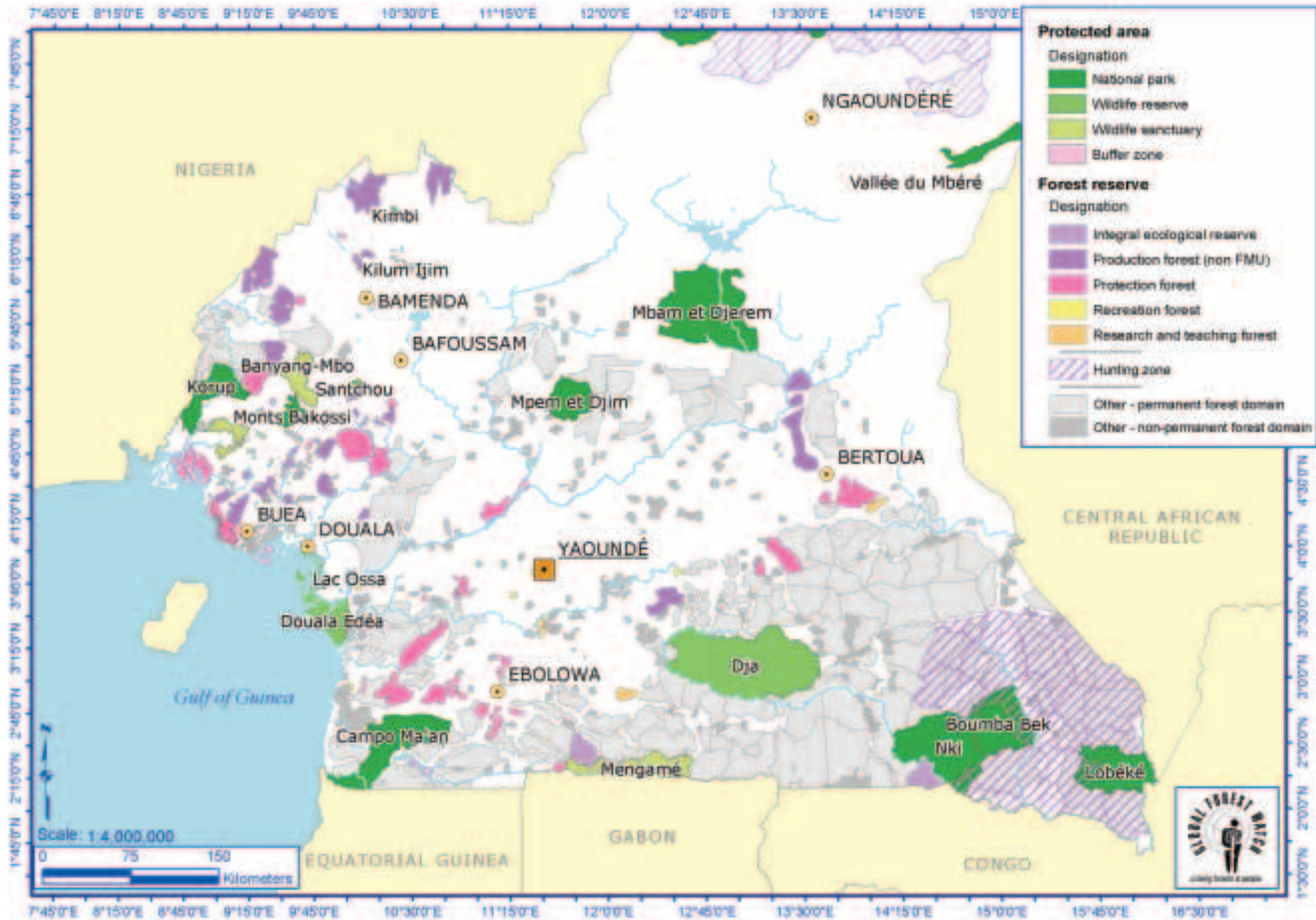
Table 6. Wildlife Protected Areas

	Designation and Name	Area (ha)	Management plan status	Managing party
National Park				
	Campo-Ma'an National Park	260,944	Approved	State/FEDEC
	Bénoué National Park	199,241	Approved	State
	Bouba Ndjida National Park	213,414	—	State
	Boumba Bek National Park	238,941	—	State/WWF
	Kala-Maloué National Park	6,757	—	State
	Korup National Park	129,457	Approved	State
	Vallée du Mbéré National Park	74,884	—	State
	Lobéké National Park	218,372	Approved	State/WWF
	Mozogo Gokoro National Park	1,736	—	State
	Mpem et Djim National Park	104,138	—	State
	Nki National Park	326,567	—	State/WWF
	Waza National Park	141,939	Approved	State
	Mbam et Djerem National Park	430,242	—	State/FEDEC
	Faro National Park	342,887	—	State
	Monts Bakossi National Park	36,000	—	State
Wildlife Reserve				
	Douala Edéa Reserve	168,116	—	State
	Kimbi Wildlife Reserve	5,163	—	State
	Santchou Wildlife Reserve	9,500	—	State
	Dja Wildlife Reserve	590,053	Approved	State/ECOFAC
	Lac Ossa Wildlife Reserve	4,539	—	State

	Name	Area (ha)	Management plan status	Managing party
Wildlife Sanctuary				
	Mengamé Gorilla Sanctuary	120,646	—	State/ITTO
	Banyang-Mbo Wildlife Sanctuary	69,093	—	State
	Rumpi Hills Wildlife Sanctuary	45,169	—	State
	Kilum Ijim Plant Sanctuary	1,000	—	
Zones in development				
	Ngondoré National Park	230,000	—	
	Takamanda National Park	69,599	—	
	Ebo National Park	143,000	—	
	Mont Kupé Integral Wildlife Reserve	4,300	—	
	Lom Pangar National Park	47,686	—	
	Manengouba Integral Ecological Reserve	5,252	—	
	Monts Bamboutos Reserve	2,500	—	
	Kupé Integral Ecological Reserve	4,676	—	

Source: DFAP-MINFOF (2006)

MAP 6 Biodiversity Protection and Wildlife Management in 2006



CONCLUSION AND NEXT STEPS

The *Interactive Forestry Atlas for Cameroon* constitutes an important innovation in that it links key spatial and non-spatial information pertaining to forest management and governance in a user-friendly format. Integration of various data layers—including distribution and attributes of timber extraction zones, location of forestry roads (digitized and mapped from satellite imagery), and location of zones dedicated to biodiversity protection and wildlife management—makes the atlas a complete source of up-to-date information on the Cameroonian forestry sector.

Version 2.0 of the atlas not only presents updates of information already contained in version 1.0 of the atlas, but also incorporates novel information. This includes four new datasets—on forest concessions, annual harvestable areas (AACs) in forest concessions with an approved management plan, primary sawmills and their relevant attributes, and hunting zones (ZIC) in northern Cameroon.

Distribution and Training

Version 2.0 of the atlas will be distributed on CD-ROM and also made available online via MIN-FOF (www.minef.cm) and WRI's Global Forest Watch (GFW) initiative (www.globalforestwatch.org). Atlas V2.0 will be distributed widely within Cameroon, as well as to a more targeted audience within the Congo Basin region and internationally. Dissemination within Cameroon will be complemented by several informational and training workshops designed to ensure that the atlas is used appropriately and to its full capacity.

These dissemination and training efforts will be aimed at promoting continued, progressive integration of the atlas, as a decision-support tool, into the decision-making process of various actors in the forestry sector, such as the provincial and central administrations of MINFOF, members of parliament, NGOs, research and training institutes, and the private sector. Trainings will be designed to

catalyze significant improvement in the capacity of these actors to generate and manage forestry-related information through the use of the atlas, as has already happened via workshops and training sessions carried out since publication of Version 1.0. Building on the success of prior workshops, a new series of workshops associated with atlas V2.0 will be undertaken in the provinces of *Adamaoua*, *Nord*, and *Extrême Nord* and will specifically address issues surrounding management of protected areas and hunting zones (ZIC).

Workshops and other capacity-development initiatives will also focus on supporting transfer of complete responsibility for atlas development, updating, and associated technical services to the Cameroonian forest administration. The mechanisms for such a transfer will require further elaboration, however, in order to better define the roles and responsibilities of each administrative branch in this new context.

Future Versions of the Cameroon Atlas

In order to maximize its relevance, the *Interactive Forestry Atlas of Cameroon* must be regularly updated so that it contains the most recent information available on active forestry concessions, including geographic boundaries, allocation year, timber production statistics, and any other relevant attributes (e.g., status of forest management plans). To this end, the periodic publication of an updated version is envisioned for the foreseeable future.

The *Interactive Forestry Atlas of Cameroon* was designed to be in a constant state of evolution, with priority given to regularly updating information contained within. Effectively, the relevance of this tool rests on its ability to provide the decision-maker with the most current, accurate, and complete information available. This information will be continuously updated by the MINFOF-WRI partnership, and made publicly available via annual updates.

In particular, updating of the data layer on forest roads—annually, at minimum—is critically important. Recent information on the location of roads is essential for successful monitoring of current logging activity as well as for timely intervention when illegal activities are detected.

Other data gaps in version 2.0 should be addressed in future editions of the atlas. For instance, forthcoming atlases should include all relevant data and attributes of community forests, council forests, and *petits titres*, presented in the same format currently used for FMUs, SSVs, and forest concessions.

With regard to protected areas, future improvements to the interactive forestry atlas will be compatible with the protected area database currently being developed by MINFOF.

Expansion within the Congo Basin Region

Experience with the *Interactive Forestry Atlas of Cameroon* will guide efforts to extend the initiative to other countries within the Congo Basin region. Memoranda of Understanding (MOUs) have already been signed with the Ministry of Forest Economy and Environment in the Republic of Congo and the Gabon Ministry of Forest Economy, Water, Fisheries and National Parks. For both of these countries, a pilot interactive forestry atlas is scheduled to be published during 2007. An MOU has also been signed with the Democratic Republic of Congo's (DRC) forest administration in pursuit of undertaking a similar atlas initiative.¹⁶

The Cameroon atlas will also complement other regional efforts to promote monitoring, transparency, policy, research, and data availability in the forest sector across the Congo Basin. The recently published State of the Congo Basin Forest report¹⁷ contains information and analysis that serves as useful context for Version 2.0 of the Cameroon atlas. Likewise, the contents of any of the national interactive forestry atlases mentioned above will certainly be an important source of reliable data for future region-wide State of the Forest reports.

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NOTES

1. Following the 2004 elections, the Cameroonian government officially split the Ministry of the Environment and Forestry (MINEF) into the Ministry of Forestry and Wildlife (MINFOF) and the Ministry of Environment and Protection of Nature (MINEP).
2. A technical report on the review of classification decrees for FMUs, including problems encountered and recommendations, was presented to MINFOF in February 2006.
3. The extent (in ha) of AACs issued by SIGIF may not correspond exactly to the extent of AACs as measured using GIS. This is because the applications submitted annually by timber companies and the certificates granted by MINFOF can refer to slightly different zones.
4. See the overview report from atlas V1.0 or, for more detail, the associated Technical Report: Mapping Historic and Current Logging Roads in Cameroon.
5. Decree n°2006/0129/PM from 27 January 2006, modifying and completing certain clauses of Decree n°95/531/PM from 23 August 1995 defining the forestry regime clause; Decision n°0124/D/MINFOF/SG/DF/SDAFF/SAG from 16 March 2006, ending the suspension of wood recuperation, removal, and personal logging permits; circular letter n°0131 LC/MINFOF/SG/DF/SDAFF/SN, relating to delivery procedures and monitoring execution of petits titres.
6. Refer to Box 4 in V1.0 for a discussion of the FMU and SSV allocation process.
7. At prevailing bid prices and rates of taxation, local markets generally do not provide sufficient economic returns to logging on SSVs. Thus, timber from these titles is primarily export oriented. Timber from *petits titres* is prohibited from export.
8. This is the case for council forests in Dimako (16,500 ha) and Moloundou (42,000 ha), which are being logged in partnership with one or more private companies.
9. Incomplete logging statistics for ARBs are available through SIGIF and are reflected in this discussion. However, these data were not integrated in atlas V2.0, because the geographic boundaries of these permits could not be verified.
10. Devaluation of the *Communauté Financière d'Afrique* (CFA) Franc occurred in 1994.
11. Extreme reported values (greater than 35 m³ per hectare) warrant further examination.
12. According to regulations defined by Articles 75–77 of Decree n°95/531/PM.
13. See Box 5 from V1.0 for a more in-depth discussion of this process.
14. Only four concessions were classified before 2000, with another five in 2004 and an additional 29 in 2005–06.
15. An example of this is the exclusion of certain commercially valuable species from Group 1 (i.e., “managed species”) in the forest management plan, thus making harvest of these species exempt from controls contained in the management plan. Similarly, economically negligible species may be included within Group 1 in order to attain the legislatively specified quota, i.e., that 75 percent of the total potential timber volume from a given concession must be of Group 1 species. After fulfilling this obligation, a company could theoretically harvest certain commercially valuable species not included in Group 1 under laxer requirements (i.e., at administrative harvesting diameter requirements, which are equal to or less than the optimum silvicultural diameter), resulting in regeneration rates potentially below the legal minimum of 50 percent (Vandenhoute and Heuse 2006).
16. For all of these countries, complete MOUs can be found online at www.globalforestwatch.org.
17. Available online at <http://carpe.umd.edu/>

Appendix 1. Atlas Datasets and Sources¹

Dataset (name)	Description	Data Source
Basic map features		
Roads – forested zone of Cameroon (VOIE_COM.shp)	Roads digitized from satellite imagery	Original data created by WRI and LBZG (see Appendix 2) ²
Country boundaries outline (Ctrl_Africa.shp)	Country boundaries for Central African countries	National Geospatial-Intelligence Agency’s (NGA) Digital Chart of the World
Cameroon administrative boundaries (LIM_ADM.shp)	Terrestrial national, provincial, and divisional boundaries for Cameroon	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Cameroon coastline (HYDR_SUR_Coastline.shp)	Part of the Atlantic Ocean and estuaries along Cameroon coastline	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Settlements – southern Cameroon (ELEM_HAB.shp)	The different settlements of Cameroon	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Boundaries for topographic map sheets – southern Cameroon (INCmapsheets.shp)	Boundary of Cameroon from the national topographic maps	Scanned 1:200,000 INC topographic maps of Cameroon and compiled by WRI ³
Boundaries for Landsat scenes (Landsat_PR_frame.shp)	Boundary of Landsat Path/Row scenes for southern Cameroon	
Rivers and streams – forested zone of Cameroon (HYDR_LIN.shp)	Hydrological network (rivers and streams) for the forested zones of Cameroon	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Cameroon major rivers, lakes, and ocean (HYDR_SUR.shp)	Major rivers, lakes and the Atlantic Ocean for Cameroon	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Forest management		
Permanent Forest Domain (dom_for_permanent.shp)	Permanent forest domain in Cameroon (see Box 2 – Overview of Forest Legislation, Zoning and Classification in Cameroon)	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ^{3,4}
Non permanent forest domain (dom_for_non_permanent.shp)	Non Permanent Forest Domain in Cameroon (see Box 2 – Overview or Forest Legislation, Zoning and Classification in Cameroon)	Layer updated by WRI (using official attributions documents) from data digitized on the national 1:200,000 INC topographic map sheets ³
Licenses (licence.shp)	Old logging concessions formerly referred to as Licenses	Layer based on national 1:200,000 INC topographic maps ³
Forest concessions (concession_forestiere.shp)	Cameroon forest concessions – singly managed grouping of FMUs	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Forest management units (ufa.shp)	FMUs – within PFD	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Council forests (foret_communale.shp)	Council forests – within PFD.	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Community forests (foret_communautaire.shp)	Community forests located within the nPFD	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³

Appendix 1. continued

Dataset (name)	Description	Data Source
Forest management (continued)		
Sales of standing volume (vente_coupe.shp)	Sales of standing volume – within nPFD	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Forest reserves (reserve_forestiere.shp)	Forest reserves within the PFD	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Biodiversity conservation and wildlife management		
Northern hunting zone (zic_nord.shp)	Privately and community managed hunting zones of northern Cameroon	Information System on the Biodiversity of Cameroon (SIBC) - MINEF
Eastern hunting zone (zic_est.shp)	Privately and community managed hunting zones of eastern Cameroon	GTZ Southeast Cameroon project
Protected areas (aireprotegee.shp)	All protected areas in Cameroon with relative designations	Layer updated by WRI from data digitized on the national 1:200,000 INC topographic map sheets ³
Vegetation		
Land use and land cover types for the southern parts of Cameroon (STR_FOR.shp)	Land use and land cover types for southern Cameroon	Layer based on national 1:200,000 INC topographic maps ³
Vegetation map of Africa (glc2000.img)	1 km resolution land cover map	Global Land Cover 2000 database. European Commission, Joint Research Centre, 2003
FMU attribution and production statistics		
Years of attribution (AttributesZonage_2006-07-13.mdb)	The year of allocation for the various forest extraction zone titles	Official public notice of attribution documents (<i>Avis au Public</i>)
Wood volume produced (AttributesZonage_2006-07-13.mdb)	Annual wood volume produced per forest extraction zone titles	Obtained from SIGIF and compiled by WRI
Annual harvestable area (AAC.shp)	Boundaries of the annual harvestable areas, as defined in the management plan approved by MINFOF	Obtained from MINFOF or logging companies, and compiled by WRI
Sawmills (usine.shp)	Location and basic characteristics of the major sawmills in Cameroon	WRI survey and field verification
<p>1. GIS users should refer to the metadata of each shapefile or raster for more detailed information.</p> <p>2. Certain areas of the Atlas roads dataset were cross-checked with similar datasets produced by the GTZ Southeast Cameroon project and Tropenbos Cameroon Project (TCP) for their respective project areas.</p> <p>3. Original layer prepared for MINEF on behalf of CIDA by Tecresult Inc.</p>		

Appendix 2. FMU Management Plan Data Sources

FMU ID	Digitized Management Plan Data Source	FMU ID	Digitized Management Plan Data Source
00-004	Timber company	09-006	WRI-GFW
10-001	Timber company	09-016	WRI-GFW
10-002	Timber company	09-019	WRI-GFW
10-003	Timber company	09-021	WRI-GFW
10-004	Timber company	09-023	WRI-GFW
10-007	Timber company	09-024	WRI-GFW
10-008	Timber company	09-025	WRI-GFW
10-009	Timber company	10-018	WRI-GFW
10-010	Timber company	10-020	WRI-GFW
10-011	Timber company	10-021	WRI-GFW
10-012	Timber company	10-022	WRI-GFW
10-015	Timber company	10-023	WRI-GFW
10-030	Timber company	10-029	WRI-GFW
10-038	Timber company	10-031	WRI-GFW
10-039	Timber company	10-037	WRI-GFW
10-041	Timber company	10-045	WRI-GFW
10-042	Timber company	10-046	WRI-GFW
10-044	Timber company	10-059	WRI-GFW
10-051	Timber company	10-060	WRI-GFW
10-052	Timber company	10-061	WRI-GFW
10-054	Timber company	10-062	WRI-GFW
10-058	Timber company	11-002	WRI-GFW
10-063	Timber company	00-003	No data
10-064	Timber company	08-006	No data
08-001	WRI-GFW	09-017	No data
08-002	WRI-GFW	09-018	No data
08-004	WRI-GFW	10-026	No data
08-009	WRI-GFW	08-008	Plan approved but UFA abandoned
09-004b	WRI-GFW		



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