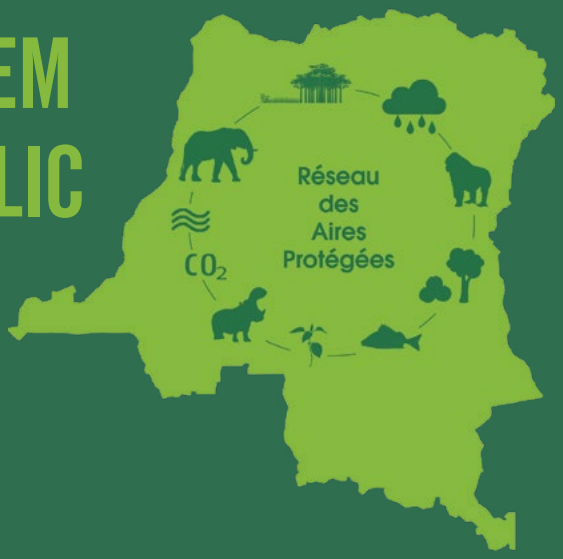
THE PROTECTED AREA SYSTEM OF THE DEMOCRATIC REPUBLIC OF THE CONGO



An evaluation for its consolidation and extension

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Cartography:
The background data for the maps come from the Common Geographical Reference (*Référentiel géographique commun* - RGC) in 2013.

Disclaimer:
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THE PROTECTED AREA SYSTEM OF THE DEMOCRATIC REPUBLIC OF THE CONGO

An evaluation for its consolidation and extension

Implementing partners

ICCN INSTITUT CONGOLAIS POUR LA CONSERVATION DE LA NATURE

WWF

Programmatic partners

Supported by:

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

based on a decision of the German Bundestag

german cooperation
DEUTSCHE ZUSAMMENARBEIT

With friendly support:

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USAID FROM THE AMERICAN PEOPLE

NORWEGIAN MINISTRY OF CLIMATE AND ENVIRONMENT

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Table of contents

Preface

The Democratic Republic of the Congo has signed international commitments in various sectors of the environment. We cite in particular the Joint Declaration with the Federal Republic of Germany at the ninth Conference of the Parties (CoP) of the Convention on Biological Diversity (CBD) held in Bonn in May 2008 in order to "bring the coverage of protected areas to 15 % of the extent of the national territory" and the commitment at the tenth CoP of the CBD to extend the expanse of protected areas up to 17 % as part of Aichi Target 11 of the Strategic Plan for Biodiversity 2011-2020.

Capitalizing on the content of these agreements, the Congolese Institute for the Conservation of Nature (*Institut Congolais pour la Conservation de la Nature* - ICCN) developed a national strategy for the conservation of biodiversity in the protected areas of the DRC, including program 3 (i.e., consolidation and extension of the system of protected areas) which provides elements of the response.

In this context, ICCN and the World Wide Fund for Nature (WWF) initiated in 2011 the Program of Support to the Protected Area System (*Programme d'Appui au Réseau des Aires Protégées* - PARAP). The overall objective of the program is to support the DRC in achieving its objective of biodiversity conservation and to preserve the essential services provided by its ecosystems through the development of a system of protected areas that is effectively and fairly managed.

As such, ICCN, in partnership with WWF, has been able, through PARAP, to conduct a systematic evaluation of the protected area system, focusing its attention on areas for which there is no current information, but which are considered to be priorities, to enable the DRC to consolidate and extend its national protected area system.

The results of phase 1 of this program have allowed ICCN to acquire qualitative information on areas identified as priorities in order to, on the one hand, establish a referential state on the status of the protected areas and areas with high biological potential and, on the other hand, to guide priority interventions on the basis of elements of the evaluation in order to create future protected areas.

While there are still certain steps to be accomplished to achieve the program's final result, the work of phase 1 has been accomplished through the commitment and support received by ICCN and WWF from various technical and financial partners, who I thank sincerely.

My most ardent wish is that current and future technical and financial partners, as well as the ensemble of actors in the field, can appropriate this monograph on the state of management, the conservation status of the network of protected areas and priority zones, in order to rehabilitate and consolidate the national system of protected areas.

Pastor Dr. Cosma WILUNGULA BALONGELWA
Director General of ICCN

Acronyms*

AGB	Aboveground biomass
ASM	Artisanal small-scale mining
AZE	Alliance for Zero Extinction
BMUB	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety – *Bundersministerium für Umwelt, Naturschutz und nukleare Sicherheit*
CAMI	Mining Cadastre – *Cadastre minier*
CBD	Convention on Biological Diversity
CEFE	Center for Functional and Evolutionary Ecology – *Centre d'écologie fonctionnelle et évolutive*
CIA	Central Intelligence Agency
CM & M	Carbon Map and Model project
CNRS	National Center for Scientific Research – *Centre national de la recherche scientifique*
CoCoCongo	Coalition for conservation in the Congo – *Coalition pour la conservation au Congo*
CoCoSi	Site coordination committee – *Comité de coordination du site*
CoP	Conference of the Parties
CR	Critically endangered
CSB	Center for Biodiversity Monitoring – *Centre de surveillance de la biodiversité*
DD	Data deficient
DG	Directorate General – *Direction générale*
DIAF	Direction of Forest Inventories and Management – *Direction des inventaires et de l'aménagement forestier*
DPSE	Directorate of Planning, Monitoring and Evaluation – *Direction de la planification, suivi et évaluation*
DRC	Democratic Republic of the Congo
DSCRP	Growth and Poverty Reduction Strategy Document – *Document de la stratégie de croissance et de réduction de la pauvreté*
DSS	Decision Support System
DTS	Technical and Scientific Department – *Département technique et scientifique*
EN	Endangered
FAO	Food and Agriculture Organization of the United Nations
FPIC	Free, prior and informed consent
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHS	Global Human Settlement
GIS	Geographic Information System
GIZ	German Development Agency – *Gesellschaft für Internationale Zusammenarbeit*
GW	Gigawatt
ha	Hectare
HDI	Human Development Index
IBA	Important Bird and Biodiversity Areas
ICCN	Congolese Institute for the Conservation of Nature – *Institut congolais pour la conservation de la nature*
IMET	Integrated Management Effectiveness Tool
INERA	National Institute for Agronomic Study and Research – *Institut national pour l'étude et la recherche agronomiques*
IPNCB	Institute for the national parks of the Belgian Congo – *Institut des parcs nationaux du Congo belge*

IUCN	International Union for the Conservation of Nature
IWRM	Integrated Water Resource Management
JRC	Joint Research Center of the European Commission
KBA	Key Biodiversity Area
KfW	Reconstruction Credit Institute of the Federal Republic of Germany – *Kreditanstalt für Wiederaufbau*
km	Kilometer
km²	Square kilometer
LC	Least concern
LSM	Large-scale industrial mining
m	Meter
MAB	Man and Biosphere Programme of UNESCO
MEDD	Minister of the Environment and Sustainable Development – *Ministre de l'environnement et du développement durable*
MW	Megawatt
NASA	National Aeronautic and Space Administration
NE	Not evaluated
NGO	Non-governmental organization
NORAD	Norwegian Agency for Development Cooperation
NT	Near threatened
PA	Protected area
PAP	Priority Action Program
PARAP	Program of Support to the Protected Area System – *Programme d'Appui au Réseau des Aires*
PgC	Petagram of carbon
REDD	Reducing Emissions from Deforestation and Forest Degradation
RGC	Common Geographic Reference – *Référentiel géographique commun*
SNCB	National Strategy for Biodiversity Conservation – *Stratégie nationale de conservation de la biodiversité*
SYGIAP	Information Management System for Protected Areas – *Système de gestion d'information pour les aires protégées*
UCLA	University of California in Los Angeles
UMD	University of Maryland
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIKIS	University of Kisangani – *Université de Kisangani*
USAID	United States Agency for International Development
USD	United States Dollar
USGS	United States Geological Survey
VU	Vulnerable
WB	World Bank
WCPA	World Commission on Protected Areas
WRI	World Resources Institute
WWF	World Wide Fund for Nature
ZP	Priority zone – *Zone prioritaire*

*Please note that the codes for protected areas are provided in Annex 1.

Chapter 1
The Democratic Republic of the Congo

The Democratic Republic of the Congo (DRC) lies at the heart of Central Africa and spans over 2.3 million square kilometers. It is the second largest country in Africa by area and shares borders with nine other countries. The capital Kinshasa sits on the Congo River in the west, with other urban clusters spread across the country. In 2017, the population of the DRC was estimated at over 81 million. With one of the world's highest growth rates, the population is rapidly increasing.[i]

The most biologically diverse country on Africa's mainland, the DRC is composed of a mosaic of ecosystems that includes dense forest, savanna, wetlands, mountains and active volcanoes. It is part of the planet's second-largest block of tropical rainforest and encompasses over 60 % of the Congo Basin's dense humid forest. To the north and south of the hot and humid equatorial forest zone, the climate in the DRC becomes tropical. The highest areas of the country lie in the mountain ranges of the East African Albertine Rift. The ecosystems of the DRC serve as critical habitat for numerous locally and globally threatened species and play a key role in climate change mitigation and adaptation. They also greatly contribute to national food security and local livelihoods.

Much of the DRC is occupied by the basins of the Congo River and its tributaries. This vast system of rivers and lakes accounts for 52 % of Africa's surface water resources and represents considerable potential for hydropower development.[ii] These same freshwater ecosystems provide a common means to navigate areas of the country where road infrastructure is undeveloped.

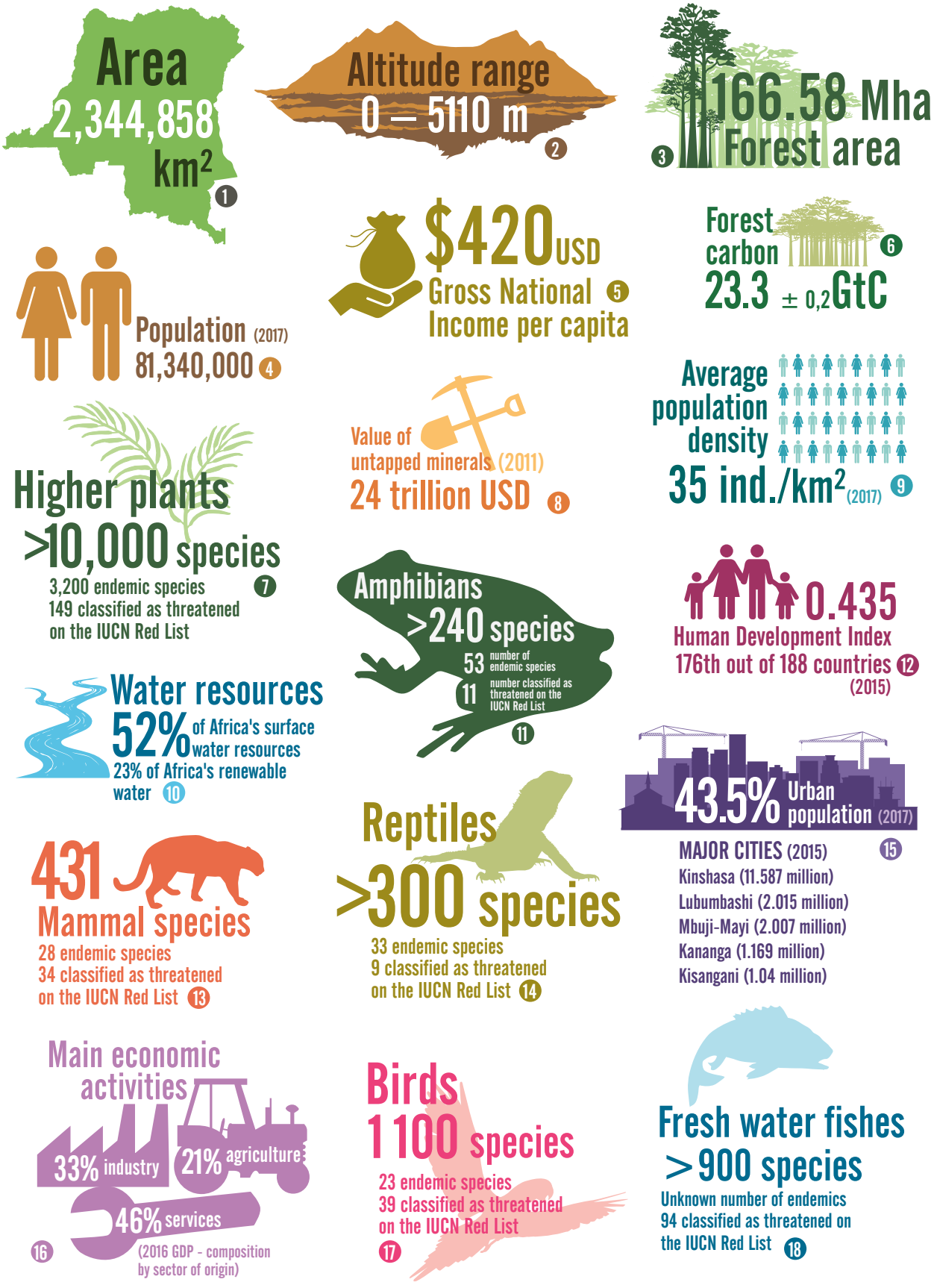
Despite long being considered one of the wealthiest countries in the world when it comes to its natural resources, which include an estimated 24 trillion USD in untapped mineral deposits,[iii] the DRC remains one of the lowest income countries in the world. The Gross National Income per capita in 2017 was estimated by the World Bank at 420 USD. The latest Human Development Index, which measures life expectancy, education and income levels, ranked the DRC 176 out of 188 countries.

Ubangi River

Map 1
The Democratic Republic of the Congo

Group of roan antelope (Hippotragus equinus), Domaine et réserve de chasse de Swa-Kibula

The Democratic Republic of the Congo in numbers



1. CIA, 2017. **2**. CIA, 2017. **3**. Saatchi et al., 2017. **4**. United Nations, 2017. **5**. World Bank, 2017. **6**. Saatchi et al., 2017. **7**. Mittermeier et al., 1997; IUCN, 2018. **8**. UNEP, 2011a. **9**. CIA, 2017; United Nations, 2017. **10**. World Bank, 2008; UNEP, 2011b. **11**. Mittermeier et al., 1997; IUCN, 2018. **12**. UNDP, 2016. **13**. Mittermeier et al., 1997; IUCN, 2018. **14**. Mittermeier et al., 1997; IUCN, 2018. **15**. CIA, 2017. **16**. World Bank, 2017. **17**. Mittermeier et al., 1997; IUCN, 2018. **18**. Mittermeier et al., 1997; IUCN, 2018.

Common duiker (Sylvicapra grimmia), Domaine et réserve de chasse de Swa-Kibula

Chapter 2
The Program of Support to the Protected Area System (PARAP)

Aerial view of the Parc national de la Salonga

What is PARAP ?

The Program of Support to the Protected Area System (*Programme d'Appui au Réseau des Aires Protégées* - PARAP) is a joint initiative of the Congolese Institute for the Conservation of Nature (*Institut Congolais pour la Conservation de la Nature* - ICCN) and the World Wide Fund for Nature (WWF). The primary objective of PARAP is to assist the DRC in achieving its objective of conserving its biodiversity and preserving the essential services provided by its ecosystems through the development of an effectively and equitably managed system of protected areas that covers at least 15 % of the national territory and contributes to national strategies for biodiversity conservation, development and poverty reduction.

The first phase of PARAP ran from 2011 to 2016 and benefited from the support of multiple financial partners. The major donors that were vital to sustaining the program include the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the Reconstruction Credit Institute (KfW) of the Federal Republic of Germany, as well as the WWF network. The United States Agency for International Development (USAID), the Norwegian Agency for Development Cooperation (NORAD), the Global Environment Facility (GEF) and the World Bank (WB) also contributed significantly to the realization of particular activities. Finally, targeted assistance was provided by the German Development Agency (GIZ) and the Goldhammer Foundation.

From 2011 to 2016, the program operated out of ICCN's Technical and Scientific Department (*Département technique et scientifique* - DTS), where its offices were housed. Led by a WWF Technical Advisor, in coordination with the head of the DTS and its directors, the first phase of the program mobilized approximately 25 permanent staff. The program team consisted primarily of thematic experts in fauna, flora and socio-economics. These experts guided much of the program's fieldwork and were complimented by additional logistical and administrative staff. Numerous ICCN officers and agents, from both the Directorate General (DG) and individual protected areas, participated in PARAP activities and were the beneficiaries of trainings aimed at strengthening their relevant capacities. Specific technical support was developed to strengthen the capacities of ICCN's Directorate of Planning, Monitoring and Evaluation (*Direction de la planification, suivi et évaluation* - DPSE).

To ensure a sound scientific and technical approach and encourage the emergence of a new generation of young Congolese professionals, the program established partnerships with universities and national and international research organizations. Notably, the first phase of the program benefited from partnerships with the International Union for Conservation of Nature (IUCN), the Center for Functional and Evolutionary Ecology (*Centre d'Écologie Fonctionnelle et Évolutive* - CEFE) of the National Center for Scientific Research (*Centre National de la Recherche Scientifique* - CNRS), Griffith University (Australia) and the Center for Biodiversity Monitoring (*Centre de Surveillance de la Biodiversité* - CSB) at the University of Kisangani (UNIKIS).

Box 1. The Congolese Institute for the Conservation of Nature (ICCN)

ICCN is the agency charged with the management of in and ex situ protected areas in the DRC. It is a public body with scientific and technical functions, and is under the tutelage of the Minister responsible for nature conservation, i.e. the Minister of the Environment and Sustainable Development (*Ministre de l'Environnement et du Développement Durable - MEDD*). ICCN is an entity with legal personality, and an autonomous system of financial and administrative management.

As part of its mandate, ICCN has developed strategies to guide the management of protected areas and made available a series of tools for the planning, oversight, monitoring and evaluation of protected areas. It is actively engaged in numerous partnerships with national and international institutions and organizations.

Why PARAP ?

In a context of high national population growth and sustained international demand for raw materials, the natural resources of the DRC are increasingly threatened. Unsustainable exploitation, weak inter-sectoral coordination frameworks, and inadequate technical and financial management capacity contribute to the irreversible depletion of the country's natural assets. Strengthening the DRC's existing protected areas into a structured, functional and comprehensive network is essential to mitigate these threats, ensure biodiversity conservation and assure the protected area system tangibly contributes to poverty alleviation and the country's development.

Protected areas have been the primary tool used by the Congolese government to ensure the conservation and sustainable management of the DRC's natural heritage. The concept of a network or system of protected areas, in which the total area under protection results from the sum of its composing entities, emerged as a subject of public interest over forty years ago.

The successive heads of state and governments of the Republic of Zaire, and since 1997 of the DRC, have regularly formulated guidelines and objectives related to the total size of the national system of protected areas. The legislative authority has also developed explicit, mandatory and operational provisions related to these guidelines and objectives. The main elements of which are presented below.

- In 1975, during the opening address of the twelfth Session of the IUCN General Assembly, the President of the Republic announced that the "objective is to achieve full protection of 15 % of the national territory".[iv] Achieving "immediate benefits" through the promotion of tourism, as well as the role and responsibility of the country for the "global environment" were among the considerations underlying this ambition.
- In 2002, the policy guidelines for extending the system of protected areas resulted in an explicit, mandatory and operational provision by the legislative authority. The Forest Code promulgated the same year defines an area target for classified forests (Chapter 4). They "[...] must represent at least 15 % of the total area of the national territory".
- This commitment was reaffirmed at the ninth Conference of the Parties (COP) of the Convention on Biological Diversity (CBD) held in Bonn in May 2008, through the signing of a Joint Declaration between the DRC and the Federal Republic of Germany to support efforts to "[...] bring the coverage of protected areas to 15 % of the national territory". The joint commitment establishes the importance of DRC's forest ecosystems for "the conservation of biological diversity on a global scale", "the stabilization of the Earth's climate" and to support the livelihoods of "local communities and indigenous peoples".
- At the tenth COP of the CBD, held in November 2010 in Nagoya, the target area for protected areas was increased to 17 % under Aichi Target 11 of the Strategic Plan for Biodiversity 2011-2020 (Box 2). The importance of effective management of these protected areas within a structured network, representative of biological diversity, was emphasized.

- The objective was reiterated by the President of the Republic in his speech during the Summit of the Three Tropical Rainforest Basins held in Brazzaville in June 2011.
- The National Strategy for Biodiversity Conservation (*Stratégie nationale pour la conservation de la biodiversité* – SNBC) in the protected areas of the DRC, published in 2012, reiterates the goal of 17 % of protected area coverage.
- Developed in 2013, the main objective set for "environment and climate change" under the Priority Action Program (PAP) of the Congolese government, a document that incorporates the program components of the 2011 second generation Growth and Poverty Reduction Strategy Document (DSCRP-2) and those related to the DRC's vision for emergence by 2030, is to "increase by 2015 the ratio of protected area in the territory to 17 %".[v]
- Finally, the Law on the Conservation of Nature, promulgated in 2014, explicitly reiterates the target for protected area coverage. It stipulates that "the State shall ensure that protected areas represent at least 15% of the total area of the national territory".

Box 2. Aichi Target 11

By 2020, at least 17 % of terrestrial and inland water areas and 10 % of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.

The objectives for protected area coverage set by decision-makers are ambitious. As stated, the system of protected areas, complemented by other effective conservation measures, should reach at least 351 812 km², or 15 % of the national territory, and could extend to 398 720 km² if the 17 % target is realized.

The prospect of a protected area system of that size raises important considerations that need to be addressed. Planning and management capacities are currently concentrated in a handful of high-priority protected areas where financial and technical partners are present. Simultaneously, the limited resources and capacities at the national level, as well as the lack of precise and adequate information, impede the structuration of a countrywide protected area system and hinder its consideration in national dialogues on development.

It is within this context that PARAP was tasked with the design and application of a systemic and systematic approach, with the ultimate goal of consolidating and extending the DRC's national protected area system so that it can act as a catalyst for effective in-situ biodiversity conservation.

Implementation framework

Approach

To achieve its aforementioned objective, the program is being implemented using a phased approach (Figure 1). The first phase (2011-2016) centered on a systematic assessment of the existing protected area system. Given the importance of balancing key concepts of systematic conservation planning with the immediate priorities of protected areas, conducting this assessment involved a major effort to collect and analyze different types of thematic data at two distinct levels: sites (i.e. protected areas and priority zones for biodiversity conservation) and the protected area system as a whole. The results are being used to inform subsequent phases of the program, which will be dedicated to the consolidation and extension of the system of protected areas. This document presents the main results of the first phase of the PARAP program.

Figure 1
A phased approach
PARAP was designed to be realized in multiple phases. The first phase (2011-2016) focused on evaluation.

Evaluation	Consolidation	Extension
• Determine the configuration of the protected area system • Conduct site assessments of protected areas and priority zones • Undertake thematic research to understand the role and values of protected areas	• Address inconsistencies and incoherencies in the configuration • Develop mechanisms to implement priority action plans resulting from evaluations of protected areas and priority zones • Finalize and secure endorsement of the national protected area system strategy • Improve understanding of the role of protected areas in maintaining ecosystem goods and services and support equitable valuation of benefits at site and system levels	• Assure focal biodiversity targets for the protected area system balance representation and management gaps • Implement the protected area strategic plan to extend system to reach 15-17 % of national territory • Establish holistic, effective and equitable management of ecosystems through a variety of governance and management types
Enabling conditions		
• Build capacity and develop tools to improve management • Apply best practices for protected area planning and management • Engage stakeholders • Promote principals and reinforce mechanisms of good governance • Apply scientific research • Develop sustainable financing mechanisms • Promote integration of biodiversity conservation across sectors		

Overview of the methodology

The methodology developed for the first phase of PARAP aimed to assess the existing situation. It included the collection and analysis of information at both local and national levels (Figure 2).

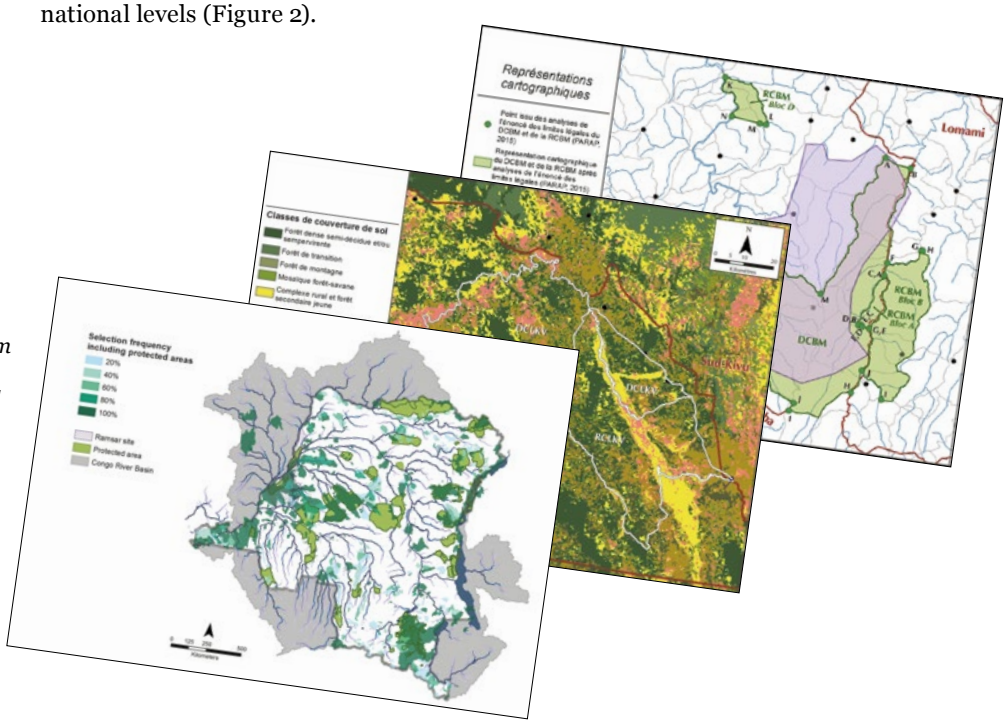


Figure 2
The evaluation phase
Undertaking the evaluation phase necessitated the implementation of activities at numerous levels. The information generated through these activities was analyzed collectively to inform recommendations for the consolidation of the protected area system.

PARAP team undertaking field work and meeting with local stakeholders

Protected areas and priority zones

Fieldwork consisted of a systematic collection of information on: the configuration and management of protected areas; large mammal species and woody plants; and the socio-economic environment in and around protected areas and priority zones. Protocols for data collection and analysis were developed and adapted to fit the objectives of the program. These protocols privileged exchanges with stakeholders. Assessments of natural values were based in part on stakeholder and field surveys for a set of indicator taxa based on biological criteria and practical considerations.

Given the vast extent of the DRC's natural ecosystems as well as operational constraints inherent to remote fieldwork, the program applied a step wise process to identify a set of potential areas for evaluation in the first phase of the program (Figure 3 and Map 2). The process integrated multiple types of existing conservation planning data, including the results of a priority-setting exercise conducted in 2007 on areas of interest for biodiversity conservation (Box 3).

Additional criteria, including logistical and security considerations, were evaluated in the final process to identify and prioritize the set of sites that were targeted for fieldwork in the first phase of PARAP. During the prioritization process, protected areas with no active partners on site and for which limited information was available were prioritized over protected areas with active partners on site.

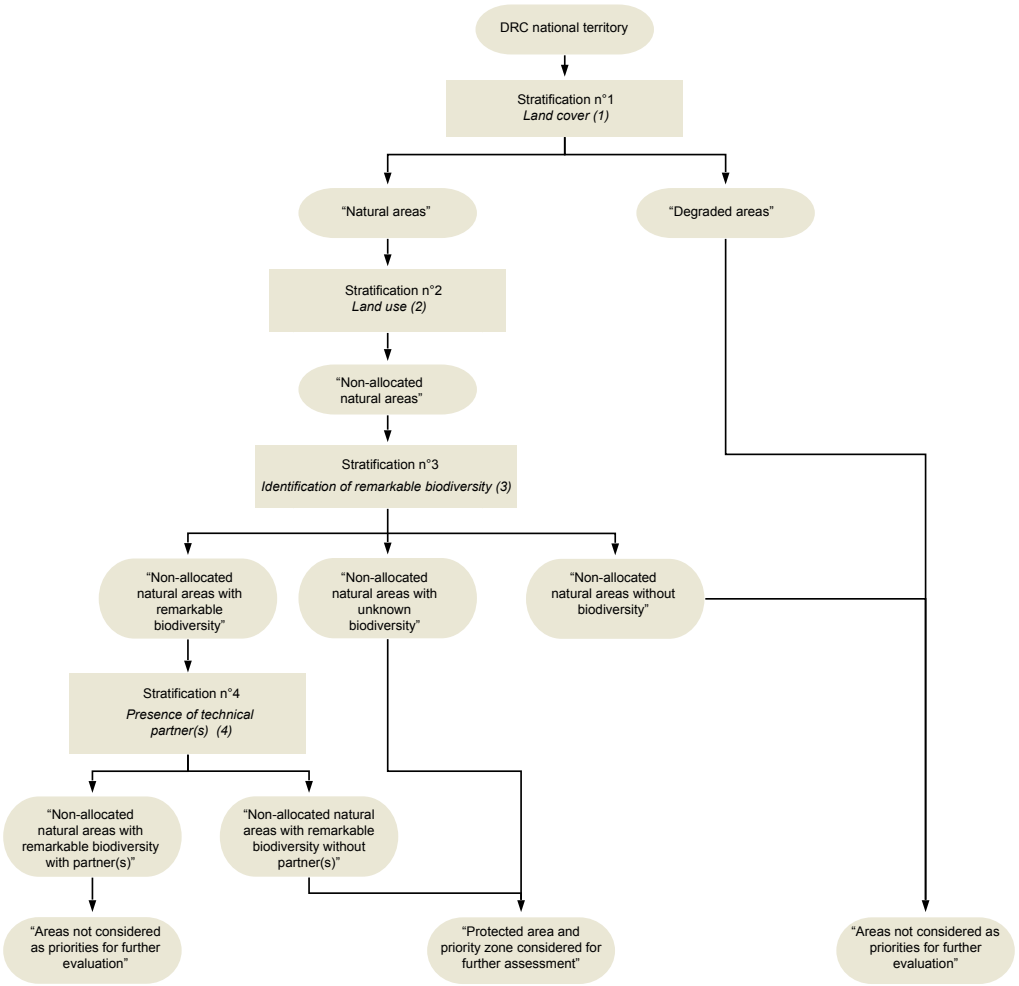
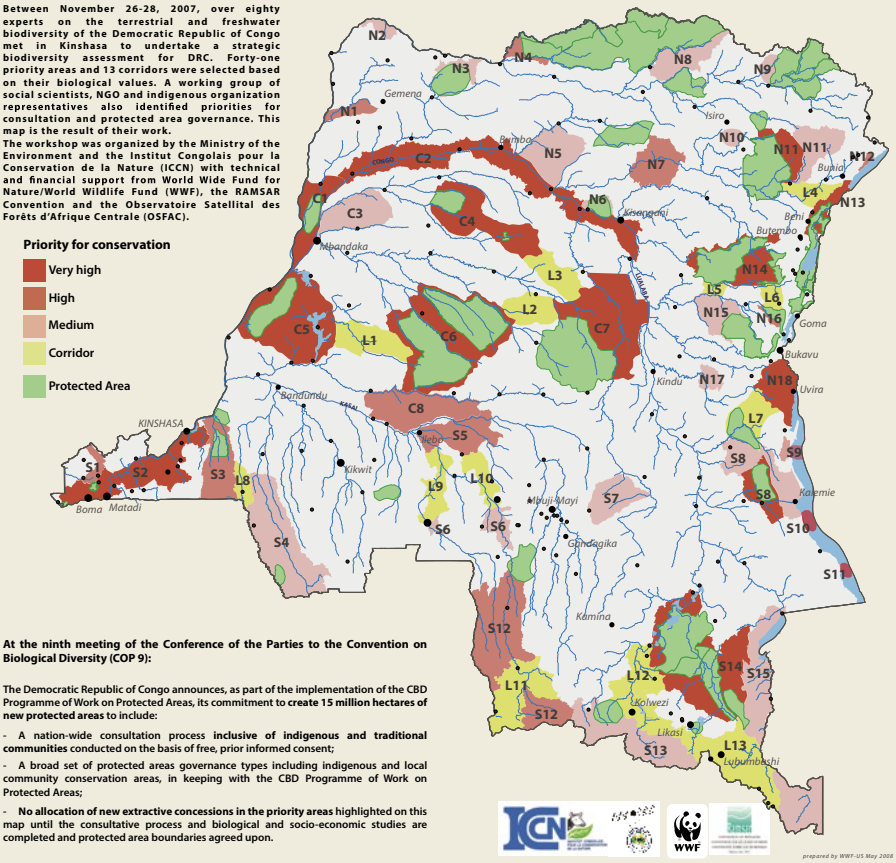


Figure 3
Identification of sites to be assessed
1. Latham, 2001; Verheggen and Defourny, 2010; Potapov et al., 2012. 2. WRI and MECNT, 2010; Data from CAMI and the RGC, 2012. 3. Kamdem-Toham et al., 2003; Demey & Louette, 2001; Stattersfield et al., 1998; Kamdem-Toham et al., 2009. 4. ICCN (pers. comm.).

Box 3. Priorites for biodiversity conservation identified in 2007

RESULTS OF THE NATIONAL STRATEGIC EVALUATION OF BIODIVERSITY IN THE DEMOCRATIC REPUBLIC OF CONGO

Between November 26-28, 2007, over eighty experts on the terrestrial and freshwater biodiversity of the Democratic Republic of Congo met in Kinshasa to undertake a strategic biodiversity assessment for DRC. Forty-one priority areas and 13 corridors were selected based on their biological values. A working group of social scientists, NGO and indigenous organization representatives also identified priorities for consultation and protected area governance. This map is the result of their work.
The workshop was organized by the Ministry of the Environment and the Institut Congolais pour la Conservation de la Nature (ICCN) with technical and financial support from World Wide Fund for Nature/World Wildlife Fund (WWF), the RAMSAR Convention and the Observatoire Satellital des Forêts d'Afrique Centrale (OSFAC).



At the ninth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 9):

The Democratic Republic of Congo announces, as part of the implementation of the CBD Programme of Work on Protected Areas, its commitment to create 15 million hectares of new protected areas to include:

- **A nation-wide consultation process inclusive of indigenous and traditional communities conducted on the basis of free, prior informed consent;**
- **A broad set of protected areas governance types including indigenous and local community conservation areas, in keeping with the CBD Programme of Work on Protected Areas;**
- **No allocation of new extractive concessions in the priority areas highlighted on this map until the consultative process and biological and socio-economic studies are completed and protected area boundaries agreed upon.**

North:
N1. Dongo-Mbanza
N2. Nord de Bosobolo
N3. Nord Businga
N4. Reserve de la Bomu/DRC Bili-Uélé
N5. Basoko-Aketi
N6. Yangambi
N7. Banalia entre Lindi et Aruwimi
N8. Ango (Bas Uélé)
N9. Dungu-Watsa Garamba
N10. Abiangama
N11. Mambasa-Wamba-Watsa
N12. Flanc du Lac Albert
N13. PN des Virungas et extension Mt. Hoyo
N14. Grand Maiko
N15. Extension PN de Kahuzi-Biega
N16. Foret de Bushema
N17. Maniema
N18. Itombwe

Central:
C1. Ngiri - Triangle
C2. Cours moyen du fleuve Congo et les îles
C3. Ikelemba-Bosomba-Lulonga
C4. Lomako-Wamba
C5. Hinterland Tumba-Mai Ndombe
C6. Salonga
C7. Sankuru-Lomami-Lualaba
C8. Lukenie-Kasai

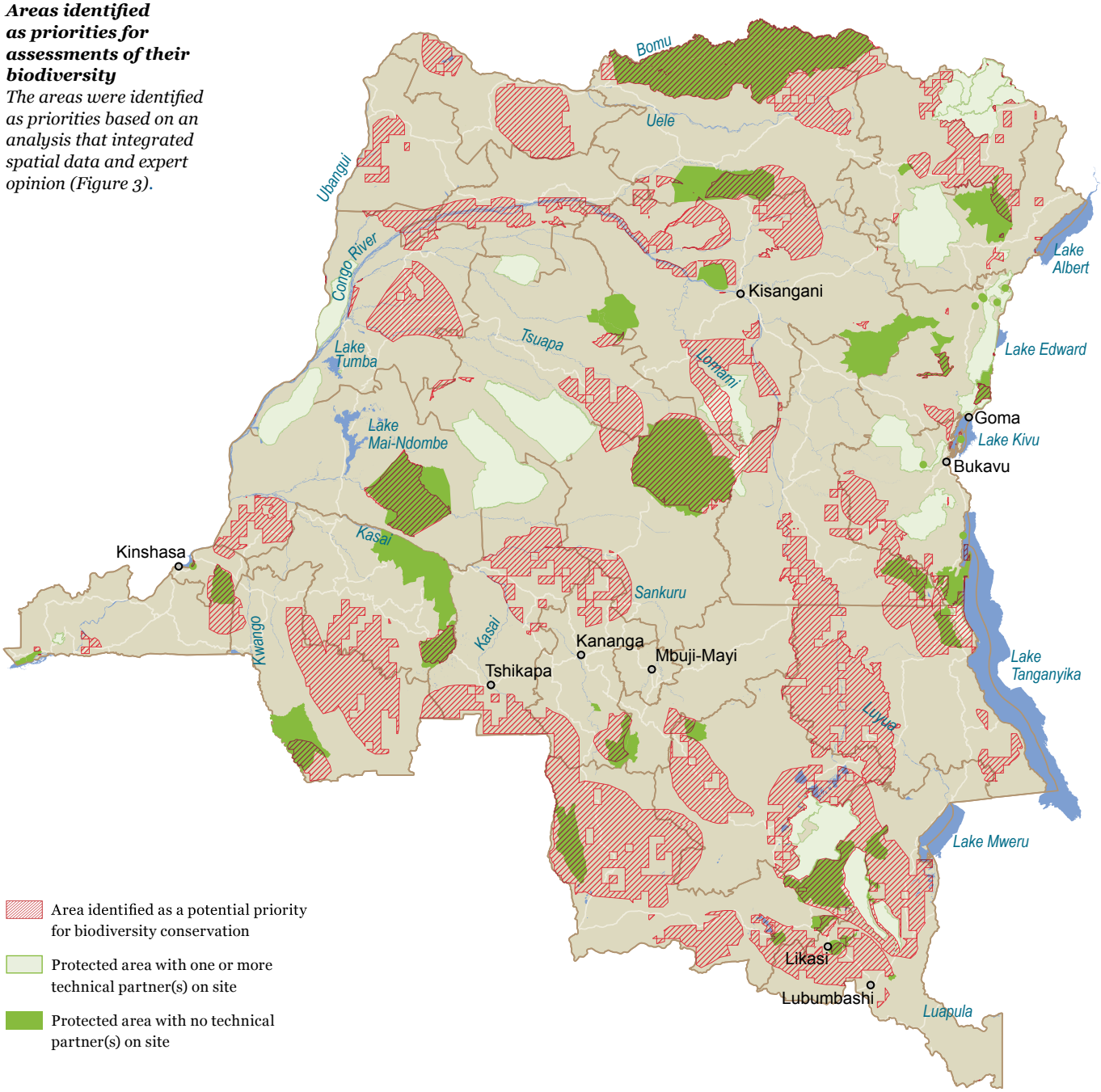
South:
S1. Forêt Maiombe
S2. Mangrove et Bas Congo Rapides et Pool Malebo
S3. Maimpili-Bombolumene
S4. Kwango-Wamba
S5. Moyen Kasai
S6. Rapides de Tshikapa et de Kananga
S7. Gefu
S8. Lukuga-Tanganyika
S9. Kabobo
S10. Lac Tanganyika Centre
S11. Lac Tanganyika Sud
S12. Haut Kasai
S13. Mustshatsha-Sakamia
S14. Upemba-Kundelungu
S15. Luapula-Mweru

Corridors:
L1. Tumba-Salonga
L2. Salonga-Sankuru
L3. Lomako-Wamba-Sankuru
L4. Mambasa-Virunga
L5. Maiko-Kahuzi-Biega
L6. Bushema-Maiko
L7. Tanganyika-Itombwe
L8. Popokabaka
L9. Tshikapa-Ilebo
L10. Kananga-Mweka
L11. Dilolo-Sandoa
L12. Bia Lualaba
L13. Lufira

prepared by WWF-US May 2008

Group of hammer headed fruit bats (Hypsignathus monstrosus), Parc national de la Salonga

Map 2
Areas identified as priorities for assessments of their biodiversity
The areas were identified as priorities based on an analysis that integrated spatial data and expert opinion (Figure 3).



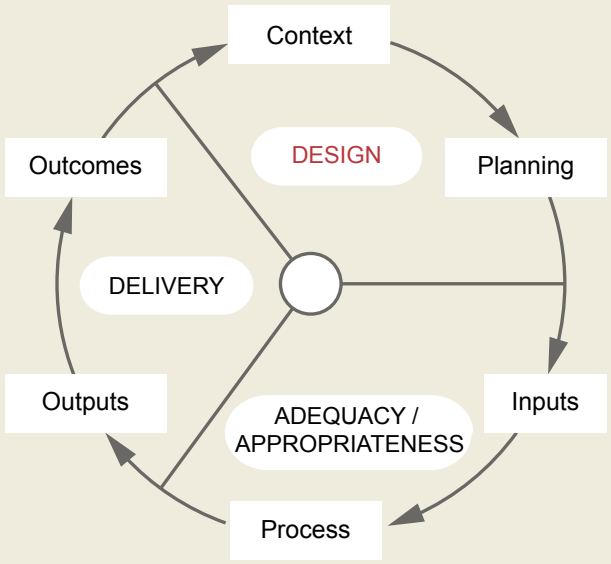
PARAP developed a tailored approach for the assessment of protected areas based on the key concept of design (Box 4). The vast majority of the DRC's protected areas were created decades ago. In most cases, the status of their characteristic biological values and associated threats as well as their social, economic and political context have evolved significantly. Additionally, it is important to note that the protected areas assessed by PARAP had very limited or no technical and financial resources. In most of these protected areas, the development of comprehensive management approaches has not been feasible, largely rendering a standard assessment of protected area management effectiveness meaningless. Consequently, the program focused instead on evaluating the design of these protected areas relative to their current context.

At the same time, recognizing that regular evaluations of management effectiveness[vi] remain critical to managing the protected area system overall, PARAP participated with ICCN in the development of the Integrated Management Effectiveness Tool (IMET) developed by IUCN and the Joint Research Center of the European Commission (JRC).

The process of evaluating the design of a protected area employed by PARAP was organized into two steps (Figure 4) and required significant data collection by teams in the field. At the end of the evaluation, priority action plans were developed with the aim of providing, where appropriate, practical and applicable solutions to improve the design of the protected area, a prerequisite for establishing effective management.

The management cycle of a protected area as defined by the WCPA/ IUCN (adapted from Hockings et al., 2006)
Hockings et al. (2006) group the elements of context and planning under the design component of the of the six-element management cycle for protected areas proposed by the World Commission on Protected Areas (WCPA) of the IUCN.

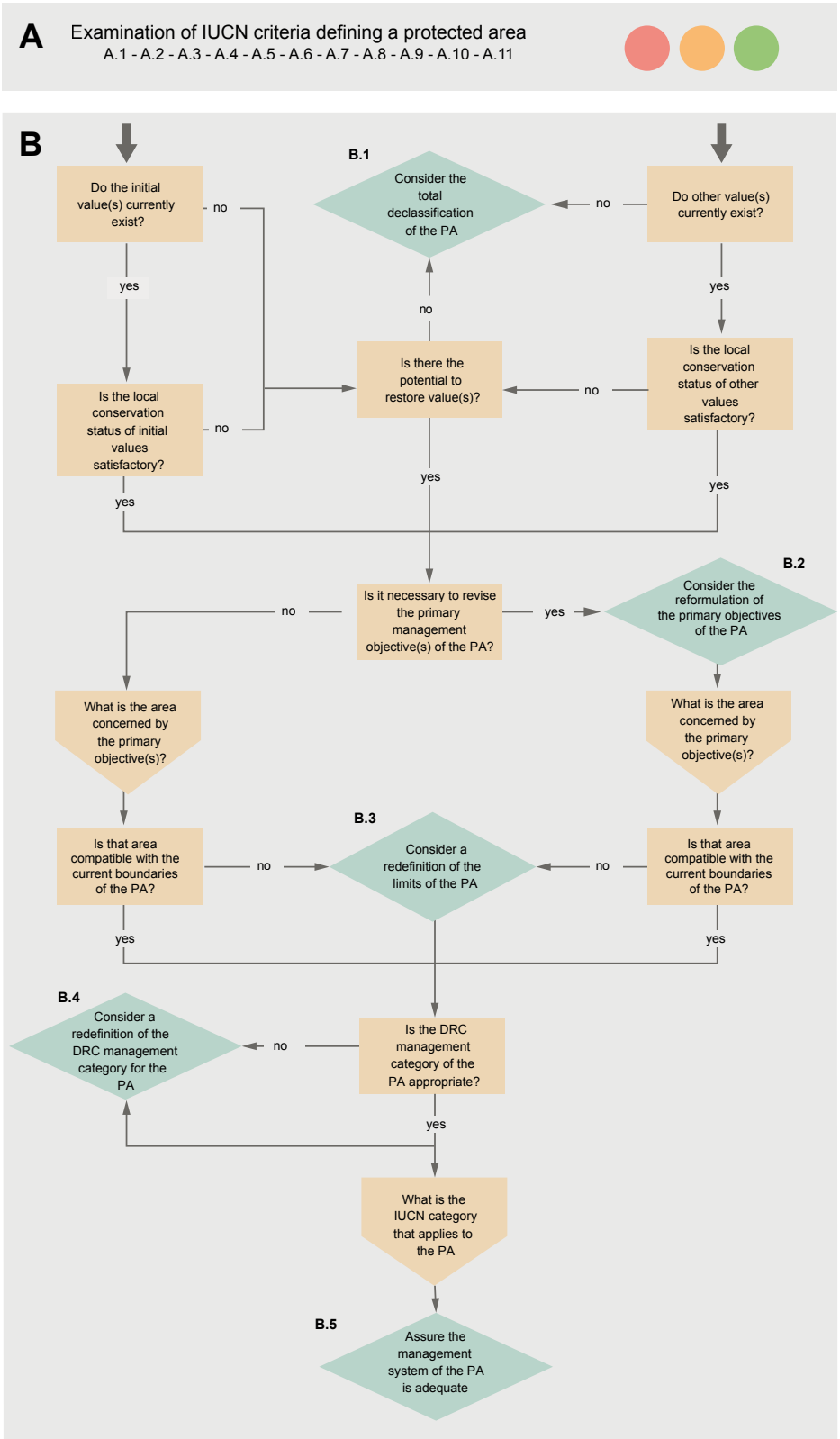
Box 4. The design of a protected area



- The context element of the management cycle focuses on the information that is necessary for planning and managing a protected area. Specifically it is concerned with understanding a protected area's values, the threats and opportunities it faces, how the management and political environment affect the protected area, and the motivations and aspirations of its stakeholders, notably local communities.
- The planning element addresses both the legal and spatial characteristics of the protected area, as well as its vision, goals, objectives and the strategies elaborated to conserve its values and manage threats.

Figure 4
The protected area design assessment process developed by PARAP

The process is designed to assess whether a protected area meets the eleven criteria listed in the definition of a protected area adopted by IUCN (Dudley, 2008) and the DRC (Chapter 4).



The data collection protocols employed by the program in priority areas for biodiversity conservation outside of the existing protected area system were adapted to assess in a standardized and systematic fashion the potential of the sites as regards the creation of protected areas.

The protected area system

Recognizing that the absence of reliable data on the configuration of the protected area system was a major constraint to its development and integration in national dialogues, the first phase of PARAP made a significant effort to produce up-to-date and accurate maps of individual protected areas and the protected area system. The program worked to gather, archive and subsequently analyze the legal texts designating protected areas in the DRC. Following this process, protected areas for which accurate limits were not available were systematically mapped to the extent possible using the best spatial and toponymic data available to the project.

Throughout the first phase of the program, efforts were also made to examine key cross-cutting issues affecting the protected area system of the DRC. Involving a large array of stakeholders, these studies aimed at gaining a better understanding of the role of protected areas and promoting their inclusion in national intersectoral dialogues. Climate change mitigation, freshwater biodiversity, interfaces with extractive industries and infrastructure, and decentralization were among the topics investigated.

Finally, the program developed a series of planning and management tools to support protected area planning and management, and organized multiple trainings to build the capacity of stakeholders at the level of the network.

Morning mist, Domaine et Réserve de Chasse de Swa-Kibula

Chapter 3
Understanding the challenges through site level assessments

In order to develop recommendations for the consolidation and expansion of the protected area system of the DRC, the program set up a team of multidisciplinary experts to evaluate a limited number of sites of importance for biodiversity conservation for which there was little or no information available. These sites included protected areas with no existing technical or financial partners, and often without an on-site management team. Based on the results of these field level assessments, the design of each protected area was evaluated.

A series of non-designated areas, or priority zones outside of the existing protected area system, were also assessed. Based on the findings of the program's field work, each priority zone's potential to contribute to the protected area system was analyzed.

Recognizing the immediate challenges facing each of the sites assessed by PARAP, action plans aimed at addressing the most pressing management issues were elaborated. The results of PARAP's field level assessments were then integrated with information gathered on other protected areas in order to inform an evaluation of the protected area system as a whole.

Overview of the sites assessed and the effort undertaken

Protected areas and priority zones to be assessed were selected based on the selection process described previously. They represent sites which were identified as having a potential to be important for biodiversity conservation and for which there was little or no current information available (Map 3 and Map 4). In order to take advantage of programmatic synergies, the program also worked to complete partial assessments (e.g., wildlife surveys) in a few additional sites which are priorities under WWF's broader protected area program. The effort allocated to undertake assessments in what were often remote, difficult areas to access was substantial (Figure 5).

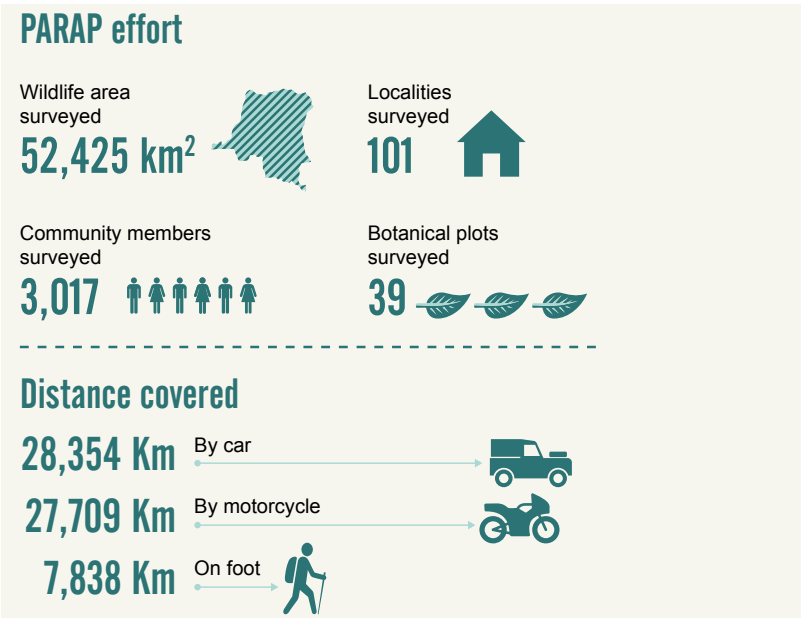
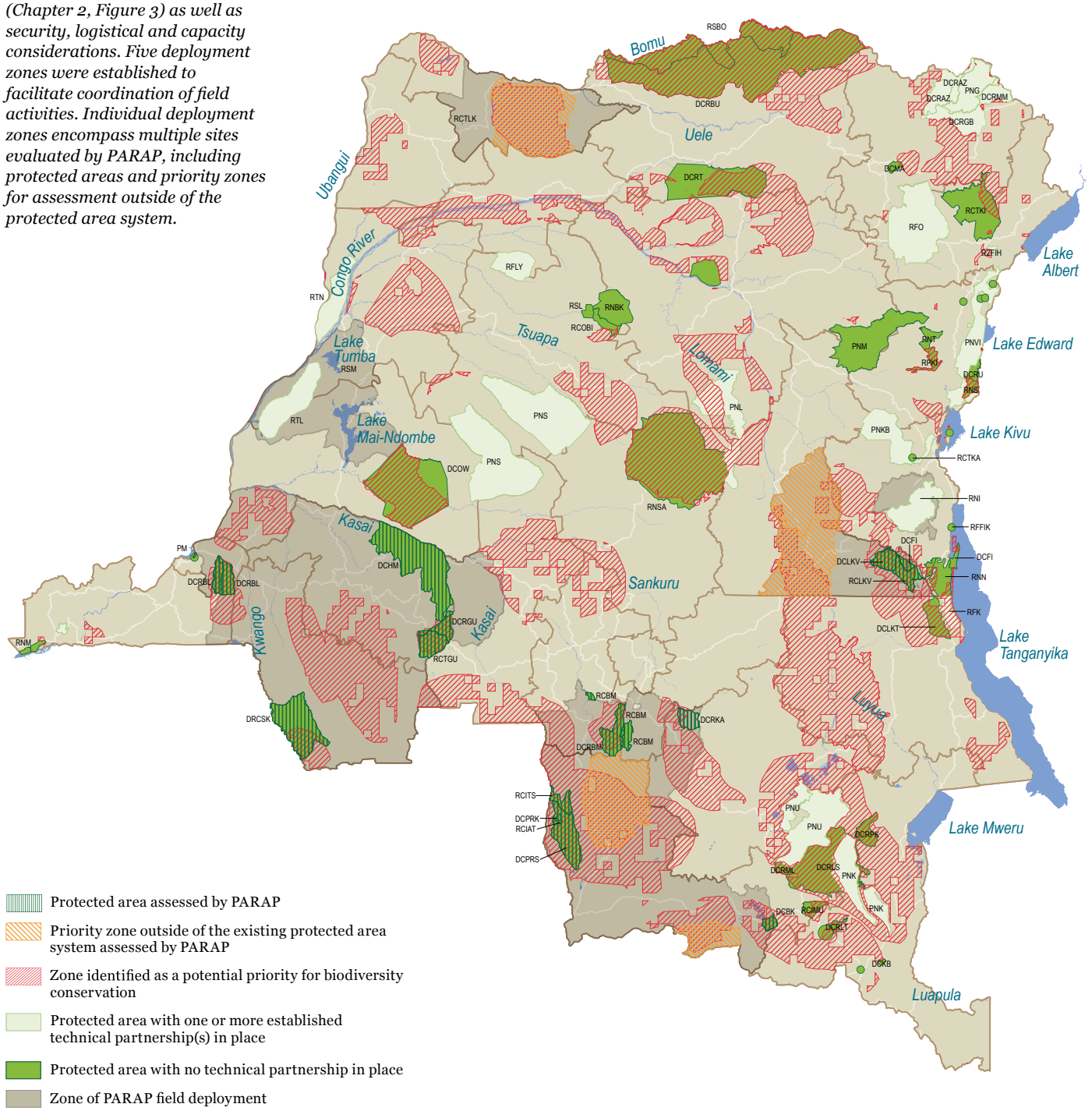


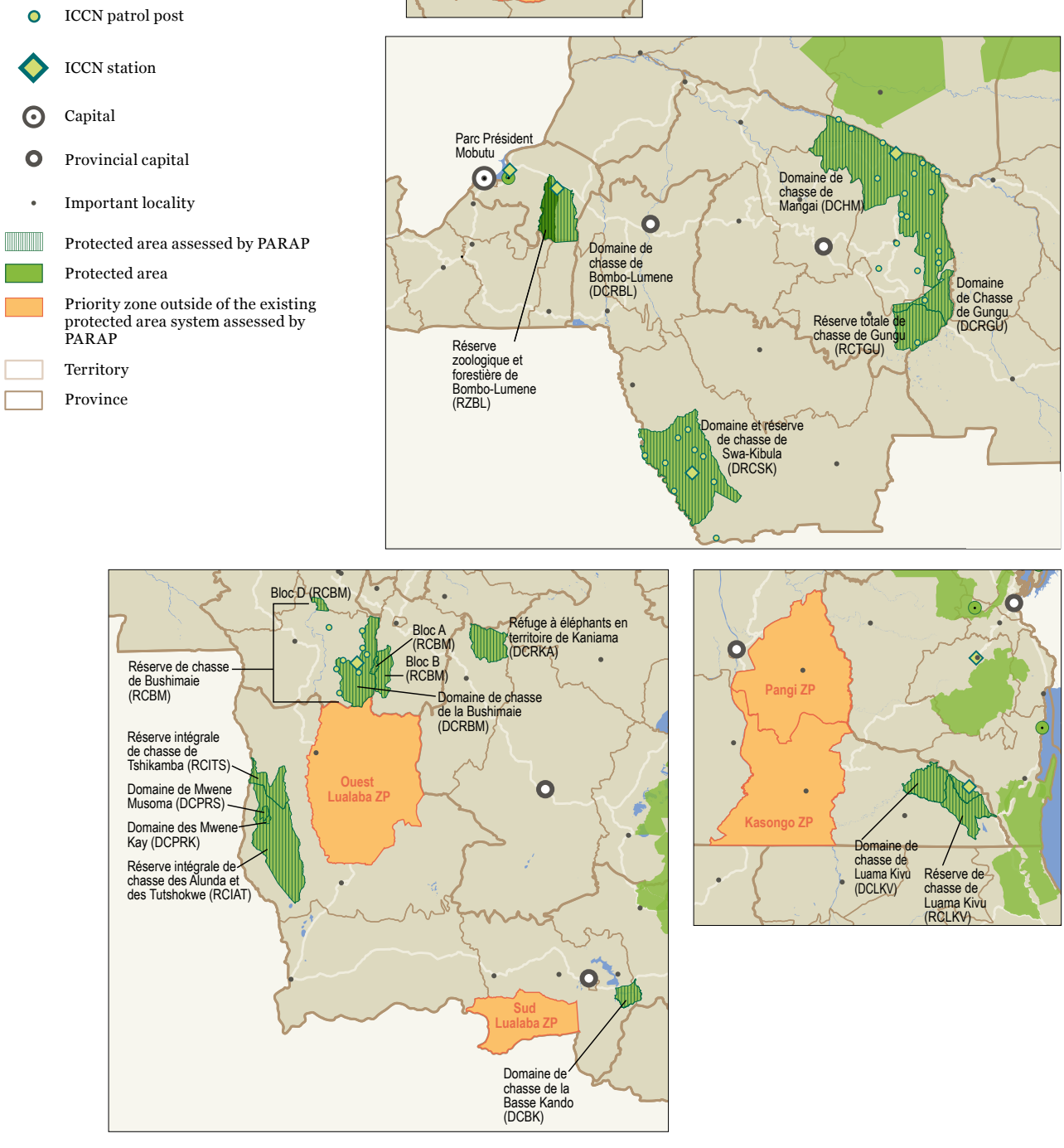
Figure 5
Effort mobilized by PARAP for site assessments

Map 3
Overview of sites assessed by PARAP
The sites selected for assessment during Phase 1 of PARAP were chosen based on the outputs of the stratification process (Chapter 2, Figure 3) as well as security, logistical and capacity considerations. Five deployment zones were established to facilitate coordination of field activities. Individual deployment zones encompass multiple sites evaluated by PARAP, including protected areas and priority zones for assessment outside of the protected area system.



- Protected area assessed by PARAP
- Priority zone outside of the existing protected area system assessed by PARAP
- Zone identified as a potential priority for biodiversity conservation
- Protected area with one or more established technical partnership(s) in place
- Protected area with no technical partnership in place
- Zone of PARAP field deployment

Map 4
Sites assessed by PARAP
The sites selected for evaluation, both protected areas and priority zones, are located within broader areas delineated based on a process of identification and prioritization.



Protected areas

Twenty protected areas were selected for assessment based on the program's stratification process, which aimed to identify important sites for biodiversity conservation for which little or no information is available (Table 1). These areas are located in eight provinces, all in the southern hemisphere. The main terrestrial ecoregions covered by the selected protected areas are the Western and Southern Congolian forest-savanna mosaic eco-regions and the Central Zambezian Miombo woodlands ecosystem. Nearly three-quarters of the protected areas were designated before the DRC's independence. Two protected areas, from among the five that were created after 1960, were designed on the basis of areas defined during the 1950s. More than half of the protected areas have had their classification modified since their respective designations. While the size of the areas is highly variable, ranging from a few thousand hectares to more than a million, two-thirds range between 100,000 and 500,000 hectares. Finally, 16 of the selected protected areas are part of six complexes made up of multiple proximate protected areas.

Priority zones

Five priority zones for biodiversity conservation were assessed by the program. The selection was based on the stratification process applied by the program.Their boundaries follow the delineation of territorial administrative entities. The five priority zones are located in three provinces: Nord-Ubangi, for the priority zone of the same name; Maniema, for the zones of Pangi and Kasongo; and Lualaba, for the zones called Ouest Lualaba and Sud Lualaba. The first two zones are characterized by the Northeastern Congolian forest ecoregion, the third and the fourth by the Southern Congolian forest-savanna mosaic ecoregion, and the fifth by the Central Zambezian Miombo woodlands ecoregion.

Justin Asimonyio of the PARAP team cataloguing botanical samples

Table 1
Overview of protected areas assessed by PARAP
Note: The Réserve de chasse de Bushimaie includes three distinct protected areas, which were created through different legal texts. They are called Bloc A, Bloc B and Bloc D by the team in place and are considered to be a single management unit. A fourth protected area, Bloc C, had its designation text repealed at the end of the 1950s (Decree No. 52/83 bis of April 18, 1958). To facilitate the presentation of results below, these three protected areas are treated as a single unit.

Protected area	PA code	Date of creation	Area (ha)	Province(s)	
Parc Président Mobutu	PM	1983	3,417	Kinshasa	
Domaine de chasse de Bombo-Lumene	DCRBL	1968	250,505	Kinshasa	
Réserve zoologique et forestière de la Bombo-Lumene	RZBL	1976	107,147	Kinshasa	
Domaine et réserve de chasse de Swa-Kibula	DRCSK	2006**	729,081	Kwango	
Domaine de chasse de Mangai	DCHM	1944	1,192,883	Kwilu	
Réserve à hippo-potames de Mangai	RCHM	1944	119,872	Kwilu	
Domaine de chasse de Gungu	DCRGU	1952	136,809	Kwilu	
Réserve totale de chasse de Gungu	RCTGU	1952	222,477	Kwilu	
Domaine de chasse de la Bushimaie	DCRBM	1958	264,417	Kasai Central	
Réserve de chasse de Bushimaie (Blocs A, B et D)	RCBM	1939 (Bloc A) 1947 (Bloc B) 1959 (Bloc D)	111,723	Kasai Central, Lomami	
Réserve intégrale de chasse des Alunda et des Tutshokwe	RCIAT	1954	450,648	Lualaba	
Réserve intégrale de chasse de Tshikamba	RCITS	1954	102,092	Lualaba	
Domaine des Mwene Kay	DCPRK	1954	5,083	Lualaba	
Domaine de Mwene Musoma	DCPRS	1954	12,111	Lualaba	
Refuge à éléphants en territoire de Kaniama	DCRKA	1959	137,774	Haut Lomami	
Domaine de chasse de la Basse Kando	DCBK	2006*	58,951	Kinshasa	
Domaine de chasse de Luama Kivu	DCLKV	1954	201,477	Maniema	
Réserve de chasse de Luama Kivu	RCLKV	1935	160,334	Maniema	

*A “réserve totale de chasse”, named the *Réserve totale de la Basse-Kando*, was created in 1957 within the same geographical area but for a duration limited to 5 years.
**A “réserve totale de chasse” and a “domaine de chasse”, respectively named the *Réserve totale de chasse de Swa-Kibula - Chutes* and the *Domaine de chasse réservée de l'entre Sefu-Kiongo*, were created in 1951 within the same geographical area. The associated legal texts were repealed in 2006 at the time of the creation of the DRCSK.
*** Non-matriculated agents.

	Legal text(s) available	Management category (as defined in legal text(s))	Presence of ICCN	Number of ICCN agents
	Ordonnance n° 83-110, 1983 *Arrêté n° 1.440-0000029-85, 1985*	*Réserve naturelle intégrale*	Yes	16
	Arrêté n° 07, 1968 *Arrêté n° 040, 1994*	*Domaine de chasse réservée*	Yes	26 (including the RZBL)
	Arrêté n° 00621, 1976	*Réserve zoologique et forestière*	Yes	26 (including the DCRBL)
	Arrêté n° 656, 1951 *Arrêté n° 658, 1951* *Arrêté n° 056, 2006*	*Domaine et réserve de chasse*	Yes	26 + 44***
	Arrêté n° 205, 1940 *Arrêté n° 414, 1944* *Arrêté n° 18, 1998*	*Domaine de chasse*	Yes	20 + 92*** (y compris RCHM, DCRGU et RCTGU)
	Arrêté n° 205, 1940 *Arrêté n° 414, 1944* *Arrêté n° 18, 1998*	*Réserve à hippopotames*	Yes	20 + 92*** (including the DCHM, DCRGU and RCTGU)
	Arrêté n° 52-326, 1952	*Domaine de chasse réservée*	Yes	20 + 92*** (including the RCHM, DCHM and RCTGU)
	Arrêté n° 52-327, 1952	*Réserve totale de chasse*	Yes	20 + 92*** (including the RCHM, DCHM and DCRGU)
	Arrêté n° 52-345, 1949 *Arrêté n° 52-83, 1958*	*Domaine de chasse réservée*	Yes	32 + 58*** (including the RCBM)
	Arrêté n° 243, 1939 *Arrêté n° 529, 1947* *Arrêté n° 552-2, 1959*	*Réserve de chasse*	Yes	32 + 58*** (including the DCRBM)
	Arrêté n° 52-35, 1954	*Réserve intégrale de chasse*	No	0
	Arrêté n° 52-34, 1954	*Réserve intégrale de chasse*	No	0
	Arrêté n° 52-37, 1954	*Domaine de chasse et de pêche réservées*	No	0
	Arrêté n° 52-37, 1955	*Domaine de chasse et de pêche réservées*	No	0
	Arrêté n° 552-50, 1959	*Domaine de chasse réservée*	No	0
	Arrêté n° 52-48, 1957 *Arrêté n° 055, 2006*	*Domaine de chasse*	Yes	10 + 20***
	Ordonnance n° 52-16, 1954 *Ordonnance n° 52-342, 1956*	*Domaine de chasse réservée*	Yes	6 + 36*** (including the RCLKV)
	Arrêté n° 39, 1935 *Arrêté n° 52-219, 1950* *Arrêté n° 52-22, 1954* *Arrêté n° 52-271, 1954*	*Réserve totale de chasse*	Yes	6 + 36*** (including the DCLKV)

Information signpost for the protected areas of Luama Kivu

ICCN office, Réserve de chasse de Rubi Télé

Results

Configuration and management

Most of the protected areas assessed by the program were created initially for the management of game species (Figure 6), and wildlife remains a key target even for those entities that were not designed around the management of hunting resources. The legal texts designating the twenty entities that were assessed reference ten different management categories (Figure 7), although some of the different categories have very similar frameworks for intervention. In terms of governance, the State has the power, authority, responsibility and accountability regarding all activities carried out in the context of managing the protected areas (Figure 7).

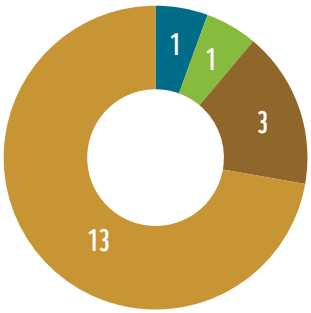
ICCN, the public agency overseeing the management of protected areas in the DRC, has management teams in place for over 70 % of the entities assessed (Figure 8). In many cases, staff numbers are limited and official staff are often supplemented by employees not officially registered by the public service. Generally, agents are poorly trained and equipment is insufficient or non-existent. The annual budgets allocated to the teams are extremely limited. They do not exceed a few thousand dollars and are mainly dedicated to the salaries of registered agents. None of the assessed protected areas had a management plan.

The protected areas evaluated are generally poorly known to the neighboring populations. Their limits are not demarcated, and applicable management regulations have not been systematically established. Some of the protected areas that do not currently have management teams in place were not even known to exist by resident or proximate populations. While local communities and stakeholders generally recognize the importance of conserving and sustainably managing natural resources, the relationships they maintain with protected area management teams are often fraught with distrust and misunderstanding.

The mapping undertaken by the program has significantly improved the knowledge of the boundaries of the protected areas assessed (Map 5 and Figure 9). This is an essential contribution to the potential improvement of their management. With this update, it is also possible to assess the extent of overlap between the protected areas and mining and forest concessions.

Ménard Mbende of the PARAP team collecting GPS points to map the boundaries of the protected areas of Luama Kivu

Figure 6
Conservation targets of protected areas assessed
The preponderance of wildlife and game resources in the conservation targets identified for the protected areas assessed is representative of the situation observed at the level of the protected area system as a whole.



Conservation targets of the protected areas assessed

- Fauna, flora, soil and water (1)
- Fauna and flora (1)
- Game species and fishing resources (3)
- Game species (13)

Figure 7
Management categories and governance types of protected areas assessed
The management categories considered are those that are defined in the legal texts designating the protected areas. All of the protected areas are characterized by a specific type of governance as defined by the CBD and IUCN: governance by government.

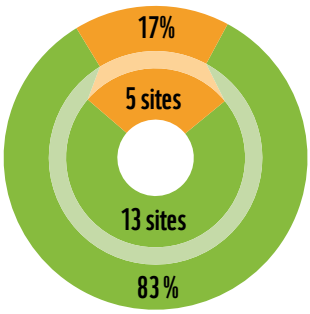
Type of governance

- Governance by the government (18)

Management category

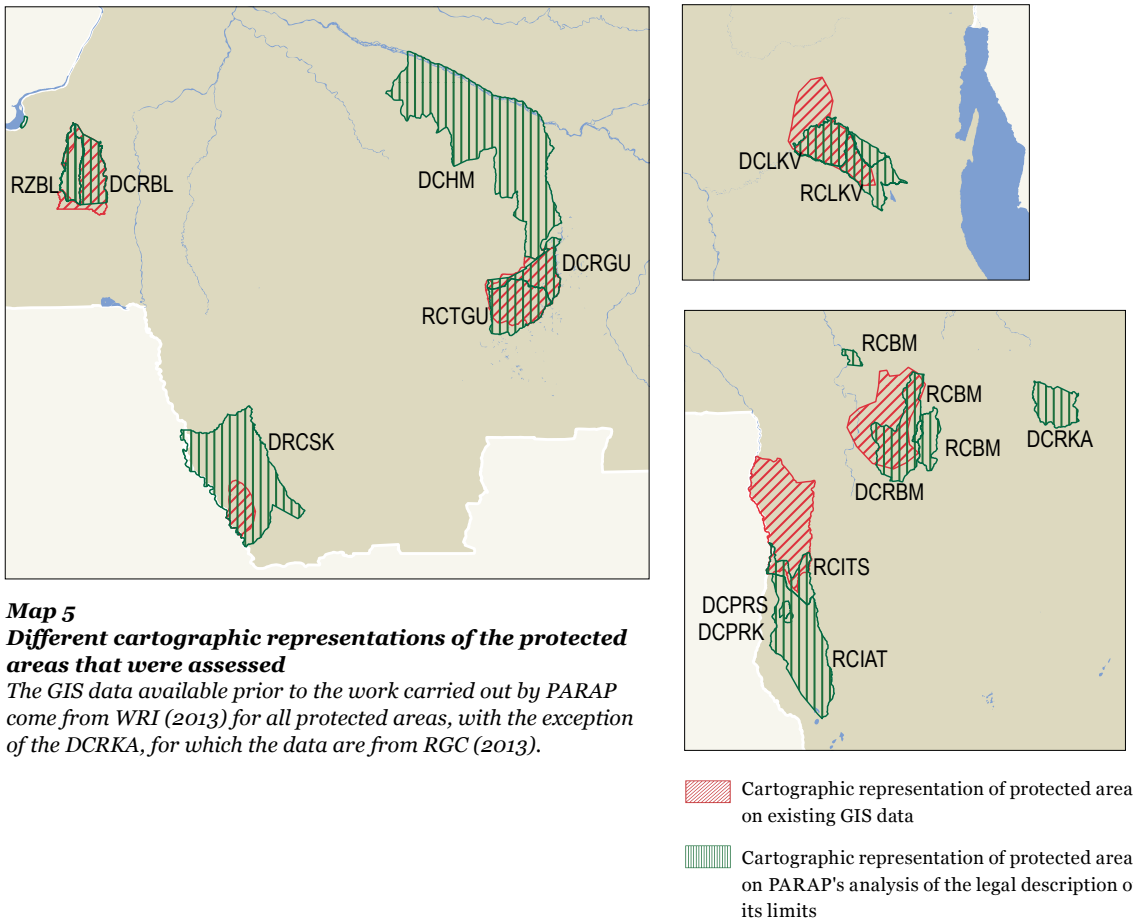
- *Réserve naturelle intégrale* (1)
- *Réserve zoologique et forestière* (1)
- *Réserve totale de chasse* (2)
- *Réserve intégrale de chasse* (2)
- *Réserve de chasse* (1)
- *Réserve à hippopotames* (1)
- *Domaine et réserve de chasse* (1)
- *Domaine de chasse réservée* (5)
- *Domaine de chasse et de pêche réservée* (2)
- *Domaine de chasse* (2)

Figure 8
ICCN presence at protected areas assessed
ICCN has management teams in 13 of the 18 protected areas that were assessed, covering more than 80 % of the total geographic area that was covered by the program's field level evaluations. These teams include 136 registered agents and 250 unregistered agents.



Presence of ICCN in the protected areas assessed

- ICCN present (13 sites/83 % area)
- ICCN not present (5 sites/17 % area)



Map 5
Different cartographic representations of the protected areas that were assessed
The GIS data available prior to the work carried out by PARAP come from WRI (2013) for all protected areas, with the exception of the DCRKA, for which the data are from RGC (2013).

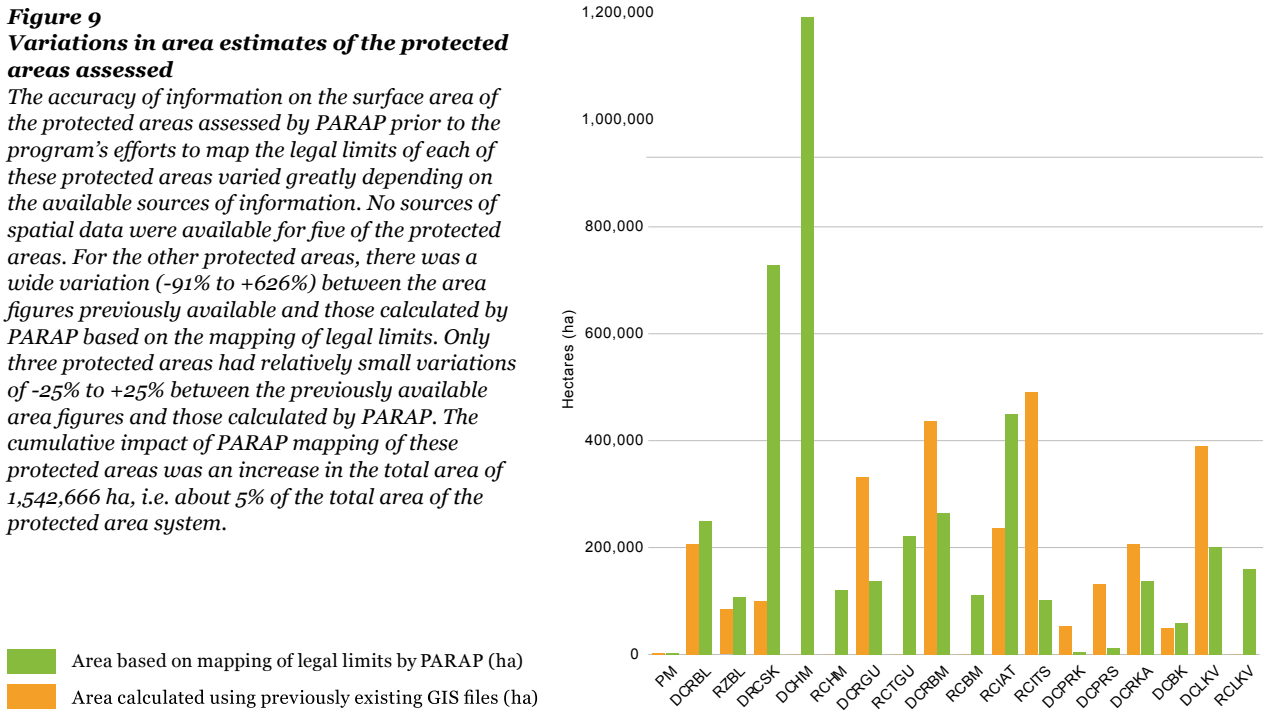


Figure 9
Variations in area estimates of the protected areas assessed
The accuracy of information on the surface area of the protected areas assessed by PARAP prior to the program's efforts to map the legal limits of each of these protected areas varied greatly depending on the available sources of information. No sources of spatial data were available for five of the protected areas. For the other protected areas, there was a wide variation (-91% to +626%) between the area figures previously available and those calculated by PARAP based on the mapping of legal limits. Only three protected areas had relatively small variations of -25% to +25% between the previously available area figures and those calculated by PARAP. The cumulative impact of PARAP mapping of these protected areas was an increase in the total area of 1,542,666 ha, i.e. about 5% of the total area of the protected area system.

Collection of a botanical sample by René Lusabu Ngaka of the PARAP team

Giant elephant shrew (Rhynchocyon stuhlmanni) captured for consumption

Socioeconomic context

The demographic context of the sites assessed varies considerably (Map 6 and Figure 10). While most of the sites are located in rural areas, population densities vary substantially, ranging from the order of 15 inhabitants/km² to nearly 100 inhabitants/km². Large urban areas are also found within or near certain sites. Most notably, the entities located in Kinshasa Province are fully situated within a peri-urban or urban environment. Various-sized human settlements, in greater or lesser numbers, are established in almost all the protected areas that were assessed, with certain protected areas and their peripheral areas having several hundred thousand inhabitants.

Socioeconomic surveys were conducted in more than 100 localities within the assessed sites, with the participation of nearly 3,000 local stakeholders. Based on semi-structured interviews with diverse groups, the surveys aimed to improve understanding of the interactions between the local communities and biodiversity and natural resources, as well as of the elements and effectiveness of the existing natural resource management framework in each site, whether the site was classified as protected or not.

The results of the program's surveys show that different economic activities are practiced by the local populations at the various sites as part of their subsistence and income generation strategies. The exploitation of natural resources is a key component of these activities and the classification of a site as a protected area has no effect on the diversity of activities.

All of the households surveyed in each of the sites practice agriculture. Women were found to play an especially important role in this production sector.

Hunting and fishing practices vary among sites, mainly based on the state of wildlife and fishing resources. In some protected areas, men, women and youth played varied roles in these activities, with men and male youth being more heavily involved in hunting and women more often involved with fishing. In many cases, it was found that women play a significant role in the marketing of products.

Harvesting of non-timber products is common at many of the sites. It is conducted by both women and men, with some divisions of roles based on the targeted product.

Finally, mining is primarily, but not exclusively, practiced by men. This activity plays an important role in household economies in regions with mineral-rich soils.

Map 6
Localities of PARAP stakeholder surveys
Localities depicted are the sites of PARAP stakeholder surveys, with the number of participating stakeholders presented following the locality name. The sites are presented on the Global Human Settlement (GHS) Population Grid (JRC, 2015) which depicts the distribution and density of population in the DRC, expressed as the number of people per 250 m cell

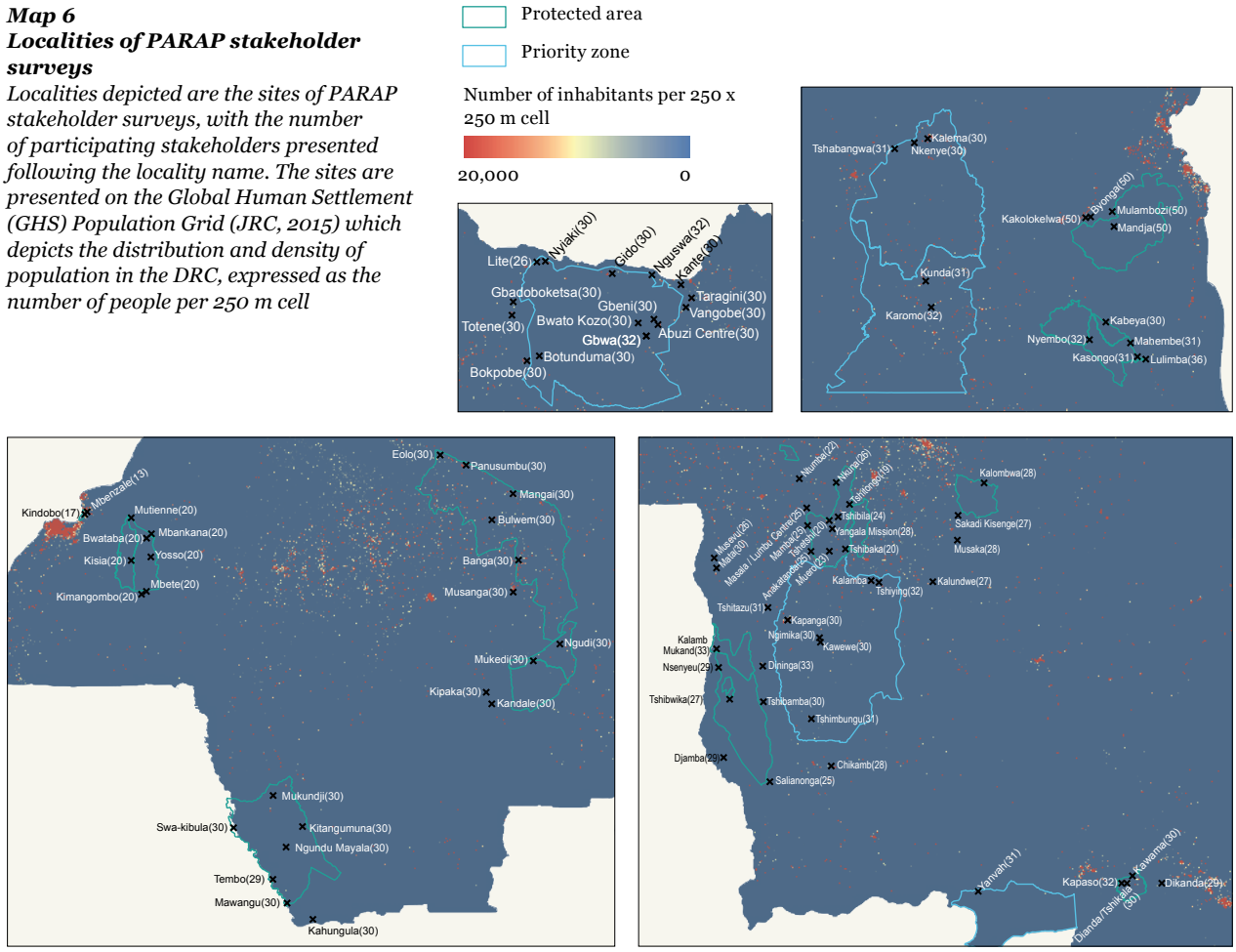
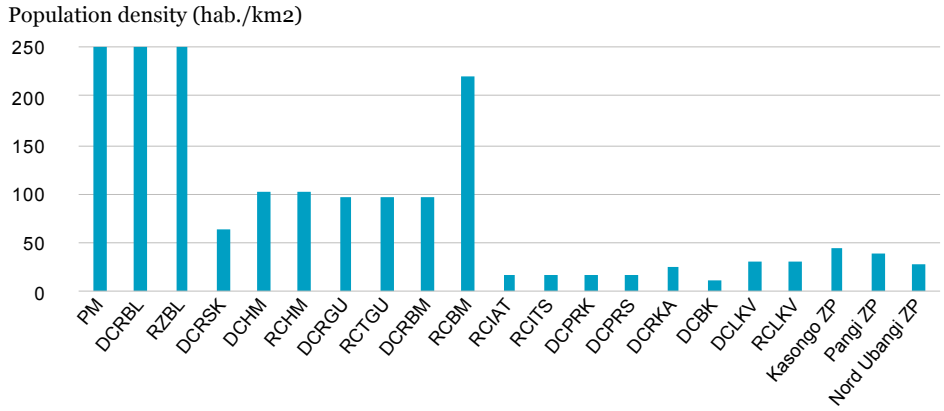


Figure 10
Demographic context of the sites assessed
The program used the data provided by the administration to characterize the demographic context of each of the sites evaluated. The average population density was estimated based on the demographic and geographic data for the relevant territories (i.e., decentralized territorial entities). It is therefore a rough estimate that does not take into account the spatial distribution of the population, especially within the sites and at their peripheries. Over 55% of the protected areas assessed by PARAP are located in relatively populated regions, with average densities greater than 100 inhabitants/km². The demographic conditions are more favorable for five protected areas, with average population densities in the range of 15 inhabitants/km² or less. Priority areas have average densities of between 25 and 50 inhabitants/km².



Agriculture

Agriculture is practiced in and around all the sites assessed by the program. While practicing agriculture is legally prohibited or strictly limited in various management categories of protected areas, including reserves and hunting areas, in practice, the development of agriculture in the protected areas assessed by the program is not regulated.

Agriculture is critical for food security and rural livelihoods. Food self-sufficiency is the primary objective pursued by households engaged in agriculture. For communities living along main roads or having access to markets, the sale of a greater or lesser part of their agricultural production supplements their income. Population growth contributes to the continuing expansion of agricultural activities, as documented during the program's field assessments.

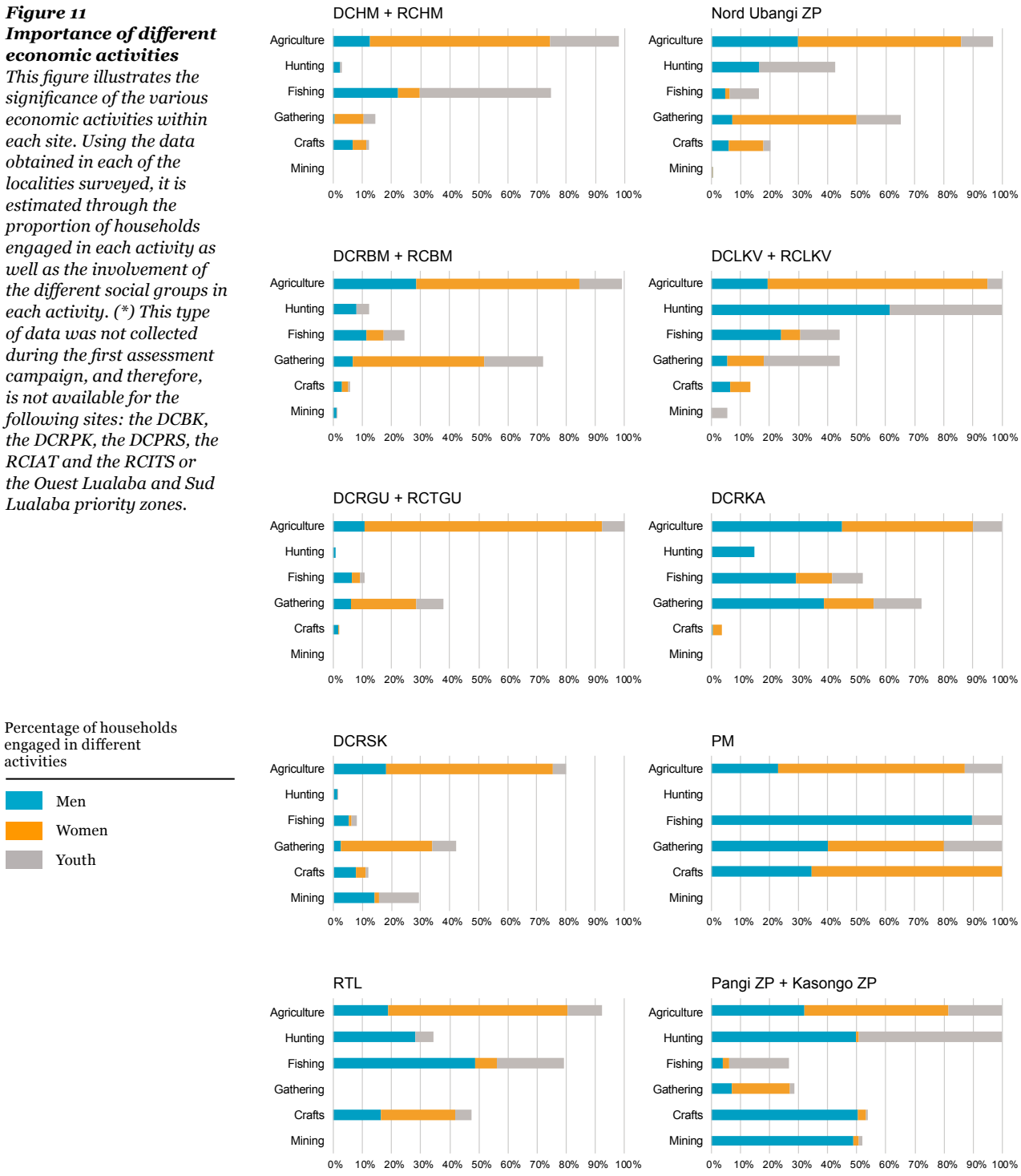
Agriculture is also a major driver of land conversion and forest fragmentation. The development of a mosaic of plant formations, including agricultural areas, fallow lands and more or less secondary formations, was observed on the outskirts of localities and along certain roads.

Slash and burn was found to be the most frequent agricultural practice within the sites evaluated; however, crops are also present in savannas or in lowlands. Irrigated cultivation was mainly observed in the sites assessed in Lualaba Province. Average annual production areas per household vary within and between sites, with a handful of crop species dominating the bulk of the production. The use of agricultural inputs was not observed and mechanization of cultivation work was only documented in a very few farms in protected areas on the outskirts of Kinshasa.

Human-wildlife conflicts were reported at some sites. Species such as elephants, hippopotamuses, Suidae or buffaloes can cause variable damage to crops. Finally, while small goat, sheep and poultry farming is widespread across all the sites assessed, cattle breeding was only observed in southwestern Bandundu and in Maniema.

Agriculture is an important management consideration for all the protected areas that were assessed by PARAP. Maintaining the status quo, which is characterized by a lack of regulation, threatens the sustainability of many of these areas. As such, it is necessary to identify conservation-relevant and socially acceptable mechanisms to effectively manage this activity. Developing appropriate and updated technical strategies to sustainably address this complex issue requires taking into consideration population growth and the aspirations of local communities as regards their economic development.

Figure 11
Importance of different economic activities
This figure illustrates the significance of the various economic activities within each site. Using the data obtained in each of the localities surveyed, it is estimated through the proportion of households engaged in each activity as well as the involvement of the different social groups in each activity. (*) This type of data was not collected during the first assessment campaign, and therefore, is not available for the following sites: the DCBK, the DCRPK, the DCPRS, the RCIAT and the RCITS or the Ouest Lualaba and Sud Lualaba priority zones.



Raptor captured for sale

Tools used for the extraction of minerals on sale in local market

Figure 12
Crop production at sites surveyed (% of households cultivating crop)
Almost all households across the sites assessed grow cassava, maize and peanuts. The diversification of complementary production is largely dependant on the soil characteristics, climate and commercial accessibility of the particular site.

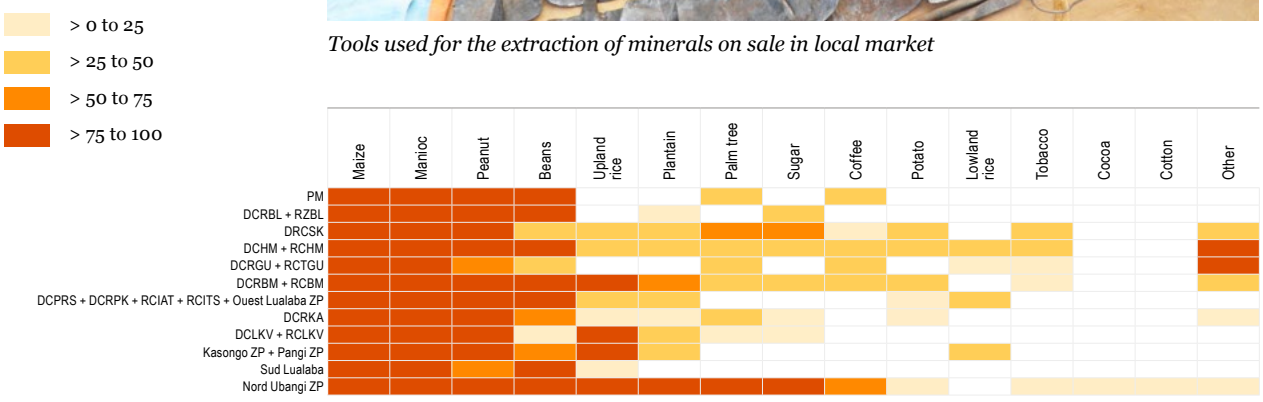
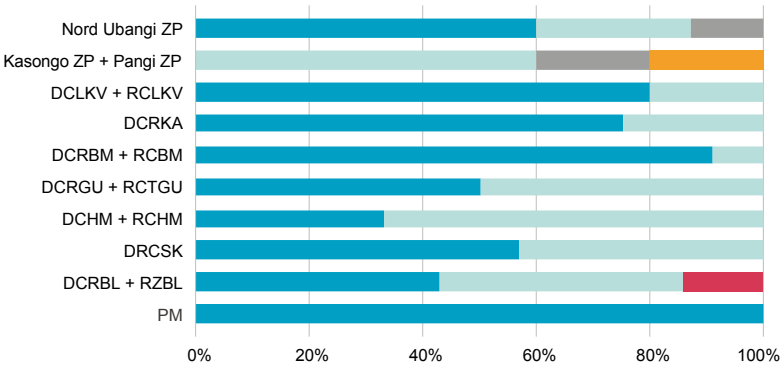
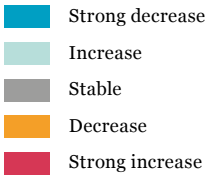


Figure 13
Average surface area cultivated by households in the different sites evaluated (% of survey participants citing the area class)



In most sites, a significant proportion of households annually cultivate an area of less than 0.5 ha. Households with cultivated plots exceeding 1.5 ha are largely in the minority or absent altogether.

Figure 14
Evolution of the average surface area cultivated by the households in the various sites (% of the localities surveyed citing the trend)



In nearly 75 % of the surveyed localities, the area cultivated per household is increasing or sharply increasing. While 20 % of localities reported that this area is decreasing. The localities reporting a decreasing trend were often characterized by particular socio-economic dynamics. For example, localities where there has been a phenomena of agricultural abandonment following the development of small-scale mining.

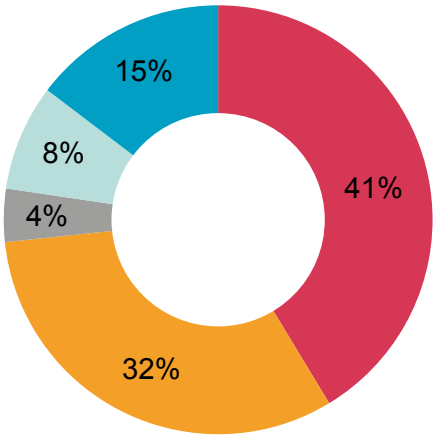
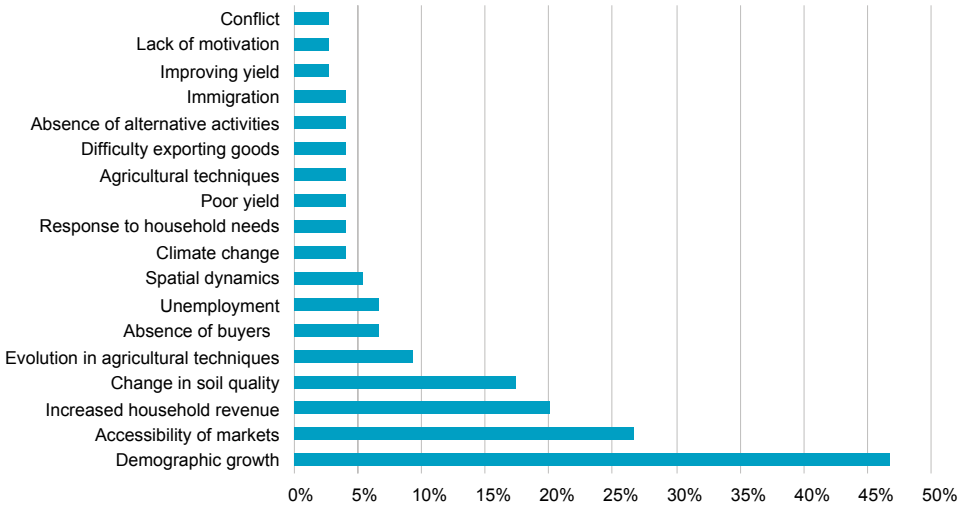


Figure 15
Drivers of changes in average surface area cultivated by households (% of the surveyed localities citing the driver)
In nearly half of the areas visited, population growth is one of the drivers of change in the average area being cultivated annually by households. Commercial opportunities, income generation, intrinsically linked drivers and the degradation of soil quality were also reported by more than 10% of the surveyed localities.



Hunting

Hunting is a key activity in rural areas, practiced in the priority zones as well as in all of the protected areas assessed. This is true despite the fact that hunting is legally prohibited in the protected areas. Local communities are rarely aware of hunting regulations and most regulations are not systematically enforced, although local protected area management teams at some sites intervene occasionally to limit hunting. The transportation of bushmeat is the subject of more frequent controls and can result in a fine for the offenders.

Bushmeat was reported as an important source of animal protein by local communities and bushmeat trade contributes to household incomes in some sites.

Population growth has led to an increase in pressure on wildlife resources from hunting. Periods of political unrest have also been closely associated with destructive wildlife exploitation. As a result, there have been significant changes in the distribution and strong declines in the abundance of many target species over the past decades, with numerous species becoming locally extirpated.

The use of firearms, be they homemade, manufactured or occasionally weapons of war, is widespread at all of the sites assessed. Snares made of synthetic fibers are also very common. Traditional rules pertaining to access to hunting areas and hunting quotas are mostly unheeded at this point.

The definition and enforcement of knowledge-based hunting regulations that promote sustainable wildlife management and appropriate practices is a high priority outside of protected areas. As regards managing this issue in protected areas, additional resources are required to increase surveillance and develop economic alternatives to hunting. Certain protected areas may also need to consider how hunting regulations can be adapted to achieve conservation objectives while also taking into consideration the local socioeconomic context. It should also be noted that some flagship species are still present in some of the sites assessed thanks in large part to the protection efforts by local communities.

As a whole, the assessments conducted by the program point to the importance of addressing the practices of uncontrolled and often illegal hunting, and illustrate how these issues continue to put at risk the survival of numerous species of large mammals.

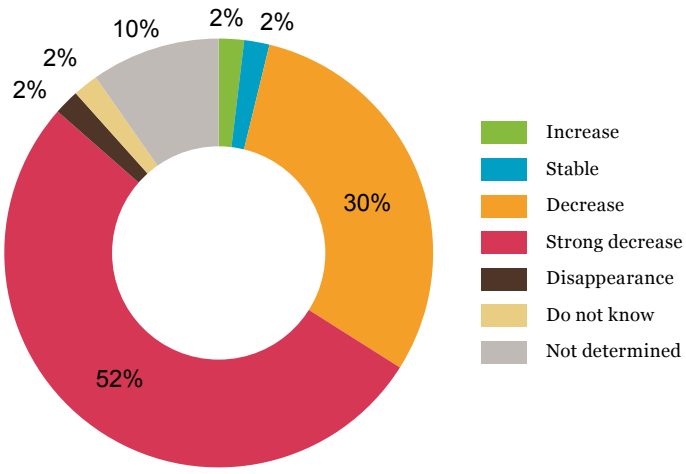
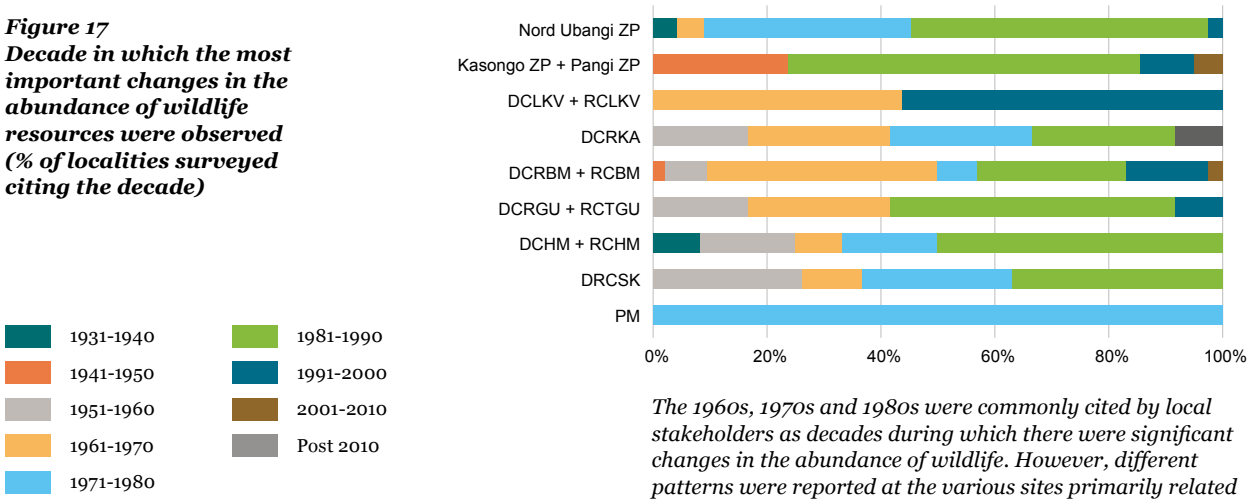


Figure 16
Evolution of wildlife resources according to local stakeholders (% of localities surveyed citing the trend)
Wildlife trends in nearly 85% of the localities surveyed are characterized by a decrease, strong decrease or even a complete loss of many mammal species. Only 2% of localities reported any increase in wildlife. These were very localized situations where there has been an occasional reappearance of individuals of one or more mammal species.

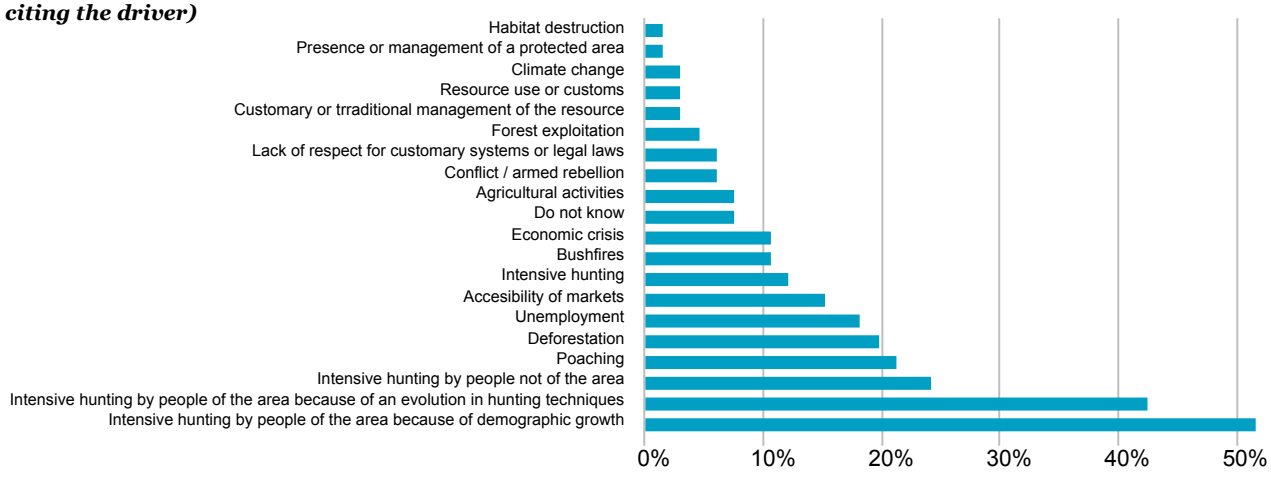
Figure 17
Decade in which the most important changes in the abundance of wildlife resources were observed (% of localities surveyed citing the decade)



The 1960s, 1970s and 1980s were commonly cited by local stakeholders as decades during which there were significant changes in the abundance of wildlife. However, different patterns were reported at the various sites primarily related to the site's particular socio-economic dynamic and the impacts of broader conflicts on the site.

Figure 18
Drivers of change in the abundance of wildlife resources (% of localities surveyed citing the driver)

Intensive hunting is the main cause of wildlife depletion. Catalyzed by population growth and change in practices, hunting is a poorly regulated practice.



Traps, Domaine des Mwene Kay

Trap, Domaine et réserve de chasse de Swa-Kibula

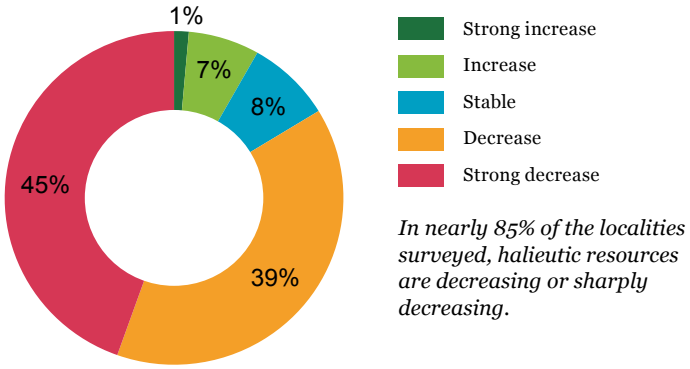
Fishing

Fishing is a key activity for some communities to ensure food security and support their livelihoods. Fishing regulations are not well defined at the sites that were assessed, although fishing is prohibited in some rivers in certain protected areas. No measures to regulate fishing or manage fishing resources were observed at the sites assessed by PARAP.

Trends in fishing practices were similar to those recorded for hunting. Changing practices, including the application of a wide spectrum of equipment and techniques, and population growth have resulted in an intensification of harvesting. Certain fish species are now rare while others have been locally extirpated.

The organization and sustainable management of fishing resources in the DRC, in and outside of most protected areas, is a major task that will require considerable resources to advance. While there have been efforts to work on this issue in some other protected areas that benefit from more technical and financial resources (e.g., *Parc national des Virunga*), there is still an immense amount of work to be done. Appropriate and gradual approaches aimed at assuring the sustainable management of this resource in alignment with the objectives of the protected area system need to be developed and tested.

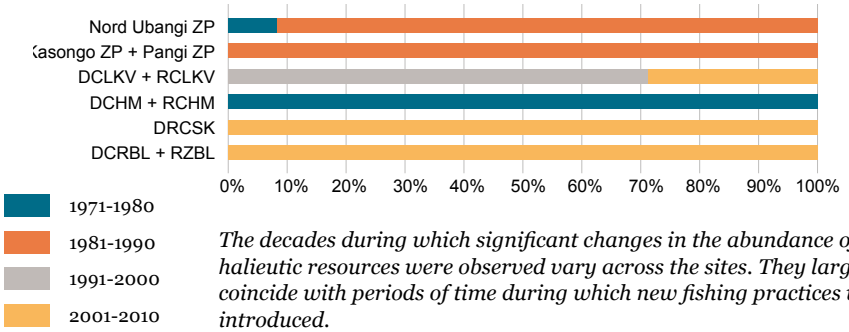
Figure 19
Evolution of fishing resources according to local stakeholders (% of localities surveyed citing the trend)



In nearly 85% of the localities surveyed, halieutic resources are decreasing or sharply decreasing.

Dried fish for sale in local market, Maniema

Figure 20
Decade in which the most important changes in the abundance of fishing resources were observed (% of localities surveyed citing the decade)



The decades during which significant changes in the abundance of halieutic resources were observed vary across the sites. They largely coincide with periods of time during which new fishing practices were introduced.

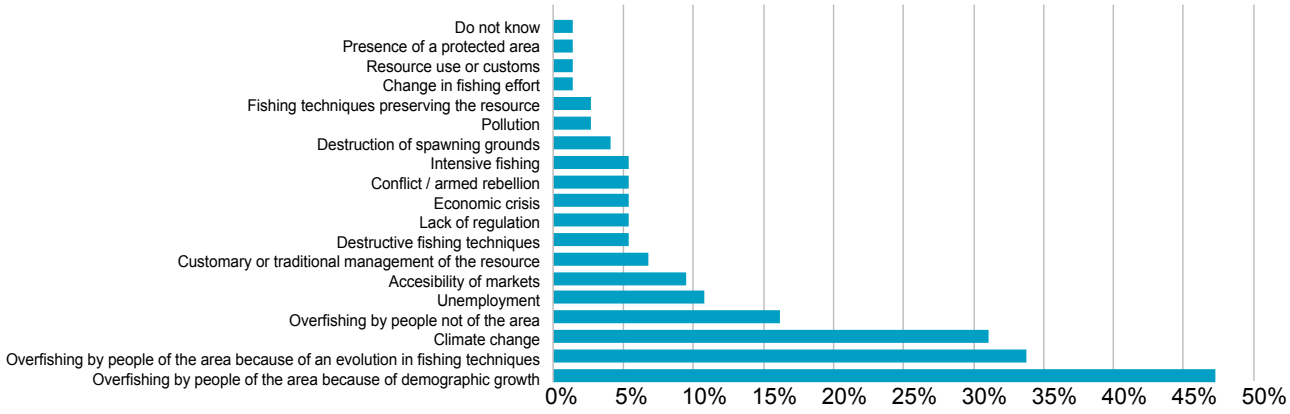


Figure 21
Drivers of change in the abundance of fishing resources (% of localities surveyed citing the driver)
Intensive fishing, driven by human population growth and changes in fishing practices, was the primary explanation cited by local stakeholders for decreasing fish stocks.

Images from a fish market, Maniema

Vegetation and flora

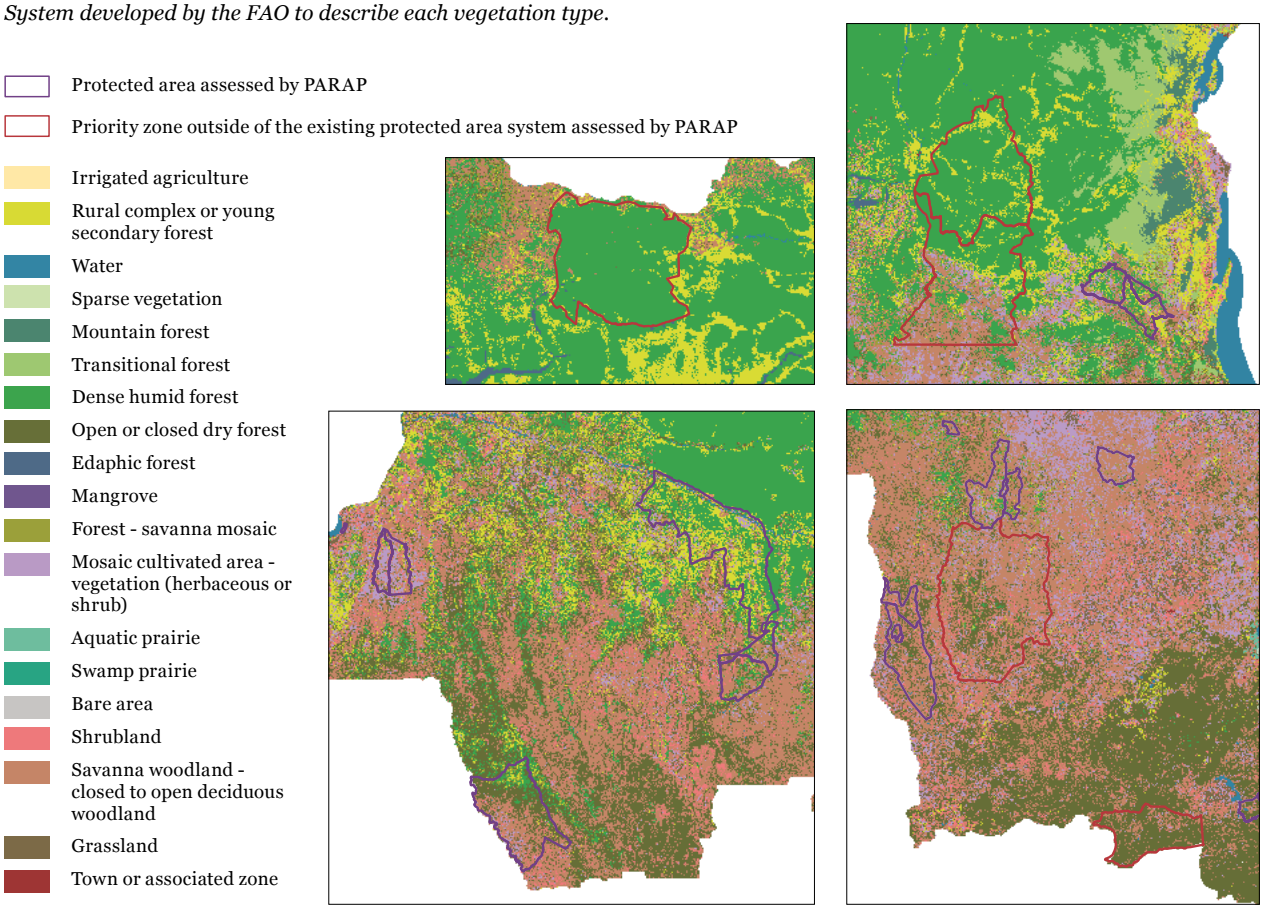
The protected areas assessed are mostly covered by more or less wooded savannas, while dense humid forest was more prominent in the priority zones (Map 7 and Figures 22 and 23). Anthropogenic formations such as rural complex or mosaics of cultivated areas also cover significant portions of some of these sites.

Deforestation rates over the period 2000-2015 vary significantly across the protected areas assessed, with approximately 70% of the entities having a rate of forest loss 3 to 30 times lower than the rate observed for the protected area with the highest rate of forest loss. In three protected areas, the rate of deforestation approached or exceeded 5% of their respective surface area.

Agriculture, fuelwood and, to a lesser extent, timber exploitation are the main drivers of deforestation. Few measures have been taken in the protected areas assessed to limit deforestation and none were observed in priority zones.

The botanical inventories conducted by the program improved the knowledge of the structure and composition of the main vegetation formations in the sites studied. They also contributed to the design of a national forest carbon map for the DRC.

Map 7
Land cover of sites assessed by PARAP
Data on land cover is from a 300 m vegetation map produced by Verhegghen and Defourny (2010). The authors used the standardized Land Cover Classification System developed by the FAO to describe each vegetation type.



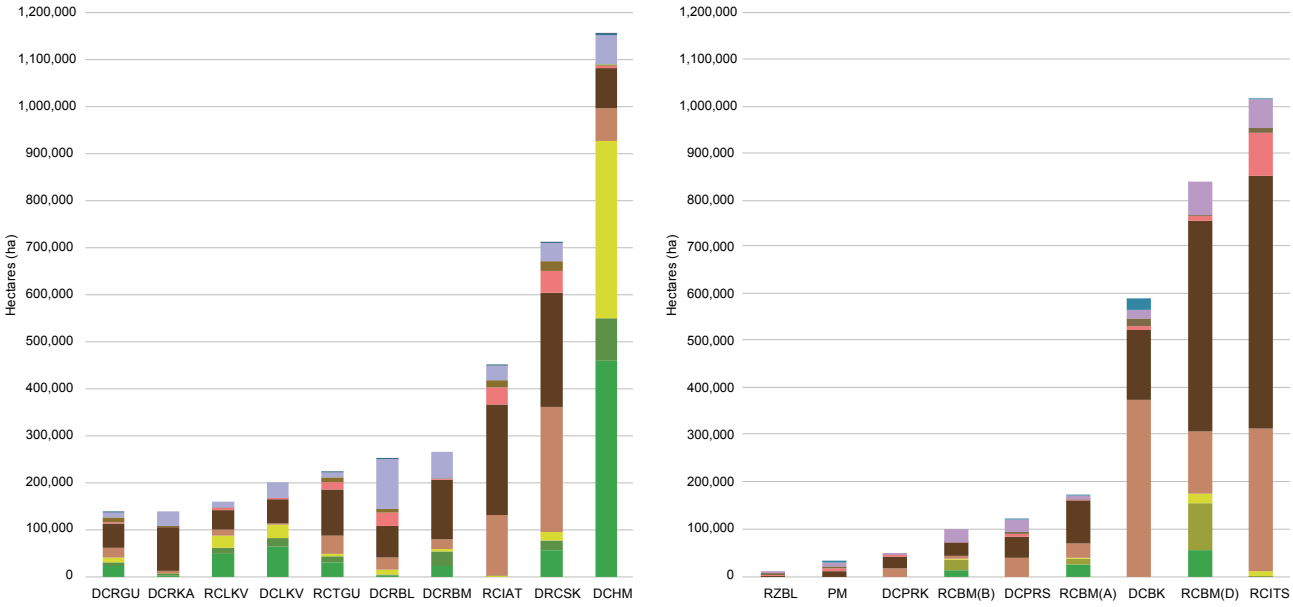


Figure 22
Land cover of the protected areas assessed by PARAP (number of hectares per class)

Data on land cover is from a 300 m vegetation map produced by Verhegghen and Defourny (2010). The authors used the standardized Land Cover Classification System developed by the FAO to describe each vegetation type.

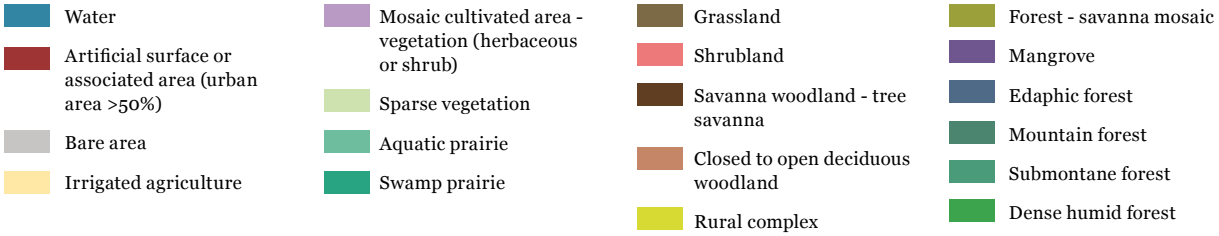
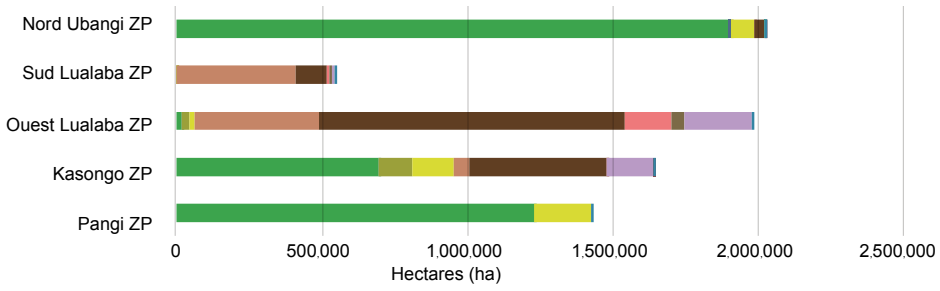


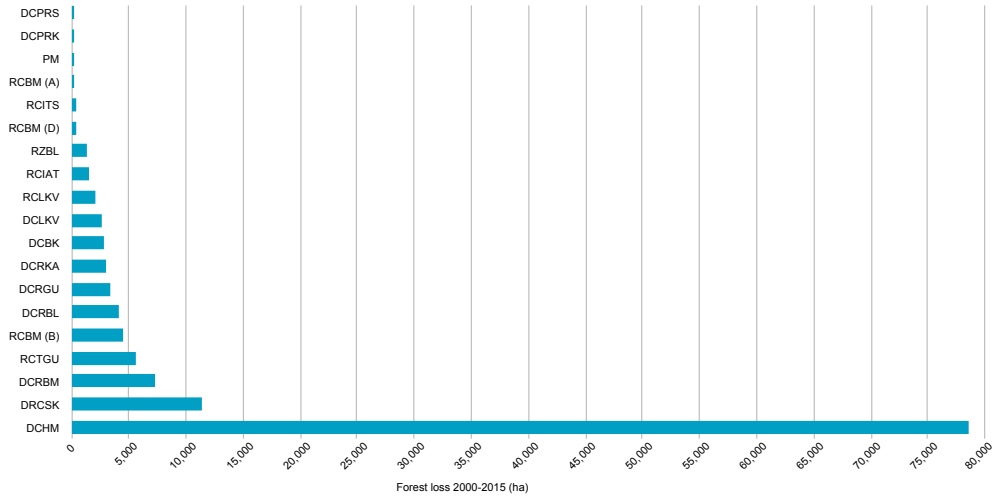
Figure 23
Land cover of the priority zones assessed by PARAP (number of hectares per class)
Data on land cover is from a 300 m vegetation map produced by Verhegghen and Defourny (2010). The authors used the standardized Land Cover Classification System developed by the FAO to describe each vegetation type.



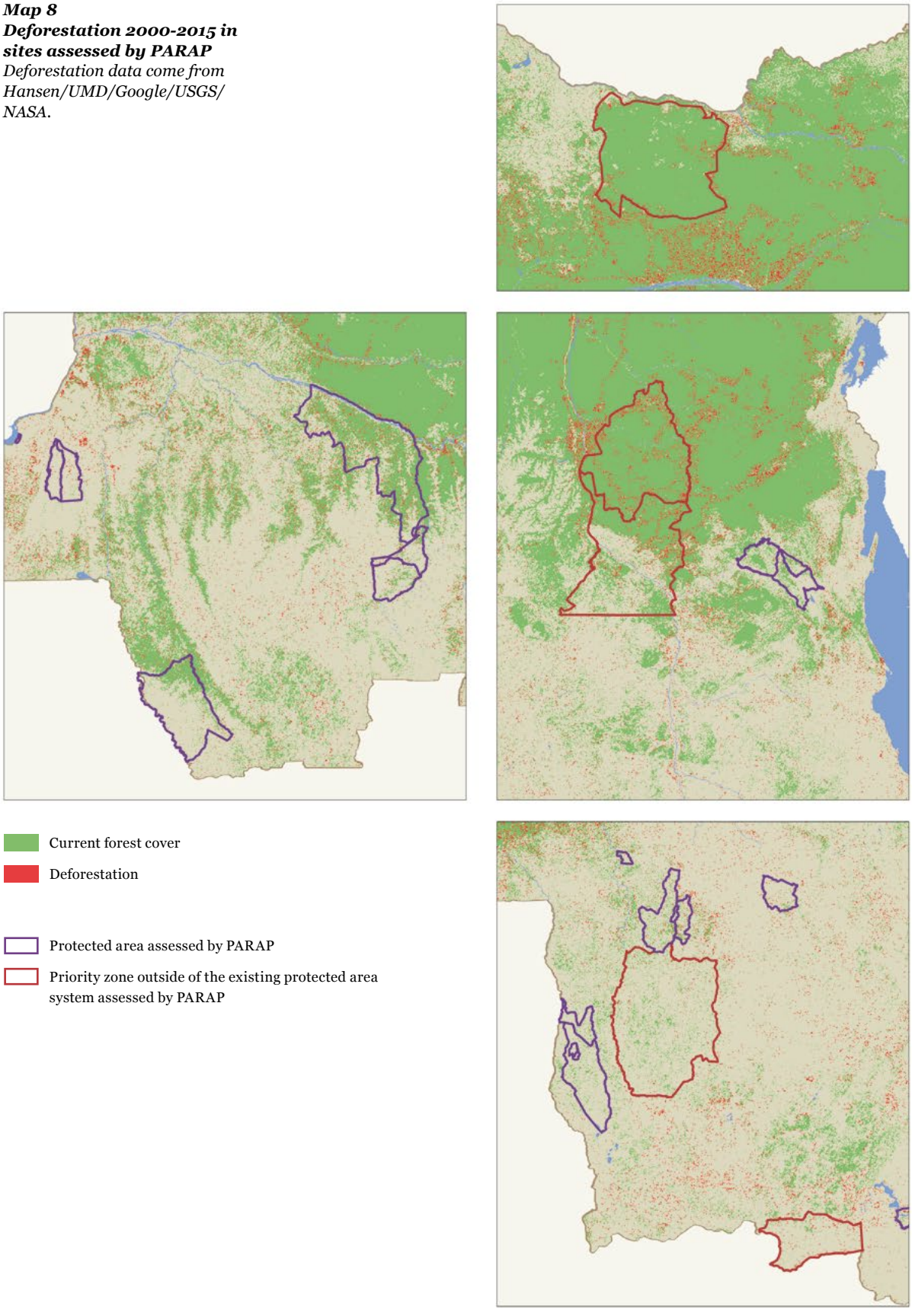
Dynamics of deforestation

Morning mist, Domaine et réserve de chasse de Swa-Kibula

Figure 24
Forest loss 2000-2015 (% of the total surface area)
Estimated areas of deforestation were produced using data from Global Forest Change (Hanson et al., 2013).



Map 8
Deforestation 2000-2015 in sites assessed by PARAP
Deforestation data come from Hansen/UMD/Google/USGS/ NASA.



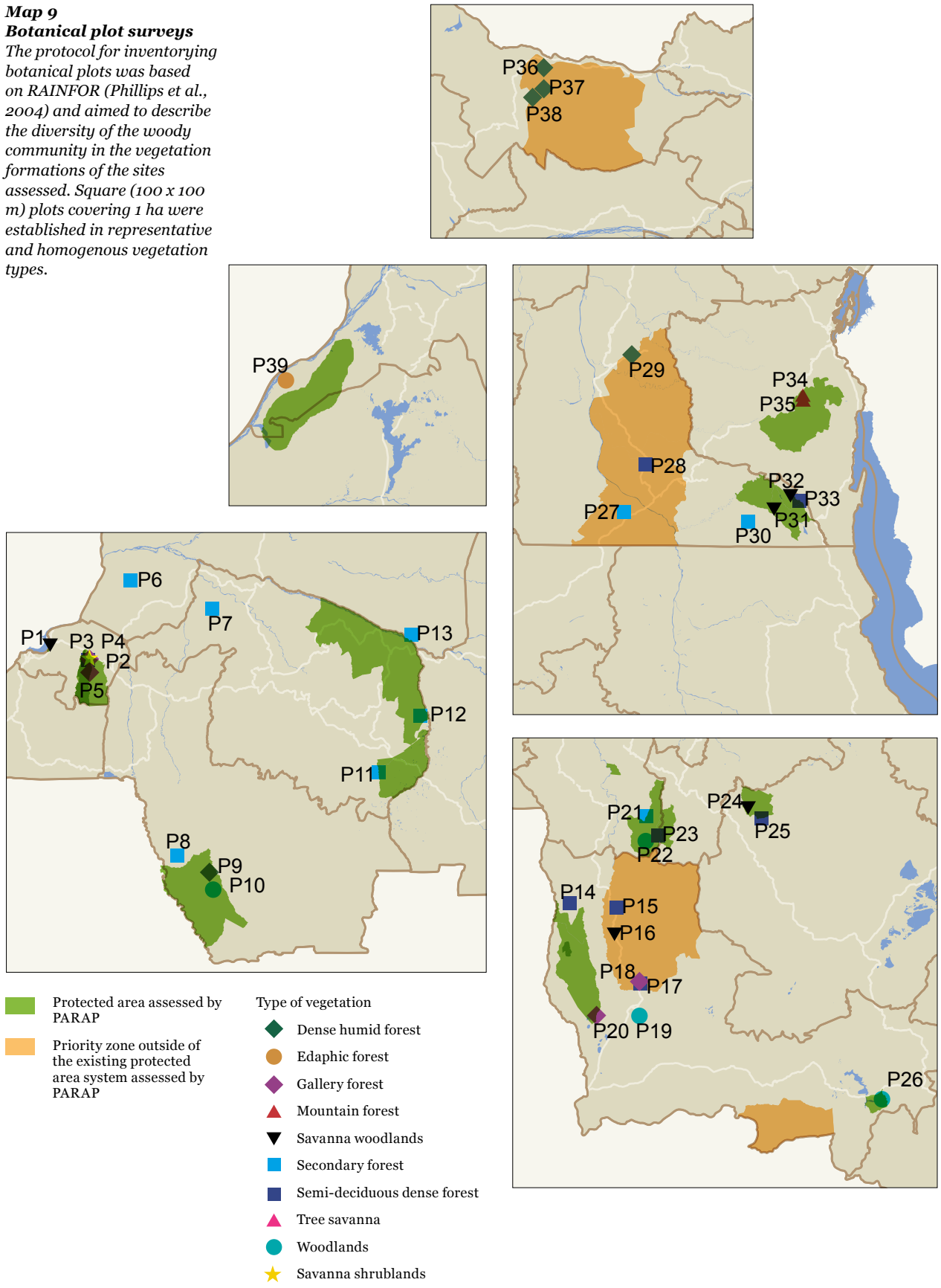
Structure and composition of vegetation formations

Plot	Vegetation type	Number of trees	Number of species of trees	Number of lianas	Number of species of lianas
P1	Savanna woodlands	65	7	1	1
P2	Semi-deciduous dense forest	517	55	76	23
P3	Savanna shrublands	150	5	0	0
P4	Gallery forest	308	47	73	18
P5	Gallery forest	605	31	61	19
P6	Secondary forest	704	38	57	11
P7	Secondary forest	539	45	45	18
P8	Secondary forest	404	74	9	7
P9	Dense humid forest	569	106	20	12
P10	Woodlands	329	30	176	6
P11	Secondary forest	501	55	63	16
P12	Secondary forest	477	62	43	10
P13	Secondary forest	406	84	24	12
P14	Semi-deciduous dense forest	608	48	125	13
P15	Semi-deciduous dense forest	388	51	110	18
P16	Savanna woodlands	403	24	232	3
P17	Semi-deciduous dense forest	463	45	300	15
P18	Gallery forest	457	79	47	21
P19	Woodlands	528	35	22	5
P20	Gallery forest	283	13	1	1
P21	Tree savanna	404	23	0	0
P22	Woodlands	383	34	34	9
P23	Semi-deciduous dense forest	403	63	37	10
P24	Savanna woodlands	433	28	9	4
P25	Semi-deciduous dense forest	470	42	37	15
P26	Woodlands	444	41	184	3
P27	Secondary forest	550	64	12	7
P28	Semi-deciduous dense forest	488	113	56	11
P29	Dense humid forest	371	69	49	14
P30	Secondary forest	502	86	122	35
P31	Savanna woodlands	331	31	9	6
P32	Savanna woodlands	322	35	4	3
P33	Semi-deciduous dense forest	450	45	72	20
P34	Mountain forest	554	47	44	15
P35	Mountain forest	470	21	45	15
P36	Dense humid forest	387	60	29	16
P37	Dense humid forest	377	44	10	8
P38	Dense humid forest	353	53	16	8
P39	Edaphic forest	470	40	16	7

Table 2 Summary of results from the inventory of botanical plots

View of the Itombwe Massif, Réserve naturelle d'Itombwe

Map 9
Botanical plot surveys
The protocol for inventorying botanical plots was based on RAINFOR (Phillips et al., 2004) and aimed to describe the diversity of the woody community in the vegetation formations of the sites assessed. Square (100 x 100 m) plots covering 1 ha were established in representative and homogenous vegetation types.



Large mammals

Wildlife conservation, particularly as regards large mammals, has always been a central component of the protected area system of the DRC. Understanding the status of target species was an essential component of assessing the past and present management of the protected areas assessed by PARAP. It was also essential to inform recommendations looking forward. In priority zones, the program aimed to evaluate the integrity of their ecosystems and assess the interest in developing new protected areas in these zones.

The program integrated several complementary methodologies to obtain up-to-date data on the distribution and abundance of large mammal species. The following orders (and families) were included: primates (Cercopithecidae and Hominidae), carnivores (Felidae, Hyanidae and Mustelidae), Tubulidentata (Orycteropodidae), Proboscidea (Elephantidae) and Artiodactyla (Bovidae, Giraffidae, Hippopotamidae, Suidae and Tragulidae). It should be noted that Perissodactyla (Equidae and Rhinocerotidae) are absent from the sites studied. Targeted stakeholder interviews to gather information on the status of taxa were conducted with knowledgeable members of proximate local communities and management team members from the protected areas. The program teams also carried out foot surveys that aimed to cover the geographic expanse of the sites and determine the distribution of species, based on a site occupancy methodology. Camera traps were also set in areas frequented by key species, as identified on the basis of the stakeholder interviews.

In addition to the sites presented previously, three additional protected areas were the target of assessments by PARAP teams: the *Réserve de la Biosphère de Luki* (RBLK), the *Réserve naturelle de Tumba Lediima* (RTL) and the *Réserve naturelle d'Itombwe* (RNI). These protected areas are respectively located in Kongo-Central, Equateur and Mai-Ndombe, and Sud-Kivu provinces and the assessments conducted were undertaken in the framework of broader assistance from WWF and its programmatic partners. As the objectives and methodologies for these assessments differed from those conducted in the twenty protected areas targeted by this program, only the results for large mammals are being presented in this document.

The results indicate a widespread collapse in the populations of large mammal species across all the sites that were assessed. The findings reveal that strong past and/or current hunting pressures, including within protected areas, are the causes of this decline.

While a few species seem to have the capacity to survive under unfavorable conditions, such as the bushbuck in savanna formations, most taxa have experienced a sharp decline. Certain species, such as elephants, are at this point only represented by relics of previously widespread populations and are close to extirpation.

The survival of a population of roan antelopes in the *Domaine et réserve de chasse de Swa-Kibula* (DRCSK), the result of the commitment of a traditional chiefdom with the

support of the ICCN team, is remarkable. Elephants, a species that had disappeared for over three decades, have also reappeared in the same protected area. Coming from Angola, probably due to anthropogenic disturbance, the species is seasonally present and poses a new challenge for the management of the area. Large antelope species are also still present in other protected areas, such as the roan and sable antelopes in change entities to areas in western Lualaba Province or the hartebeest in the *Réserve totale de chasse de Luama-Kivu* (RTCKV). Ape species are found in several protected areas: bonobos in the RTL; chimpanzees in the RLBK, the protected area complex of Luama-Kivu and the RNI; and eastern gorillas in the RNI.

The priority zone of Nord-Ubangi is notable when it comes to considering large mammals. While hunting pressure is very high, this area still has populations of charismatic species such as the chimpanzee, the okapi and the bongos. Also, the primate community appears to be intact as regards species that are still present. Finally, several groups of elephants still range in some parts of the area, although they are targeted by poachers. The Ouest Lualaba priority zone also still has a population of lions, which is probably very reduced as their prey face strong hunting pressure.

A bull elephant (Loxondata africana) bathing and drinking water in Ishango on the north shore of Lake Edward, Parc national des Virunga

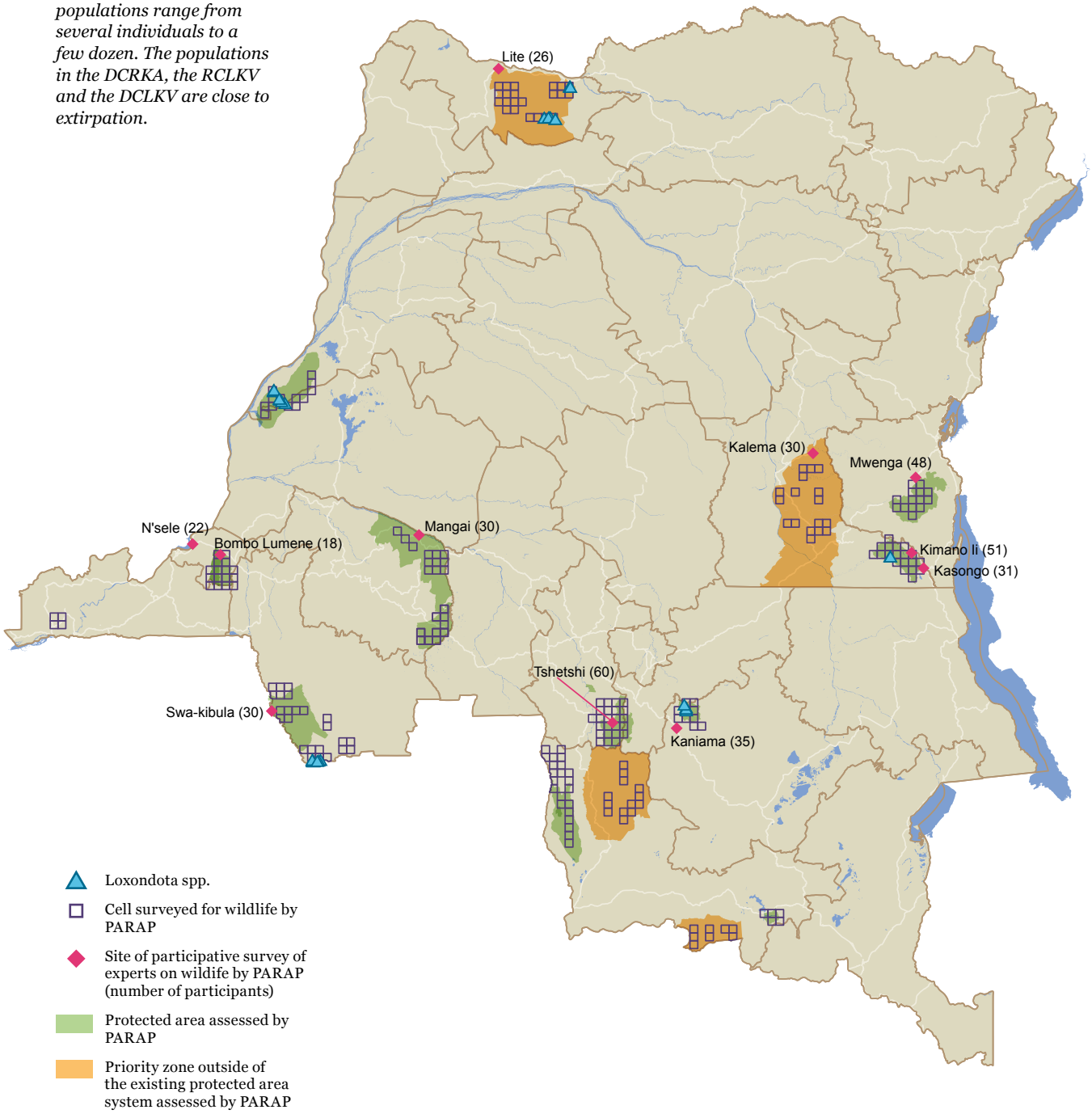
Table 3
Species encountered during PARAP's fieldwork on wildlife
The species presented in this table are those that were selected for the elaboration of maps illustrating the results of wildlife surveys for the three taxonomic groups (Map 10, Map 11 and Map 12). This table does not intend to be an exhaustive presentation of species belonging to these groups or observed during fieldwork.

Scientific name	Common name	IUCN Red list category	Protection category in the DRC
Ungulates			
Alcelaphus buselaphus	Hartebeest	Least concern	Partially protected
Hippotragus equinus	Roan antelope	Least concern	Partially protected
Hippotragus niger	Sable antelope	Least concern	Totally protected
Kobus ellipsiprymnus	Waterbuck	Near threatened	Partially protected
Kobus vardonii	Puku	Near threatened	Not protected
Redunca arundinum	Southern reedbuck	Least concern	Partially protected
Syncerus caffer	African buffalo	Least concern	Partially protected
Tragelaphus eurycerus	Bongo	Near threatened	Partially protected
Okapia johnstoni	Okapi	Endangered	Totally protected
Primates			
Cercocebus agilis	Agile mangabey	Least concern	Partially protected
Cercopithecus ascanius	Red-tailed monkey	Least concern	Partially protected
Cercopithecus denti	Dent's monkey	Least concern	Not protected
Cercopithecus hamlyni	Owl-faced monkey	Vulnerable	Totally protected
Cercopithecus mitis	Gentle monkey	Least concern	Totally protected
Cercopithecus neglectus	De Brazza's monkey	Least concern	Partially protected
Cercopithecus nictitans	Putty-nosed monkey	Least concern	Partially protected
Cercopithecus pogonias	Crowned monkey	Not assessed	Partially protected
Cercopithecus wolfi	Wolf's monkey	Not assessed	Partially protected
Chlorocebus pygerythrus	Vervet	Least concern	Partially protected
Colobus angolensis	Angola colobus	Least concern	Totally protected
Colobus guereza	Guereza colobus	Least concern	Totally protected
Gorilla beringei	Eastern gorilla	Critically endangered	Totally protected
Lophocebus johnstoni	Grey-cheeked mangabey	Least concern	Partially protected
Pan paniscus	Bonobo	Endangered	Totally protected
Pan troglodytes	Chimpanzee	Endangered	Totally protected
Papio anubis	Olive baboon	Least concern	Partially protected
Papio cynocephalus	Yellow baboon	Least concern	Not protected
Procolobus rufomitratus	Tshuapa red colobus	Near threatened	Totally protected
Elephant			
Loxondota spp.	Elephant	Vulnerable	Totally protected

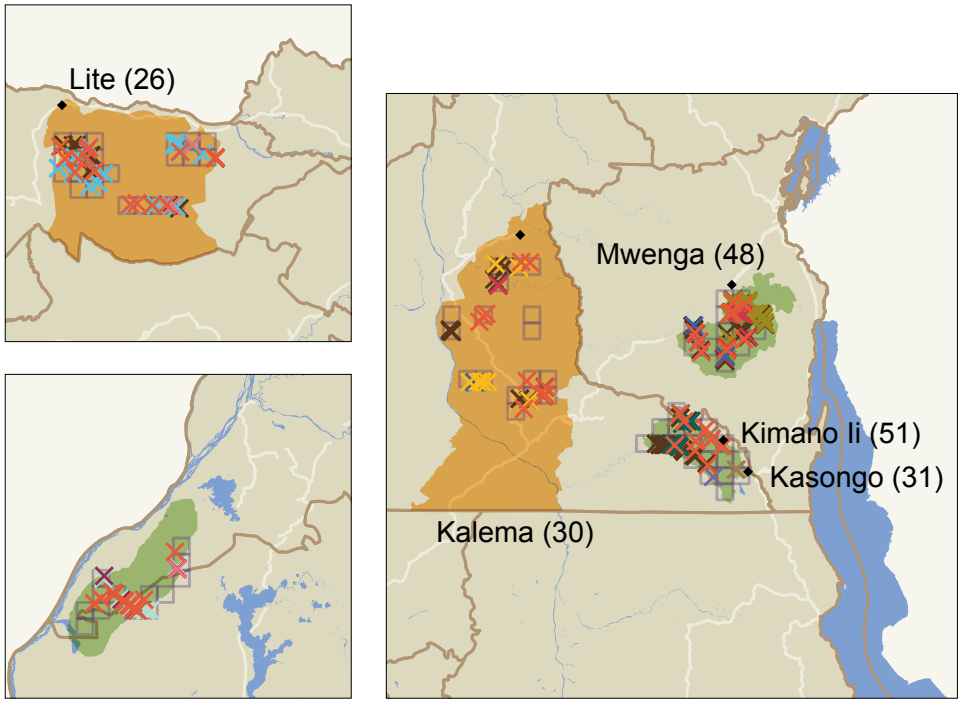
Okapi (Okapia johnstoni), Réserve de faune à okapis

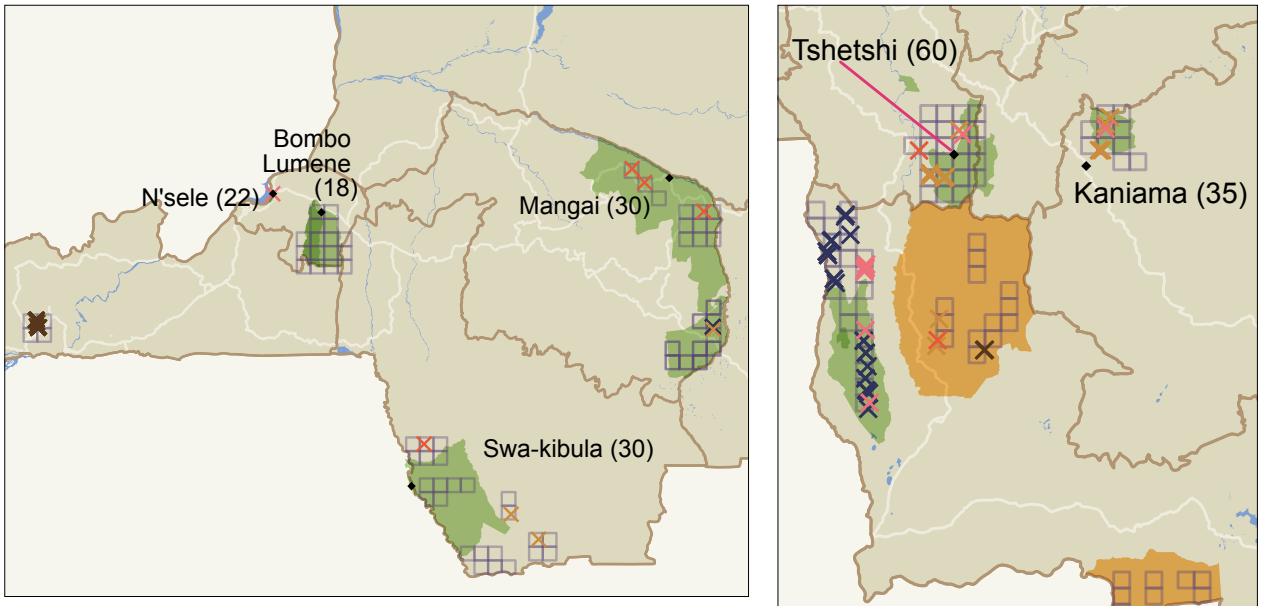
Bonobo (Pan paniscus), Mpelu

Map 10
Elephants
The presence of elephants was documented in five sites only, out of the 25-26 surveyed. These remaining populations range from several individuals to a few dozen. The populations in the DCRKA, the RCLKV and the DCLKV are close to extirpation.



Map 11
Primates
The very low number of direct observations of primates during the field surveys is striking. It reflects the sharp and general decline of the species in this taxonomic group. In addition, the individuals observed display cryptic behavior due to heavy hunting pressure.

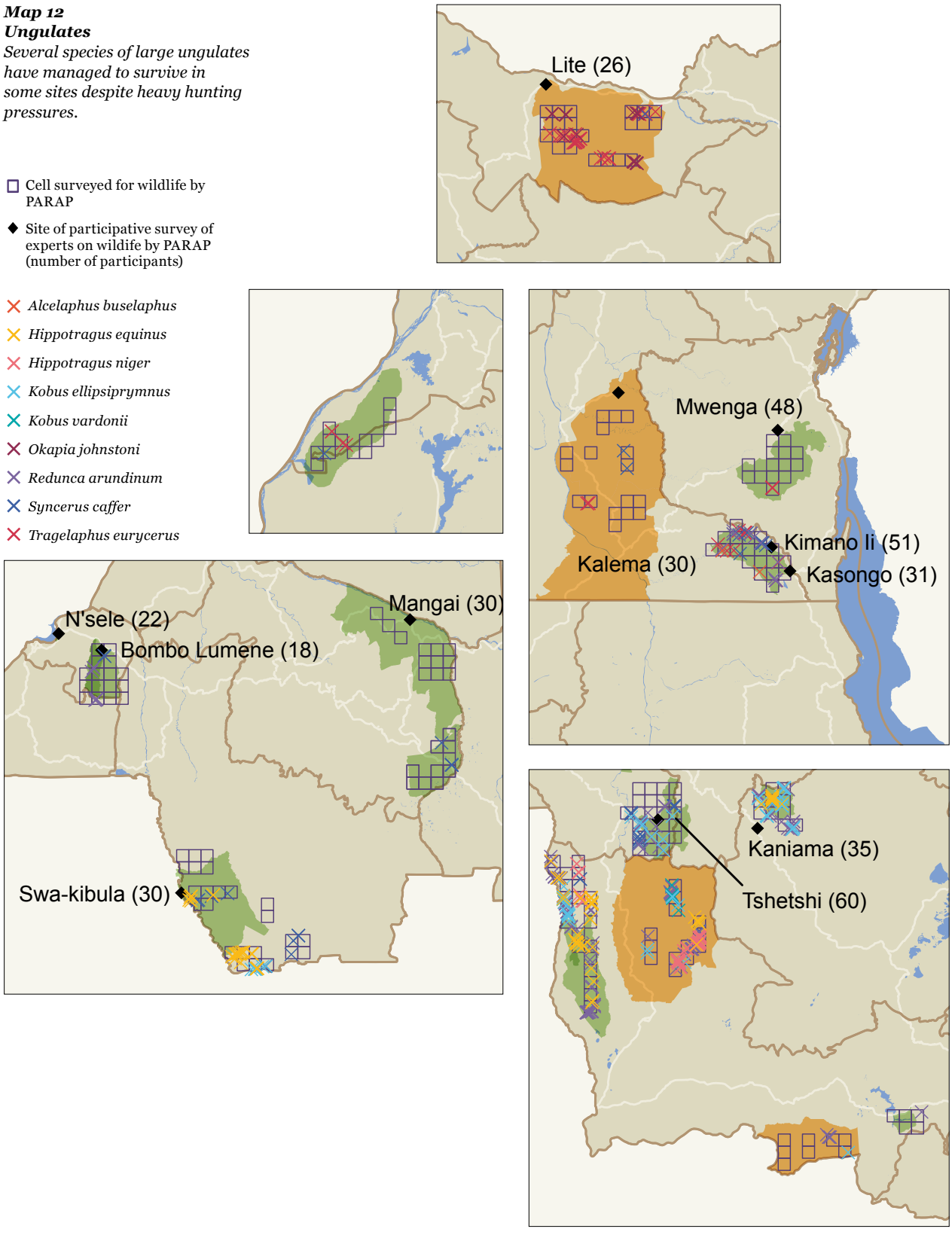




- Cell surveyed for wildlife by PARAP
- Site of participative survey of experts on wildife by PARAP (number of participants)

- *Cercocebus agilis*
- *Cercopithecus ascanius*
- *Cercopithecus denti*
- *Cercopithecus hamlyni*
- *Cercopithecus mitis*
- *Cercopithecus neglectus*
- *Cercopithecus nictitans*
- *Cercopithecus pogonias*
- *Cercopithecus wolfi*
- *Chlorocebus pygerythrus*
- *Colobus angolensis*
- *Colobus guereza*
- *Gorilla beringei*
- *Lophocebus albigena*
- *Pan paniscus*
- *Pan troglodytes*
- *Papio anubis*
- *Papio cynocephalus*
- *Piliocolobus oustaleti*

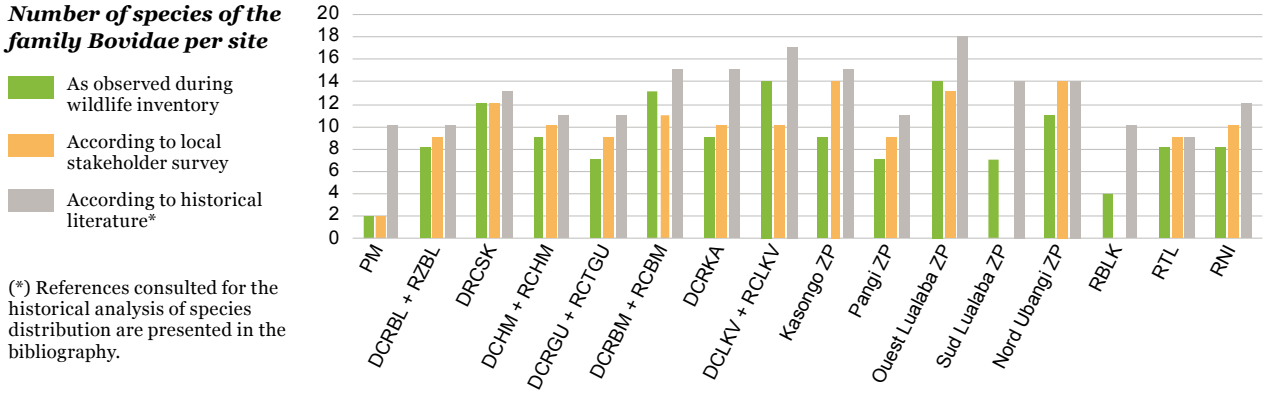
Map 12
Ungulates
Several species of large ungulates have managed to survive in some sites despite heavy hunting pressures.



Bovidae

Comparing historical data on the presence of species from the family Bovidae and the results of the fieldwork by PARAP indicate there have been local extinctions in almost all sites. Only one protected area, the *Réserve Tumba-Lediima* (RTL), and one priority area, Nord Ubangi, have a priori an intact community of Bovidae species. The number of Bovidae species has declined by more than 50% in two protected areas, the *Parc Président Mobutu* (PM) and the *Réserve de biosphère de Luki* (RBLK). Nine sites contain 10 or more species of this taxonomic group. Most species of Bovidae detected, through stakeholder surveys and/or field inventories, belong to the national category of partially protected species. Only one species is considered threatened on the IUCN Red List.

Figure 25
Number of species of the family Bovidae per site



(*) References consulted for the historical analysis of species distribution are presented in the bibliography.

Figure 26
Number of species of the family Bovidae per category of protection in the DRC according to local stakeholders
**Data from local stakeholders are not available for the DCBK and the Sud Lualaba priority zone.*

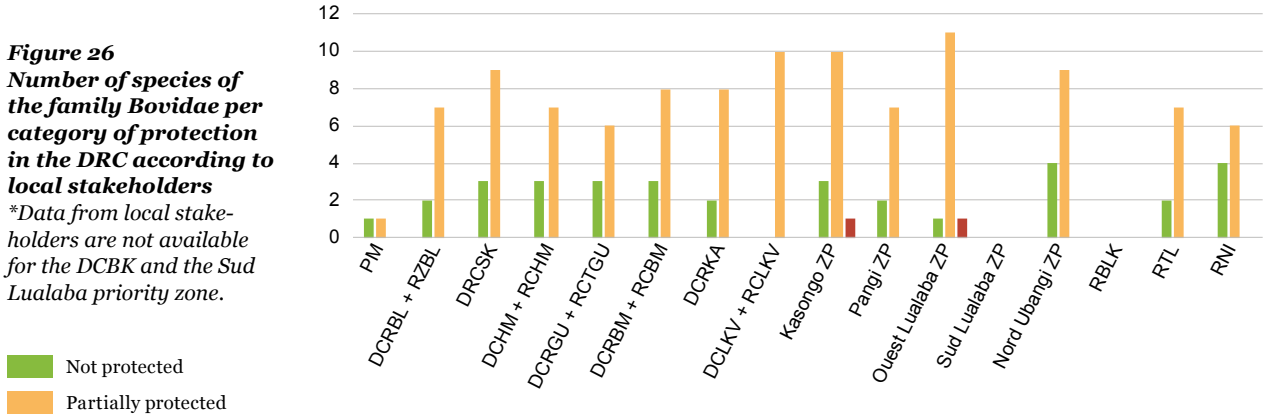


Figure 27
Number of species of the family Bovidae per category of protection in the DRC detected during field surveys

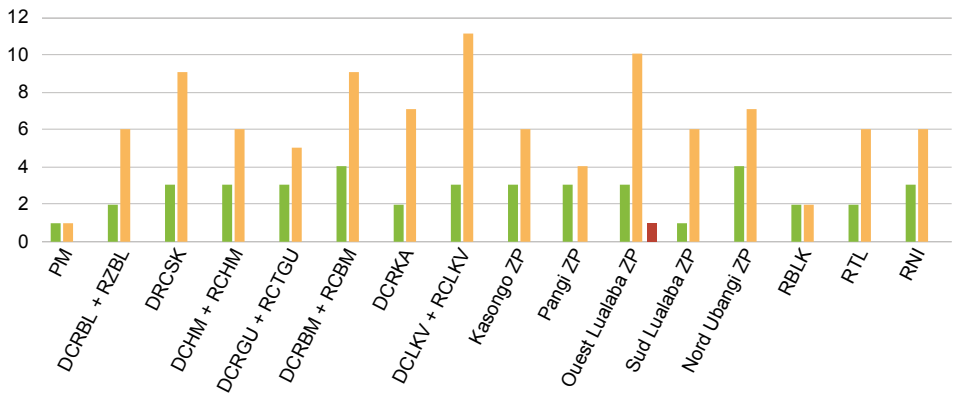


Figure 28
Number of species of the family Bovidae per category of the IUCN Red List according to local stakeholders
**Data from local stakeholders are not available for the DCBK and the Sud Lualaba priority zone.*

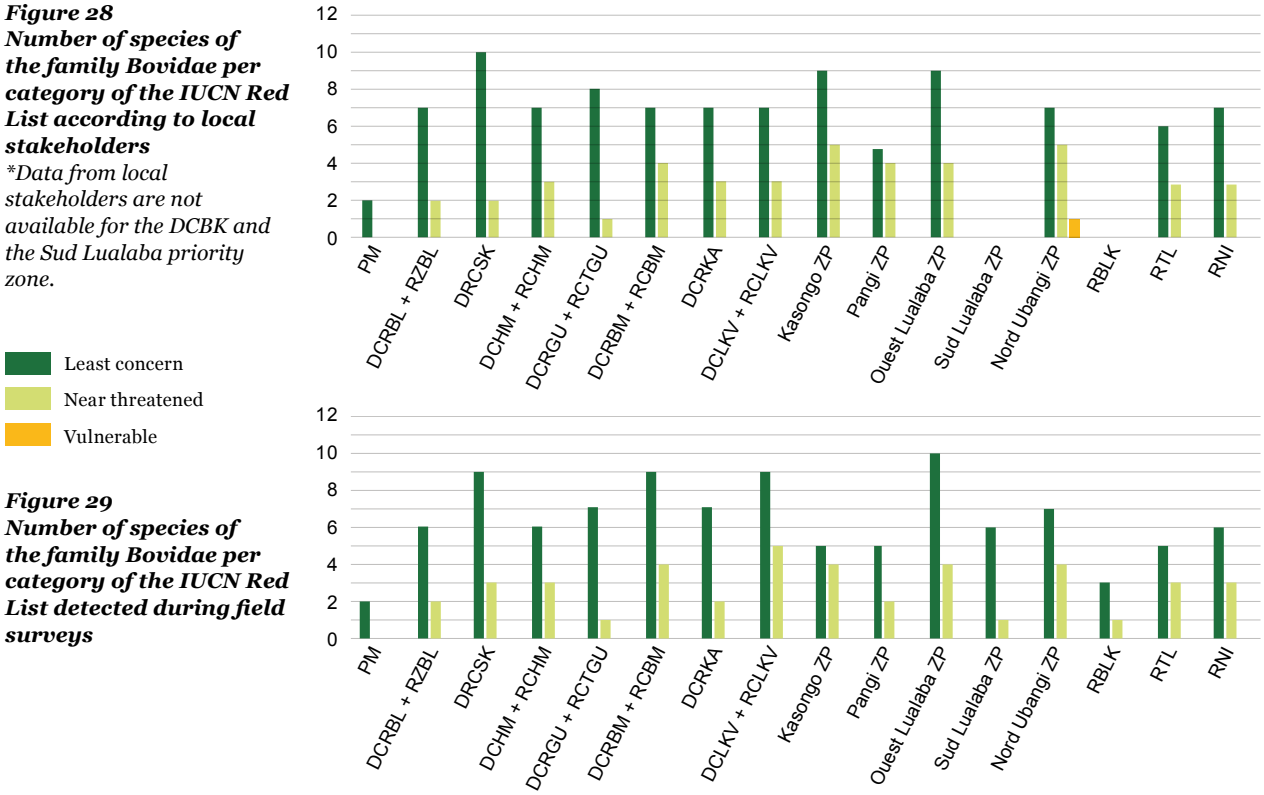


Figure 29
Number of species of the family Bovidae per category of the IUCN Red List detected during field surveys

Papy Asanzi of the PARAP team preparing a camera trap

Buffalo (Syncerus caffer) in the protected areas of Bombo Lumene

Roan antelope (Hippotragus equinus), Domaine et réserve de chasse de Swa-Kibula

Bushbuck (Tragelaphus scriptus) in the protected areas of Bombo Lumene

Cercopithecidae

Six sites harbor more than five species of Cercopithecidae, and one site has more than ten. The latter is the priority zone located in the Nord Ubangi forest range. According to the local stakeholders, ten sites contain species that are totally protected in the DRC and three sites have species that are considered threatened by the IUCN Red List.

Figure 30
Number of species of the family Cercopithecidae per site

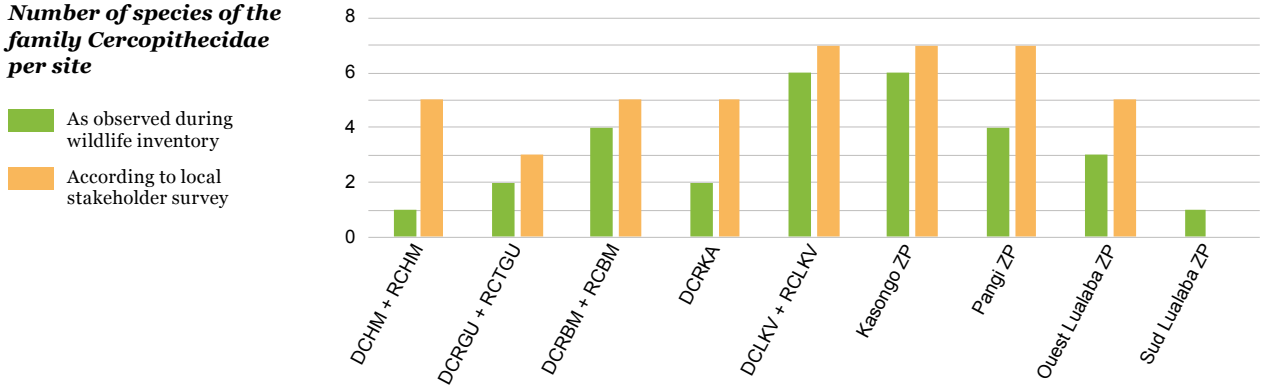


Figure 31
Number of species of the family Cercopithecidae per category of protection in the DRC according to local stakeholders
** Data from local stakeholders are not available for the DCBK and the Sud Lualaba priority zone.*

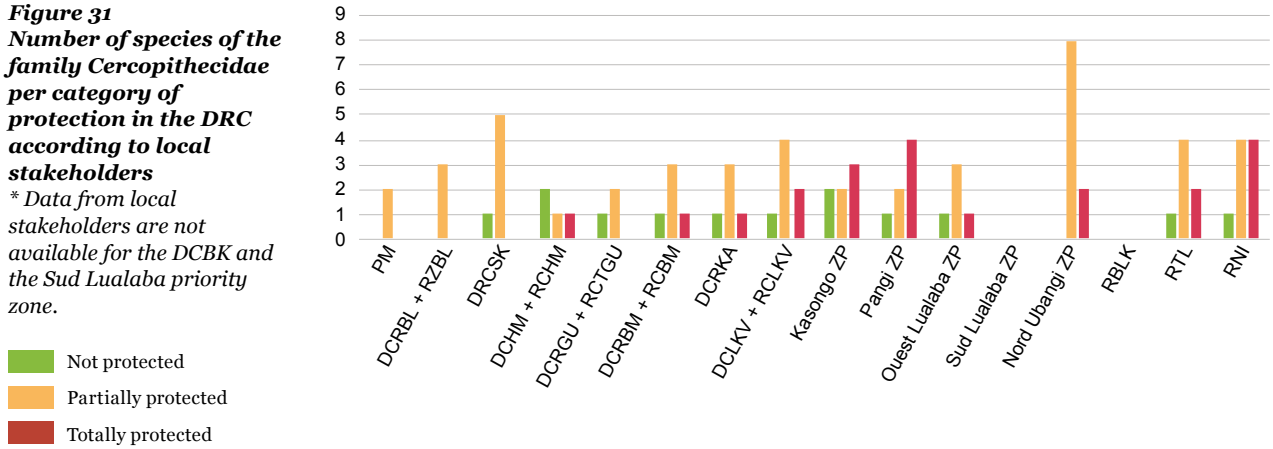


Figure 32
Number of species of the family Cercopithecidae per category of protection in the DRC detected during field surveys

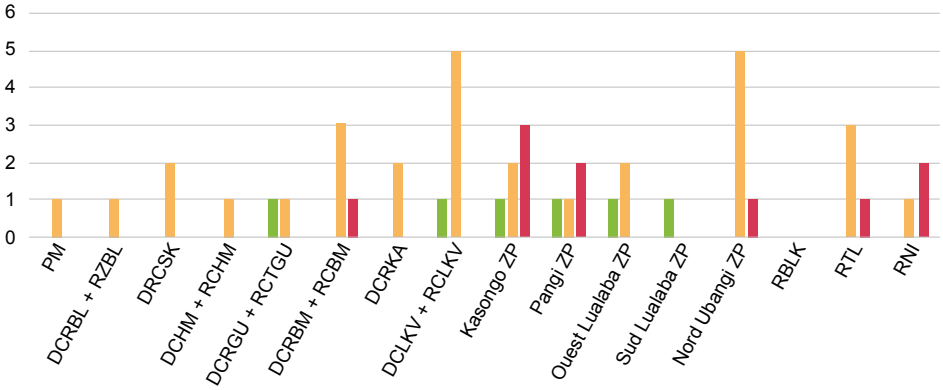


Figure 33
Number of species of the family Cercopithecidae per category of the IUCN Red List according to local stakeholders
**Data from local stakeholders are not available for the DCBK and the Sud Lualaba priority zone.*

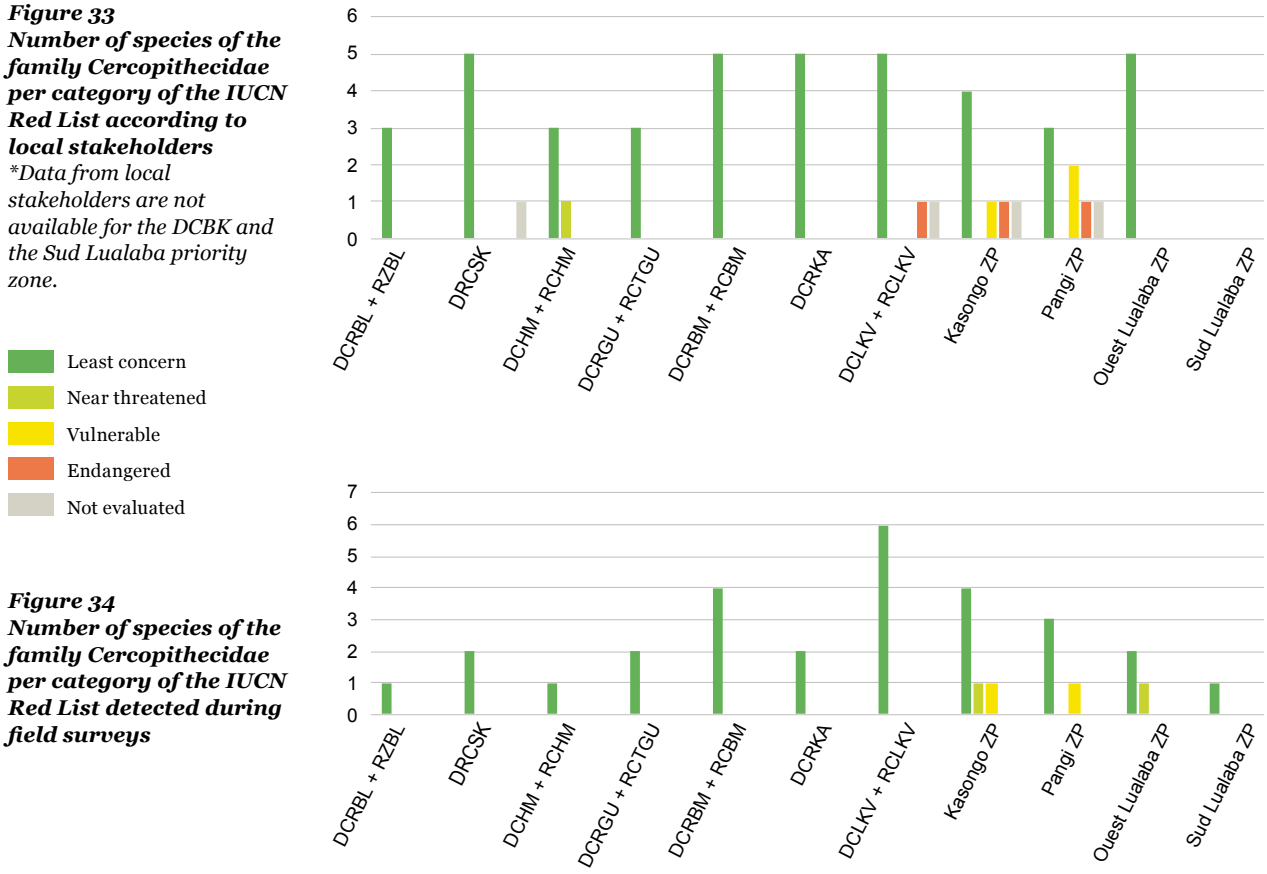


Figure 34
Number of species of the family Cercopithecidae per category of the IUCN Red List detected during field surveys

Wolf's mona monkey (Cercopithecus wolfi), Parc national de la Salonga

Felidae

According to information gathered from local stakeholders, eight sites contain at least three species of Felidae. Observations during field inventories were not able to confirm this participatory diagnosis. Field inventories only detected more than one species at two sites.

Figure 35
Number of species of the family Felidae per site

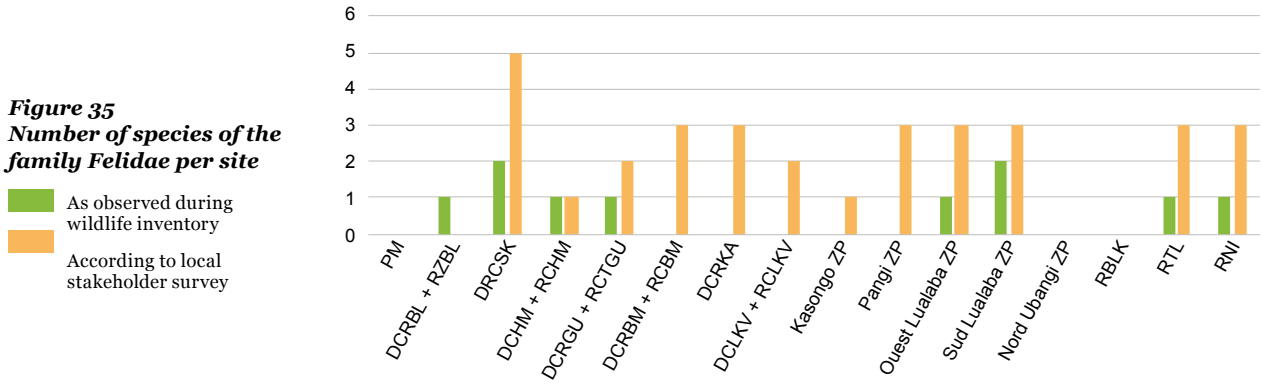


Figure 36
Number of species of the family Felidae per category of protection in the DRC according to local stakeholders
**Data from local stakeholders are not available for the DCBK and the Sud Lualaba priority zone.*

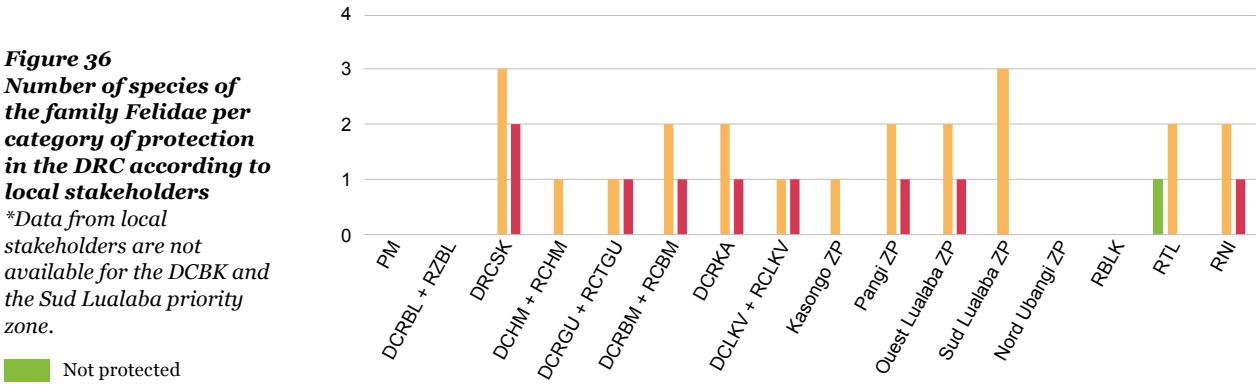


Figure 37
Number of species of the family Felidae per category of protection in the DRC detected during field inventories

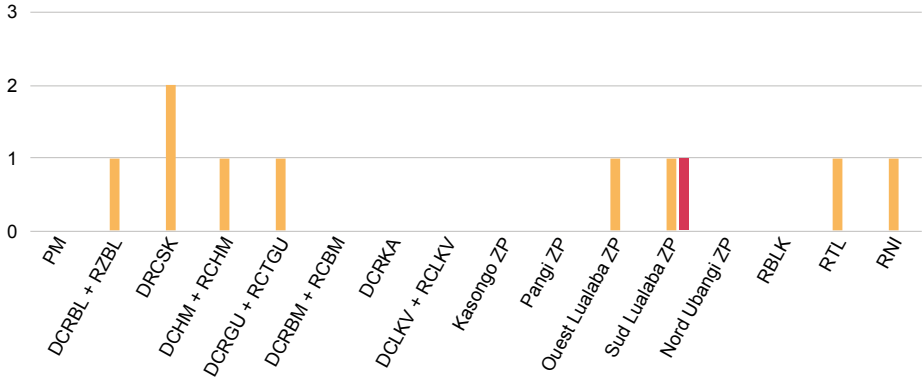


Figure 38
Number of species of the family Felidae per category of the IUCN Red List according to local stakeholders
**Data from local stakeholders are not available for the DCBK and the Sud Lualaba priority zone.*

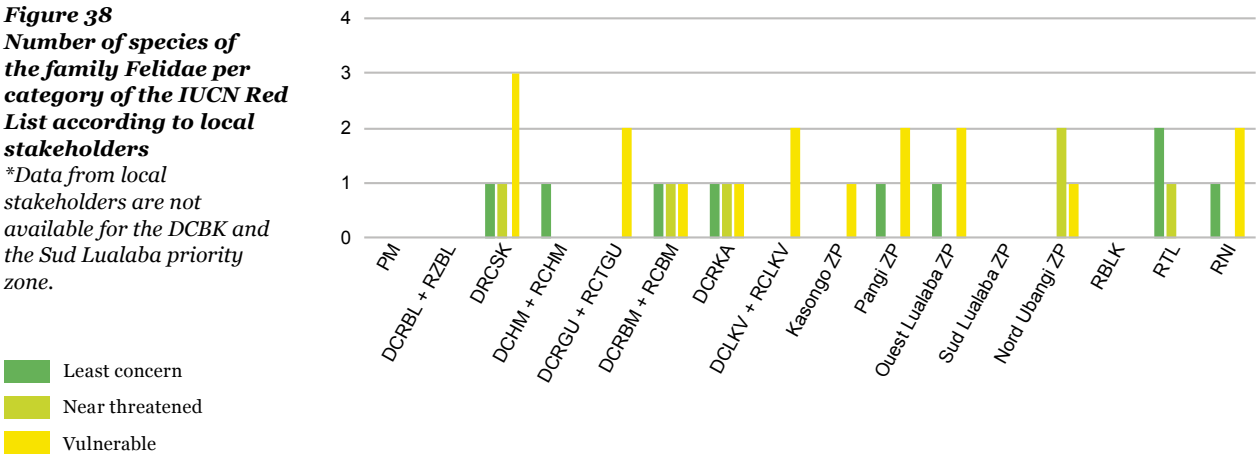
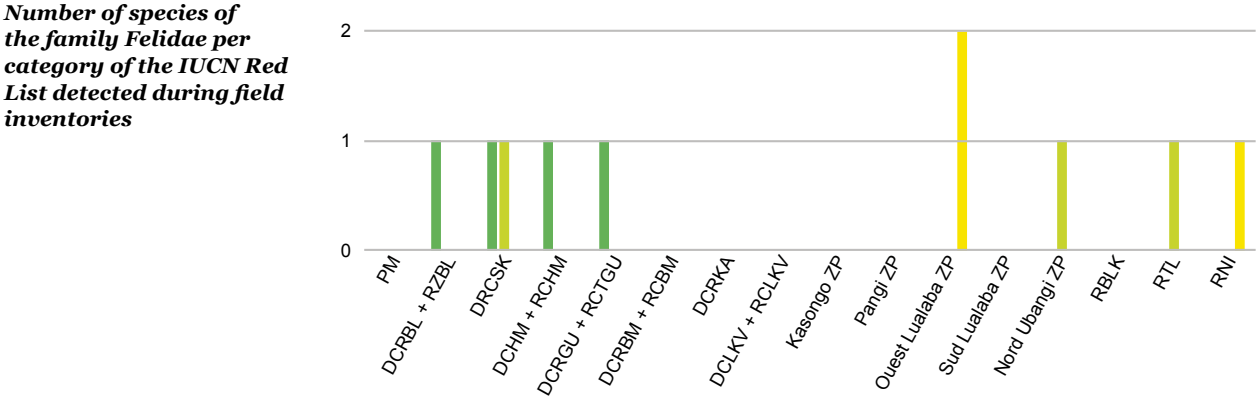


Figure 39
Number of species of the family Felidae per category of the IUCN Red List detected during field inventories



Lion (Panthera leo) skin, Lualaba

Other select taxa

The figures below present data on a select set of species belonging to taxonomic families other than the three presented previously that were observed at sites assessed by the program. Almost all sites harbor species that are totally protected at the national level and threatened according to the IUCN Red List.

Figure 40
Number of species of other select taxa* per category of protection in the DRC according to local stakeholders
**Elephantidae, Giraffidae, Hippopotamidae, Hominidae, Hyanidae, Manidae, Orycteropodidae, Suidae, Tragulidae*

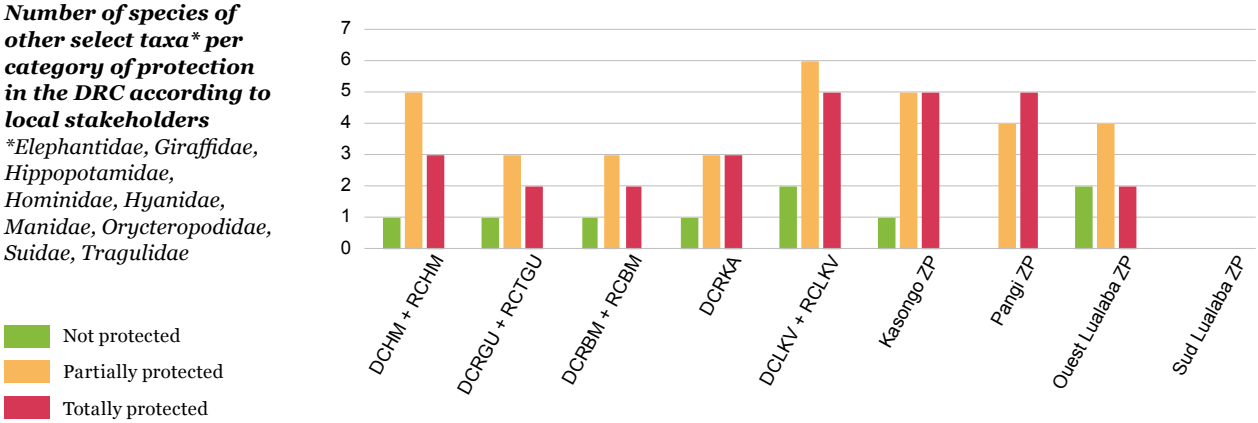
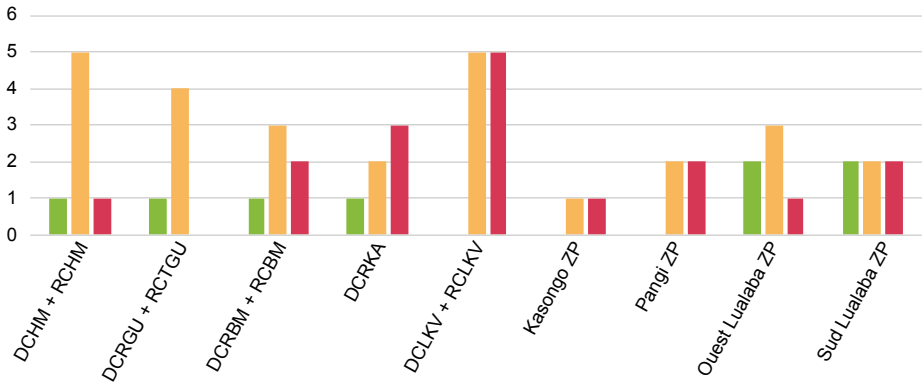


Figure 41
Number of species of other select taxa* per category of protection in the DRC detected during field inventories
**Elephantidae, Giraffidae, Hippopotamidae, Hominidae, Hyanidae, Manidae, Orycteropodidae, Suidae, Tragulidae*



Chryso Vyahavwa of the PARAP team preparing a camera trap

Hippopotamus (Hippopotamus amphibius), Lualaba

Figure 42
Number of species of other select taxa* per category of the IUCN Red List according to local stakeholders
**Elephantidae, Giraffidae, Hippopotamidae, Hominidae, Hyanidae, Manidae, Orycteropodidae, Suidae, Tragulidae*

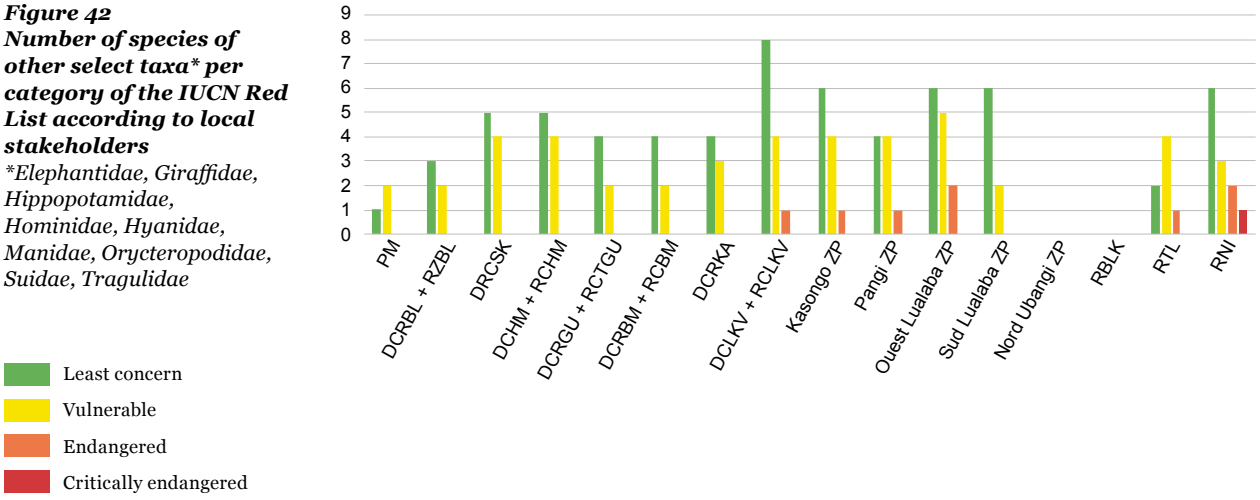
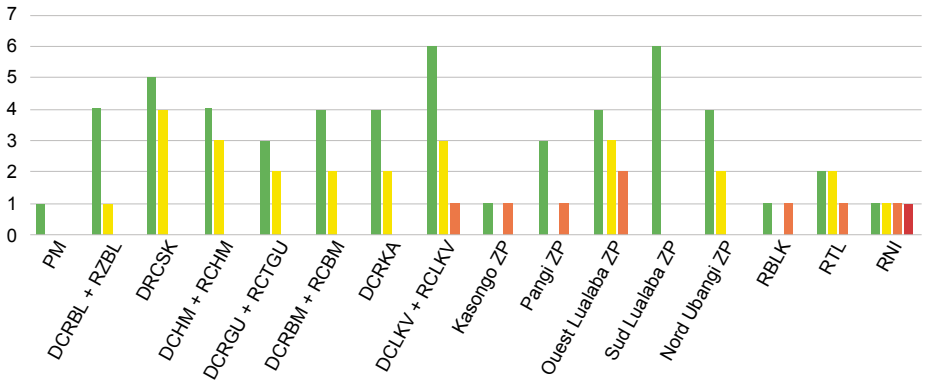


Figure 43
Number of species of other select taxa* per category of the IUCN Red List detected during field inventories
**Elephantidae, Giraffidae, Hippopotamidae, Hominidae, Hyanidae, Manidae, Orycteropodidae, Suidae, Tragulidae*



Mongoose in the protected areas of Luama Kivu

Bushpig (Potamochoerus larvatus) in the protected areas of Luama Kivu

Main findings

Data collected by the program in the twenty protected areas and five priority zones that were assessed were used to examine the design of each protected area and the potential for creating protected areas in the priority zones (Table 4 and Table 5). A priority action plan was also developed for each site; these tools provide appropriate and pragmatic approaches to guide the consolidation and extension of the protected area system.

The first part of the program's assessment process found that none of the protected areas that were assessed strictly conform to the IUCN concept of a protected area. This is primarily because there is no clear definition of their geographic area and/or the area is characterized by an absence or near absence of an appropriate management system.

The second part of the assessment process was concerned with examining and putting in perspective the distinctive natural values of each protected area with its objectives, spatial configuration and regulations, and overall context. It also worked to determine the natural values of the priority zones, and their associated potential to contribute to the protected area system.

The situations encountered across the sites assessed reflect many of the challenges and opportunities facing the DRC when it comes to biodiversity management. They iterate the importance of designing protected areas that are adapted to the modern reality and recognize future trends. These should be protected areas that apply governance mechanisms which engage all stakeholders and have the potential to establish effective management systems. Assuring protected areas are successful is key to achieve the DRC's broader objectives for consolidating and extending its protected area system, including stopping ongoing degradation and ensuring the preservation of remaining species as well as maintaining the environmental services upon which local populations depend.

Below is an overview of the findings for each site and recommendations for management actions.

- The persistence in the *Domaine et réserve de chasse de Swa-Kibula* (DCRSK) of populations of species that are threatened at the national level, such as the roan antelope and the elephant, is the result of the commitment of traditional local authorities, with the support of the ICCN management team. At the same time, the protected area faces multiple challenges. The management category included in the 2006 modification text is not clearly defined. Stakeholders are not aware of the protected area's boundaries, which are poorly defined in the protected area's legal text, or of the DCRSK's applicable regulations. The management team is also working with very limited resources. Strong demographic growth is contributing to the sustained expansion of agricultural areas around the dozens of settlements within the protected area, at the expense of forest formations. Uncontrolled hunting is also widespread. Given this reality, there is a need to redesign this protected area, potentially based on IUCN categories IV and VI. The redesign should take into consideration areas that have been identified as key for biodiversity objectives and where appropriate management efforts should be focused, for example areas where elephants are seasonally present in the periphery of the current protected area. The redesign process should also consider the potential to establish a revised governance system with stronger engagement of local stakeholders. Such a reclassification process would require time and resources; in the meantime, emergency measures should be taken to ensure,

with the collaboration of the team in place, the protection of the areas' remaining natural values.

- The protected areas of Luama-Kivu, the *Réserve de chasse de Luama Kivu* (RTCKV) and the *Domaine de chasse de Luama Kivu* (DCLKV), still contain significant natural values. Natural vegetation formations dominate the landscape and many species of fauna, some of which are extremely threatened at the national level (e.g., the elephant, the chimpanzee and the hartebeest) are still present. Local stakeholders recognize the existence of the protected areas and have at least some knowledge of associated regulations. They also cite the conservation of species as a concern. The ICCN management team in place occasionally receives support from external partners. Although agricultural cultivation is still relatively limited within the protected areas, seasonal fishing by local populations in the vast flood plain of the Luama River, at the core of the RTCKV, is resulting in significant destruction of the ligneous vegetation for the smoking of fish. Based on the existing boundaries, an internal zoning exercise of the protected areas should be carried out to delineate strict protection areas and areas where some activities by local communities are permitted. The management of the complex should be based on the management guidelines for IUCN Categories II, IV and VI. In the immediate future, protecting the remaining populations of target species is a priority to avoid their extirpation.
- Despite the threats to the natural values of the *Réfuge á éléphants en territoire de Kaniama* (DCRKA), the *Réserve intégrale de chasse des Alunda et des Tutshokwe* (RCIAT), the *Réserve intégrale de chasse de Tshikamba* (RCITS), the *Domaine de Mwene Musoma* (DCPRS) and the *Domaine des Mwene Kay* (DCPRK), and the complete absence of management in these protected areas for decades, these entities still have a level of ecological integrity that is relatively good compared to other protected areas. Large mammal species persist and there is little or no secondary vegetation for large expanses. Local stakeholders' awareness of the issues, robust local governance that is willing to see activities develop in the region, and the absence of historical conflicts around nature conservation are all aspects that should be considered when resuming the management of these areas. The protected area concept is still valid in these areas and provides a means to reverse negative trends regarding natural values. Resources should be mobilized to develop appropriate management plans, based on IUCN categories II, IV and VI, and to support improved governance. It should also be noted that the RCIAT, the RCITS, the DCPRS and the DCPRK could be grouped into a single protected area unit.
- The protected areas located in the Kinshasa Province, *Parc Président Mobutu* (PM) and the *Réserve zoologique et forestière de la Bombo-Lumene* (RZBL) and *Domaine de chasse de Bombo-Lumene* (DCRBL) complex, present opportunities to promote nature conservation at the edge of the capital city. The PM contains the last unaltered examples of the landscape typical of the Malebo Pool. The RZBL and DCRBL complex contains undisturbed vegetation formations over relatively large surfaces that are typical of the Batéké Plateau. Some species of large fauna, such as the buffalo and the hippopotamus, persist in very limited numbers. The fight against land-grabbing and the development of tourism are priority actions for these protected areas.
- The natural values of the protected areas of Bushimai, the *Réserve de chasse de Bushimaie* (RCBM) and the *Domaine de chasse de la Bushimaie* (DCRBM), have been subject to numerous threats and severe degradation dynamics for several

decades. These are driven by very strong demographic growth and the lack of economic alternatives. The persistence of some species of large fauna, such as the buffalo and the Defassa waterbuck, and the presence of natural vegetation formations should be noted. The last remnants of the values underlying the designation of these protected areas are opportunities to promote within the broader development framework of the provinces of Kasaï Central and Lomami. They are the only classified areas for nature conservation in both provinces and they can still contribute to the provinces' objectives for the protection and promotion of their natural heritage. Their boundaries should be effectively managed, and their management provisions reviewed. This process could be triggered only through the shared determination of stakeholders and the mobilization of resources.

- Much of the *Domaine de chasse de la Basse Kando* (DCBK) is occupied by industrial mining operations. A partial declassification is in order. Simultaneously, a non-classified area, which contains a large population of hippopotamus, could be integrated into the protected part. This process should take advantage of the presence of private operators, who have environmental and conservation obligations with which they must comply in order to operate.
- Given the advanced state of degradation of the natural values in the protected areas of Mangaï and Gungu as well as their extremely complex context, due in part to local demographics, the classification of these entities should be reconsidered. Mechanisms other than protected areas should be developed to ensure the preservation of residual natural values.
- Among the five priority zones that were evaluated, the Nord Ubangi priority zone has the strongest potential to contribute to the objectives of the national protected area system. The zone's forest cover is essentially intact and all large mammal species, with the exception of the lion, are still present; however, pressures on natural resources are growing. The livelihoods of communities on the periphery of and within the forest block largely depend on forest and wildlife resources, emphasizing the importance of establishing a management system that will assure their persistence. The opportunity to create a protected area exists and any such process should be integrated into broader zoning of the forest range of Nord-Ubangi Province. As part of a landscape approach, any new protected area should be designed taking into consideration the ecological requirements for maintaining the zone's natural values over the long-term and the potential for local communities to implement sustainable livelihood practices. The technical guidelines for IUCN categories IV and VI should be considered. The management of such an entity could be based on the establishment of a performance agreement between key stakeholders: the State, the Province, decentralized territorial entities and local communities. The governance structure of the protected area, involving and empowering the local populations, should take advantage of recent legal innovations.

Young southern white-faced owl (Ptilopsis granti) in the protected areas of Luama Kivu

PARAP team conducting a wildlife survey, Nord Ubangi

Table 4
Summary of findings from PARAP assessments of protected areas

Assessment element	*Domaine de chasse de Luama Kivu* (DCLKV) and *Réserve totale de chasse de Luama Kivu* (RTCKV)	*Réserve de chasse de Bushimai* (RCBM) and *Domaine de chasse de Bushimai* (DCRBM)	*Réfuge á éléphants en territoire de Kaniama* (or the *Domaine de chasse de Kaniama* - DCRKA)	*Réserve intégrale de chasse des Alunda et des Tutshokwe* (RCIAT)	*Réserve intégrale de chasse de Tshikamba* (RCITS)	*Domaine des Mwene Musoma* (DCPRS)
Ecoregion(s)	Central Miombo woodlands Southern Congolian forest-savanna mosaic	Southern Congolian forest-savanna mosaic	Southern Congolian forest-savanna mosaic	Central Miombo woodlands Southern Congolian forest-savanna mosaic	Southern Congolian forest-savanna mosaic	Southern Congolian forest-savanna mosaic
Land cover	Dense moist forest (30.9%) Savanna woodland - tree savanna (26.0%) Rural complex (14.9%)	Savanna woodland - tree savanna (48.5%) Mosaic cultivated areas/vegetation (herbaceous or shrub) (17.7%) Forest/savanna mosaic (12.3%)	Savanna woodland - tree savanna (68.3%) Mosaic cultivated areas/vegetation (herbaceous or shrub) (22.2%) Forest/savanna mosaic (3.3%)	Savanna woodland - tree savanna (52.4%) Closed to open deciduous woodland (28.8%) Shrubland (7.9%)	Savanna woodland - tree savanna (52.8%) Closed to open deciduous woodland (30.0%) Shrubland (9.1%)	* Comprised by the RCIAT
Forest loss 2000-2015 (% of surface area)	1.3	3.3	2.2	0.3	0.3	0.2
Abundance and distribution of primates						
Abundance and distribution of ungulates						
Charismatic large mammal species that are present	Chimpanzee*** Elephant* Hartebeest* Hippopotamus*	Hippopotamus*	Roan antelope* Elephant* Hippopotamus*	Sable antelope** Roan antelope** Hippopotamus**	Sable antelope** Roan antelope** Hippopotamus**	Sable antelope** Roan antelope** Hippopotamus**
Overall trend of wildlife populations	Declining	Sharply declining	Declining	Declining	Declining	Declining
Potential for recovery of wildlife populations	Moderately high	Improbable	Moderately high	Moderately high	Moderately high	Moderately high
Demographic pressure	Medium	High	Medium	Relatively low	Relatively low	Relatively low
Pressure on natural resources	Medium	High	Medium	Medium	Medium	Medium
Adequacy of protected area design	Medium	Inadequate	Medium	Medium	Medium	Medium
Management and operational capacity	Low	Very low	N. A.	N. A.	N. A.	N. A.
Community support and relations	Medium	Medium	N. A.	N. A.	N. A.	N. A.
Potential for the establishment of a protected area that will be effective over the long-term	Relatively high	Medium	Relatively high	High	High	High
Relative priority of site for the process of consolidating the protected area system	2	4	2	1	1	1

	Domaine des Mwene Kay (DCPRK)	*Domaine de chasse de la Basse Kando* (DCBK)	*Domaine et réserve de chasse de Swa-Kibula* (DRCSK)	*Domaine de chasse de Gungu* (DCRGU) and *Réserve totale de chasse de Gungu* (RCTGU)	*Domaine de chasse de Mangai* (DCHM) and *Réserve à hippopotames de Mangai* (RCHM)	*Domaine de chasse de Bombo-Lumene* (DCRBL) and *Réserve zoologique et forestière de Bombo-Lumene* (RZBL)	*Parc Président Mobutu* (PM)
	Southern Congolian forest-savanna mosaic	Central Miombo woodlands	Southern Congolian forest-savanna mosaic Western Congolian forest-savanna mosaic	Southern Congolian forest-savanna mosaic	Southern Congolian forest-savanna mosaic	Western Congolian forest-savanna mosaic	Western Congolian forest-savanna mosaic
	*Comprised by the RCITS	Closed to open deciduous woodland (63.7%) Savanna woodland - tree savanna (25.1%) Waterbodies (4.0%)	Closed to open deciduous woodland (37.8%) Savanna woodland - tree savanna (34.0%) Dense moist forest (7.8%)	Savanna woodland - tree savanna (41.3%) Closed to open deciduous woodland (16.4%) Dense moist forest (14.7%)	Dense moist forest (39.7%) Rural complex (32.7%) Forest/savanna mosaic (7.8%)	Mosaic cultivated areas - vegetation (herbaceous or shrub) (42.5%) Savanna woodland - tree savanna (27.3%) Shrubland (11.0%)	Savanna woodland - tree savanna (30.3%) Mosaic cultivated areas/ vegetation (herbaceous or shrub) (22.6%) Shrubland (18.2%)
	0.7	4.9	1.6	2.5	6.6	1.6	N. A.
	Sable antelope** Roan antelope** Hippopotamus**	Hippopotamus*	Roan antelope** Buffalo** Elephant** Hippopotamus**	-	Hippopotamus*	Buffalo* Hippopotamus*	-
	Declining	Declining	Relatively stable	Sharply declining	Sharply declining	Declining	Relatively stable
	Moderately high	Improbable	Moderately high	Improbable	Very improbable	Medium	Medium
	Relatively low	High	Medium	High	High	High	High
	Medium	High	Medium	High	High	High	High
	Medium	Inadequate	Medium	Inadequate	Inadequate	Medium	Good
	N. A.	Very low	Medium	Very low	Very low	Medium	Medium
	N. A.	Low	Relatively good	Very low	Very low	Medium	Medium
	High	Unlikely	Relatively high	Unlikely	Unlikely	Medium	Medium
	1	N. A.	2	N. A.	N. A.	3	3

Table 5
Summary of findings from PARAP assessments of priority zones

Assessment element	Nord Ubangi	Sud Lualaba	Ouest Lualaba	Kasongo	Pangi
Ecoregion(s)	Northeastern Congolian lowland forests	Central Miombo woodlands	Central Miombo woodlands Southern Congolian forest-savanna mosaic	Southern Congolian forest-savanna mosaic Northeastern Congolian lowland forests	Northeastern Congolian lowland forests Southern Congolian forest-savanna mosaic
Land cover	Dense moist forest (93.9%) Rural complex (3.9%) Savanna woodland - tree savanna (1.7%)	Closed to open deciduous woodland (75.7%) Savanna woodland - tree savanna (20.1%) Mosaic cultivated areas - vegetation (herbaceous or shrub) (1.8%)	Savanna woodland - tree savanna (53.1%) Closed to open deciduous woodland (21.6%) Mosaic cultivated areas - vegetation (herbaceous or shrub) (11.9%)	Dense moist forest (42.1%) Savanna woodland - tree savanna (28.5%) Mosaic cultivated areas - vegetation (herbaceous or shrub) (9.7%)	Dense moist forest (86.0%) Rural complex (13.8%) Submontane forest (0.2%)
Abundance and distribution of primates					
Abundance and distribution of ungulates					
Charismatic large mammal species that are present	Okapi** Chimpanzee** Elephant*	-	Sable antelope** Roan antelope**	Chimpanzee*	Chimpanzee*
Overall trend of wildlife populations	Declining	Declining	Declining	Declining	Declining
Potential for recovery of wildlife populations	Moderately high	Moderately high	Moderately high	Medium	Medium
Demographic pressure	Medium	Medium	Medium	High	High
Pressure on natural resources	Medium	Medium	Medium	High	High
Sustainability of current natural resource management systems	Low	Low	Low	Low	Low
Local stakeholder's familiarity with the concept of a protected area	Low	Low	Low	Low	Low
Stakeholder support for more sustainable natural resource management systems	High	High	High	High	High
Potential to design a protected area	Good	Medium	Good	Low	Low

Traps, Lualaba

Traditional chief, Lualaba

Chapter 4
Building a protected area system in the DRC

The foundation

Timeline of conservation in the DRC

The current network of protected areas in the DRC is the outcome of a long conservation history that spans nearly a century (Figure 44). Across the first half of the 20th century and in response to the earliest recognized impacts of over exploitation of natural resources, colonial authorities established the first legal instruments regulating their extraction. The particular attention paid to issues of nature conservation also led to the publication of a series of specific legislations, which are the foundation of the modern legal corpus.

The first two botanical gardens were established as early as 1900. Initially intended for the cultivation of fruits and vegetables as well as the acclimatization of exotic plants of interest, they gradually collected plant species characteristic of the country's ecosystems. By 1955, seven botanical and zoological gardens had been created.

Following a series of scientific expeditions in the eastern part of the country, which highlighted the importance of the region for fauna and flora, the *Parc national Albert* was designated on April 21, 1925. It was the first national park created on the continent, and was subsequently renamed the *Parc national des Virunga* in 1969. Seven other national parks were subsequently classified, including five after independence.

In 1934, the Institute for the National Parks of the Belgian Congo (*Institut des Parcs Nationaux du Congo-Belge* - IPNCB) was created. One of the oldest institutions in the country, it underwent several statutory and structural changes to become ICCN, which oversees the management of all the DRC's protected areas today.

Starting in the 1930s and until after the Second World War, a large number of forest reserves and hunting reserves were classified. This period coincided with the implementation of numerous land management and economic initiatives. Some of these reserves still exist today while others have been abandoned or declassified.

In the 1970s, several protected areas were recognized at international level for their exceptional universal values (i.e., through the World Heritage Convention) or their role in the application of combined conservation and development approaches (i.e., through the MAB Programme). The first sites in the DRC that were recognized on the List of Wetlands of International Importance (i.e., Ramsar sites) were inscribed in the 1990s.

Starting in the 2000s, the DRC adopted a series of strategies, programs and legislative provisions to reaffirm the State's commitment to nature conservation and protected areas. The new framework places the rehabilitation of protected areas and the extension of the protected area system as central elements of the country's sustainable development and climate change mitigation and adaptation.

A more detailed presentation of the conservation history of the DRC, which was prepared by the program, can be found in the DRC chapter in the 2015 report on the state of protected areas in Central Africa.[vii]

Figure 44
Timeline of conservation in the DRC
This timeline presents key events in the nature conservation sector in the DRC over the past hundred years.

1900	Creation of first two botanical gardens (Kisantu and Eala)
1908	End of the Congo Free State and annexation of the Congo by Belgium
1925	Designation of *Parc national Albert*, the first national park in Africa. In 1969 it was renamed *Parc National des Virunga*.
1934	Creation of the *Institut des Parcs Nationaux du Congo-Belge* (IPNCB)
1937	Promulgation of Royal Decree of April 21, 1937 on hunting and fishing
1938	Designation of the *Parc national de la Garamba*
1939	Designation of the *Parc national de l'Upemba*
1949	Promulgation of Decree of April 11, 1949 on the forest regime of the Belgian Congo
1960	Proclamation of independence and creation of the Republic of Congo, which would subsequently become the Democratic Republic of the Congo in 1964, then the Republic of Zaire in 1971 and again the Democratic Republic of the Congo in 1997.
1967	Transformation of the IPNCB into the *Institut des Parcs Nationaux du Congo* (IPNC)
1969	Transformation of the IPNC into the *Institut de Conservation de la Nature du Congo* (ICNC)
1969	Promulgation of Ordonnance No. 69/041 of August 22, 1969 on the conservation of nature
1970	Designation of the *Parc national de la Salonga*, *Parc National du Kahuzi-Biega* and *Parc national de la Maiko*
1975	Announcement by the President of the Republic of the objective to have 15% of the national territory under protection
1975	Promulgation of Law No. 75/024 of July 22, 1975 on the creation of conserved areas
1975	Designation of the *Parc national des Kundelungu*
1975	Transformation of the ICNC into the *Institut Zaïrois pour la Conservation de la Nature* (IZCN)
1976	Signature by Zaire of the Convention on International trade in Endangered Species (CITES)
1976	Designation of two first biosphere reserves within the World Network of Biosphere Reserves (WNBR) of the Man and the Biosphere (MAB) Program
1979	Inscription of Parc national des Virunga on the List of World Heritage. Four additional protected areas were subsequently inscribed.
1982	Promulgation of Law No. 82/002 of May 28, 1982 on regulations for hunting and repealing the royal decree from 1937
1994	Ratification by the DRC of the Convention on Biological Diversity (CBD)
1995	Ratification by the DRC of the United Nations Framework Convention on Climate Change (UNFCCC)
1996	Ratification by the DRC of the Convention on Wetlands or Ramsar Convention, laying the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Inscription of first two sites on the List of Wetlands of International Importance: *Zones humides du Parc National des Virunga* and *Parc marin des mangroves*. Two additional sites have since been added.
1997	Creation of the *Institut Congolais pour la Conservation de la Nature* (ICCN)
2002	Promulgation of Law No. 11/002 of August 29, 2002 on the Forest Code repealing the former decree from April 11, 1949
2005	Signature by the DRC of treaty on the sustainable use of the Congo basin forest ecosystems, making the Central African Forest Commission (COMIFAC) a legal entity. The COMIFAC Convergence Plan established in 2005 was revised and adopted in July 2014 for the period 2015-2025.
2008	Signature of a memorandum of understanding with the German government to set aside 15% of its forest area as protected
2010	Integration of the Institut des Jardins Zoologiques et Botaniques du Congo (IJZBC) within ICCN
2011	Promulgation of Law No. 11/009 of July 9, 2011 establishing fundamental principles for the protection of the environment
2012	Adoption of the REDD+ National Strategy Framework aiming to stabilize forest cover by 2030
2014	Adoption of National Plan for Adaptation to climate change
2014	Promulgation of Law No. 14/003 of February 11, 2014 on the conservation of nature repealing Ordonnance No. 69-041
2016	Designation of the *Parc national de la Lomami*

Legal and regulatory framework

The term "protected area" has been in use in the DRC since the early 2000s. The formal definition of the term was legally introduced in 2009 and then again in 2014, and provided substance to the concept of a protected area de jure (Box 5). In alignment with institutional reforms, the application of the term brought with it many innovative aspects of how protected areas can be considered. Its current application across sectors, also provides a means to improve coherence as regards the State's interventions in these areas. The definition of the term further provides a means to establish a clear framework for recognizing the numerous biodiversity management mechanisms that had been defined previously in the DRC. These mechanisms, which are the product of the DRC's long and complex legal and regulatory history as regards the management of natural resources and conservation, reflect a variety of managerial attributes and goals. While many of these mechanisms can be differentiated, there are also some clear redundancies. The program's review of available legal texts identified 29 different categories of management referenced across the history of the protected area system. In the context of this evaluation, the 29 categories were grouped into 12 standardized categories to facilitate the understanding of the protected area system (Table 7).

Historically, the government has had the authority and responsibility of the management of protected areas. Thanks to recent legal developments, all types of governance defined by the CBD and the IUCN can now be applied for the creation and management of protected areas in the DRC (Table 6). Among the innovations more recently introduced are the possibility of delegation to the private sector, the incorporation of mechanisms for decentralization and the establishment of forest concessions for conservation by local communities. This diversity of governance types promotes the development of approaches that are adapted to the context and respect the rights of stakeholders.

The effectiveness of the process to design and establish a new protected area (Chapter 2) plays an important role in determining whether the protected area will eventually achieve its goals. In the DRC, this process has been defined through the legal corpus. It

Tortoise, Parc national de la Salonga

is articulated around several phases involving multidisciplinary competences and the engagement of stakeholders (Box 6). As part of this process, right- and interest-holders, including local communities, must be consulted through a process of “public inquiry”. Since the publication of the new law on Nature Conservation (2014), the DRC government has incorporated the concept of free-prior and informed consent(FPIC) into its regulations on the process of protected area creation. The formulation of the first management plan of the protected area marks the culmination of the 8-step process to create a protected area.

Box 5 : The concept of a protected area

The term "protected area" appeared for the first time in the legislation of the DRC in 2010, with the publication of Decree No. 10/15 of April 10, 2010 establishing the mandate of ICCN. Echoing the Convention on Biological Diversity (CBD) the decree mentions *ex situ* and *in situ* protected areas, referring to the conservation of elements of biological diversity "in" and "outside" their "natural environment".

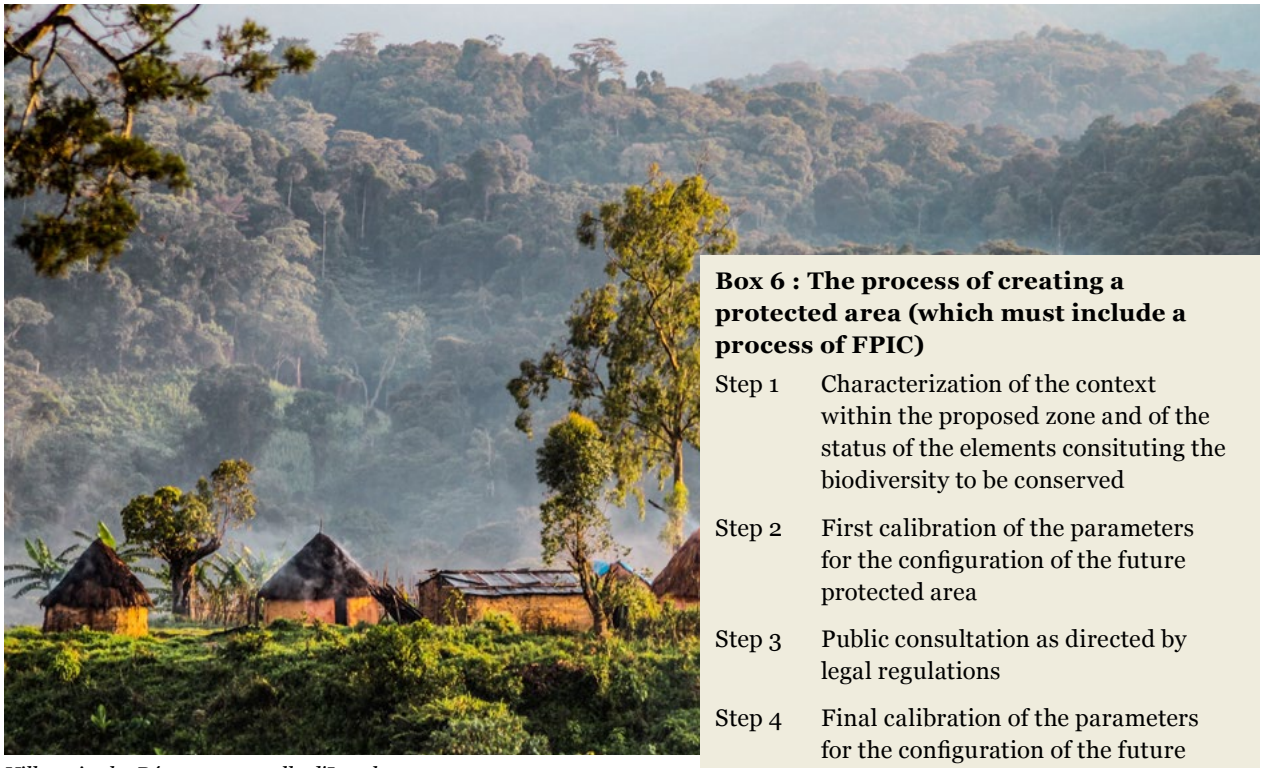
A definition of the term first appeared in Law No. 11/009 of July 9, 2011 on the protection of the environment. Within this law, a protected area is defined as “a geographically designated, defined, regulated and managed to achieve specific conservation objectives”. This transcription aligns with the definition under the CBD.

A second definition was introduced in Law No. 14/003 of February 11, 2014 on the conservation of nature. In this legal text, a protected area is defined as “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”. This description stems from the definition adopted by the IUCN.

The CBD and the IUCN have recognized the compatibility of their two definitions and for all intents and purposes they are considered equivalent.

Two types of protected areas are presently recognized in the DRC, those of national interest and those of provincial interest.

Mountain gorilla (Gorilla beringei beringei) family, Parc national des Virunga



Village in the Réserve naturelle d'Itombwe

Box 6 : The process of creating a protected area (which must include a process of FPIC)

Step 1	Characterization of the context within the proposed zone and of the status of the elements consituting the biodiversity to be conserved
Step 2	First calibration of the parameters for the configuration of the future protected area
Step 3	Public consultation as directed by legal regulations
Step 4	Final calibration of the parameters for the configuration of the future protected area
Step 5	Assessment of environmental and social impacts and development of a plan to manage these impacts
Step 6	Submission of the proposal for classification to forest advisory council(s)
Step 7	Creation of the protected area
Step 8	Elaboration of a management plan for the protected area

Table 6
Protected area governance
The four types of governance defined by the CBD and IUCN are based on the category of actors holding the power, authority, responsibility and accountability of key decisions. For private governance, the implementing provisions of Law 14/003 clarify the arrangements for the delegation of creation and management powers to private-law entities. Governance by indigenous peoples and local communities can only take place if the actors acquire a legal personality through the formalization of a private-law entity. The delegation procedures provided by Decree 14/018 frame the development of the management mechanism.

	Governance by the government			Shared governance		
	Ministry or national agency responsible	Ministry or international organization responsible	Management delegated by the government	Transboundary governance	Collaborative governance	Joint governance
Classified forest	x	x	x			
Protected area	x	x	x	x	x	x

	Private governance			Governance by indigenous peoples and local communities	
	Individual proprietor	Non profit organization	Commercial organization	Indigenous peoples	Local communities
Classified forest					
Protected area	x	x	x	x*	x*

Table 7
Protected area categories
"None" refers to the absence of a reference to a law in creation instrument while "undetermined" refers to an impossibility to determine the category or law, mainly due to the absence of a text. Additional details on the different categories are found in the annex.
** Provided stakeholders are organized into a legal entity under private law*

Category cited in legal text	Period of creation	Number of entities created	Legal basis cited within creation texts	Standardized category
Domaine de chasse	1944 - 2011	6	*Décret du 21 avril 1937* *Ordonnance-loi n° 69-041 du 22 août 1969* *Loi n° 82-022 du 28 mai 1982* *Loi n° 011/2002 du 29 août 2002*	*Domaine de chasse*
Domaine de chasse et de pêche réservées	1950 - 1954	3	*Décret du 21 avril 1937*	*Domaine de chasse*
Domaine de chasse réservée	1950 - 2004	22	*Décret du 21 avril 1937* *Ordonnance-loi n° 69-041 du 22 août 1969* *Loi n° 82-022 du 28 mai 1982*	*Domaine de chasse*
Domaine et réserve de chasse	2006	1	*Ordonnance-loi n° 69-041 du 22 août 1969* *Loi n° 82-022 du 28 mai 1982* *Loi n° 011/2002 du 29 août 2002*	*Domaine de chasse*
Réserve de chasse	1929 - 1950	5	*Décret du 26 juillet 1910* Undetermined	*Réserve de chasse*
Réserve générale de chasse	1933 - 1938	2	*Décret du 21 avril 1937*	*Réserve de chasse*
Réserve intégrale de chasse	1934 - 1954	9	*Décret du 26 juillet 1910* *Décret du 21 avril 1937*	*Réserve de chasse*
Réserve totale de chasse	1935 - 1957	11	*Décret du 26 juillet 1910* *Décret du 21 avril 1937* *Décret du 11 avril 1949*	*Réserve de chasse*
Réserve partielle de chasse	1930 - 1959	9	*Décret du 26 juillet 1910* *Décret du 21 avril 1937* *Undetermined*	*Réserve de chasse*
Réserve partielle et intermittente de chasse	1938	1	*Décret du 21 avril 1937*	*Réserve de chasse*
Réserve totale de chasse et partielle de pêche	1955	1	*Décret du 21 avril 1937*	*Réserve de chasse*
Réserve de chasse à l'éléphant	1929 - 1937	4	*Décret du 26 juillet 1910*	*Réserve de chasse*
Réserve à antilopes	1938 - 1939	4	*Décret du 21 avril 1937*	*Réserve de chasse*
Réserve à hippopotames	1932 - 1944	11	None *Décret du 21 avril 1937*	*Réserve de chasse*
Réserve de faune	2016	1	*Loi n° 82-022 du 28 mai 1982* *Loi n° 011/2002 du 29 août 2002* *Loi n° 014/003 du 11 février 2014*	*Réserve de chasse*
Réserve de faune et de flore	1925	1	None	*Réserve intégrale de faune et de flore*
Réserve forestière et réserve de chasse	1950	1	*Décret du 21 avril 1937* *Décret du 4 avril 1934*	*Réserve de chasse*
Réserve intégrale de faune et de flore	1950	1	*Décret du 21 avril 1937*	*Réserve intégrale de faune et de flore*
Réserve intégrale de flore	1941 - 1947	2	*Décret du 4 avril 1934* Undetermined	*Réserve intégrale de flore*
Réserve zoologique et forestière	1934 - 1976	3	*Décret du 21 avril 1937* Undetermined	*Réserve zoologique et forestière*
Réserve intégrale zoologique et forestière	1937 - 1947	2	*Décret du 26 juillet 1910* *Décret du 4 avril 1934* *Décret du 21 avril 1937*	*Réserve zoologique et forestière*
Réserve naturelle	1992 - 2016	12	*Ordonnance-loi n° 69-041 du 22 août 1969* *Loi n° 82-022 du 28 mai 1982* *Loi n° 011/2002 du 29 août 2002*	*Réserve naturelle*
Réserve naturelle intégrale	1934 - 2016	11	*Décret du 26 novembre 1934* *Ordonnance-loi n° 69-041 du 22 août 1969* *Loi n° 014/003 du 11 février 2014*	*Réserve naturelle intégrale*
Réserve scientifique	1959 - 1992	2	*Ordonnance-loi n° 69-041 du 22 août 1969* *Loi n° 82-022 du 28 mai 1982* Undetermined	*Réserve scientifique*
Réserve spéciale	1974	1	*Décret du 21 avril 1937* *Ordonnance-loi n° 69-041 du 22 août 1969*	*Réserve spéciale*
Zone annexe	1975	2	*Ordonnance-loi n° 69-041 du 22 août 1969*	*Zone annexe*
Réserve de biosphère	1976 - 1982	3	Undetermined	*Réserve de biosphère*
Forêt classée	2012	1	*Loi n° 011/2002 du 29 août 2002*	*Forêt classée*
Undetermined	1922 - 1956	5	None *Décret du 21 avril 1937* Undetermined	Undetermined

The evolution of the protected area system

The designation of protected areas in the DRC has been carried out using various legal instruments, based on the provisions of the primary laws regulating the sector of nature conservation. These legal instruments include hundreds of ministerial orders, decrees deliberated by the Council of Ministers (i.e., the Cabinet) and ordinances.

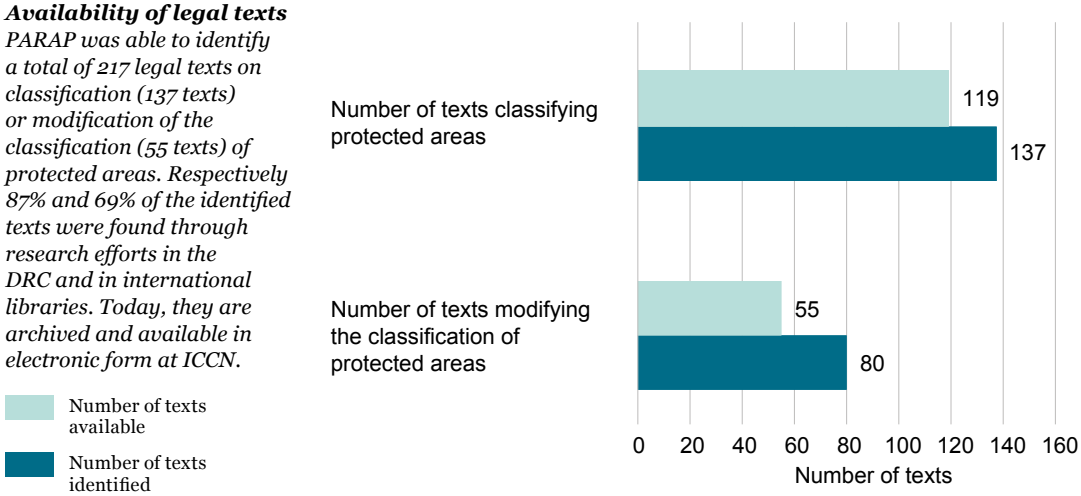
The lack of an official archiving system for legal acts pertaining to the creation and management of protected areas in the DRC has resulted in significant gaps in their accessibility and availability, and presents a challenge when it comes to understanding and defining the configuration of the current protected area system. As such, PARAP prioritized activities aimed at identifying, analyzing and archiving legal text concerned with the protected area system. The work conducted by the program has contributed to a significant increase in the availability of said legal documentation (Figure 45).

The review of the legal texts compiled by the program provides a means to better understand the history of the protected area system over the last century. The designation of the first entity akin to a protected area took place in 1922. In total, 137 protected areas have been created as of 2017 (Figure 46). The number of protected areas classified annually has varied considerably across the different political periods making up the modern history of the DRC.

Taking into account occasional declassifications, the number of existing protected areas shows a virtually uninterrupted progression since the beginning of the 1920s (Figure 47). Today, 94 protected areas are legally defined in the DRC. A review of available legal texts further shows that an additional 16 reserves were designated to manage certain species of large mammals. These reserves were not considered in the context of the evaluation of the current protected area system because of their redundancy with existing hunting regulations (Box 7). Reserves established to regulate hunting were among the first entities created and remain the most numerous type of protected area in the DRC.

Across the history of the protected area system, the boundaries of some protected areas have also been modified. From the 1920s until today, 51 spatial transformations of existing protected areas have been identified via the review of available legal texts (Figure 48). Some occurred simultaneously with a change in management category, which is considered as synonymous with creating a new protected area.

Figure 45
Availability of legal texts
PARAP was able to identify a total of 217 legal texts on classification (137 texts) or modification of the classification (55 texts) of protected areas. Respectively 87% and 69% of the identified texts were found through research efforts in the DRC and in international libraries. Today, they are archived and available in electronic form at ICCN.



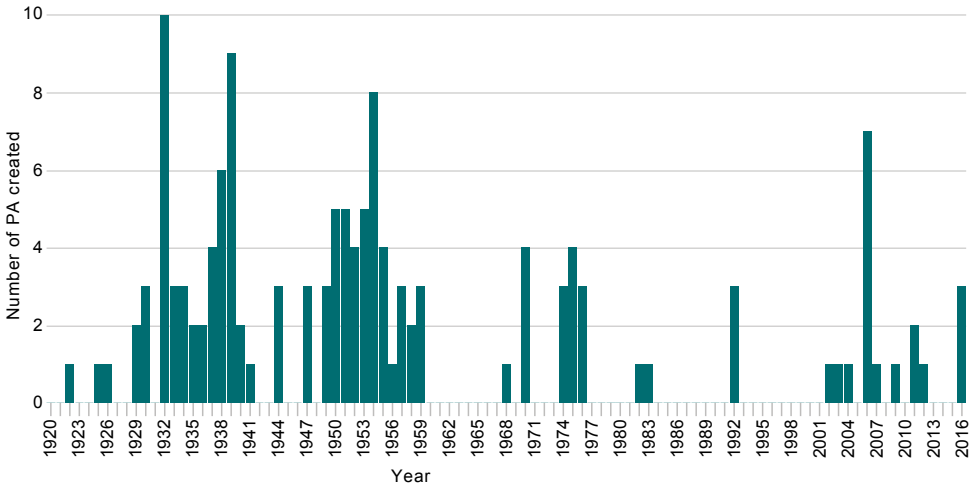


Figure 46
Number of protected areas created annually
A significant number of protected areas were created in the 1930s and 1950s, with 31 and 29 areas designated in each decade respectively. This equates to approximately 30% of the total number of protected areas in the DRC created in each of these two decades. More than 70% of all protected areas came into existence during the colonial era. The 1970s and 2000s were the most productive post-independence decades, with respectively 14 and 12 protected areas designated, or 10% and 9% of the total number. A limited number of protected areas was created in the 1960s, 1980s, 1990s and 2010s.

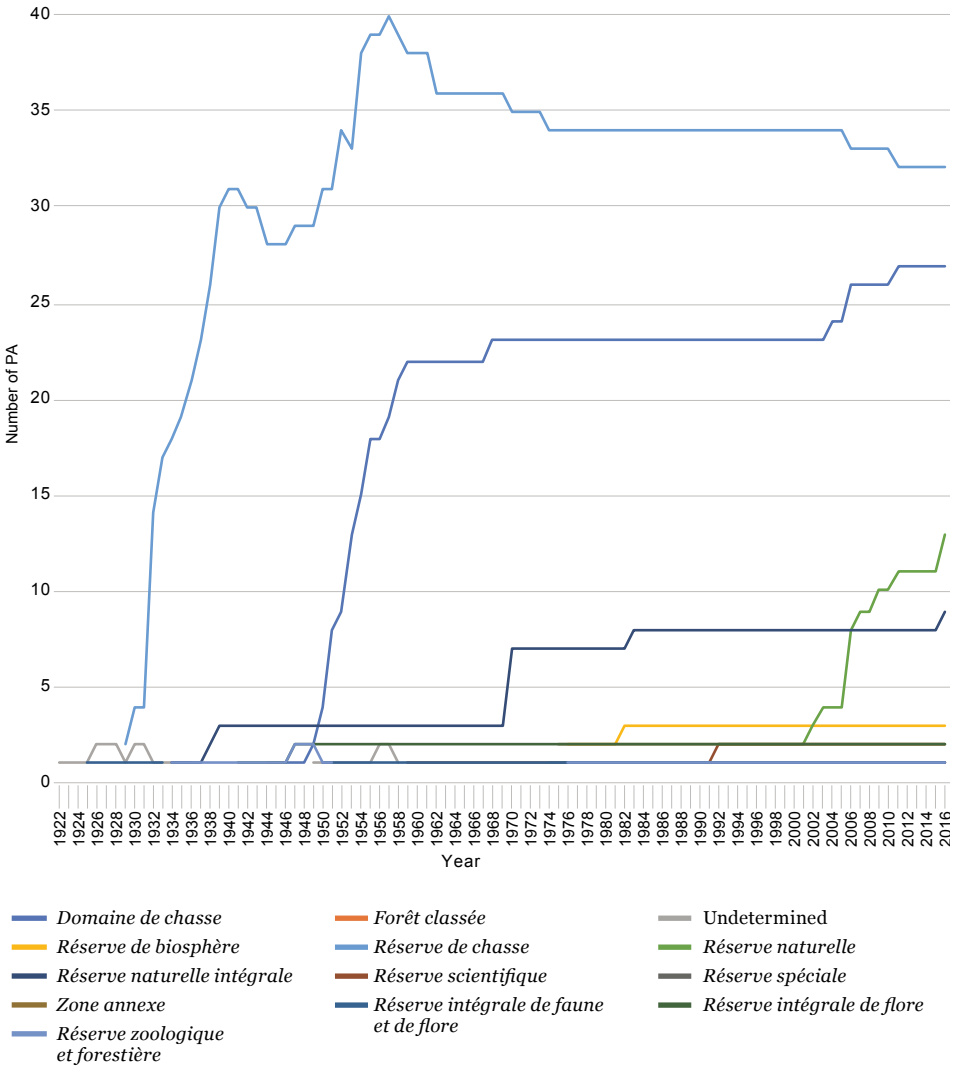
Box 7 : Species management areas

Sixteen species reserves, covering large tracks of land, are not taken into account in the state of the protected area system. The management rules they aim at implementeng are redundant with the one promoted at national level through Law No. 82-002 of May 28, 1982.

The reserves are the following:

- *Réserve à antilopes rouannes de la province de Costermanville*
- *Réserve à antilopes rouannes de la province de Lusambo*
- *Réserve partielle de chasse dans les provinces de Costermanville et Stanleyville*
- *Réserve partielle de chasse dans la région des lacs Mokotos*
- *Réserve partielle de chasse dans le territoire de Rutshuru*
- *Réserve partielle de chasse dans le territoire de Sakania*
- *Réserve partielle de chasse dans les régions de Tshofa et de Kasengwa*
- *Réserve à hippopotames dans la province de Coquilhatville*
- *Réserve à hippopotames dans les eaux et sur les rives Lualaba, entre le 5^{e} parallèle et Kindu*
- *Reserve à hippopotames dans les eaux et sur la rive gauche d'une section de la rivière Lomami*
- *Réserve à hippopotames sur certaines sections de la rivière Lomani*
- *Réserve à hippopotames dans les eaux et sur les rives du fleuve Lualaba comprises entres les chutes Bamanga et les chutes Stanley*
- *Réserve à hippopotames de Mangai*
- *Réserve à hippopotames dans les eaux et sur la rive gauche de la rivière Semliki, entre le confluent avec la Lamya et l'embouchure dans le lac Albert*
- *Réserve à hippopotames dans le territoire de Sakania*
- *Réserve partielle et intermittente dans la région ouest du territoire des Bayaka*

Figure 47
Number of protected areas by year and standardized category
At the end of the 1920s, the "réserve de chasse" category had the highest number of entities. The "domaine de chasse" category appeared at the end of the Second World War and increased in number significantly over the following fifteen years. Today it is the second most represented category. The first "réserves naturelle intégrale" were created in the 1930s. Their number more than doubled in the 1970s. The "réserve naturelle" category emerged in the 1990s and has experienced a surge in numbers since the beginning of the 2000s.

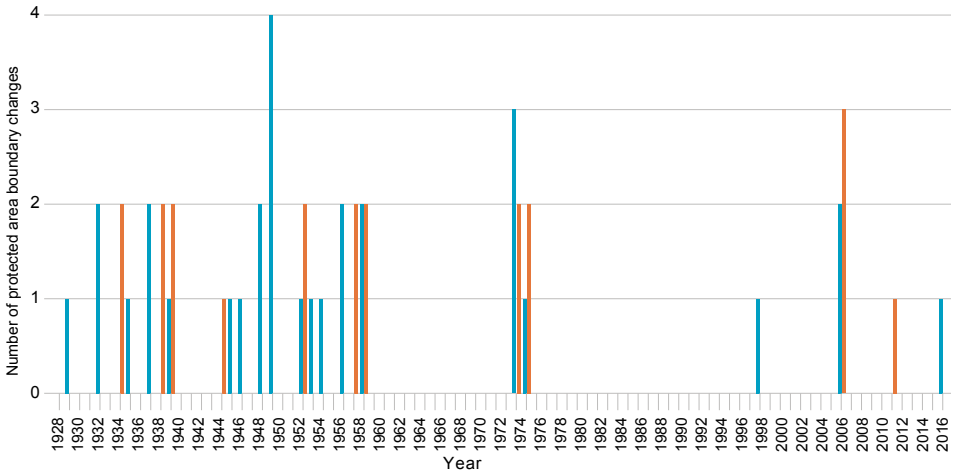



A view of the forest canopy


Chameleon, Maniema

River, Lualaba

Figure 48
Number of protected area boundary changes by year
Boundary changes without modification of category represent 59% of the total number of documented cases. Nearly 70% of all spatial transformations, with or without category change, occurred during the colonial period. Respectively 23% and 33% of the observed changes occurred in the 1930s and 1950s. Fifty percent of all post-independence changes were registered in the 1970s and 30% in the 2000s. Modifications with a change in management category have been relatively higher since the 1960s.



The protected area system today

The current protected area system includes 78 *in situ* protected areas, covering at least 13.5% of the national territory (Table 8). Most of these protected areas were designated with large mammal species as their primary conservation targets.

Approximately 55% of the total number of protected areas, representing more than 14 million hectares or 44% of the system's total area, have been designated explicitly to manage hunting. Encompassing a variety of hunting objectives, these protected areas form a disparate group that potentially comprises an array of IUCN protected area categories (i.e., II, IV, VI and "uncategorized").

Protected areas such as strict nature reserves, including the eight national parks, and some nature reserves, have been designated using a more systematic approach, although wildlife has very often played an important role in the definition of their objectives. Applying strict management regulations, these entities account for only 15% of the total number of protected areas, but represent a relatively large percent of the protected area system's area (i.e., 27%). They typically correspond to an IUCN category II protected area.

Finally, a very small number of protected areas focus mainly on flora protection. They have very limited areas.

Thanks to their biological riches, some of the DRC's protected areas have been recognized at global level. Five are inscribed on the World Heritage List and a dozen are entirely or partly covered by the four sites inscribed on the List of Wetlands of International Importance.

The so-called *ex situ* protected areas, which contribute to the conservation of flora and fauna taxa outside of their natural environment, include three botanical gardens, three zoological gardens and one mixed garden.

ICCN is the public agency overseeing the management of *in situ* and *ex situ* protected areas. Biosphere reserves are the only entities placed under another authority, the national MAB committee of the MEDD. The National Institute for Agronomic Study and Research (*Institut National pour l'Étude et la Recherche Agronomiques* - INERA) is also implicated in the management of two of the DRC's biosphere reserves.

Aerial view of a watercourse, Parc national de la Salonga

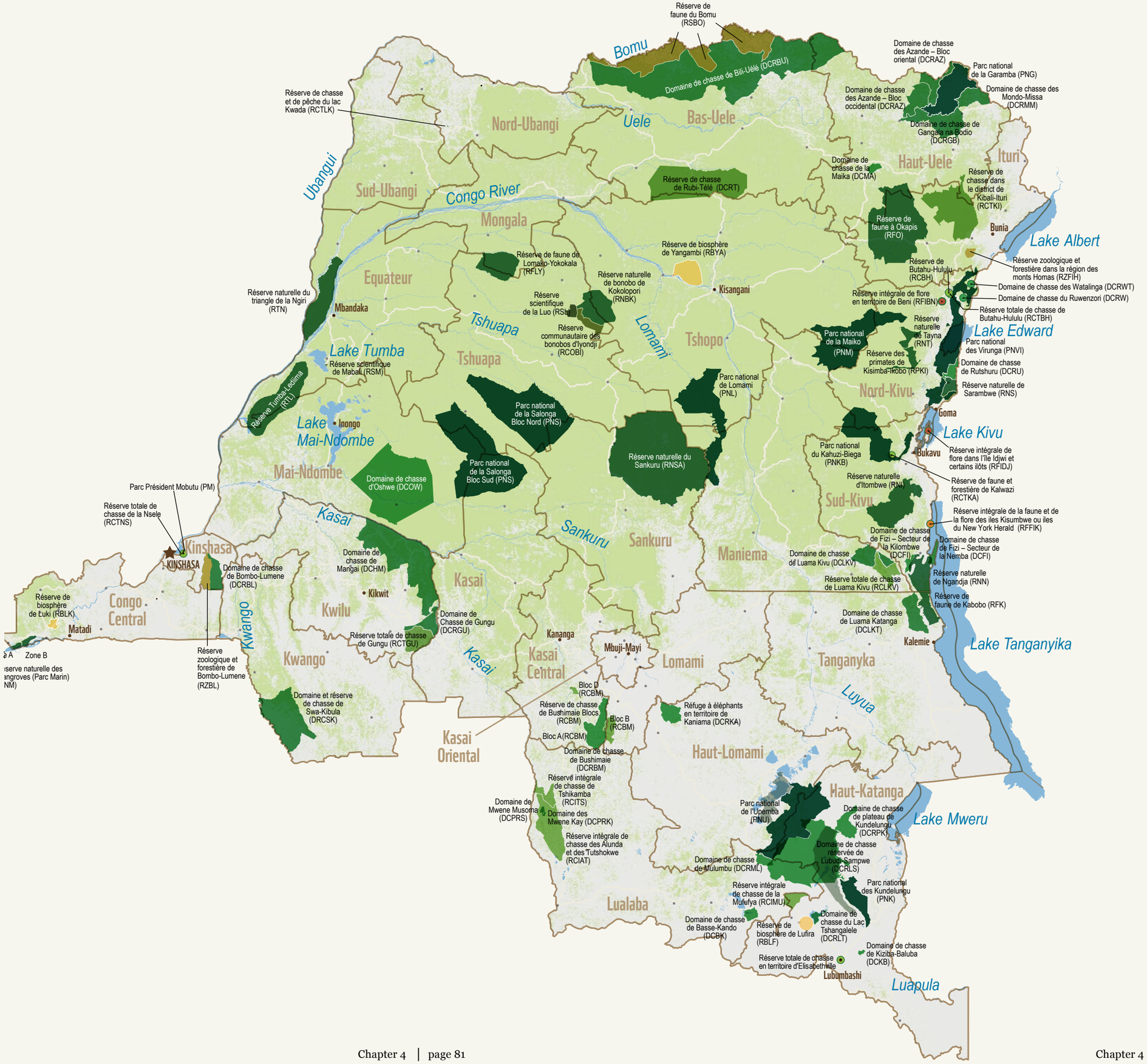
Map 13
The protected area system of the Democratic Republic of the Congo
Please note that complimentary information on the configuration of certain protected areas is provided in Annex 2.

Legend

- National capital
- Provincial capital
- Important locality
- Province
- Major river

Standardized category

- Réserve naturelle intégrale
- Réserve naturelle
- Domaine de chasse
- Réserve de chasse
- Réserve scientifique
- Forêt classée
- Réserve spéciale
- Réserve zoologique et forestière
- Zone annexe
- Réserve de biosphère
- Réserve intégrale de faune et flore
- Réserve intégrale de flore



Standardized category	Number of protected areas*	Total area (ha)	% of national territory
Domaine de chasse	26 (24)	10,986,893	4.67
Forêt classée	1 (1)	103,000	0.04
Réserve de biosphère	3 (3)	332,641	0.14
Réserve de chasse	16 (11)	3,006,210	1.28
Réserve naturelle	13 (13)	7,362,341	3.14
Réserve naturelle intégrale	9 (9)	8,466,689	3.61
Réserve scientifique	2 (2)	50,379	0.02
Réserve spéciale	1 (1)	1,067,102	0.45
Zone annexe	2 (2)	849,121	0.36
Réserve zoologique et forestière	2 (2)	138,877	0.06
Réserve intégrale de faune et de flore	1 (0)	Not calculated	Not calculated
Réserve intégrale de flore	2 (0)	Not calculated	Not calculated
Total	**78**	**31,704,091****	**13.5****

Table 8
Number and area of existing protected areas by standardized management category
* The number of protected areas that figured in the calculation of area and percentage of national area is included in parentheses. The discrepancy results from the fact that some protected areas were not able to be mapped.
** The calculation takes into consideration 659 162 ha of overlap concerning multiple protected areas.

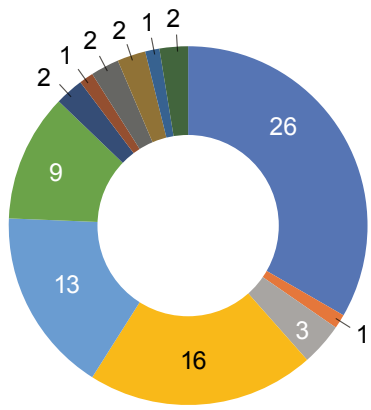


Figure 49
Number of protected areas by standardized management category

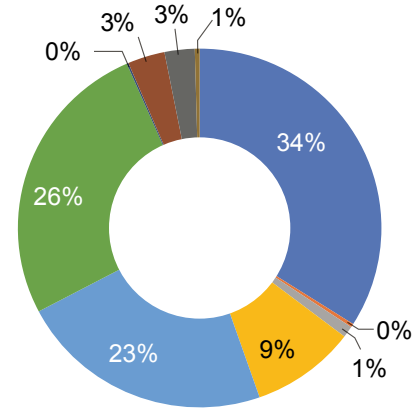
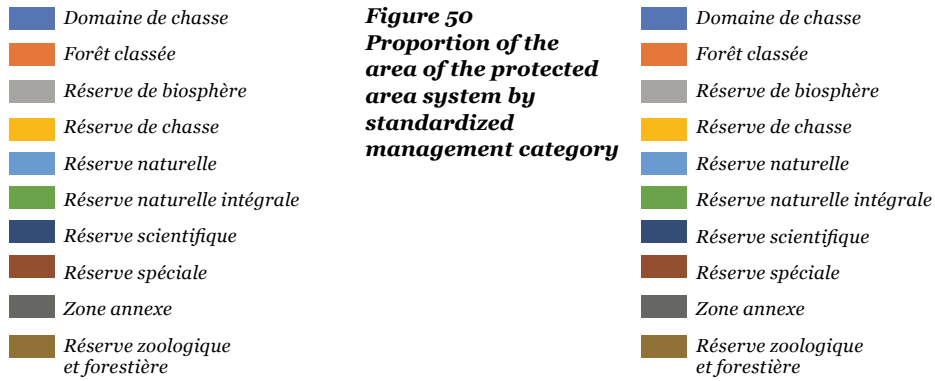


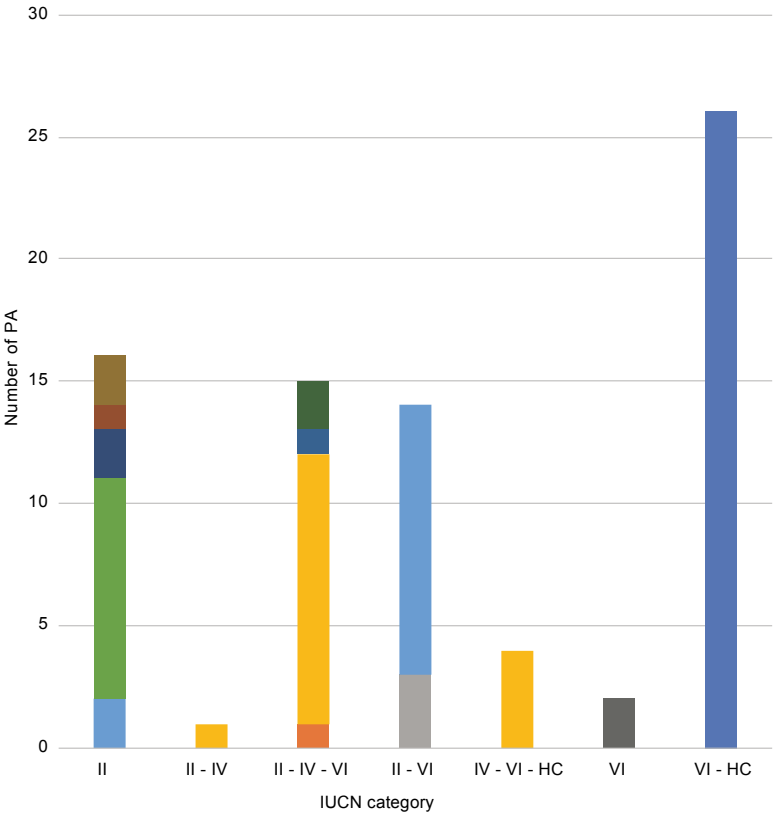
Figure 50
Proportion of the area of the protected area system by standardized management category



Children gathering fruit, Mbanzi

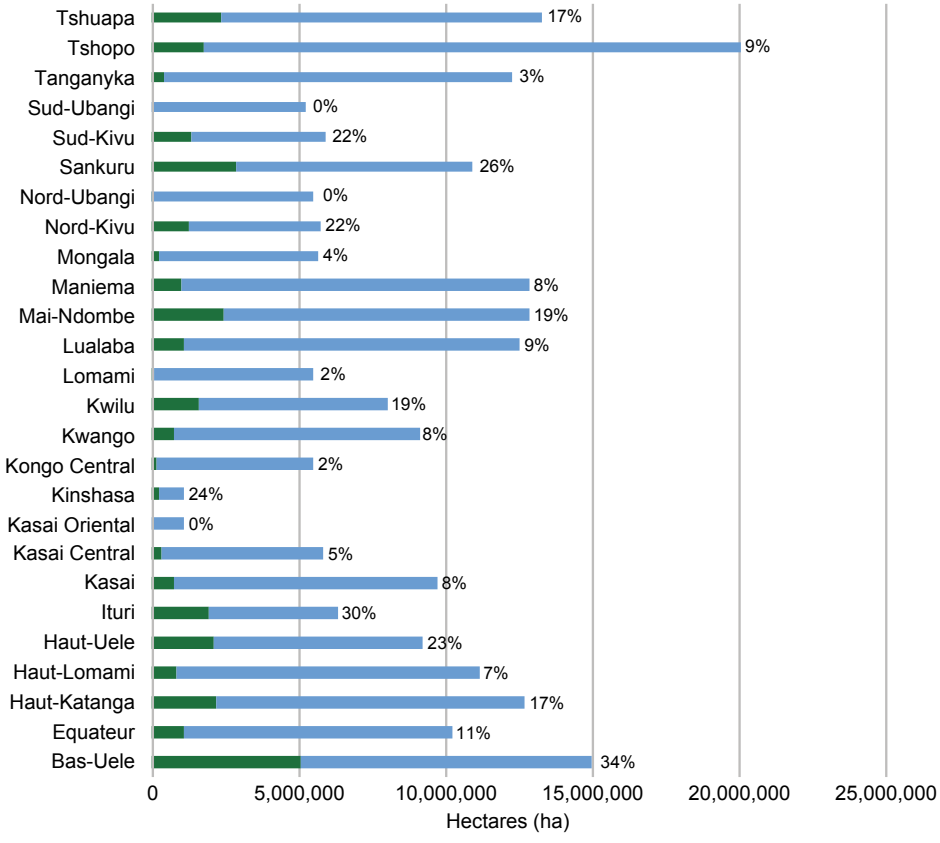
Young slender snouted crocodile (Mecistops cataphractus), Parc national de la Salonga

Figure 51
Number of protected areas by IUCN category
The attribution of an IUCN category to a protected area requires compliance with certain principles. Based on a dialogue with the managing authority, the IUCN categories apply to a site and not to a category. The category is determined on the basis of the conservation objective, the alignment between the management arrangements and the conservation objective, and the fact that these arrangements must apply to at least 75% of the area of the assessed site. Undertaking this process is not feasible for most protected areas in the DRC; therefore, the program analyzed the system based on a notion of potential IUCN categories.



- *Réserve intégrale de flore*
- *Réserve intégrale de faune et de flore*
- *Réserve zoologique et forestière*
- *Zone annexe*
- *Réserve spéciale*
- *Réserve scientifique*
- *Réserve naturelle intégrale*
- *Réserve naturelle*
- *Réserve de chasse*
- *Réserve de biosphère*
- *Forêt classée*
- *Domaine de chasse*

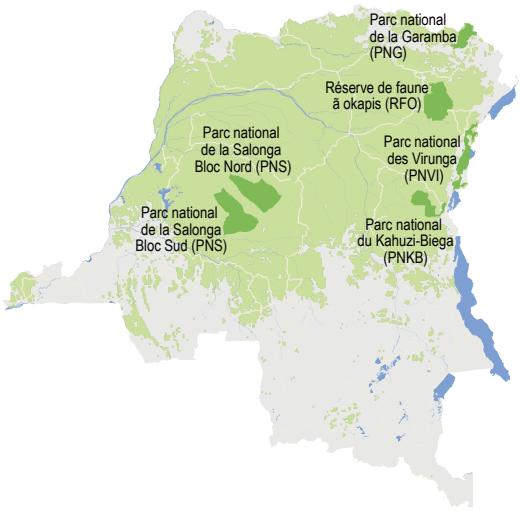
Figure 52
Proportion of each province that is protected
Over a third of the area of Bas-Uele is covered with protected areas. More generally, six eastern provinces are among the ten provinces with the highest rate of protected area coverage.



- Total area of province under protection (ha)
- Total area of province not classified under protection (ha)

Table 9
Protected areas inscribed on the List of World Heritgage
Five protected areas in the DRC, covering 6,658,286 ha (2.84% of national territory), have been recognized for their exceptional natural values under the World Heritage Convention. At present, all five of these sites are inscribed on the List of World Heritage in Danger. The administrative areas cited are those referenced in inscription documents; more recently the Information Management System for Protected Areas (Système de Gestion d'Information pour les Aires Protégées - SYGIAP) program produced base maps of each of these sites allowing for more precise calculation of areas using a geographic information system (GIS).

Map 14
Protected areas inscribed on the List of World Heritage

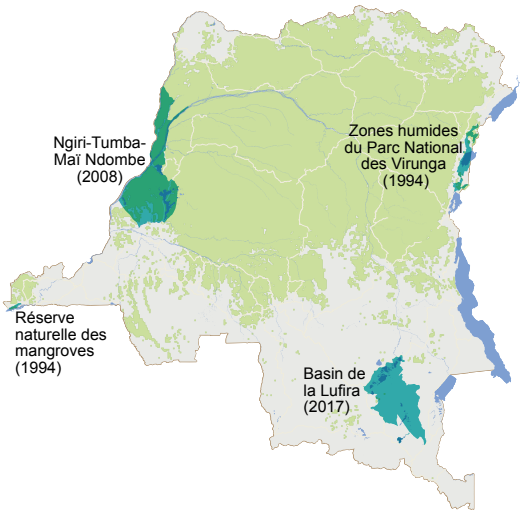


World Heritage Site (WHS)	Administrative area (ha)*	Date of inscription on the List of World Heritage	Date(s) of inscription on the List of World Heritage in Danger
Parc national des Virunga	790,000	1979	1994 - present
Parc national de Garamba	490,000	1980	1984 - 1992, 1996 - present
Parc national du Kahuzi-Biega	600,000	1980	1997 - present
Parc national de la Salonga	3,600,000	1984	1999 - present
Réserve de faune à okapis	1,372,625	1996	1997 - present

* Administrative area refers to the area referenced in documentation.

Table 10
Sites inscribed on the List of Wetlands of International Importance
The four sites inscribed on the List of Wetlands of International Importance cover 5.08% of the national territory. This surface is not directly included in the area figures for the protected area system presented above. These sites comprise existing protected areas to varying degrees. Two sites are centered on two respective protected areas without being congruent, one site encompasses a protected area complex and a very limited non-classified area, and the fourth includes several protected areas within a vast non-classified landscape. The Lufira Basin site was inscribed under an initiative led by PARAP.

Map 15
Sites inscribed on the List of Wetlands of International Importance

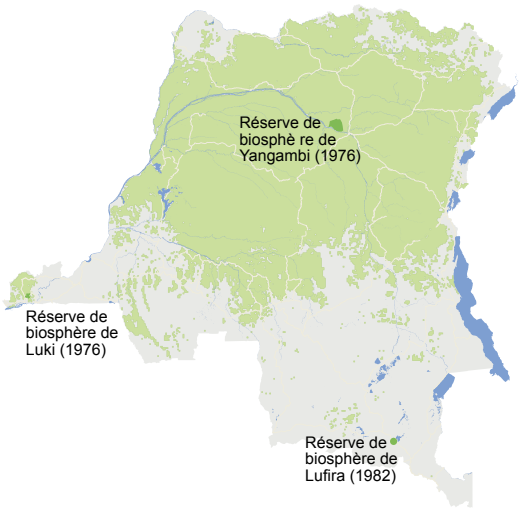


Ramsar site	Administrative area (ha)*	Date of Inscription on the List of Wetlands of International Importance
Parc national des Mangroves	66,000	1996
Zones humides du Parc national des Virunga	800,000	1996
Ngiri-Tumba-Maindombe	6,569,624	2008
Basin de la Lufira	4,487,593	2017

* Administrative area refers to the area referenced in documentation.

Table 11
Biosphere reserves
The government of the DRC has nominated three sites as biosphere reserves under the UNESCO's Man and the Biosphere Programme (MAB). These areas comprise different types of ecosystems and are intended to serve as living laboratories to balance biodiversity conservation with sustainable development.

Map 16
Biosphere reserves



Biosphere reserve	Administrative area (ha)*	Date of inscription
Réserve de la biosphère de la Lufira	14,700	1982
Réserve de la biosphère de Luki	32,968	1976
Réserve de la biosphère de Yangambi	235,000	1976

* Administrative area refers to the area referenced in documentation.

Table 12
Botanical and zoological gardens
The first botanical and zoological gardens in the DRC were established over 100 years ago. Today the degree of operation and capacity of these sites varies significantly.

Map 17
Botanical and zoological gardens

Ex situ protected area	Date of creation
Jardin botanique de Kisantu	1900
Jardin botanique d'Eala	1900
Jardin zoologique de Kinshasa	1933
Jardin botanique de Kinshasa	1936
Jardin zoologique et botanique de Gbadolité	1980
Jardin zoologique de Lubumbashi	1936
Jardin zoologique de Kisangani	1955

Understanding the context

Strategic planning and management of the protected areas system requires careful consideration of its context. Among the most complex challenges facing the protected area system of the DRC are the country's demographic trends and competition for land and raw materials.

Demography and the protected area system

The DRC has a rapidly growing population that is the fourth largest in Africa and eighteenth largest in the world. Between 2005 and 2050, the DRC is anticipated to be one of nine countries expected to account for over half of the world's projected population increase. From 2010 to 2015, the population grew at an annual rate of over 3% and in 2017 was estimated to total over 81 million.[viii] The population of the country is very diverse, encompassing over 200 different ethnic groups. Forty-three percent of the population is estimated to live in rapidly growing urban areas, including the capital, Kinshasa, as well as the province capitals of Lubumbashi, Mbuij-Mayi, Kananga, Kisangani and Bukavu. The distribution of the rural population greatly varies, with some very low-density areas in the center and the northeast, and average to high or very high-density areas in the east. The DRC is also a source of and host to hundreds of thousands of refugees; as of 2017 the DRC was estimated to have 3.9 million internally displaced peoples.

The rapid population growth in the DRC translates into a high number of young people poised to join and contribute to the country's workforce. At the same time, the growing population requires additional resources to meet food and energy needs and adds to the strain on the country's resources. The DRC has been implementing a series of economic reforms for over a decade, but progress remains slow due to instability, low commodity prices and an uncertain legal framework. Today poverty is widespread and substantial economic activity still occurs within the informal sector.

Many of the DRC's protected areas have significant human populations within their boundaries and in peripheral areas. Often in locations that see limited investment or infrastructure, these indigenous peoples or local communities can face notable socio-economic challenges. Many have limited access to basic public services, such as education and health, and they frequently rely on natural resources as an important source of subsistence and livelihoods. While protected areas provide an important means of preserving the values upon which these communities depend, the growing demand for resources both locally and globally poses a considerable threat. Overharvesting of natural resources and encroachment of protected areas, including for agricultural expansion, are among the key threats facing protected areas in the DRC today.

Map 18
Demography and the protected area system
The Global Human Settlement (GHS) Population Grid (JRC, 2015) depicts the distribution and density of population in the DRC, expressed as the number of people per 250 m cell. The data indicate urban clusters and the scattered distribution of people across rural areas.

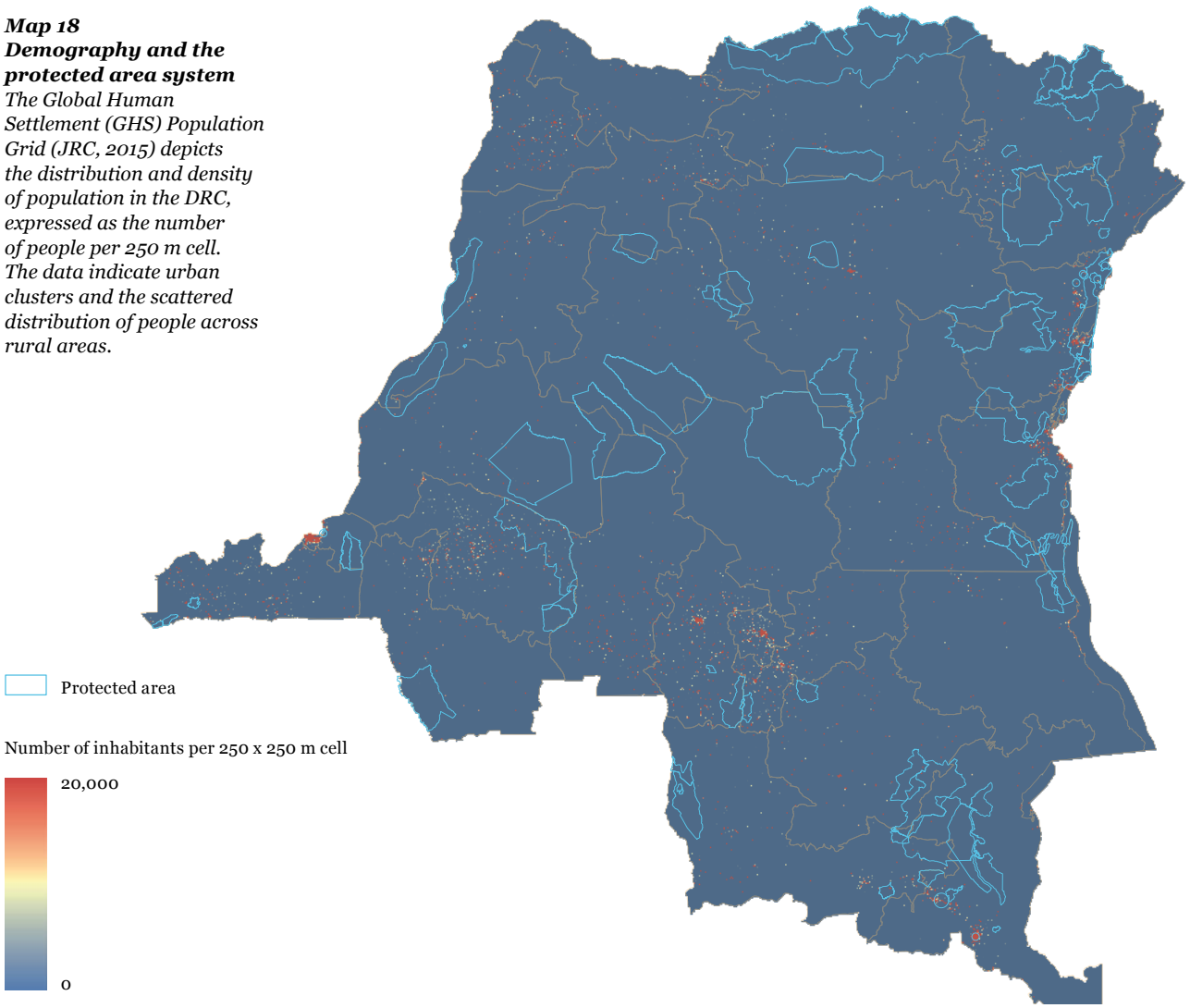
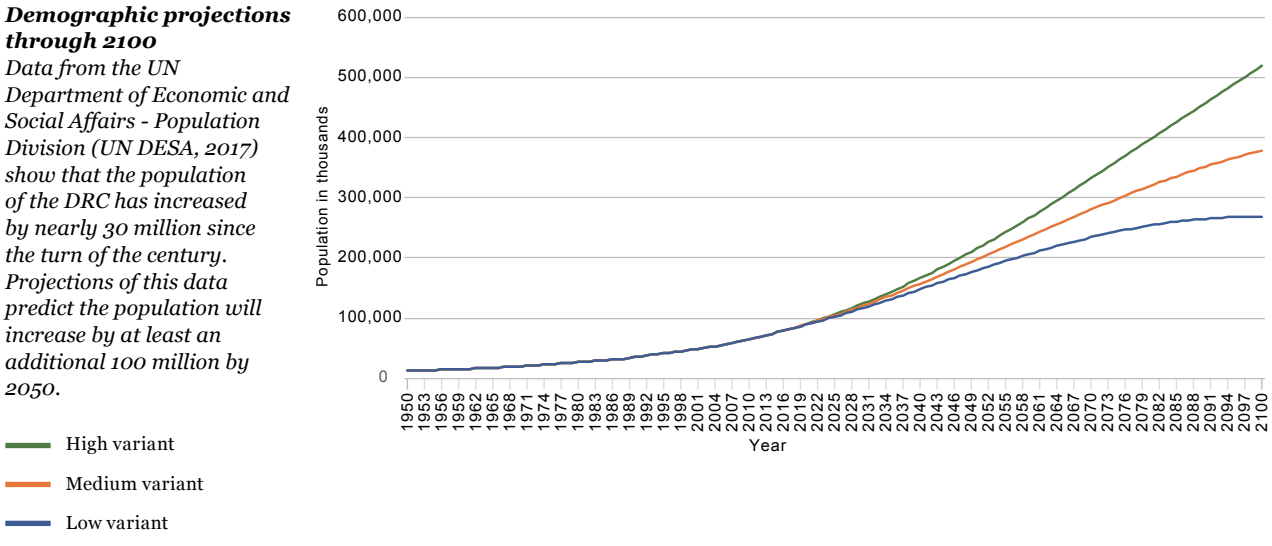


Figure 53
Demographic projections through 2100
Data from the UN Department of Economic and Social Affairs - Population Division (UN DESA, 2017) show that the population of the DRC has increased by nearly 30 million since the turn of the century. Projections of this data predict the population will increase by at least an additional 100 million by 2050.



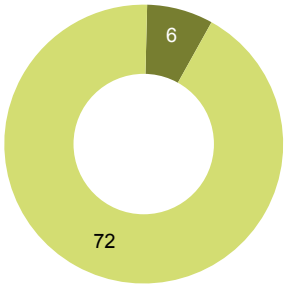
Land use

Competition for land and resources in the DRC is increasing because of both the growing population and the demand for commodities. This competition is evidenced by increasing pressures on natural resources and the overlapping of protected areas with other land uses. Recognizing that the commercial exploitation of forests, mining, and oil and gas resources represent important sources of revenue for the DRC, managing the impacts of these activities and associated infrastructure through coordinated, inter-sectoral land use planning is imperative. It also requires the establishment and implementation of a strong policy and legal framework that is aligned as regards exploration and exploitation of resources within protected areas, as well as building the institutional capacity to implement and enforce relevant laws and regulations.

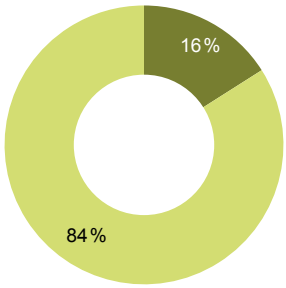
Forest management

The vegetation cover of the DRC is dominated by dense forests, covering about 49% of the national territory, and other types of forest formations. These forests represent significant capital and are owned by the State. The forest regime, which has been in effect for fifteen years, promotes the sustainable management of forest resources in order to increase their contribution to socio-economic development while preserving biodiversity. Recognition of the vital role the forests of the Congo Basin play in regulating climate has reiterated the importance of sustainable management strategies.

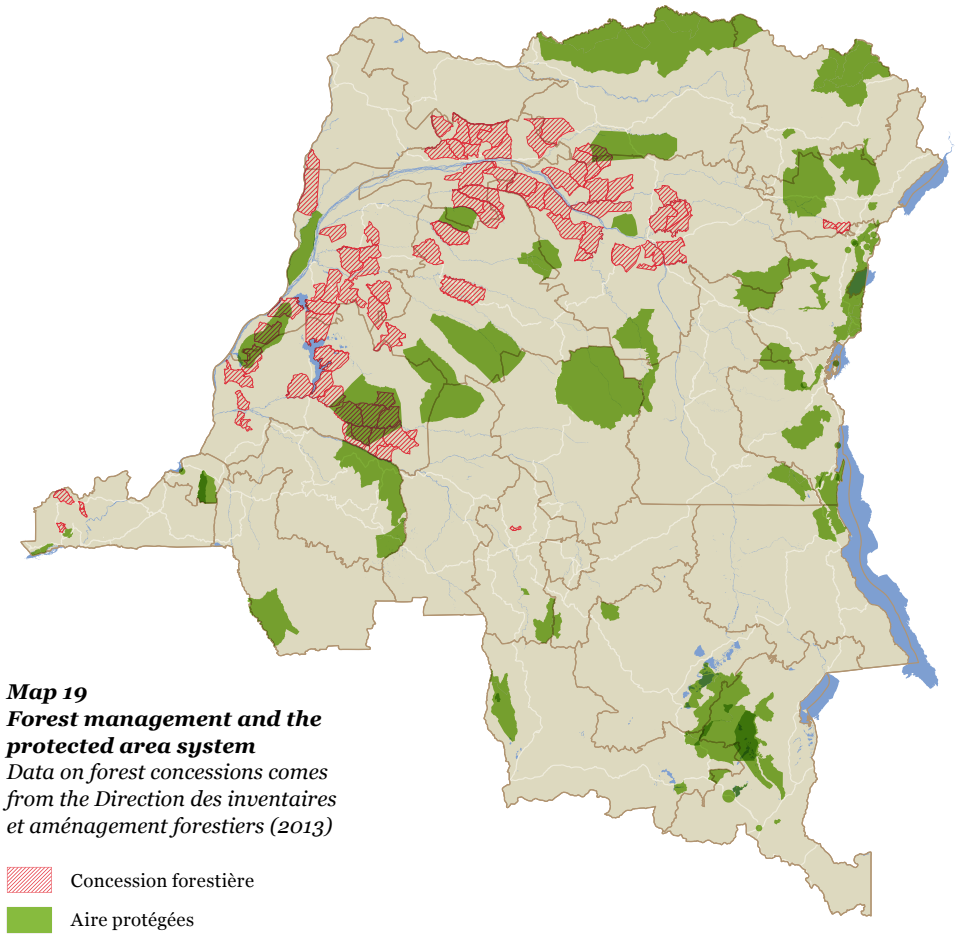
Figure 54
Overlap between forest concessions and the protected area system



Number of protected areas affected by overlapping forest concessions
Number of protected areas affected: 6
Number of protected areas not affected: 72



Percentage of surface area of the protected area system affected: 16%
Percentage of surface area of the protected area system not affected: 84%



Map 19
Forest management and the protected area system
Data on forest concessions comes from the Direction des inventaires et aménagement forestiers (2013)

The national forest estate is divided into three forest categories based on their usage: classified forests, protected forests and permanent production forests.

Part of the State domain, classified forests are formations of ecological interest. They are designated through a formal act of classification and fall under a restrictive legal regime in terms of use and exploitation rights. A large proportion of classified forests are protected areas of national interest, as recently defined. According to the forest regime, classified forests should cover at least 15% of the national territory.

The legal regime on use and exploitation rights is less restrictive for protected forests. Concessions are permitted, for a maximum duration of twenty-five years, to valorize their resources. A community with legal status is entitled to obtain a forest concession within protected forests. Since 2016, it has been possible to establish biodiversity conservation as the main management objective of a concession. According to recent provisions, such entities could be recognized as protected areas.

Permanent production forests are forests extracted from the protected forest domain based on a public process with the objective to establish concessions that will valorize their resources. They are included in the permanent forest register and their management must guarantee the preservation of forest cover and the conservation of wildlife. Concession managers must implement several measures for biodiversity conservation under the sustainable forest management process. Such measures aim at the sustainable management of wildlife, the protection of high conservation value ecosystems and the development of management synergies with any proximate protected areas.

Artisanal and commercial exploitation of forest resources can have significant impact on ecosystems, also within protected areas. Undergrowth destruction, soil erosion and canopy loss are locally generated disturbances, while fragmentation of forests and modification of their structures and flora compositions are observed at the landscape level. Exploitation activities also indirectly facilitate access to remote areas, leading to the settlement of external people and subsequent increases in hunting and bushmeat trade.

Today, six protected areas overlap with forest concessions. Three of these protected areas have over half of their respective areas affected (i.e., the *Réserve scientifique de Mabali* - RSM, the *Réserve Tumba-Lediima* - RTL and the *Domaine de chasse d'Oshwe* - DCROW), one is approximately 10% affected (i.e., the *Réserve de chasse de Rubi-Télé* - DCRT), and two are subject to less than 1% of overlap (i.e., the *Réserve de faune de Lomako-Yokokala* - RFLY and the *Domaine de chasse de Mangai* - DCHM). The total area concerned represents 5 million hectares.

Intersectoral coordination must be enhanced to implement effective and integrated management of the forest estate and ensure the conservation of biodiversity. The Direction of Forest Inventories and Management (*Direction des Inventaires et de l'Aménagement Forestier* - DIAF) and ICCN, two institutions under the authority of the MEDD, play an important role in this process.

Mining

The DRC is one of the world's most important countries for mining, with a mineral wealth that was estimated at $24 trillion in 2011. Among its most important mineral resources are three percent of global copper reserves, 25% percent of global diamond reserves and 45% of global cobalt reserves, as well as important quantities of tantalum and tin.[ix] These reserves constitute an important source of potential revenue to support development.

Presently, the mining sector is divided between large-scale industrial mining and artisanal and small-scale mining. Artisanal scale mining (ASM) became increasingly important in the 1990s as the country experienced considerable insecurity. In 2011, it was estimated to account for 90% of production and involve up to two million workers.[x] Improvements in security starting in 2004 mean that large-scale industrial mining (LSM) has re-emerged within the sector.

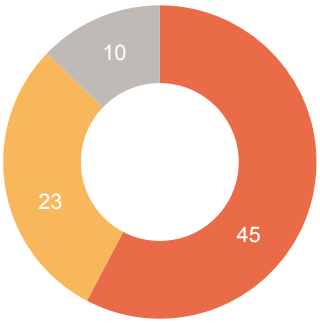
The environmental impacts of mining can be significant, and include landscape and vegetation degradation, water and air pollution, and radioactive contamination. Similar to logging, the presence of mining and associated infrastructure can also increase access to remote areas and put additional pressures on natural resources, also in protected areas. These pressures include the expansion of slash and burn agricultural activities, wood collection, and the illegal and unsustainable hunting of wildlife.

Overlap between mining and protected areas

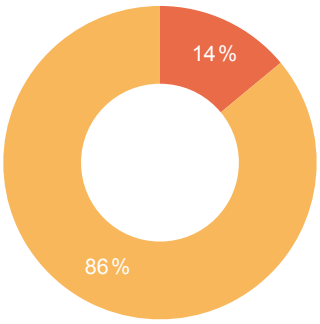
The issue of overlapping land uses between protected areas and mining concessions is prevalent across the DRC. Over 50% of the country's protected areas are affected by varying degrees of overlap, representing a total area of approximately 4.4 million hectares. The mining permits concerned by this overlap are held by different types of parties, including public companies, individuals, small ventures and international mining groups. Many protected areas, including national parks and World Heritage Sites are also important sites of ASM, especially in the east of the country. Among the factors contributing to this overlap are inconsistencies in the legal framework, the lack of a national strategy for land use and weak intersectoral capacity and planning, and inconsistent delimitation of protected areas and mining concessions. Addressing this land use conflict requires close coordination between ICCN and the Mining Cadastre (*Cadastre Minier* - CAMI).

Gold dust

Mineral extraction, Domaine et réserve de chasse de Swa-Kibula



Number of protected areas affected by overlapping mining concessions
Number of protected areas affected: 45
Number of protected areas not affected: 23
Undetermined: 10



Percentage of the area of the protected area system affected by overlapping mining concessions
Percentage of area affected: 14
Percentage of area not affected: 86

Figure 55
Overlap between mining concessions and the protected area system
A significant number of exploration and exploitation permits for LSM and ASM overlap existing protected areas in the DRC. Addressing this land use conflict will require close coordination between ICCN and the Mining Cadastre (Cadastre Minier - CAMI).

Recognizing its values

Biodiversity

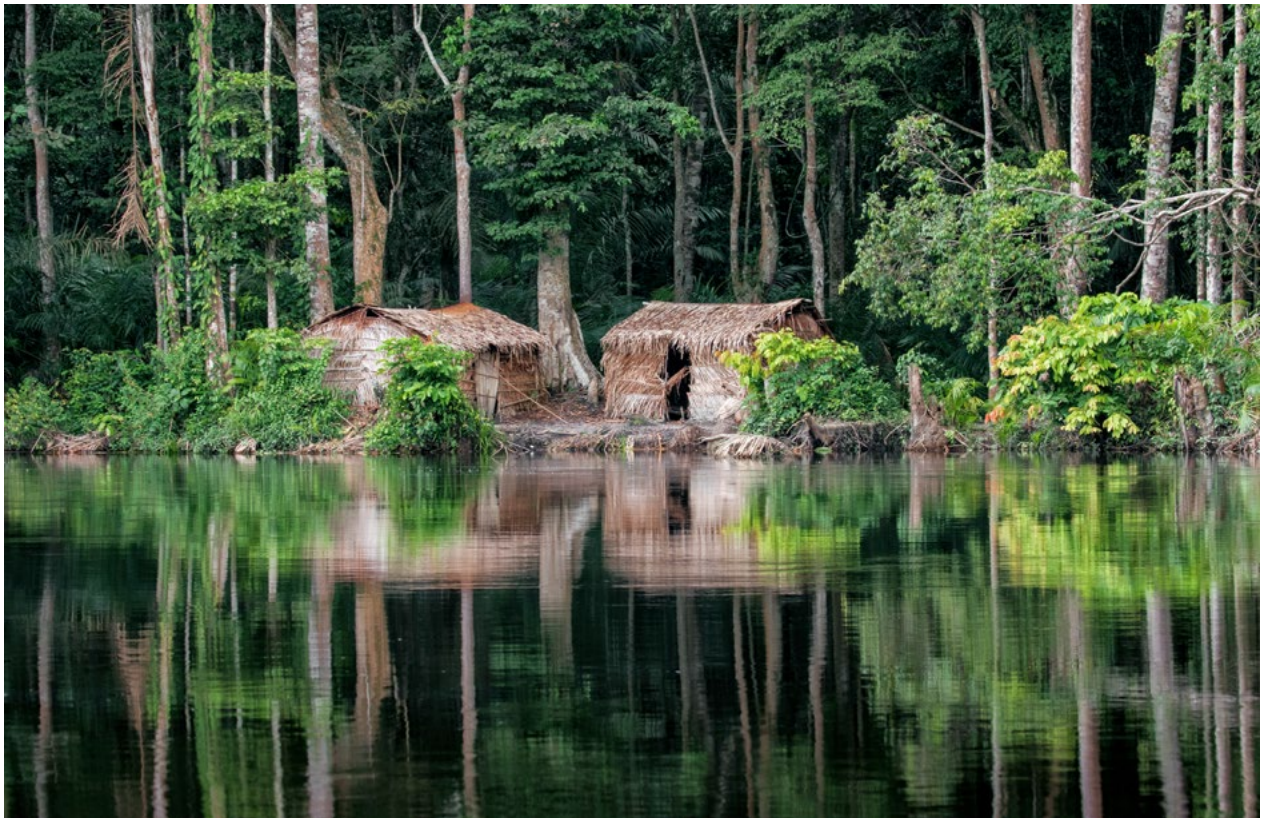
With a plethora of terrestrial and aquatic habitats that span from mangrove forests on the Atlantic Ocean in the west to the montane forests of the Albertine Rift in the east, the DRC is the most biologically diverse country on Africa's mainland. The DRC has been ranked fifth in terms of global significance among the megadiversity countries.[xi] With the highest deforestation rate amongst all the countries of the Congo Basin and 390 species classified as threatened on the IUCN Red List, the biodiversity of the DRC faces intense pressure. A secure protected area system that is well-designed and managed is a critical component of any cost-effective solution to preserving the country's natural heritage and halting the loss of biodiversity.

Land cover

The DRC is a complex patchwork of terrestrial and freshwater ecosystems that represent important habitats for the species of the DRC and provide national, regional and global ecosystem services. Some of these ecosystems are very localized while others cover vast areas of the country. A comprehensive dataset on the ecosystems of the DRC does not exist and there remains much to be learned about the country's wealth of species. As such, data on land cover and ecoregions provide a practical means of examining the diversity of the DRC and the degree to which its ecosystems are represented and effectively conserved within its protected area system.

Mapping of land cover by Verhegghen et al. (2012)[xii] shows that DRC is predominated by dense forests. These forests, which include dense moist forest, submontane forest, montane forest, edaphic forest and mangrove forest, encompass approximately 49% (114,500,000 ha) of the national territory and 60% (19,421,991 ha) of the mapped protected area system. Dense moist forest, defined by White (1983)[xiii] under the term Lower Guineo – Congolian forest, is the most prominent forest type and covers 101,800,000 ha. It also makes up 55% (17,143,488 ha) of the mapped protected area system. Submontane and montane forests are restricted to the eastern mountain range and make up 4% (1,486,935 ha) of the system. Edaphic forests make up an additional 2% (791,568 ha) of the system and are found along the Congo River and

Forest-savanna landscape, Nord Ubangi



Riverside camp, Parc national de la Salonga

some of its tributaries. Some of the DRC's largest protected areas, such as the *Parc national de la Salonga*, are almost entirely dense moist forest while others, like the *Parc national des Virunga*, encompass a wider variety of forests and other land cover classes.

Among the other prominent land classes found in the DRC are: savanna woodland and tree savanna, covering about 16% (37,070,000 ha) of the national territory and 15% (4,566,537 ha) of the mapped protected area system; open deciduous woodland, which includes the Miombo forests, covering 10% (23,920,000 ha) of the country and 6% (1,820,034 ha) of the protected area system; forest savanna transition zones, covering 3% (6,956,000 ha) of the national territory and 4% (1,199,664 ha) of the protected area system. Land cover classes that are distributed more locally include the shrubland, grassland and swamp grassland found in the southern regions of the country and the aquatic grassland found along the Congo River. The rural complex, which is a mosaic of agricultural areas, village plantations and gardens, fallow areas and secondary regrowth, covers 9% (21,440,000 ha) of the DRC and 5% (1,562,121 ha) of the protected area system. Cultivated areas represent about 6% (12,950,000 ha).

Map 20
Land cover and the protected area system
Data on land cover is from a 300 m vegetation map produced by Verhegghen and Defourny (2010). The authors used the standardized Land Cover Classification System developed by the FAO to describe each vegetation type.

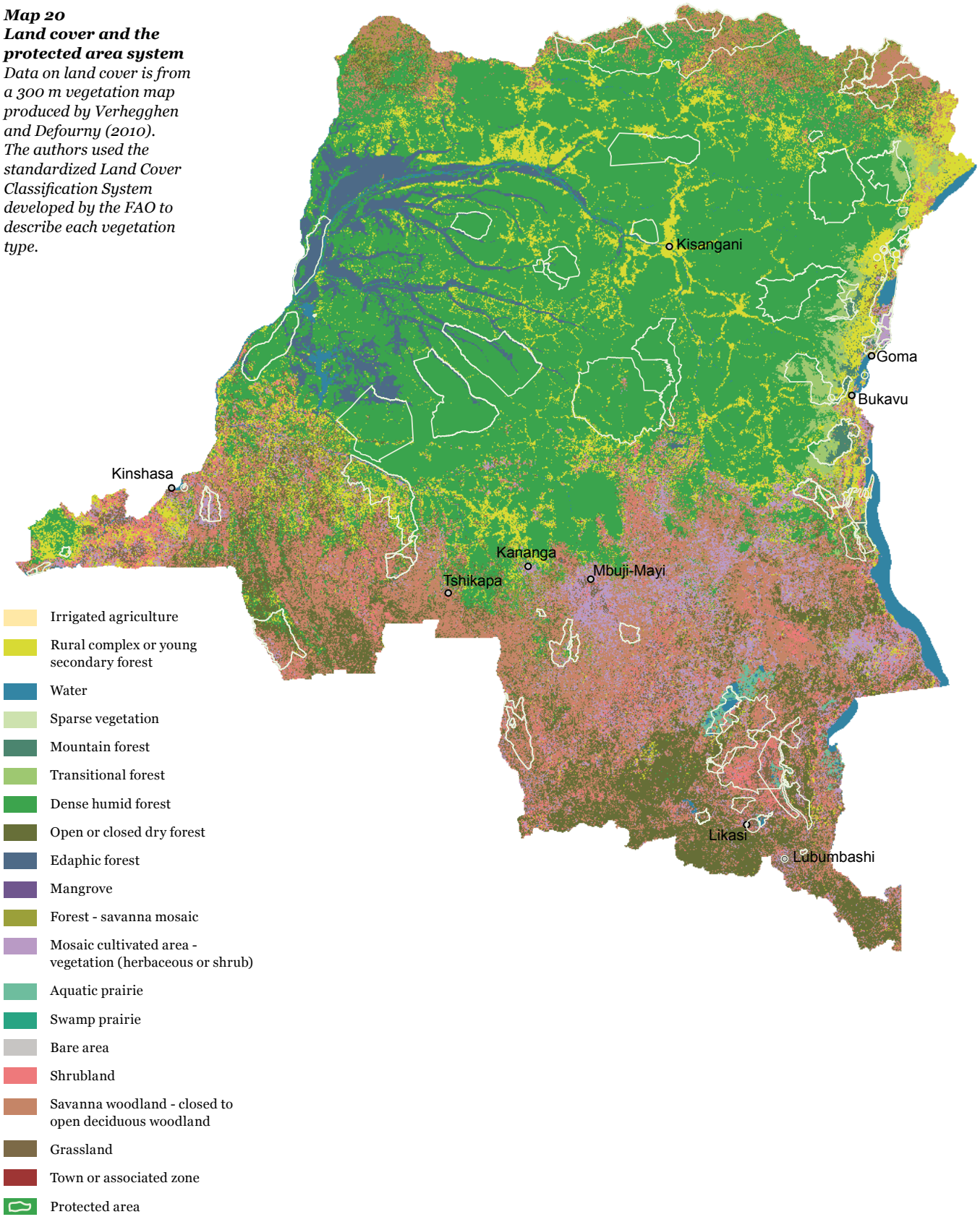
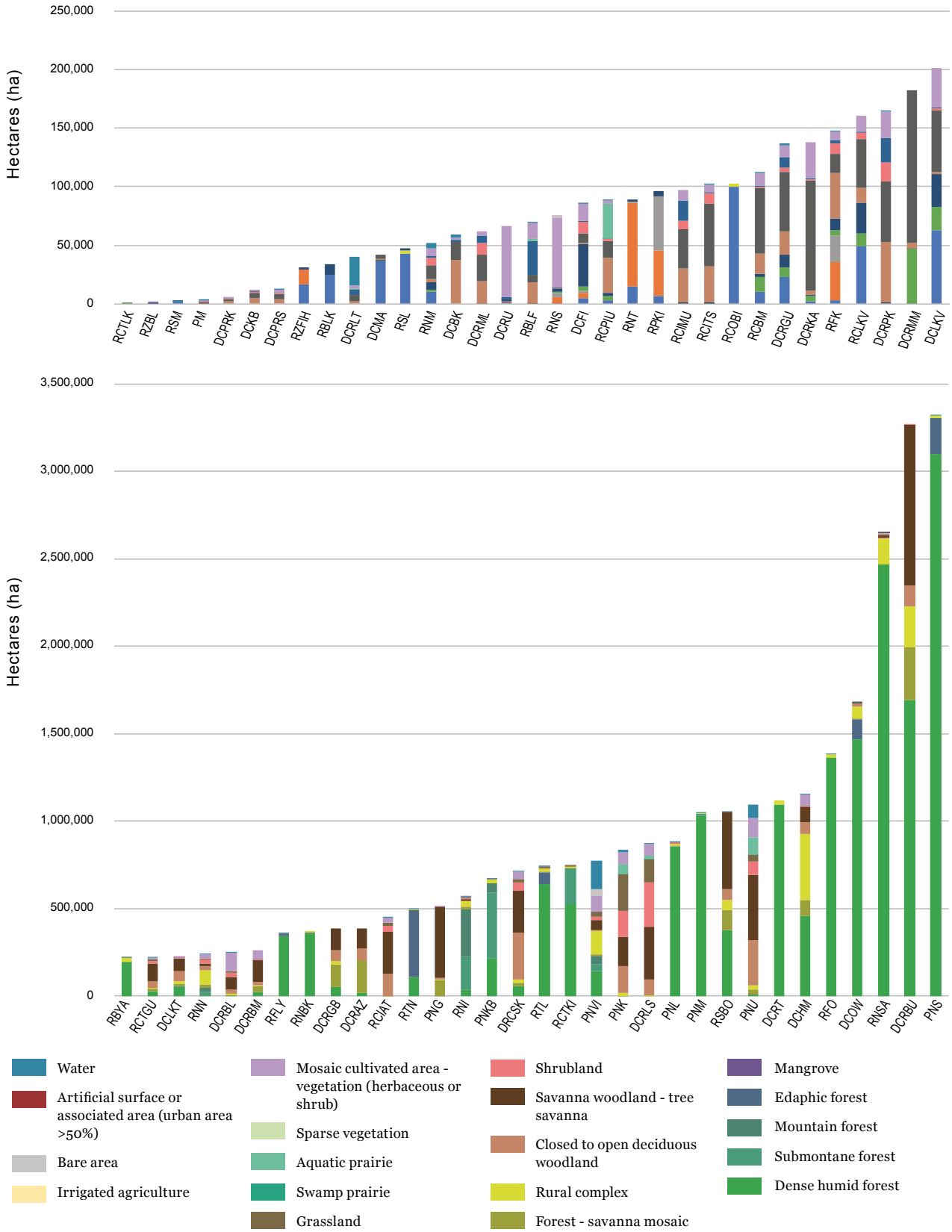


Figure 56
Land cover and the protected area system



Terrestrial ecoregions

The DRC encompasses portions of 18 different terrestrial ecoregions[xiv] that range in size from less than 200,000 to over a 100 million hectares. These geographically distinct assemblages of natural communities were defined by the fact that they share a large majority of species, dynamics, and environmental conditions. The degree of overlap between each ecoregion and the DRC ranges from ecoregions with less than one percent of their geographic area within the DRC to ecoregions that are exclusively found within the DRC. The two ecoregions found exclusively in the DRC are the Central Congolian lowland forests ecoregion, of which 23% is currently found within the protected area system, and the Eastern Congolian swamp forests, of which 7% is currently within the protected area system. Three additional ecoregions have over half of their geographic area within the boundaries of the DRC: the Albertine Rift montane forests ecoregion, which is 62% (6,265,766 ha) within in the DRC and has 13% (1,314,279 ha) of its total area within the protected area system of the DRC; the Northeastern Congolian lowland forests ecoregion, which is 94% (50,030,912 ha) within the DRC and has 10% (5,424,993 ha) of its total area within the protected area network; and the Southern Congolian forest-savanna mosaic ecoregion, which is 90% (50,886,265 ha) within the DRC and has 6% (3,157,908 ha) of its total area within the protected area system.

Map 21
The protected area system and terrestrial ecoregions
Data on ecoregions comes from Olsen et al. (2001).

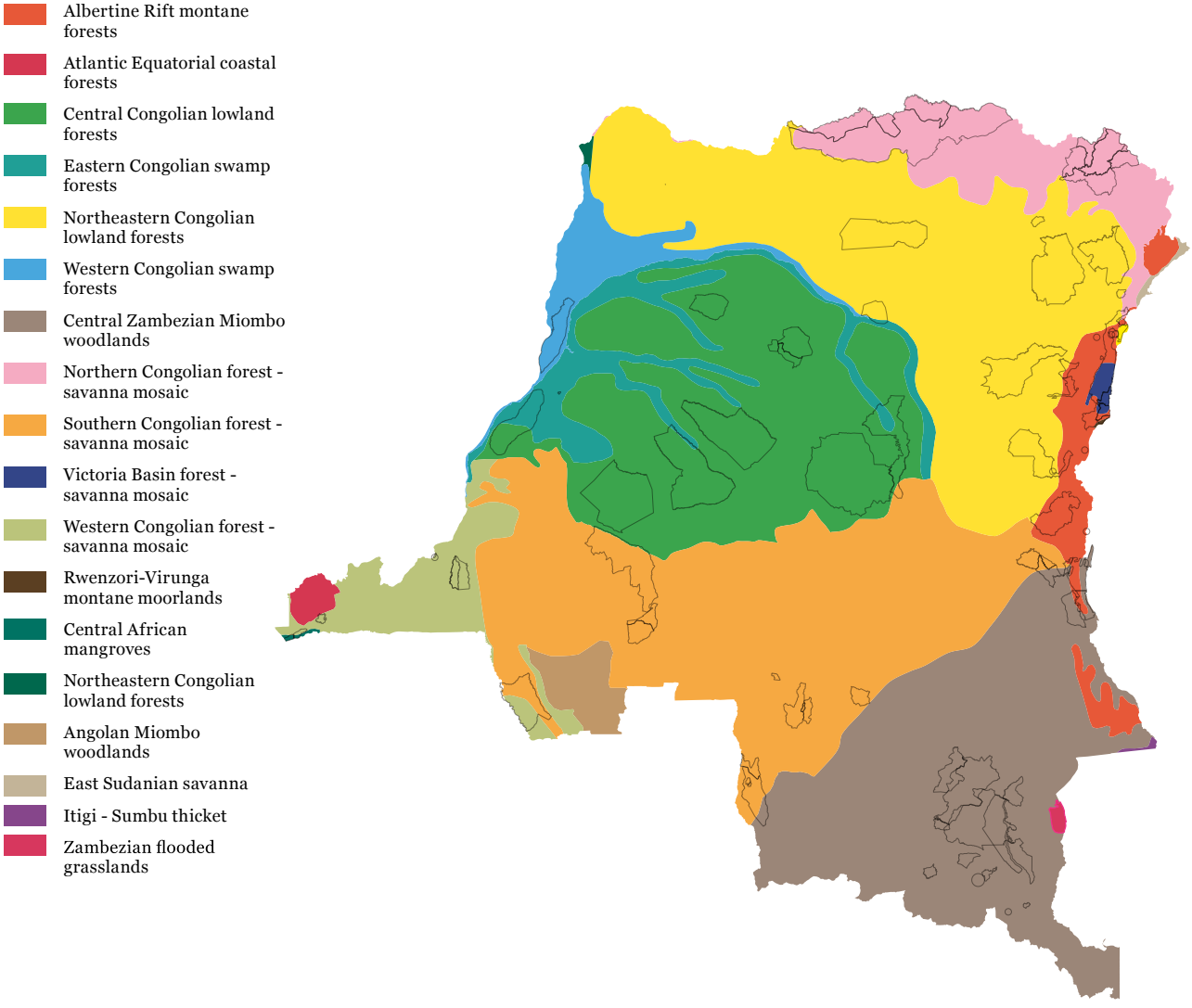


Figure 57
The protected area system and terrestrial ecosystems

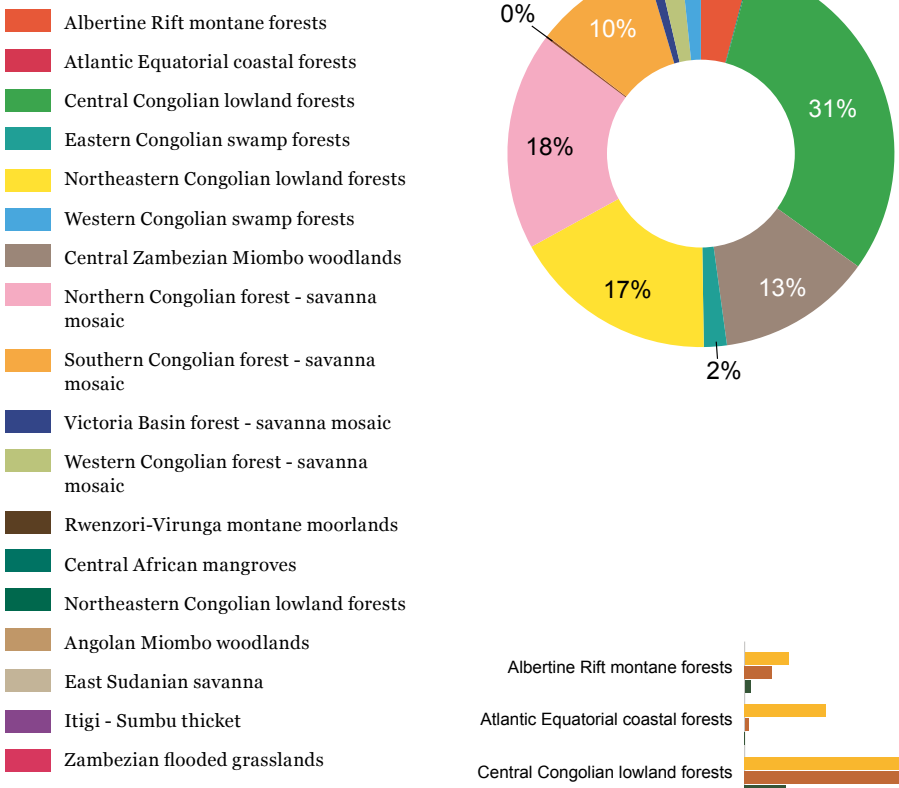
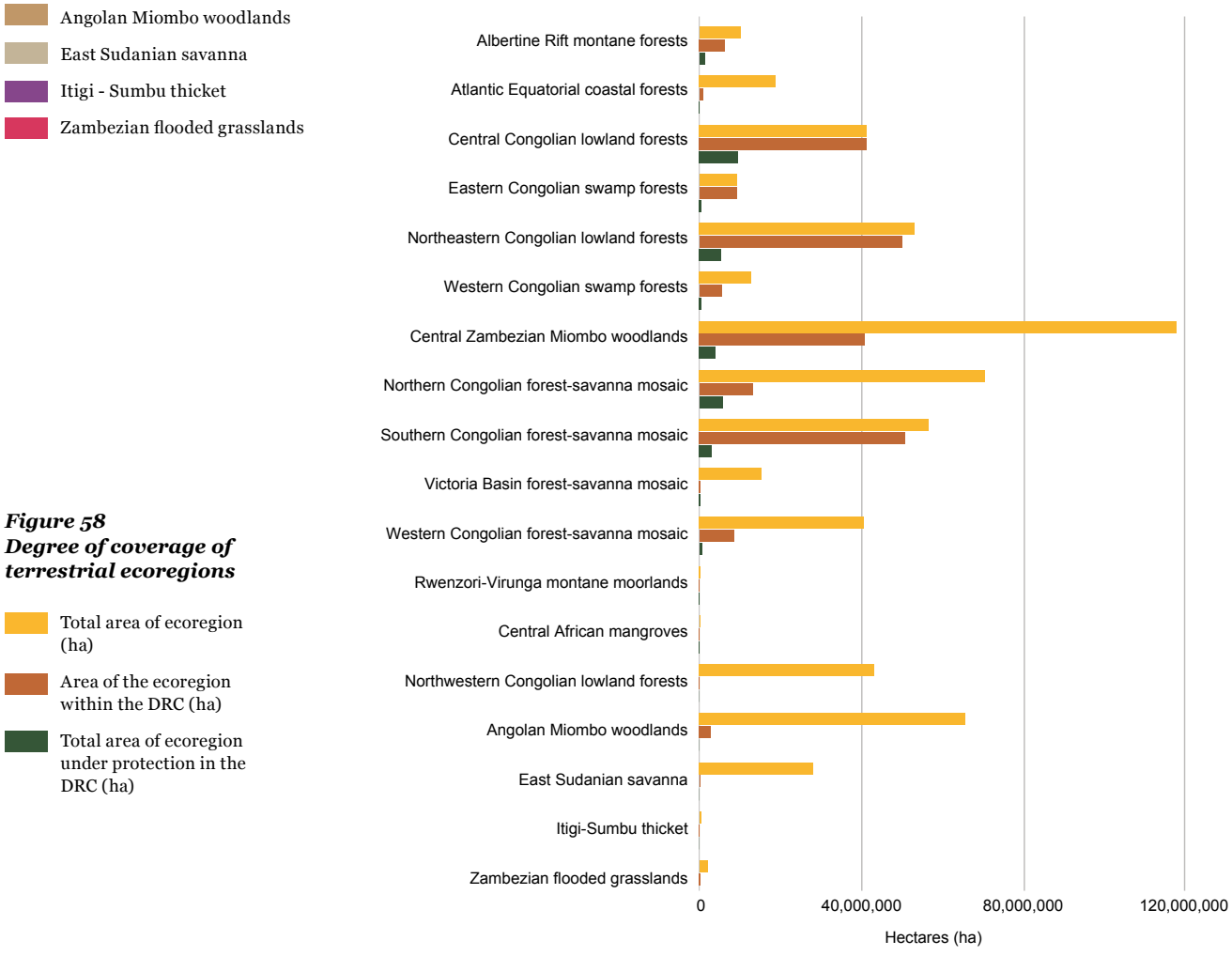


Figure 58
Degree of coverage of terrestrial ecoregions



Land cover dynamics

Habitat loss and degradation pose important threats to natural habitats in the DRC and the services they provide. With over half of the Congo Basin's tropical forest, deforestation and forest degradation are especially important land dynamics to understand and monitor, also within protected areas. Studies have shown that core forest area is decreasing in the DRC, at the same time as the rural complex, patch forests, edge forests and perforated forests, which represent intrusions into core forest areas and are a departure from the rural complex, are growing.[xv] Among the drivers of forest and biodiversity loss in the DRC are slash and burn agriculture, fuelwood collection, artisanal logging and extractive industries, including mining and logging. Behind these drivers are growing pressure from increased global demand for resources and an ever-increasing population.

Within the mapped protected area system, there is high variability between the rates of forest loss of different protected areas. The highest overall areas of forest loss from 2000 to 2015 were observed in the *Réserve naturelle du Sankuru* (79,000 ha), the D*omaine de chasse de Mangai* (78,552 ha), the *Domaine de chasse d'Oshwe* (48,042 ha), the *Domaine de chasse de Bili-Uéré* (34,287 ha) and the *Parc national des Virunga* (926,183 ha). The protected areas that saw the greatest percentage of their area affected by forest loss from 2000 to 2015 were the *Réserve de biosphère de Luki* (9.6%), the *Domaine de chasse de Kiziba-Baluba* (9%), the *Réserve intégrale de chasse de la Mufufya* (6.89%), the *Domaine de chasse de Luama Katanga* (6.67%), and the *Domaine de chasse de Mangai* (6.67%). Improving the effectiveness of protected area management to address encroachment and habitat conversion is crucial to address this dynamic and maintain core forest areas.

Map 22
Deforestation and protected areas
Deforestation data is from Hansen/UMD/Google/ USGS/NASA.

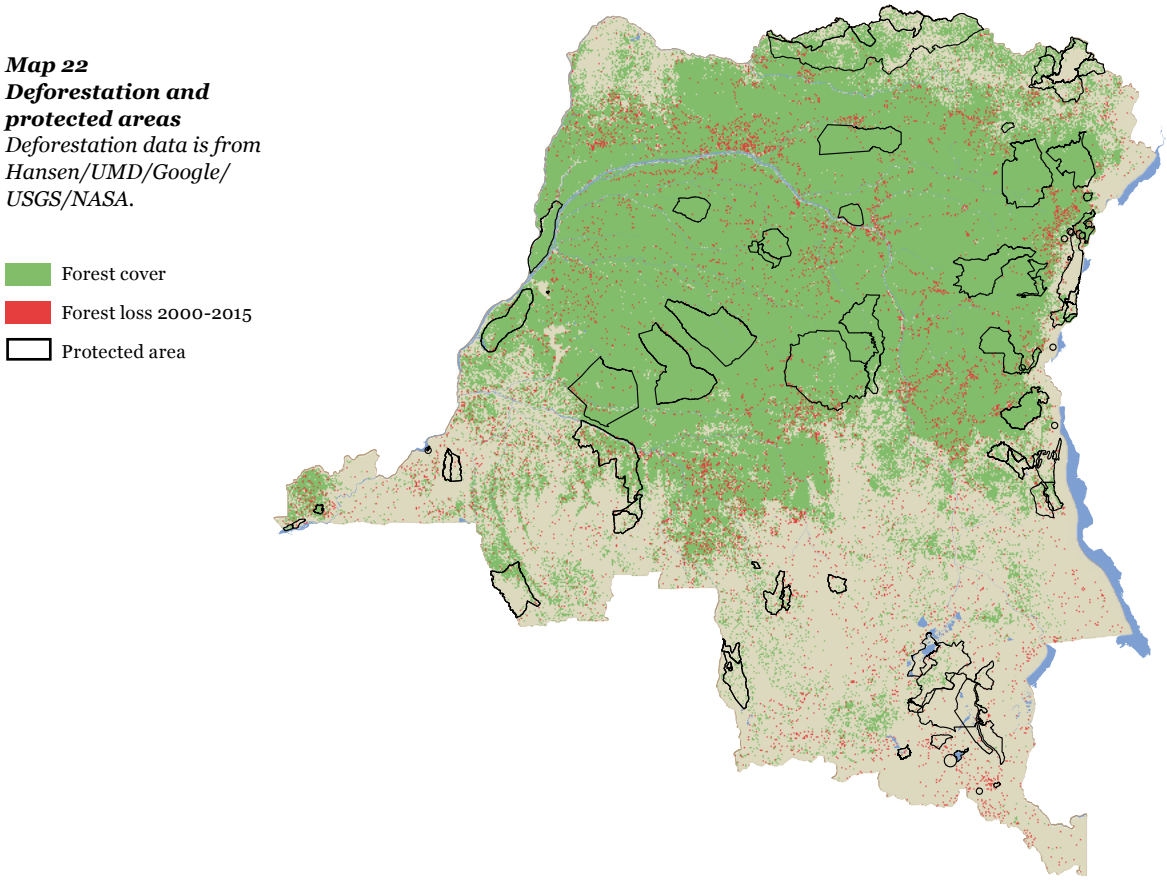
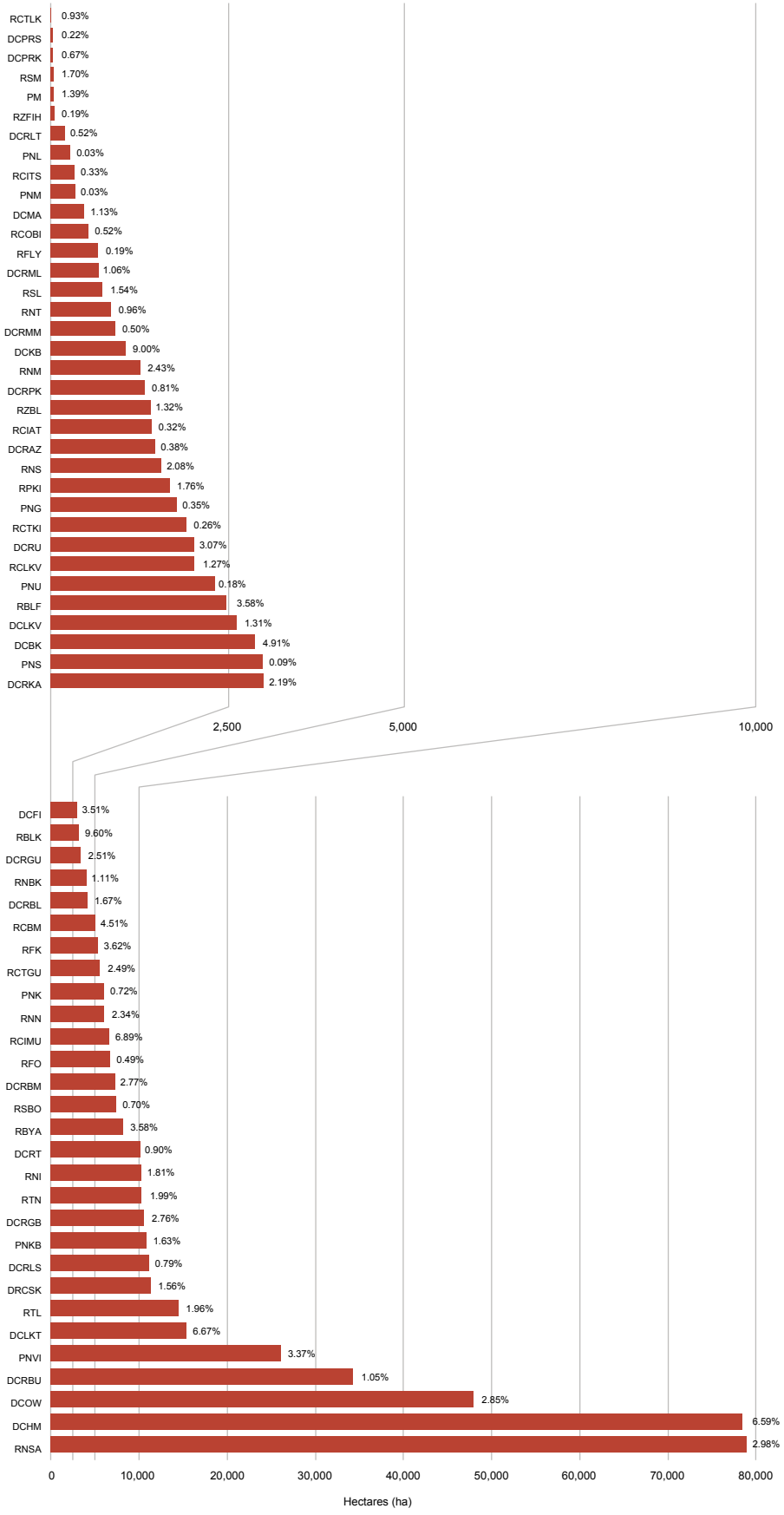


Figure 59 Deforestation and protected areas: Forest loss from 2000 to 2015

Deforestation data is from Hansen/UMD/Google/USGS/ NASA.



Species

The DRC has more species than any other African country when it comes to most taxonomic groups, including mammals and birds. Of the 431 mammal species in the DRC that have been assessed on the IUCN Red List,[xvi] three are categorized as critically endangered (CR), nine as endangered (EN), and 22 as vulnerable (VU). Among the threatened species are some spectacular endemics, including the okapi (*Okapia johnstoni* - EN), the bonobo (*Pan paniscus* - EN), Grauer's gorilla (*Gorilla beringei graueri* - CR) and the Dryas monkey (*Cercopithecus dryas* - CR).

Other endemic species include a subspecies of black mangabey (*Lophocebus aterrimus aterrimus* - NT), the golden-bellied mangabey (*Cercocebus chrysogaster* - DD), the Tshuapa red colobus (*Piliocolobus tholloni* – NT), the Lesula (*Cercopithecus lomamiensis* - NE), the aquatic genet (*Genetta piscivore* - NT), Thor's hero shrew (*Scutisorex thori* - NE), Willard's horseshoe bat (*Rhinolophus willardi* - NE) and the Mount Kahuzi climbing mouse (*Dendromus kahuziensis* - CR).

Among other threatened species are two species of elephant which are classified as vulnerable, the African savanna elephant (*Loxodonta africana*) and the African forest elephant (*Loxodonta cyclotis*), the hippopotamus (*Hippopotamus amphibius* - VU), the African manatee (*Trichechus senegalensis* - VU), the African golden cat (*Caracal aurata* - VU), the lion (*Panthera leo* - VU), the leopard (*Panthera pardus* - VU), the black-bellied pangolin (*Phataginus tetradactyla* - VU), the white-bellied pangolin (*Phataginus tricuspis* - VU), the giant ground pangolin (*Smutsia gigantean* - VU), L'Hoest's monkey (*Allochrocebus lhoesti* - VU), the owl-faced monkey (*Cercopithescus hamlyni* - VU) and the Ruwenzori horseshoe bat (*Rhinolophus ruwenzorii* - VU).

The DRC's avifauna includes over 1,100 species. Of the 1,105 assessed, four are currently classified as critically endangered (CR), 13 as endangered (EN) and 22 as vulnerable (VU) on the IUCN Red List. Among these species are the endemic Congo peacock (*Afropavo congensis* - VU), the Congo Bay-owl (*Phodilius prigoginei* - EN), Schouteden's Swift (*Schoutedenapus schoutedeni* - VU), Prigogine's Nightjar (*Caprimulgus prigoginei* - EN), Prigogine's Greenbul (*Chlorocichla prigoginei* - EN), the Yellow-crested Helmetshrike (*Prionops alberti* - VU), Rockefeller's Sunbird (*Cinnyris rockefelleri* - VU), the Lendu Crombec (*Sylvietta chapini* - CR) and the Yellow-legged Weaver (*Ploceus flavipes* - VU). Other endemic species are listed as Near Threatened (NT) and Data Deficient (DD). Among the critically endangered species that have ranges that overlap with the DRC are the white-headed vulture (*Trigonoceps occipitalis*) and the hooded vulture (*Necrosyrtes monachus*).

Estimates of the number of reptiles in the DRC surpass 300 species, including three species of crocodiles, 120 species of lizards, 181 species of snakes and 22 species of turtles. Among these are nine species currently listed as threatened (CR, EN or VU) on the IUCN Red List and over thirty endemic species, including snakes, lizards, such as the beautiful skink (*Trachylepis pulcherrima*) and the Circular-scaled Chameleon (*Kinyongia gyrolepis* – DD), and the Upemba Mud Turtle (*Pelusios upembae*).

The list of amphibians for the DRC is incomplete due to a lack of information from many sites. Of the 241 species assessed under the IUCN Red List, 50 species are listed as endemic. Eleven of the species that have been assessed so far have been classified as threatened, and include multiple endemic species from eastern DRC such as the Lendu Plateau clawed frog (*Xenopus lenduensis* - CR), the white-striped reed frog (*Hyperolius leucotaenius* -EN), the falls reed frog (*Hyperolius polystictus* - VU), the Luvubu reed frog (*Hyperolius leleupi* - EN), the *Hyperolius constellatus* (VU), the Itombwe River frog (*Phrynobatrachus asper* - VU), the young Itombwe forest treefrog (*Leptopelis anebos* - EN), the Itombwe Massif clawed frog (*Xenopus itombwensis* -

EN), and the Itombwe golden frog (*Chrysobatrachus cupreonitens* - EN). Many other endemic species are currently classified as data deficient (DD).

Invertebrates species are much less well known and have only been studied in certain sites. Among the most well studies are the diurnal butterflies, for which over 2000 species are listed in the African Butterfly Database.[xvii]

Finally, the DRC has over 10,000 species of plants. Of the 639 of these plant species that have been assessed, 149 are currently classified as threatened on the IUCN Red List. Precise numbers on the number of endemic plant species are not available.

Butterflies on the forest floor, Parc national de la Salonga

Box 8 : Internationally recognized high conservation value areas in the DRC

The DRC has multiple sites and species that have been recognized as important for biodiversity conservation at national and international level. Among the sites with international recognition for their high conservation value are five World Heritage Sites, four Ramsar Sites, 19 Important Bird and Biodiversity Areas (IBA), 34 Key Biodiversity Areas (KBA) and additional sites of the Alliance for Zero Extinction (AZE). Most of these areas are either existing protected areas or they are largely superimposed on existing protected areas.

The IUCN Red List currently ranks as threatened 390 species of flora and fauna present in the DRC (i.e., species fall under the categories "Critically Endangered", "Endangered" or "Vulnerable"). At the national level, Ministerial Order No. 020/CAB/MIN/ECN-EF of May 20, 2006 classified 72 animal species as fully protected and 234 as partially protected. However, significant efforts are required to fill knowledge gaps on the status of many species in the DRC and update their classification in terms of protection.

Trends in the status of species

As described above, many species in the DRC are currently under significant threat. Among the most important pressures affecting the country's remarkable diversity are unsustainable collection and the alteration of ecosystems. As described in previous sections, extractive industries, agricultural expansion and the collection of wood for fuel or other uses all contribute to habitat degradation, fragmentation and destruction. Certain species or groups of species are also susceptible to threats such as climate change, wildlife trafficking, invasive species or pollution. Many of the threats to the DRC's biodiversity have been exacerbated by the effects of political and economic instability, poverty, the proliferation of arms and the displacement of large numbers of people.

While select protected areas have provided a degree of defense from certain threats, many species in the DRC have seen dramatic declines in range and numbers both outside and within the protected area system (Table 13). Stopping this regression is critical to preserve the country's biodiversity and necessitates significantly improving capacity for protected area system planning and management. It also requires dedicated commitment to assuring more effective enforcement of national and international regulations and conventions regarding biodiversity conservation. More systematic integration of climate change considerations into protected area planning and management is also important, particularly when it comes to conserving ecosystems and species that are especially vulnerable to climate variability.

Finally, much remains to be discovered about the flora and fauna of the DRC. As additional information becomes available, it remains important to regularly assess the degree to which the protected area system represents and protects key biodiversity and adapt conservation targets and management strategies as justified.

Large mammals and the protected area system

The iconic large fauna of the DRC is the historical cornerstone of the country's protected area system. Large mammals drove the creation of most entities within the protected area system, such as species management areas, hunting reserves and national parks. The aim of many of these entities was and is to strictly protect rare or endemic taxa while ensuring the rational exploitation of the most common taxa for recreational, commercial and subsistence purposes.

Today, several decades after the first implementation of these objectives, the conservation status of many large mammal taxa is extremely alarming (Table 13). The areas of distribution of many species has drastically decreased while their numbers have experienced widespread and catastrophic decline. The case of the two species of elephants is emblematic of the problem. Once occurring in almost all the country's ecosystems, with numbers among the highest in the region, today elephants are only found in very reduced numbers in a handful of areas where they have been more sheltered. For many species, protected areas represent the last refuges where they still survive.

Unsustainable exploitation, which has often been illegal, is the main threat driving these trends. There are multiple underlying causes related to the political, socioeconomic and institutional situation in the DRC that have contributed to this phenomenon. Wildlife has borne the brunt of conflicts and the associated proliferation of light weapons. The importance of the income-generating aspects of the bushmeat trade for the livelihoods of rural populations has also contributed to the overexploitation of this resource. The overall weakness of public authorities has prevented the effective implementation and enforcement of more sustainable

management strategies in and outside protected areas.

At the same time, there have been some remarkable successes. More than half of the remaining population of mountain gorillas are found in the Virunga Massif, in the national park of the same name. Management efforts by protected area teams have been critical in effectively protecting the population of this critically endangered species.

Given the overall context in the DRC, halting the decline of the remaining populations of large mammals and protecting habitats that might support potential restoration initiatives requires tremendous efforts and the involvement of all stakeholders.

Table 13
Population status and trends for certain emblematic mammal species of the DRC

Primates - Apes		
Mountain gorilla	604 (2018)	Increasing
Eastern lowland gorilla	Few thousand	Decreasing
Western lowland gorilla	?	Probably extirpated
Bonobo	Few tens of thousands	Decreasing
Eastern chimpanzee	Few tens of thousands	Decreasing
Central chimpanzee	Few dozen	Decreasing
Even-toed ungulates		
Giraffe	Few dozen	Decreasing
Okapi	Few thousand	Decreasing
Sable antelope	Few hundred	Decreasing
Roan antelope	Few hundred	Decreasing
Common eland	?	Probably extirpated
Giant eland	?	Probably extirpated
Greater kudu	Few dozen	Decreasing
Lichtenstein's hartebeest	Few dozen	Decreasing
Common hartebeest	Few hundred	Decreasing
Hippopotamus	Few thousand	Decreasing
Odd-toed ungulates		
Plain zebra	Few dozen	Decreasing
White rhinoceros	0	Extirpated (2006)
Carnivores		
Lion	Few hundred	Decreasing
Wild dog	?	Probably extirpated - occasional vagrants
Cheetah	?	Probably extirpated - occasional vagrants
Leopard	Few thousand	Decreasing
Proboscids		
Elephant	Few thousand	Decreasing

Ecosystem Services

Maintaining the direct and indirect ecosystem services provided by the DRC's natural heritage is imperative to the region and the global community. It also provides a critical foundation for the country's development and more sustainable economic growth. If effectively and sustainably managed, the protected area network represents an important mechanism to help sustain the flow of multiple ecosystem services. Achieving this objective necessitates additional efforts to identify, assess, and demonstrate the value of ecosystem services being preserved through protected areas. It is also important to assure that these values are being captured in decision-making and that the protected area system is integrated into national and regional strategies for management of these services.

Among the key ecosystem services that can be expected from the protected area system of the DRC are: provisioning services, including food, water and medicine; regulating services, including filtration by wetlands, climate regulation and pollination; cultural services, including the protection of social and cultural values and education; and supporting services, such as photosynthesis and nutrient cycling. Many of these values have not been systematically assessed in relation to the protected area system. This elevates the risk that they are not being sufficiently considered within the management of protected areas and the protected area network. It also contributes to their undervaluation in decision-making processes.

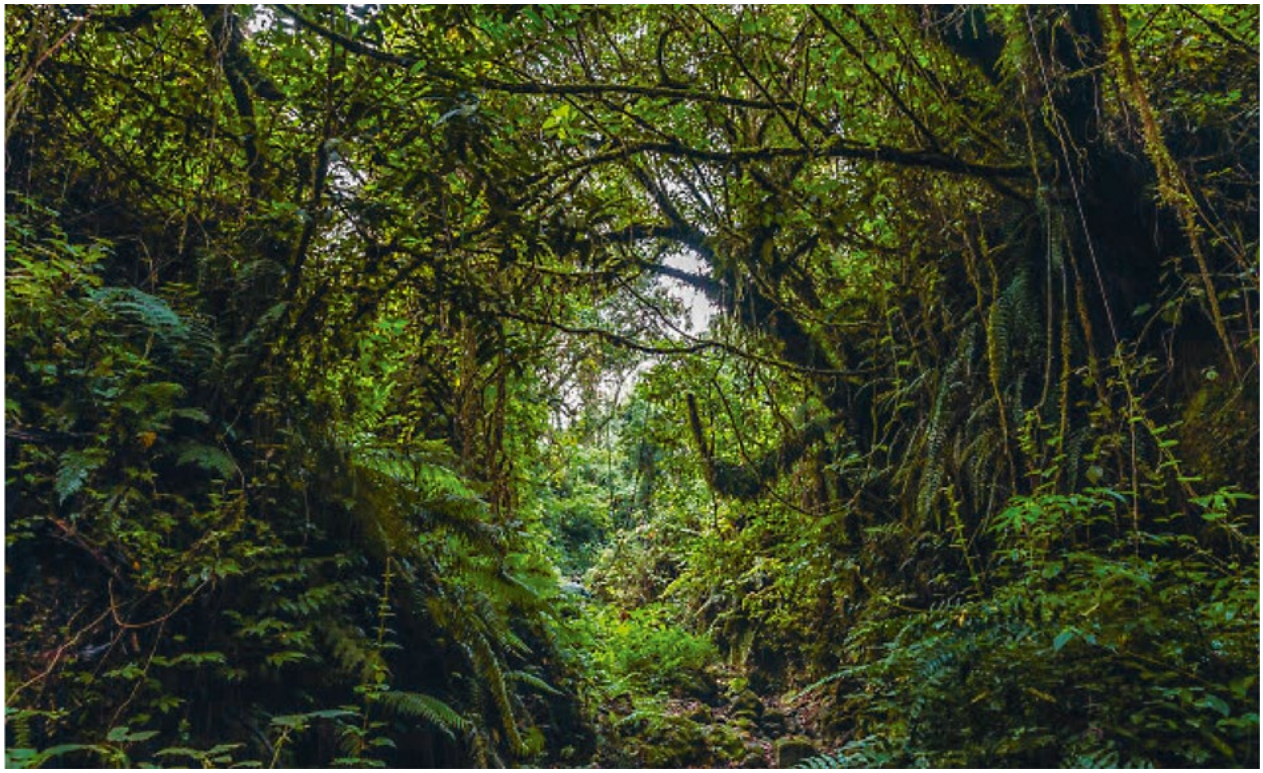
Boats near the fishing village of Kavanyongi on the north shore of Lake Edward

Forest carbon and the protected area system

The DRC's forest ecosystems constitute one of the world's foremost carbon sinks, thanks in particular to their aboveground and underground biomass and soils. In this respect, the recently described peatlands of the central basin of the Congo River are remarkable. Their soils store the equivalent of the total carbon in the aboveground biomass of the Congo Basin forests.[xviii]

The consequence of maintaining this globally significant value has been recognized by the Government with the initiation of a jurisdictional program to reduce emissions from deforestation and degradation (REDD+) as well as the launching of national-scale efforts to quantify and monitor forest carbon stocks. In addition to contributing to climate change mitigation, these same forest ecosystems are helping to maintain services upon which local communities rely to adapt to the changes caused by climate change on natural and anthropogenic systems.

A significant part of the country's above and below ground forest carbon stock is currently within the boundaries of the protected area system. The estimated forest carbon stock per protected area ranges from near zero for small, non-forested protected areas all the way up to the *Parc national de Salonga*, which on its own is estimated to contain 0.731 PgC of forest carbon. A network wide categorization of protected areas by their forest cover and deforestation rates shows that approximately 60% of the DRC's mappable protected areas fall into the high forest low deforestation category. These protected areas represent approximately 87% of the protected area system's total surface area. If effectively managed, the established protected area system can continue to contribute efficiently to national and global climate change mitigation and adaptation strategies. This will necessitate working to address any areas of high carbon dynamics, such as the expanding rural complex, within protected areas.



Dense forest of the Parc national des Virunga

Map 23
Forest carbon and the protected area system
Aboveground biomass (ABG) map showing the spatial pattern of biomass across the DRC and within protected areas. Biomass data and carbon statistics were provided by the Carbon Map and Model (CM & M) project, a collaboration between WWF, the National Aeronautics and Space Administration (NASA), the University of California in Los Angeles (UCLA) and the MEDD (Xu et al., 2017)

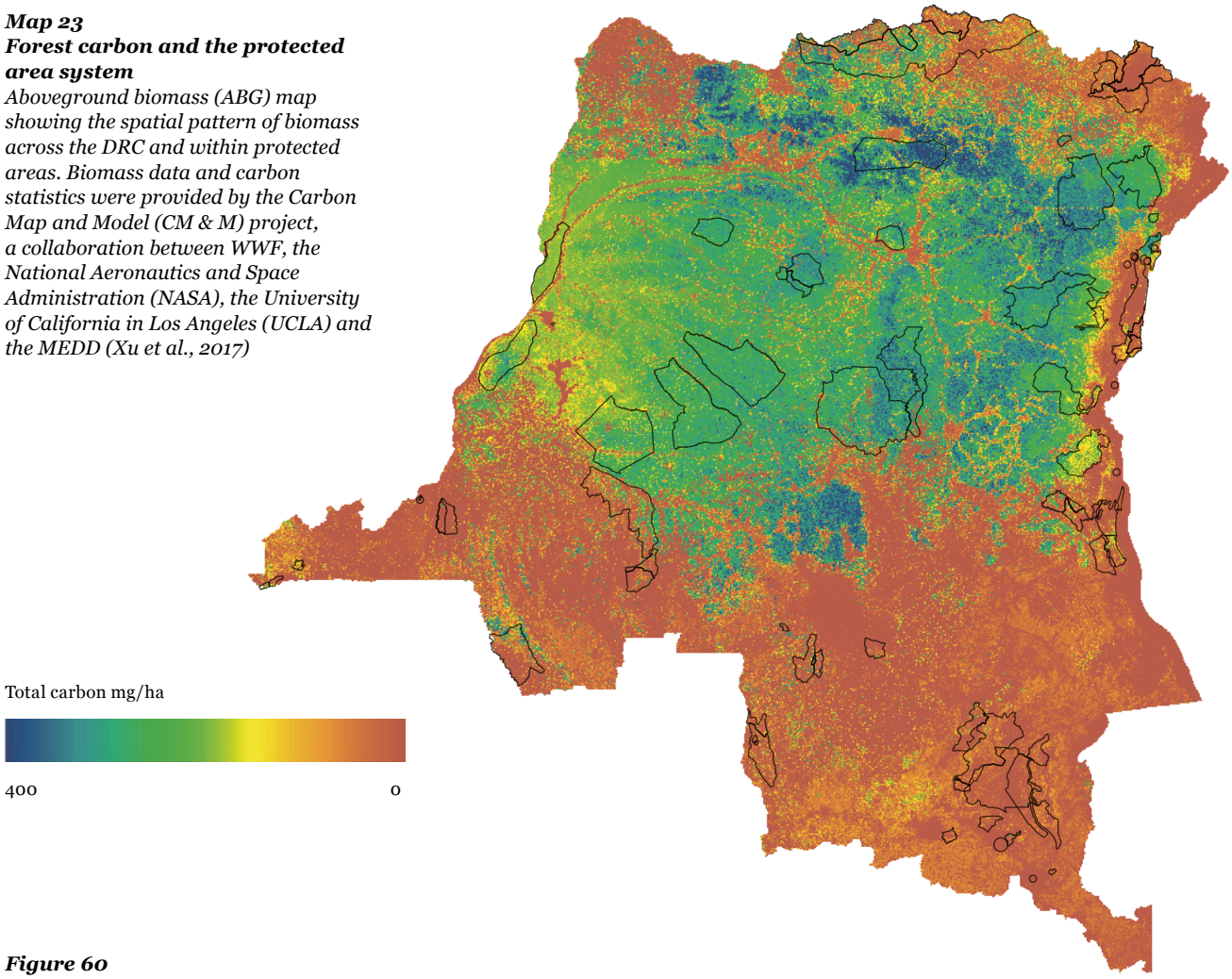
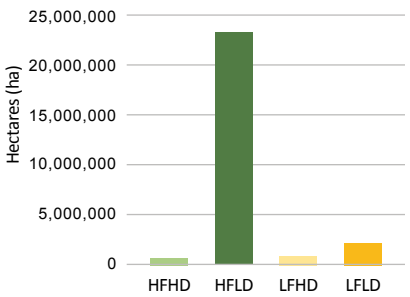
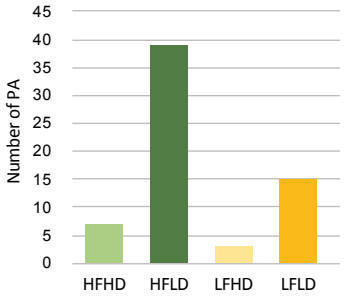


Figure 60
Forest cover and deforestation were assessed from 2000 to 2015 using global forest change data (Hanson et al., 2013). High deforestation was defined as annual deforestation greater than or equal to 0.235%. Low deforestation was defined as annual deforestation less than 0.235%. High forest was defined as forest cover greater than or equal to 66.83%. Low forest was defined as forest cover less than 66.83%.



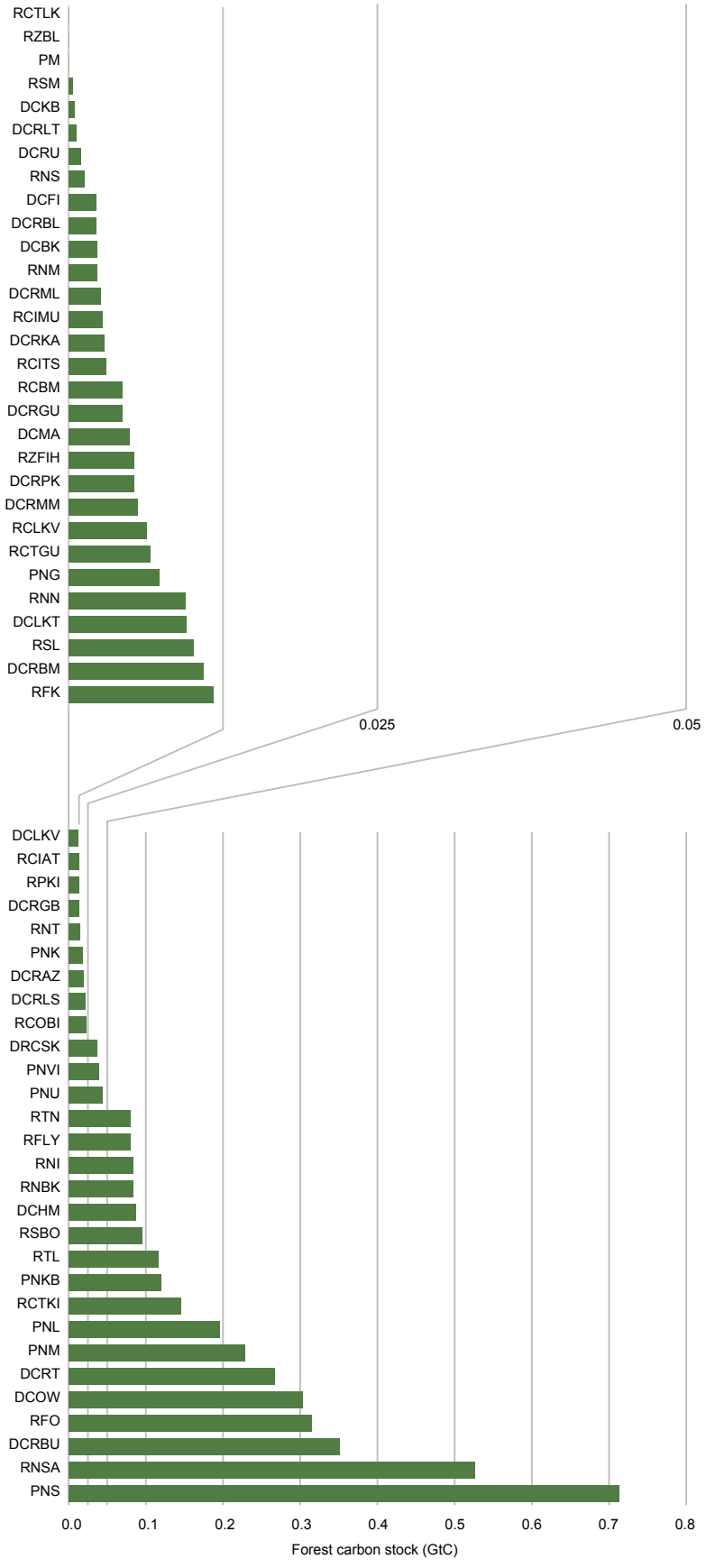
Repartition of the area (in ha) under protection based on forest cover and deforestation



Repartition of protected areas based on forest cover and deforestation

Figure 61

Forest carbon and the protected area system



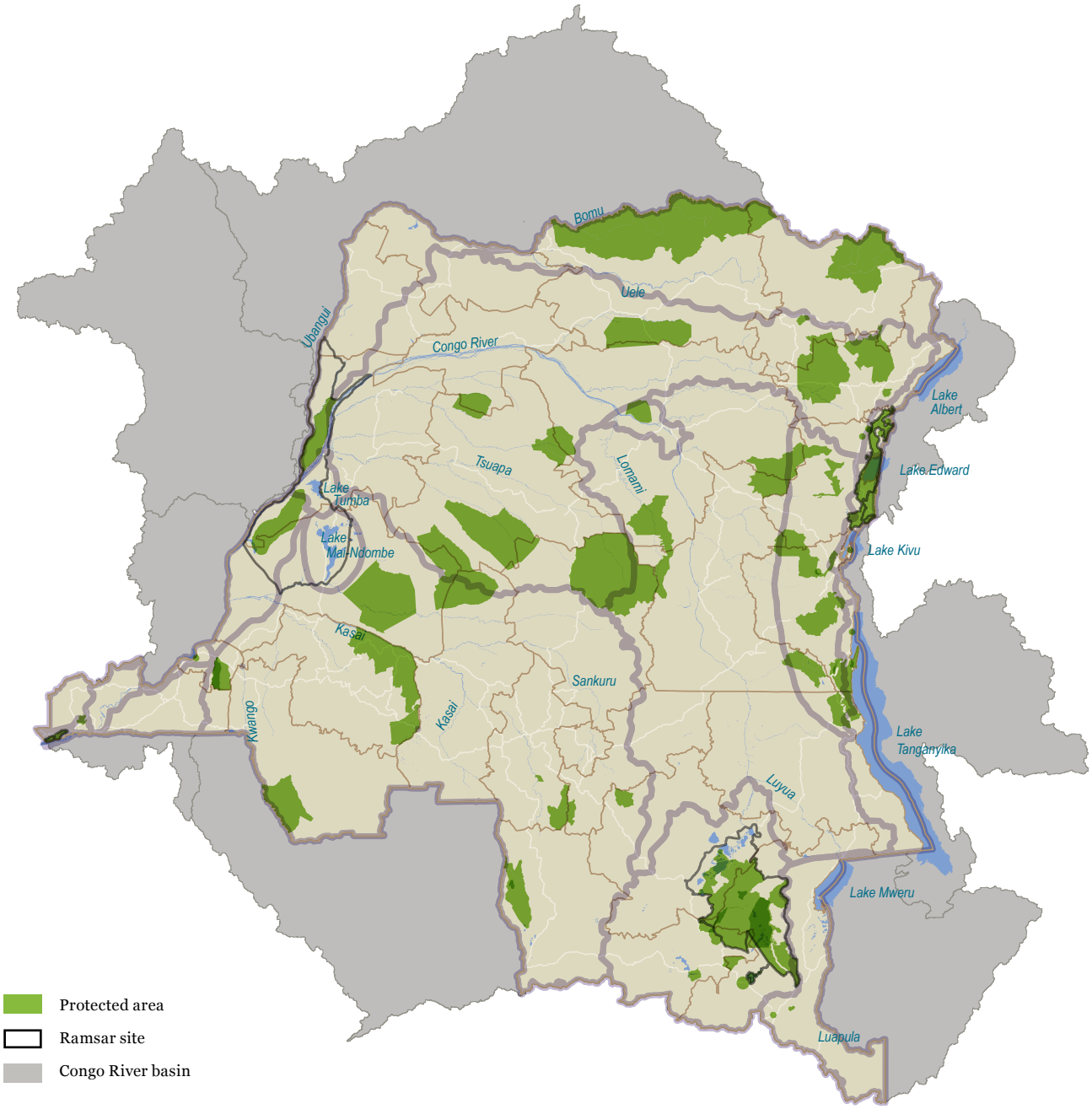
Freshwater and the protected area system

The DRC covers over 50% of the Congo Basin watershed. Its river system and lakes, which span from the mouth of the Congo River in the west to the Rift Valley lakes in the east, account for approximately 52% of Africa's surface water resources. These resources provide numerous water-related services, including water supply, flow regulation, water quality and habitat for a range of aquatic plants and animals. This dense network of waterways also serves as an important navigation system. In rural areas, the dependence on water resources can be especially acute given a disproportionate reliance on fisheries as a source of protein and as an important part of household incomes.

The abundance and distribution of the DRC's freshwater resources mean there is a high potential for future development of these resources for hydropower, irrigation and navigation. At present, the installed capacity of hydropower generating plants represents only a fraction of the estimated potential of over 100,000 MW. The most notable potential for further hydropower development is around the Inga rapids, located on the lower reaches of the river, where the generating capacity has been estimated at 44 GW.

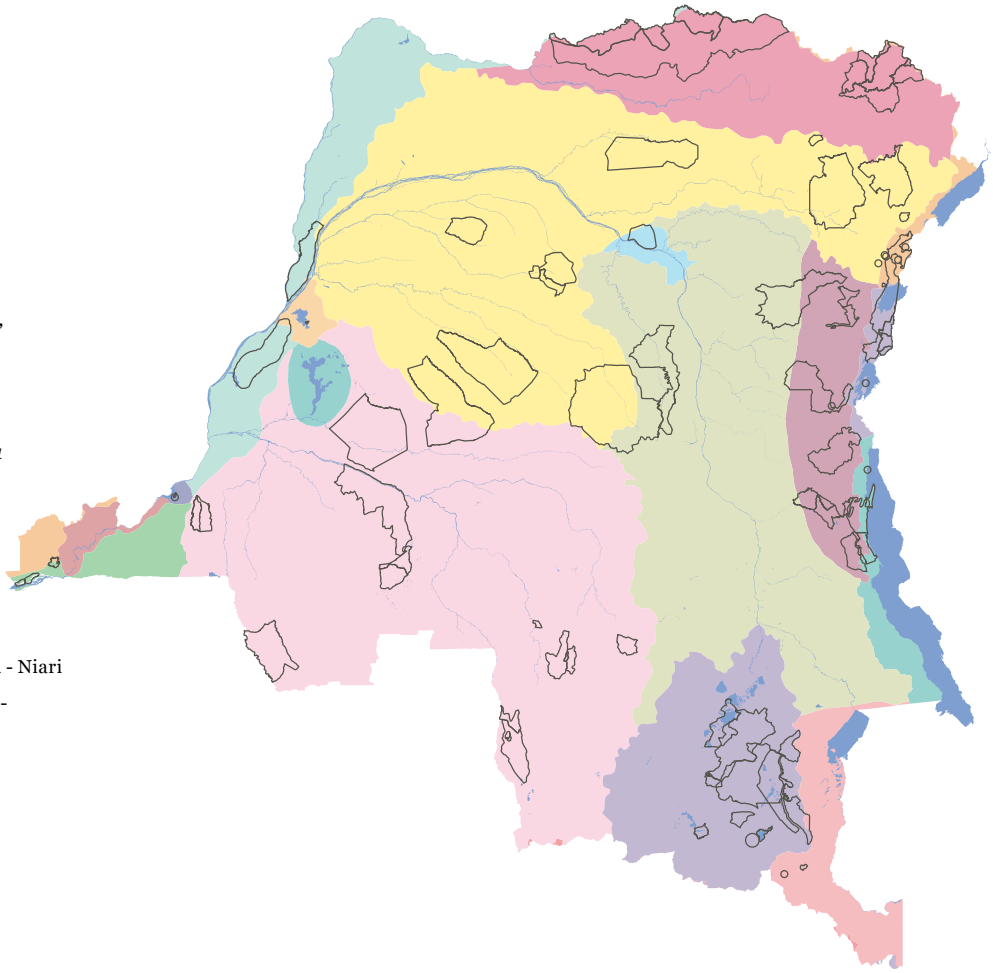
View from a river, Parc national de la Salonga

Map 24
Hydrology of the Democratic Republic of the Congo



Freshwater biodiversity

The DRC encompasses a large array of freshwater habitats, including mangroves, marshes, swamp forests, lakes and a dense network of assorted river types. Many of these habitats are part of the Congo River system, which is the most species diverse freshwater system in Africa. The high species richness of the Congo River system is due to the variety of its habitats and its vast geographic extent. It also reflects the prevalence of hydrographic barriers. The most notable of these barriers are the many waterfalls and rapids formed by the descent of water from the south, east and north into the Congo River's central basin. The major tributaries and sub-basins of the Kasai, Uele, Mbomou and Ubangui rivers are all characterized by large series of rapids. The main channel of the Congo River is also dissected by rapids, including some of the world's largest in the Upper Congo Rapids and Lower Congo Rapids ecoregions.



Map 25
The protected area system and freshwater ecoregions
The array of freshwater system types and habitats in the DRC is reflected in the country's aquatic ecoregions, which have been defined to illustrate patterns of species composition as well as associated ecological and evolutionary processes. Data on ecoregions are from Abell et al. (2008).

Freshwater ecoregion

- Lake Victoria Basin
- Upper Nile
- Ogooué - Nyanga - Kouilou - Niari
- Sudanic Congo - Oubangui-
- Uele
- Cuvette Centrale
- Lake Tumba
- Upper Congo Rapids
- Upper Congo
- Albertine Highlands
- Lake Tanganyika
- Bangweulu - Mweru
- Upper Lualaba
- Kasai
- Malebo Pool
- Lower Congo Rapids
- Lower Congo
- Lake Mai Ndombe

Figure 62
The protected area system and freshwater ecoregions
Seventy-seven percent of the protected area network of the DRC falls within four freshwater ecoregions: Cuvette Central, Kasai, Uele and Upper Lualaba.

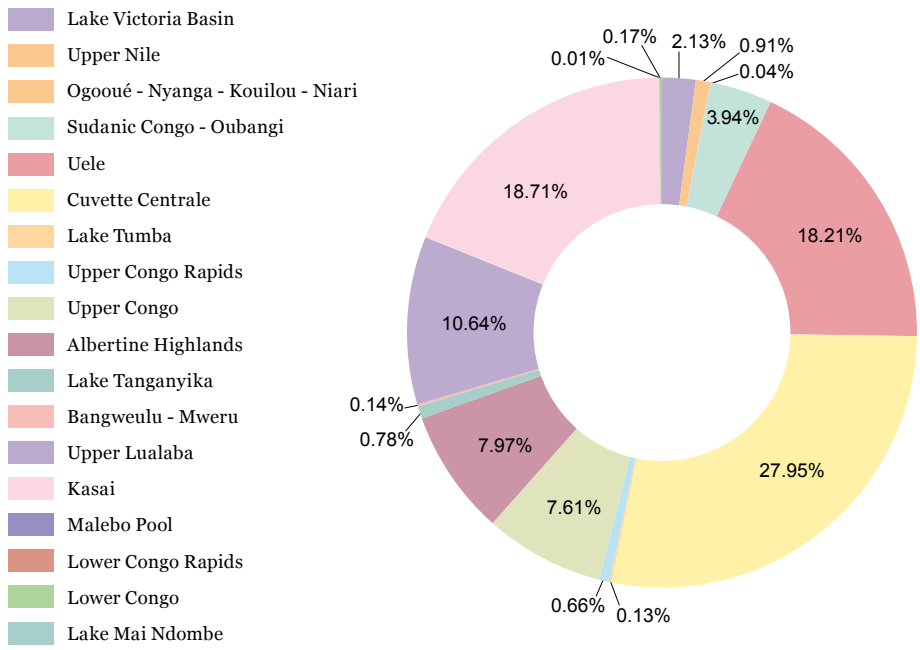
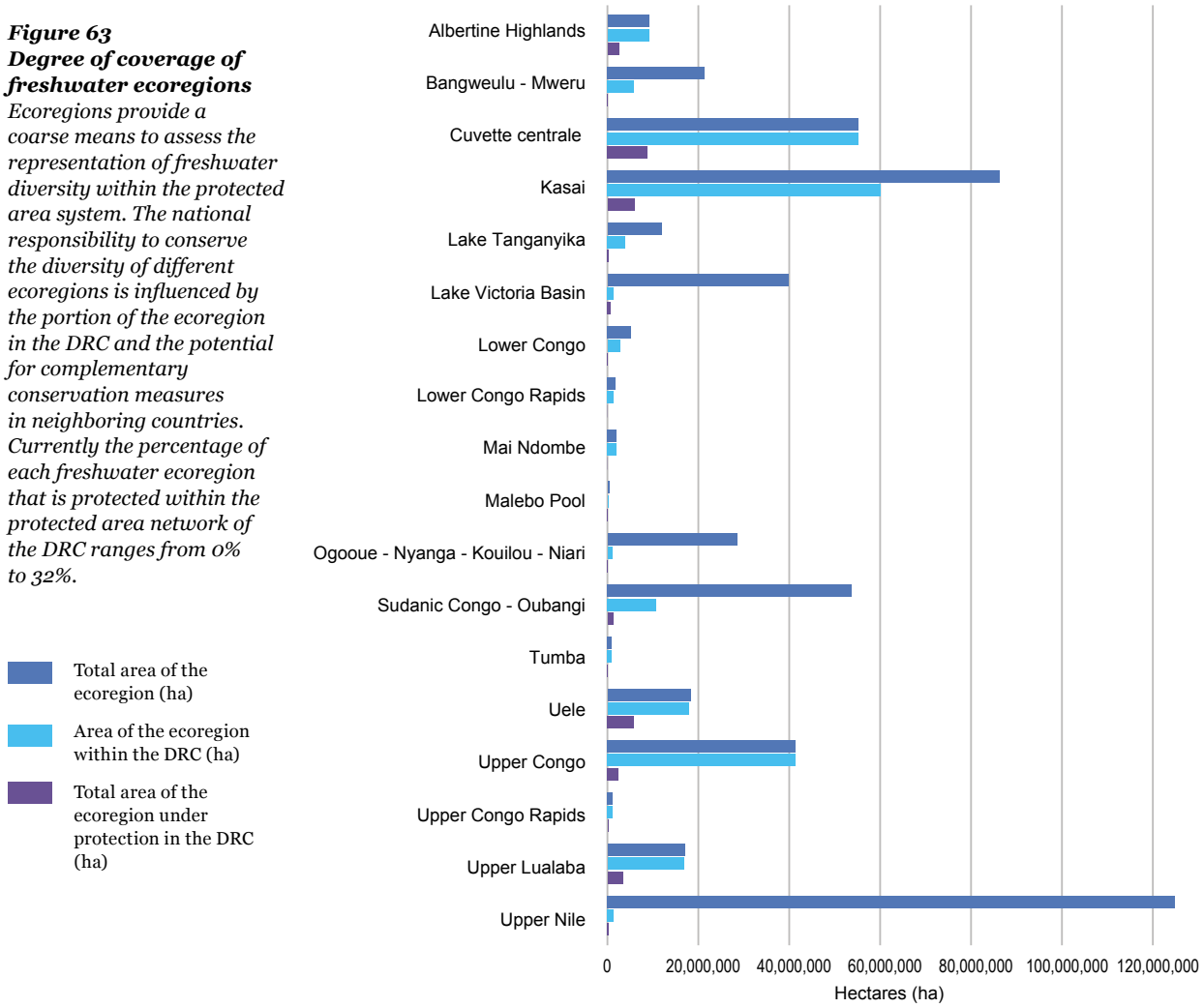


Figure 63
Degree of coverage of freshwater ecoregions
Ecoregions provide a coarse means to assess the representation of freshwater diversity within the protected area system. The national responsibility to conserve the diversity of different ecoregions is influenced by the portion of the ecoregion in the DRC and the potential for complementary conservation measures in neighboring countries. Currently the percentage of each freshwater ecoregion that is protected within the protected area network of the DRC ranges from 0% to 32%.



Among the species that depend on the DRC's freshwater ecosystems are plants, fish, birds, mammals, reptiles, amphibians, mollusks and crabs. While significant information gaps exist when it comes to the DRC's freshwater biodiversity, a review of existing data by the IUCN found that the channel of the Congo River, and its tributaries the Ubangi River and the Kasai River, are areas of particular species richness. The Malebo Pool and Upper Congo Rapid basins have also been found to have a high species diversity. Additional surveys in smaller tributaries and the headwaters of the Congo Basin are required to more precisely discern species richness across the country. In addition to high numbers of freshwater dependent species, the freshwater systems of the DRC also have a high degree of species endemism. Areas where particularly high levels of endemism have been recorded are the Congo River and its tributaries like the Kasai River and Lake Tanganyika.

Among the important threats to the DRC's freshwater biodiversity are: deforestation, land conversion for subsistence agriculture and agroindustry; human settlement; dams and water extraction; mining and drilling; overharvesting and poorly regulated fisheries, including uncontrolled use of extremely fine mesh and poisons; invasive species; and climate change. These threats, which are anticipated to increase, affect freshwater ecosystems in multiple ways, including the loss of riparian habitat, a reduction of water quality and increased sediment loads. The highest centers of threatened freshwater-dependent species in the DRC are the Lower Congo, Lower Congo Rapids and Malebo Pool ecoregions.

Conservation of freshwater biodiversity

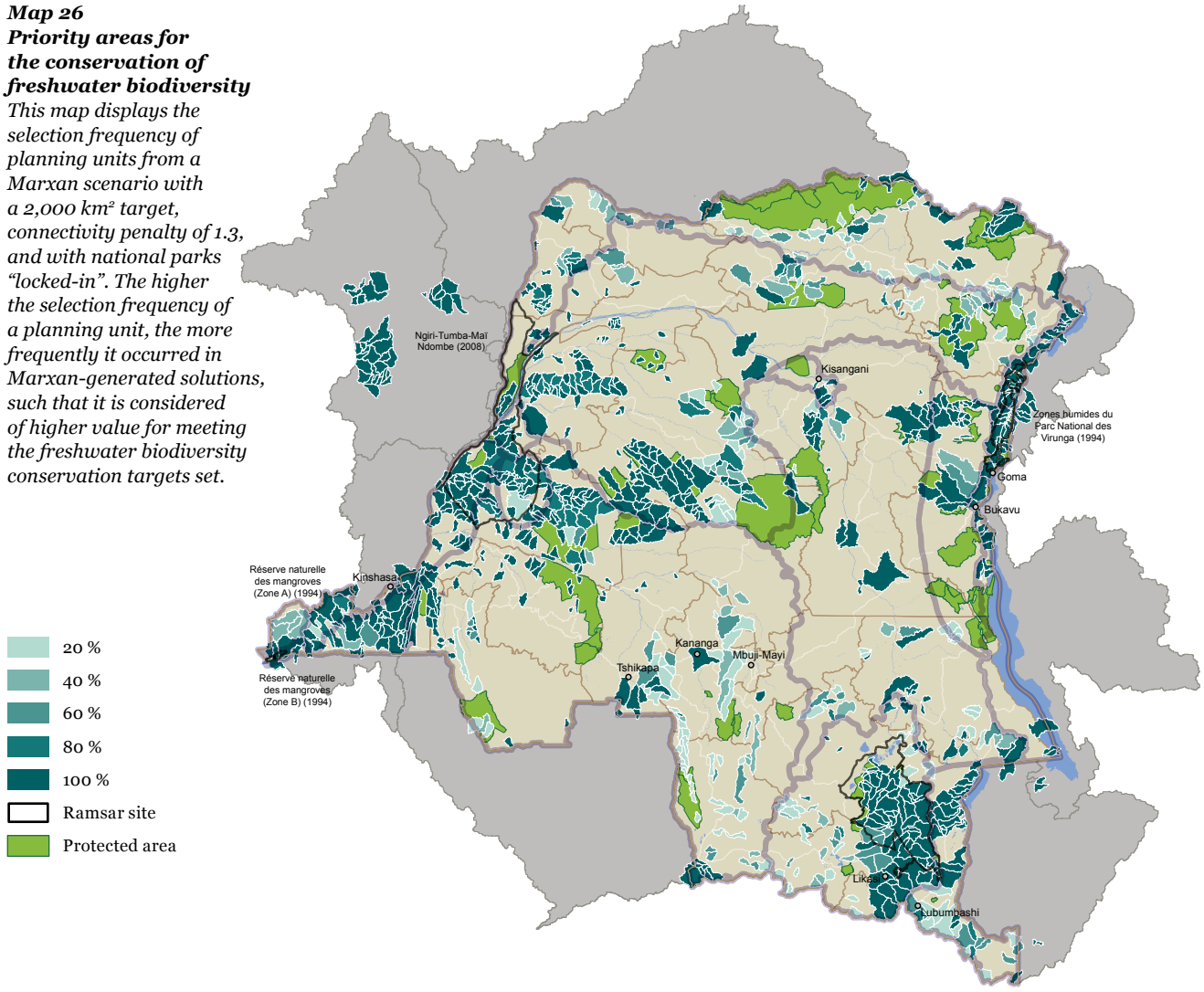
Conserving the freshwater biodiversity of the DRC relies on adopting an Integrated Water Resource Management (IWRM) approach that considers the needs of human populations as well as the protection measures necessary to maintain water related services and protect biodiversity. The success of such an approach relies in part on improving the state of knowledge of freshwater biodiversity and the values of the entire range of goods and services provided by freshwater ecosystems. This information is imperative to take the ecological requirements of freshwater species into consideration when planning for conservation and sustainably managing the use of hydrological resources. It can also be used to validate priority areas for conservation and inform a systematic process to identify Key Biodiversity Areas (KBA) for freshwater based on set criteria for vulnerability and irreplaceability. An integrated approach should work to maintain natural flow regimes. In cases where this is unavoidable, it will be imperative to implement environmental impact assessments and develop strategies to mitigate detrimental impacts.

Protected areas have an important role to play in an IWRM approach. The DRC has four sites (7,435,624 ha) that have been designated as Wetlands of International Importance under the Convention of Ramsar. Management systems for these sites still need to be established or strengthened. Other existing protected areas also encompass important freshwater habitats, many of which are relatively undisturbed. Building the capacity to integrate freshwater management considerations into the objectives of existing protected areas will help to assure these values are maintained. Finally, there is a need to consider additional protection measures and mechanisms to address any important gaps in the protection of freshwater species, particularly those that have restricted ranges or limited numbers of congregation, migration or breeding sites. Considering the high connectivity of freshwater systems will also be key.

Priority areas for the conservation of freshwater biodiversity

In collaboration with Griffith University in Queensland, Australia, WWF's Science program and local experts, PARAP took advantage of advances in systematic conservation planning for freshwaters and the compilation of IUCN freshwater species data for Africa[xix] to identify priority areas for freshwater species in the DRC. The study used optimization techniques to identify priority areas based on a series of freshwater biodiversity conservation targets. Further work is required to substantiate and refine these results and integrate them into protected area system planning.

Map 26
Priority areas for the conservation of freshwater biodiversity
This map displays the selection frequency of planning units from a Marxan scenario with a 2,000 km² target, connectivity penalty of 1.3, and with national parks "locked-in". The higher the selection frequency of a planning unit, the more frequently it occurred in Marxan-generated solutions, such that it is considered of higher value for meeting the freshwater biodiversity conservation targets set.



Stakeholders to the management of protected areas

Cultural and social values

The protected area network of the DRC encompasses land and resources from which many diverse groups derive social and cultural values. Recognizing these values and incorporating the rights of indigenous peoples and local communities into protected area design and management is critical from both a human rights perspective and for the sustainability of conservation actions. This is especially pertinent given that many protected areas in the DRC were created during a period when the rights of indigenous peoples and local communities were not systematically considered. As well as because many types of protected areas restrict access and use rights to resources.

Many indigenous peoples and local communities within and on the periphery of the DRC's existing protected areas are dependent on access to resources for their food security and livelihoods. As evidenced by data collected by PARAP during site level assessments, the direct, consumptive use values that relate to many protected areas include those associated with provisioning services: wildlife and fish, other non-timber forest products, wood, water, agriculture and livestock. Data collected via field surveys and stakeholder consultations also demonstrate that many of these direct use values and conservation targets are being negatively impacted by unsustainable practices. This makes it imperative that protected area managers find a means to balance and integrate the long-term benefits of protected areas with the immediate needs and aspirations of indigenous peoples and communities. Among the non-consumptive values that pertain to certain protected areas are jobs and tourism. Additional research is needed to more systematically identify and better quantify the socio-economic values of these services across the protected area network and better take them into consideration.

Data on cultural heritage and spiritual sites within protected areas as well as threats to these values has not been collected or documented for many protected areas in the DRC. This remains important to assure the values of indigenous peoples and local communities are fully recognized and taken into consideration in protected area planning and management.

Today, the legal process to establish protected areas in the DRC obliges a process of public consultation. Mechanisms for the regular consultation of local stakeholders have also been established at some protected areas. The degree to which these mechanisms assure representation of all stakeholders and function effectively varies. In addition, the legal framework allows for the management of national or provincial protected areas to be shared with or transferred to other legal entities, including potentially local communities. This transfer is conditional on the entity being able to demonstrate the necessary capacity to assume the responsibility. Finally, the Forest Code recognizes the potential to establish community forests that would meet the criteria of protected areas.

Management of the system

The achievement of sustainable biodiversity conservation results is the foundation of protected areas and of the entire protected area system or network. Their success as management tools is measured by the preservation of the natural and other values for which they were designated; however, achieving effective management is difficult. It requires, among other things, the adoption of appropriate management objectives and governance systems, adequate technical and financial capacities, and the use of appropriate management strategies and associated implementation arrangements.

As presented previously, ICCN is the agency charged with the management of in and ex situ protected areas in the DRC. It is a public body with scientific and technical functions, and is under the tutelage of the Minister responsible for nature conservation, i.e. the Minister of the Environment and Sustainable Development (*Ministre de l'Environnement et du Développement Durable* - MEDD). ICCN is an entity with legal status, and an autonomous system of financial and administrative management. ICCN has approximately 2,500 agents, of which approximately 50% are ecoguards. The level of training of ICCN agents varies greatly. Although most of ICCN's staff is deployed to work the field, only a few dozen protected areas have management teams in place.

Strategies have been developed to guide the management of protected areas, and tools to assist with planning, supervision, and monitoring and evaluation are available. Some protected areas have a site coordination committee (*Comité de Coordination du Site* - CoCoSi), a local platform regularly convened by the management team to organize in a participative fashion with local communities and indigenous peoples the coordination, planning, and monitoring and evaluation of activities associated with the protected area. A national Coalition for Conservation in the Congo (*Coalition pour la Conservation au Congo* - CoCoCongo) aims to reunite annually. The CoCoCongo reunites actors across sectors to discuss the challenges and issues faced by protected areas and identify measures to improve their management effectiveness.

ICCN has developed partnerships with nearly 40 national and international institutions and organizations to strengthen its technical, scientific and financial resources. Their area of intervention is largely focused on national parks, adjoining other protected areas and certain natural reserves.

Certain of ICCN's technical partners intervene within the context of delegations for the management of protected areas. These management frameworks take different forms. Some meet the criteria of a so-called collaborative management, under which the partner has the decision-making authority and management responsibility and must inform and consult other actors. Others are based on joint management, where the different actors sit in a body with the decision-making authority while the management authority is entrusted to the partner.

The annual financial allocation for the management of protected areas largely depends on the commitment of international donors. Their contribution generally represents over 80% of the total annual budget, with additional funding coming from the State and ICCN. Most of the financial resources provided by the international community are designated to support around a dozen specific sites. This means most protected areas have inadequate or no resources for their management. The dependence on international donors also means the annual budget for the protected area system varies from year to year; it was recently estimated at over 30 million USD. A process is underway to establish a trust fund to sustainably finance the management activities in protected areas, primarily those inscribed on the World Heritage List.

Despite considerable investments by ICCN and its partners in a select number of protected areas, the overall system or network is far from achieving its objectives. With a socio-economic context that has changed profoundly since their creation, the majority of protected areas do not have the technical and financial resources necessary to establish effective management. Many are also affected by insecurity.

Among the key actions that are critical to improve the management effectiveness of the protected area system are: enhancing inter-agency and intersectoral collaboration; continuing efforts to prioritize entities for investment, based on the most up-to-date knowledge on conservation targets; developing adequate governance systems and innovative management approaches; and improving the overall capacities for long-term management. Recent legal developments provide an important opportunity to test innovative approaches to the creation and management of protected areas, particularly by increasing the role of local communities, the provinces, decentralized territorial entities and the private sector.

Ecoguards on foot patrol in the Parc national de la Salonga

Ecoguards on a river patrol in the Parc national de la Salonga

Vegetable market in the periphery of the Parc national des Virunga

Chapter 5
Moving forward

A changing context

The protected area system of the DRC developed over the course of the country's complicated history, punctuated by periods of time when nature conservation was strongly promoted through public policy. Most of the country's protected areas were created in the 20th century and almost exclusively for the conservation and management of large fauna and its habitat.

Since the initial establishment of most of these areas, the national context has continued to change. Strong population growth and ever-increasing national and international demand for natural resources are key factors driving an extension and intensification of unsustainable extractive practices. While these practices are largely illegal within protected areas, they regularly encroach on these spaces. The inadequacy of public management capacities, as well as the recurrence of regional armed conflicts for more than two decades, also constitute important constraints to the establishment of appropriate natural resource management systems.

Despite the evolving setting in the DRC, a number of zones that harbor important natural values and provide important opportunities for biodiversity conservation continue to persist outside of the existing protected area system. Recent legal changes offer new opportunities for governance and management of these spaces, including the potential to create innovative models of protected areas that respect the rights of local populations and effectively address ecological and socio-economic issues.

In the face of these challenges and opportunities, and recognizing that the primary needs of its population and their aspirations for economic development cannot be dissociated from the sustainable management of the country's biodiversity, the DRC has made the consolidation and extension of its protected area system a key measure of national plans for transformation and development by 2030.

Protected areas and the protected area system today

Investments by ICCN and its partners have made it possible for certain protected areas to maintain and, in select cases, enhance their management effectiveness. At present, approximately a dozen of the DRC's protected areas possess significant technical and financial capacities to address the challenges they face. Multiple of these areas have benefited from international recognition of their universal conservation values. The central role that protected areas play in maintaining the ecosystem services on which communities depend is also being increasingly recognized. Ever more investments are being made to valorize this role and mobilize greater stakeholder support for the sustainable management of these areas.

Concurrently, the original designs for many protected areas in the DRC have become obsolete. Among the factors contributing to this actuality are: the disappearance of conservation targets, the fragmentation of ecosystems, the anthropization of natural environments, inadequate governance and insufficient resources. Given these realities, reconsidering the relevance and design of some protected areas is pertinent. This consolidation process is imperative to support the development of appropriate management strategies and preserve the natural values that remain in these areas.

Today, the vast assemblage of heterogenous entities that constitutes the national protected area system of the DRC remains very vulnerable. The viability of the system is affected not only by direct threats to its natural values, but also by the fragility of the design of a large number of protected areas, the absence of management systems in many protected areas and the lack of sufficient intersectoral coordination when it comes to natural resource planning and management. Given the sheer size of the system, and thanks to the investments already made by ICCN and its partners to protect its natural values, addressing these vulnerabilities remains vital to the long-term preservation of the country's unique biodiversity and the maintenance of environmental services on which local populations, the country and the global community depend.

Saddle-billed stork (Ephippiorhynchus senegalensis) and other birdlife on the shores of Lake Edward

PARAP team on field mission, Domaine et réserve de chasse de Swa-Kibula

Perspectives and recommendations

Assuring effective protected area governance and management within a vast and functional national system, the main long-term objective of which is to preserve biodiversity while ensuring its tangible and positive contribution to poverty reduction and sustainable development, is a titanic but essential endeavor. The stakes are particularly high as DRC aims to establish the country's natural capital as one of the pillars of its economic emergence.

Successfully consolidating and strategically extending the DRC's protected area system necessitates the development of a robust approach organized around well-defined priorities for the short, medium and long terms. This approach should consider how to mobilize the entirety of the national community and secure adequate resources.

There are a number of points to be considered in the development and implementation of such an approach:

- Increased engagement on the part of the State and its resources, improved interinstitutional collaboration, innovative partnerships and strengthened human capacity at ICCN are all essential to sustainably improve the management effectiveness of protected areas and the protected area system in the DRC. The resolution of ongoing insecurity is also fundamental to the effective operation of protected areas in certain regions.
- Establishing systematic consideration of the protected area system in sectoral and intersectoral planning processes, particularly dialogues on land use planning and development, is essential to help ensure its sustainability in the context of increasing competition for land and an incessant demand for natural resources.
- The conservation of endangered species of flora and fauna in the DRC is largely dependent on protected areas. The illegal removal of species or species parts for trade is often the work of criminal networks with proven capabilities. Strengthening law enforcement, through anti-poaching and anti-trafficking operations, is a priority to ensure the maintenance of these often iconic species. The threat posed by the illegal exploitation of certain resources, such as minerals or charcoal, is also embedded in crime and insecurity in some protected areas.
- Hunting regulations in the DRC require urgent revision and improved enforcement. Many of the ecological and social considerations underlying the current hunting framework were elaborated thirty years ago and are no longer relevant. This lack of relevancy and the total ineffectiveness of the application of these regulations seriously impede conservation efforts and the sustainable management of wildlife.
- The role of protected areas in maintaining ecosystem goods and services needs to be more comprehensively researched and integrated into natural resource management and development processes. Notably there is a need to better understand the role of the protected area system as regards provisioning services, including for water and food, and regulating services, such as for climate control. Taking these values into consideration provides an important opportunity to engage stakeholders, including local communities and the private sector, in issues of protected area planning and management. In the context of decentralization, it also provides a means to strengthen local communities ability to participate in the governance and regulation of these goods and services as well as to equitably share the benefits of strategies to conserve said goods and services. More systematic valuation of ecosystem services benefits at site and system levels

is also important to inform cross-sectoral development policies, strategies and plans. Finally, the development of innovative financing mechanisms that valorize these goods and services should help the DRC increase resources available for the management of the protected area system.

- The diversity of governance options that are legally recognized in the DRC presents an important opportunity to develop protected areas that more effectively deliver sustainable conservation outcomes and benefits for local livelihoods. Assuring the application of principles of good governance, including respect for the rights of local populations, is critical to the future of the protected area system. This should include the development of national guidelines for the implementation of FPIC in the context of protected area creation and management, using as an example the precedents that have been set in other national frameworks (i.e. REDD+). Additional investments are needed to establish pilot programs aimed at testing a variety of governance types at scale.
- Strategies and standards for conserving biodiversity outside the protected area system should be developed and the resources necessary to implement such measures should be mobilized. For example, in the context of responsible forest management, logging concession operators or local communities may be held accountable for applying measures to maintain forest cover and protect biodiversity.

Sunset, Parc national de la Salonga

In addition to these key areas of consideration, the following actions should be considered within the strategic framework of a next phase of the program:

- Institute arrangements to effectively strengthen the human capital for planning and managing protected areas and the protected area system.
- Establish a national steering committee that brings together key stakeholders to guide and coordinate interventions at the scale of the protected area system.
- Produce a strategic plan for the protected area system, ensuring in particular:
  - The identification of focal biodiversity and setting of associated targets, taking into consideration gaps in representation and management;
  - The finalization of Principles, Criteria and Indicators for the protected area system;
  - The formulation of operational objectives for the consolidation and extension of the system;
  - The systematic revision of national management categories for protected areas and the assignment of IUCN categories; and
  - The validation of an official map depicting the protected area system.
- Apply recommendations and implement priority action plans for the sites evaluated by PARAP, including the application of innovative types of governance and, as appropriate, the redefinition of management objectives, categories and boundaries.
- Prioritize and address through legal means inconsistencies identified in the classification texts of existing protected areas.
- Establish an inter-sectoral and inter-institutional framework to deal with overlaps in land use classifications affecting protected areas.
- Complete additional assessments of areas identified as potentially important for biodiversity conservation that were not assessed in the first phase of the program.
- Establish the national red lists for fauna and flora species and update the corresponding national list of protected species.
- Undertake a systematic identification of Key Biodiversity Areas (KBA), taking into consideration variables related to climate change.
- Ensure the operationalization of the ICCN Decision Support System (DSS) for the planning and management of the protected area system, as well as standardized tools for the application of best practices, as part of the consolidation process.

Chameleon, Maniema

Annex 1 : Protected areas of the DRC

Name	PA code	Date of creation	Area (ha)	Management category
Domaine de chasse de Bili-Uéré	DCRBU	1974	3,273,280	*Domaine de chasse réservée*
Domaine de chasse de Bombo-Lumene	DCRBL	1968	250,734	*Domaine de chasse réservée*
Domaine de chasse de Bushimaie	DCRBM	1958	261,937	*Domaine de chasse réservée*
Domaine de chasse de Fizi	DCFI	1953	86,251	*Domaine de chasse réservée*
Domaine de chasse de Gangala na Bodio	DCRGB	1958	386,233	*Domaine de chasse réservée*
Domaine de chasse de Kiziba-Baluba	DCKB	2006	11,388	*Domaine de chasse*
Domaine de chasse de la Basse-Kando	DCBK	2006	57,308	*Domaine de chasse*
Domaine de chasse de la Maika	DCMA	1951	42,103	*Domaine de chasse*
Domaine de chasse de Luama Katanga	DCLKT	2011	230,300	*Domaine de chasse / Réserve naturelle*
Domaine de chasse de Luama Kivu	DCLKV	1954	201,837	*Domaine de chasse réservée*
Domaine de chasse de Mangai	DCHM	1944	1,194,844	*Domaine de chasse*
Domaine de chasse de Mulumbu	DCRML	1957	62,860	*Domaine de chasse réservée*
Domaine de chasse de Rutshuru	DCRU	1953	66,550	*Domaine de chasse réservée*
Domaine de chasse de Swa-Kibula	DRCSK	2006	722,765	*Domaine et réserve de chasse*
Domaine de chasse des Azande	DCRAZ	1951	389,097	*Domaine de chasse réservé*
Domaine de chasse des Mondo-Missa	DCRMM	1974	183,184	*Domaine de chasse réservée*
Domaine de chasse des Watalinga	DCRWT	1955	Unknown	*Domaine de chasse réservée*
Domaine de chasse d'Oshwe	DCOW	2004	1,692,435	*Domaine de chasse réservé*
Domaine de chasse du Lac Tshangalele	DCRLT	1955	38,654	*Domaine de chasse réservée*
Domaine de chasse du plateau des Kundelungu	DCRPK	1953	161,529	*Domaine de chasse réservée*
Domaine de chasse du Ruwenzori	DCRW	1955	Unknown	*Domaine de chasse réservée*
Domaine de chasse en territoire de Gungu	DCRGU	1952	136,555	*Domaine de chasse réservée*
Domaine de chasse réservée de Lubudi-Sampwe	DCRLS	1957	1,383,501	*Domaine de chasse réservée*
Domaine des Mwene Kay	DCPRK	1954	4,996	*Domaine de chasse et de pêche réservées*
Domaine des Mwene Musoma	DCPRS	1954	11,908	*Domaine de chasse et de pêche réservées*
Parc national de la Garamba	PNG	1938	512,401	*Réserve naturelle intégrale*

Name	PA code	Date of creation	Area (ha)	Management category
Parc national de la Lomami	PNL	2016	887,522	Unknown
Parc national de la Maiko	PNM	1970	1,052,867	*Réserve naturelle intégrale*
Parc national de la Salonga	PNS	1970	3,336,813	*Réserve naturelle intégrale*
Parc national de l'Upemba	PNU	1975	974,185	*Réserve naturelle intégrale*
Parc national de l'Upemba	PNU (ZA)	1975	276,354	*Zone annexe*
Parc national des Kundelungu	PNK	1975	243,743	*Réserve naturelle intégrale*
Parc national des Kundelungu	PNK (ZA)	1975	572,767	*Zone annexe*
Parc national des Virunga	PNVi	1934	782,652	*Réserve naturelle intégrale*
Parc National du Kahuzi-Biega	PNKB	1970	673,082	*Réserve naturelle intégrale*
Parc Président Mobutu	PM	1983	3,424	*Réserve naturelle intégrale*
Refuge à Éléphants en Territoire de Kaniama	DCRKA	1959	136,645	*Domaine de chasse réservée*
Réserve communautaire des bonobos d'Iyondji	RCOBI	2012	103,000	*Forêt classée*
Réserve de biosphère de Lufira	RBLF	1982	69,544	*Réserve de biosphère*
Réserve de biosphère de Luki	RBLK	1976	33,567	*Réserve de biosphère*
Réserve de biosphère de Yangambi	RBYA	1976	229,530	*Réserve de biosphère*
Réserve de Butahu-Hululu	RCBH	1950	Unknown	Unknown
Réserve de chasse de Bushimaie (Bloc A)	RCBM (A)	1939	10,183	*Réserve totale de chasse*
Réserve de chasse de Bushimaie (Bloc B)	RCBM (B)	1947	83,038	*Réserve partielle de chasse*
Réserve de chasse de Bushimaie (Bloc D)	RCBM (D)	1959	17,498	*Réserve partielle de chasse*
Réserve de chasse de Rubi-Télé	DCRT	1930	1,127,370	*Réserve de chasse*
*Réserve de chasse et de pêche du lac Kwa*da	RCTLK	1955	29	*Réserve totale de chasse et partielle de* pêche
Réserve de Faune à Okapis	RFO	1992	1,393,958	*Réserve naturelle*
Réserve de faune de Kabobo	RFK	2016	146,785	*Réserve de faune*
Réserve de faune de Lomako-Yokokala	RFLY	2006	362,823	*Réserve naturelle*
Réserve de faune du Bomu	RSBO	1974	1,067,102	*Réserve spéciale*
Réserve de faune et forestière de Kalwazi	RCTKA	1949	Unknown	*Réserve totale de chasse*
Réserve de totale de chasse de la Nsele	RCTNS	1952	Unknown	*Réserve totale de chasse*
Réserve des primates de Kisimba-Ikobo	RPKI	2006	97,042	*Réserve naturelle*
Réserve intégrale de chasse de la Mufufya	RCIMU	1954	94,319	*Réserve intégrale de chasse*
Réserve intégrale de chasse de Tshikamba	RCITS	1954	100,537	*Réserve intégrale de chasse*
Réserve intégrale de chasse des Alunda et des Tutshokwe	RCIAT	1954	442,301	*Réserve intégrale de chasse*

Name	PA code	Date of creation	Area (ha)	Management category
Réserve intégrale de flore dans l'île Idjwi et certains ilôts	RFIDJ	1941	Unknown	*Réserve intégrale de flore*
Réserve intégrale de flore en territoire de Beni	RFIBN	1947	Unknown	*Réserve intégrale de flore*
Réserve intégrale de la faune et de la flore des iles Kifumbwe ou iles du New York Herald	RFFIK	1950	Unknown	*Réserve intégrale de faune et de flore*
Réserve naturelle de bonobo de Kokolopori	RNBK	2009	374,090	*Réserve naturelle*
Réserve naturelle de Ngandja	RNN	2016	260,960	*Réserve naturelle*
Réserve naturelle de Sarambwe	RNS	2003	75,802	*Réserve naturelle*
Réserve naturelle de Tayna	RNT	2002	89,968	*Réserve naturelle*
Réserve naturelle des mangroves (Parc Marin)	RNM	1992	52,333	*Réserve naturelle*
Réserve naturelle d'Itombwe	RNI	2006	571,790	*Réserve naturelle*
Réserve naturelle du Sankuru	RNSA	2007	2,667,017	*Réserve naturelle*
Réserve naturelle du triangle de la Ngiri	RTN	2011	523,506	*Réserve naturelle*
Réserve scientifique de la Luo	RSL	1992	48,016	*Réserve scientifique*
Réserve scientifique de Mabali	RSM	1959	2,363	*Réserve scientifique*
Réserve totale de chasse dans le district de Kibali-Ituri	RCTKI	1938	748,582	*Réserve totale de chasse*
Réserve totale de chasse de Butahu-Hululu	RCTBH	1953	Unknown	*Réserve totale de chasse*
Réserve totale de chasse de Gungu	RCTGU	1952	221,841	*Réserve totale de chasse*
Réserve totale de chasse de Luama Kivu	RCLKV	1935	160,512	*Réserve totale de chasse*
Réserve totale de chasse en territoire d'Elisabethville	RCTEB	1940	Unknown	*Réserve totale de chasse*
Réserve Tumba-Lediima	RTL	2006	746,269	*Réserve naturelle*
Réserve zoologique et forestière dans la région des monts Homas	RZFIH	1947	31,626	*Réserve intégrale zoologique et forestière*
Réserve zoologique et forestière de la Bombo-Lumene	RZBL	1976	107,252	*Réserve zoologique et forestière*

Annex 2 : Notes to accompany the map of the protected area system of the DRC

PA code	Protected area	Note
DCBK	*Domaine de chasse de la Basse-Kando*	Ministerial Order No. 055/CAB/MIN/ECN-EF/2006 of July 7, 2006 includes no description of the protected area's legal limits. Order No. 52/48 of March 27, 1957, which revises a preceding text, designates the DCBK as a "réserve totale de chasse" for a period of 5 years.
DCHM	*Domaine de chasse de Mangai*	The only available copy of Order No. 414/Agri of July 3, 1944 is a certified copy dated July 2007; its content is not organized according to the standards used for such texts in the 1940s. Its veracity is therefore uncertain.
DCKB	*Domaine de chasse de Kiziba-Baluba*	Ministerial Order No. 054/CAB/MIN/ECN-EF/2006 of July 7, 2006 provides no description of the protected area's legal limits. In addition, Order No. 52/47 of May 6, 1944 is revised by Order No. 552/24 of February 18, 1959, which designated the DCKB as a "réserve totale de chasse" for a period of 3 years.
DCLKT	*Domaine de chasse de Luama Katanga*	Ministerial Order No. 002/CAB/MIN/ECN-T/03/JEB/11 of January 19, 2011 includes a description of limits that can be partially mapped. It appears that these limits define a geographical area that is distinct from the area described be the description of limits in Order No. 52/36 of April 15, 1954. The management category presented in the text from 2011 is also confusing, referencing a "domaine de chasse et réserve naturelle". The cartographic representation of this protected area is based on the description of limits that is recognized by actors of the field, i.e., limits derived from the description in in Order No. 52/36 of April 15, 1954.
DCRBL	*Domaine de chasse de Bombo-Lumene*	Ministerial Order No. 040/CAB/MIN/ECNT/94 of February 4, 1994 downgrades a portion of the protected area designated by Order No. 07 of February 10, 1968. The description of limits for this protected area can only be mapped partially.
DCRLS	*Domaine de chasse réservée de Lubudi-Sampwe*	Order No. 5520/103 of June 20, 1959, repealing three earlier texts, provides the current description of legal limits for this protected area. Its cartographic representation is superimposed on those of other protected areas.
DCRLT	*Domaine de chasse du lac Tshangalele*	It is probable that the DCRLT is equivalent to the RBLF, as inscribed in UNESCO's Man and the Biosphere Programme (MAB); however, the lack of legal documentation concerning the DCRLT rendered it impossible for the program to confirm this hypothesis.
DCRW	*Domaine de chasse du Ruwenzori*	Mapping of the legal limits of this protected area could not be realized.
DCRWT	*Domaine de chasse des Watalinga*	Mapping of the legal limits of this protected area could not be realized.
DRCSK	*Domaine de chasse de Swa-Kibula*	Order No. 056/CAB/MINI/ECN-EF/2006 of December 8, 2006 provides a description of limits that can only be mapped partially. The management category introduced in the text of 2006 (i.e., "domaine et réserve de chasse") is also unclear.
DCRT	*Réserve de chasse de Rubi-Télé*	Mapping the legal limits of this protected area would require additional field work. The cartographic representation presented is therefore unfinished.
RCBH	*Réserve de Butahu-Hululu*	Mapping of the legal limits of this protected area could not be realized.
RCTBH	*Réserve totale de chasse de Butahu-Hululu*	Mapping of the legal limits of this protected area could not be realized.
RCTEB	*Réserve totale de chasse en territoire d'Elisabethville*	Mapping of the legal limits of this protected area could not be realized.
RCTKA	*Réserve de faune et forestière de Kalwazi*	Mapping of the legal limits of this protected area could not be realized.
RCTNS	*Réserve de totale de chasse de la Nsele*	Mapping of the legal limits of this protected area could not be realized.
RFFIK	*Réserve intégrale de la faune et de la flore des îles Kifumbwe ou îles du New York Herald*	Mapping of the legal limits of this protected area could not be realized.

PA code	Protected area	Note
RFIBN	*Réserve intégrale de flore en territoire de Beni (Kivu)*	Mapping of the legal limits of this protected area could not be realized.
RFIDJ	*Réserve intégrale de flore dans l'île Idjwi et certains îlots*	Mapping of the legal limits of this protected area could not be realized.
RNN	*Réserve naturelle de Ngandja*	The classification text for this protected area could not be obtained.
RTL	*Réserve Tumba-Lediima*	Ministerial Order No. 053/CAB/MIN/ECN-EF/2006 of July 7, 2006 includes no description of the protected area's legal limits. The cartographic representation used for this protected area is that which is recognized by actors in the field.
RZFIH	*Réserve zoologique et forestière dans la région des monts Homas*	The designation of the RZFIH involves multiple legal texts. Ordinance No. 74 of February 28, 1947 establishes the reserve. Ordinance No. 318 of October 14, 1947 modifies the limits set out previously. Additionally, Ordinance No. 52/256 of July 19, 1952 repeals Ordinance No. 74 of February 28, 1947. The current validity of the classification of this protected area requires further examination.
RBLF	*Réserve de biosphère de Lufira*	It is conceivable that the RBLF is equivalent to the DCRLT; however, the lack of legal documentation related to the RBLF rendered it impossible for the program to validate this hypothesis. The cartographic representation retained for this protected area is that of ICCN.
RFK	*Réserve de faune de Kabobo*	The RFK was designated in 2016 through a provincial order. It is therefore considered a protected area of provincial interest, as defined by Law No. 14/003. It is anticipated that a significant portion of this protected area will eventually be designated as a national park (i.e., a "réserve naturelle intégrale"). As such, its management category is considered provisional.

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