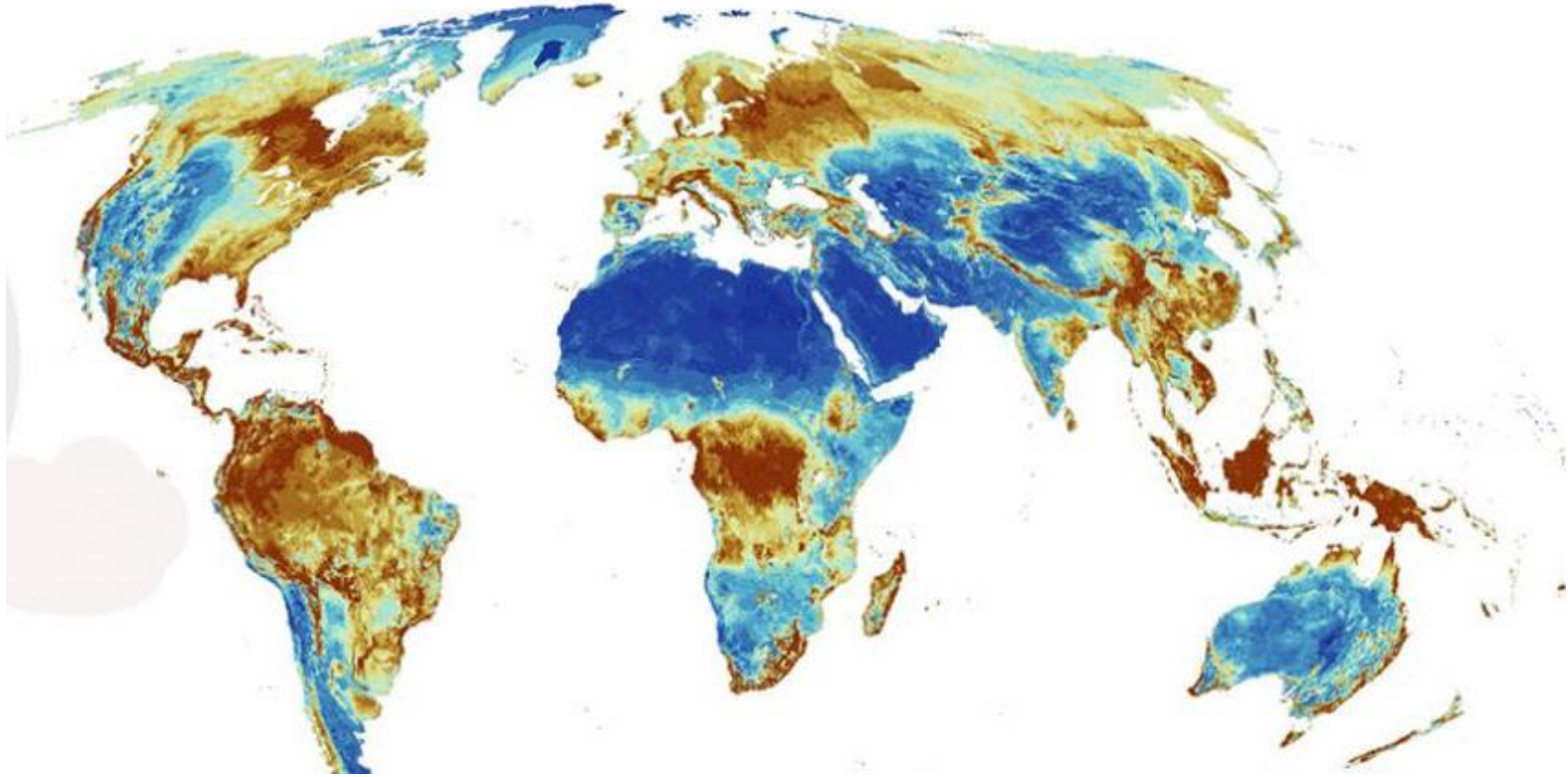


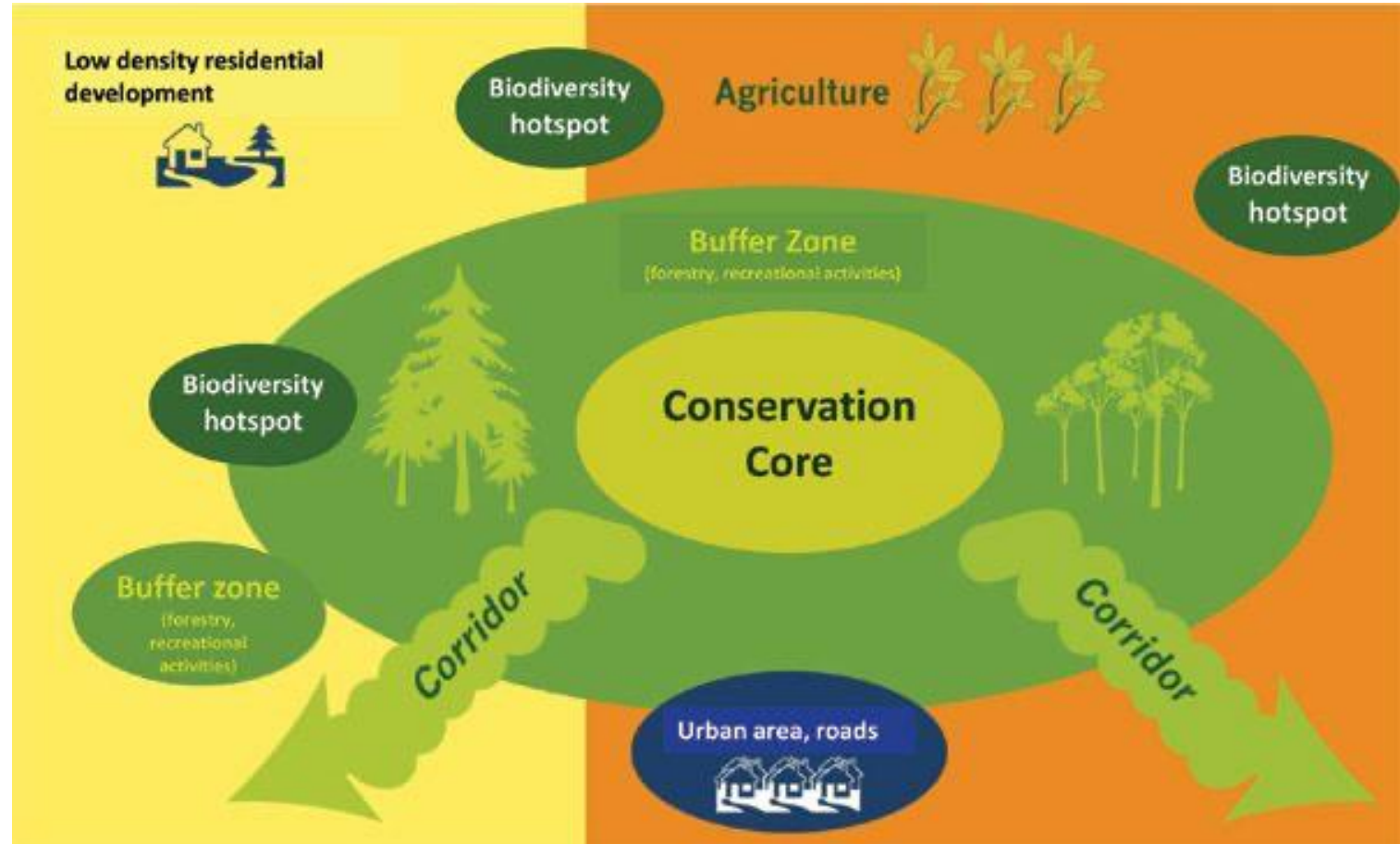
Module 3: Conservation Strategies



Forestry Training Institute
Tubmanburg, Liberia

Key Topics

- What is conservation?
- Conservation Governance
- Conservation Planning
- Conservation Management
- Protected Areas in Liberia



What is Conservation?

The Cambridge English Dictionary defines **conservation** as, “the protection of plants, animals, and natural areas.”

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News



CONSERVATION: LIBERIAN SEA TURTLES ARE AT RISK OF EXTINCTION

📅 FEBRUARY 20, 2020 👤 ADMIN2 🔖 CONSERVATION, LIBERIA, SEA TURTLE

What is Conservation?

IUCN (1980) defines the objectives of conservation as:

- To maintain essential ecological processes and life support systems
- To preserve genetic diversity
- To ensure the sustainable utilization of species and ecosystems

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News



CONSERVATION: LIBERIAN SEA TURTLES ARE AT RISK OF EXTINCTION

FEBRUARY 20, 2020 ADMIN2 CONSERVATION, LIBERIA, SEA TURTLE

Conservation Governance

There are two broad categories of *protected area governance*:

- a) government managed protected areas;
- b) co-managed protected areas, including community conserved areas and private reserves.

Co-managed protected areas are governed and managed either jointly or independently by local and indigenous communities, cooperatives, private individuals, corporations, etc.

There is wide variation in these categories of PAs in terms of governance arrangements, ecological representation, and outcomes.

Conservation Governance: International Agreements



The Convention on Biological Diversity (CBD) is the international legal instrument for "*the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources*" that has been ratified by 196 nations.

Conservation Governance: International Agreements

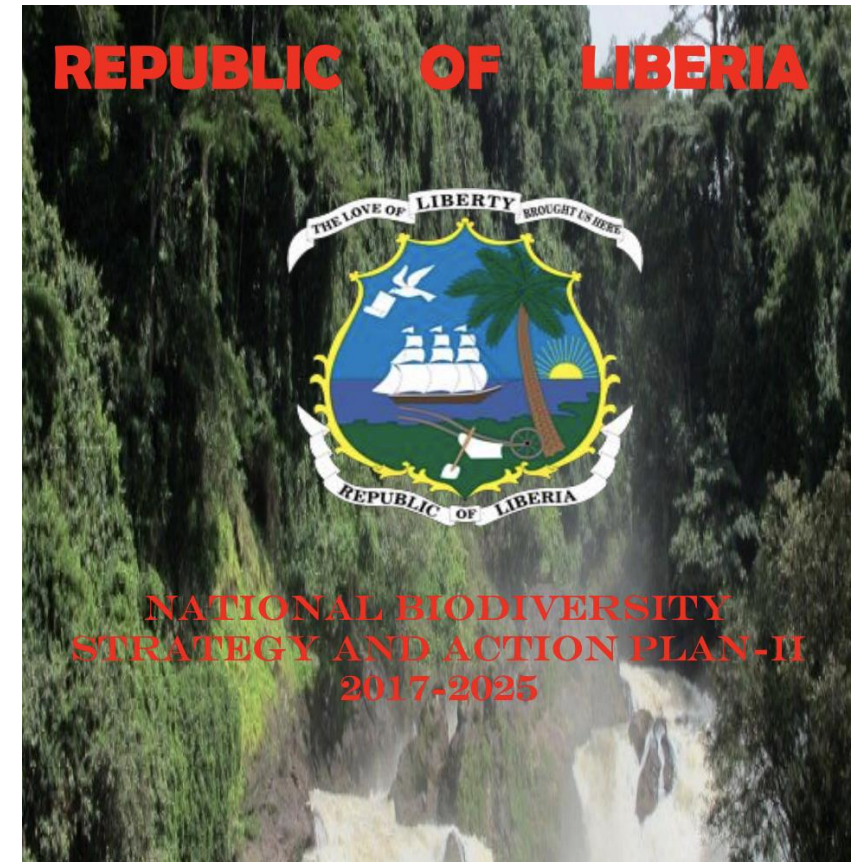


The **Convention on Biological Diversity (CBD)** has three main goals:

1. the conservation of biodiversity;
2. the sustainable use of its components; and
3. the fair and equitable sharing of benefits arising from genetic resources.

Conservation Governance

The Convention on Biological Diversity (CBD) requires countries to prepare a national biodiversity strategy (or equivalent instrument) and to ensure that this strategy is mainstreamed into the planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity.



Conservation Governance: IN-SITU CONSERVATION

Article 8 of the Convention on Biological Diversity mandates each party:

- Establish a system of protected areas to conserve biological diversity.
- Develop guidelines for the selection, establishment, and management of protected areas.
- Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species.

Conservation Governance: IN-SITU CONSERVATION

Article 8 of the Convention on Biological Diversity mandates each party:

- Prevent the introduction of, control, or eradicate alien species that threaten ecosystems, habitats and species
- respect, preserve, and maintain *knowledge, innovations, and practices* of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity.

Conservation Governance: Climate Change

United Nation Framework Convention on Climate Change (UNFCCC) sets limits on greenhouse gas emissions for individual countries but it contains no enforcement mechanisms.



Conservation Governance: Climate Change

The objective of the UN Framework Convention on Climate Change (UNFCCC) is..

“the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human-caused interference with the climate system.”

As of 2015, the UNFCCC has 197 parties including all United Nations member states.

Conservation Governance: CITES



The **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** is a multilateral treaty that protects endangered plants and animals. CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species in the wild

Conservation Governance: CITES



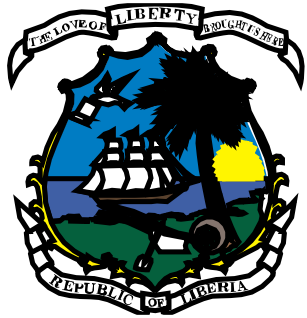
CITES is one of the largest and oldest conservation agreements in existence. Participation by countries like Liberia is voluntary.

Conservation Governance: CITES



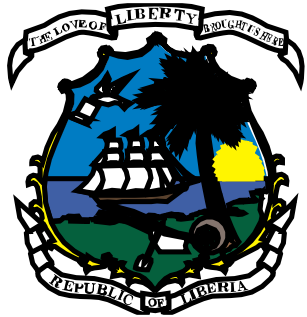
Although CITES is legally binding on the Parties, it does not take the place of national laws. Rather it provides a framework respected by each Party, which must adopt their own domestic legislation to implement CITES.

Conservation Governance: Timeline in Liberia



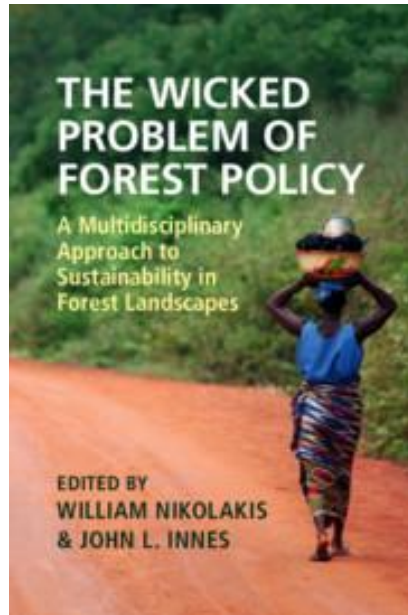
1. Creation of Liberia Forest Development Authority (FDA)
2. Environment Protection and Management Law 2002
3. Act to Establish Protected Forest Network 2003
4. National Forestry Reform Law of 2006

Conservation Governance: Timeline in Liberia



5. Community Rights Law of 2009
6. National Biodiversity Strategic Action Plan of 2015
7. Wildlife Conservation and Protected Areas Management Law of 2016
8. Protected area gazettelement Act (e.g. East Nimba Nature Reserve Act, Lake Piso Sustainable Multiple-Use Reserve Act, Gola National Park Act, etc).
9. Land Rights Law of 2018

Conservation Governance in Liberia



The Forestry Development Authority was established by an Act of the Legislature in 1976 with the mandate of ensuring the sustainable management and conservation of Liberia's forest and related natural resources for the benefit of current and future generations.



Conservation Governance in Liberia

Environment Protection and Management Law 2002

- Section 77 of the Environment Protection and Management Law focuses on the protection of forests.
- Section 78 contains provisions on re-forestation and afforestation.

Act to Establish Protected Forest Network (2003)

- This Act describes the procedure for the establishment of a protected forest area and conservation corridor.

Conservation Governance in Liberia



National Forestry Reform Law (2006)

- Provides for rules on the ownership and use of forest resources, policy and planning in relation to forests
- defines commercial and other uses of forest resources
- outlines contractual aspects of forest resources licenses

Conservation Governance in Liberia



National Forestry Reform Law (2006)

- describes the protected areas network and wildlife conservation areas;
- defines community rights and forests management, rights of land owners and occupants, dispute resolution, etc.

Conservation Governance in Liberia

Community Rights Act (2009)

- empowers communities to engage in the sustainable management of the forests of Liberia.
- defines the rights and responsibilities of communities to own, manage, use and benefit from forest resources whether by customary, statutory, or other tenure systems




Conservation Governance in Liberia

Community Rights Act (2009)

- establishes mechanisms to promote community participation in matters related to as community forest resources.
- the FDA is responsible for the observance of the principles of fair and sustainable management of forest resources.



Conservation Governance in Liberia



Liberia National Biodiversity Strategy and Action Plan (NBSAP)

Biodiversity Planning Description
Liberia's NBSAP was prepared from June 2002 to February 2004. Preparation was done through stakeholder consultations both provincially and nationally involving over 300 participants from diverse backgrounds and interests. The work was supervised by a 25 member steering committee and a planning team of 10 members drawn from relevant ministries and agencies of Government, academic institutions, local and international non-governmental organizations, and other stakeholders. The main laws to which this NBSAP is linked are: The National Environmental Policy of Liberia, the Environmental Protection Agency (EPA) Act; and the Environment Protection and Management Law. The NBSAP has been adopted by the Government.

What did we achieve?

Two protected areas have been established with combined areas of 193,500 ha. Eight additional protected areas have been proposed.

"I have no doubt that Liberia will follow the path on which nations seen as good examples of friends of the environment walk, and that we will not be found relenting on this course...the situation is urgent ... the time to take action is now..."
C. Gyude Bryant
Head of State, Republic of Liberia




National laws have been promulgated for protection of threatened species.


A five-year forest management plan is now in place to enhance sustainable forest use.

A NAPA has been prepared, with emphasis on adaptation measures in agriculture and coastal erosion.

2010 Biodiversity Target

- 1 Promote conservation of ecosystems & habitats
- 2 Promote the conservation of species diversity
- 3 Promote the conservation of genetic diversity
- 4 Promote sustainable use and consumption
- 5 Reduce pressures from habitat loss
- 6 Control threats from invasive alien species
- 7 Address challenges from climate change and pollution
- 8 Maintain capacity of ecosystems to provide services
- 9 Maintain cultural diversity of indigenous & local communities
- 10 Ensure fair & equitable benefit sharing from genetic resources
- 11 Ensure provision of adequate resources

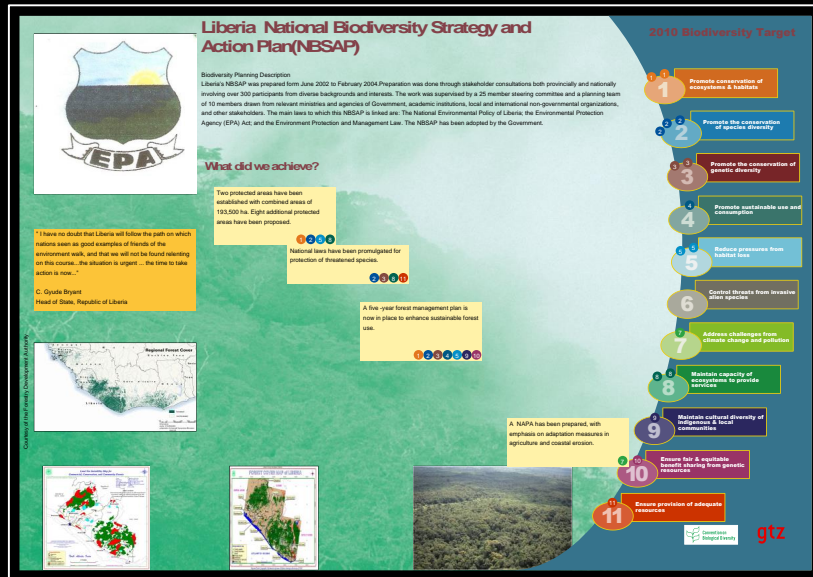


National Biodiversity Strategic Action Plan (2015)

Objective: To sustainably use biodiversity on a long-term basis that meets the requirements of present generations without endangering the potential of future generations to meet their own needs.

Conservation Governance in Liberia

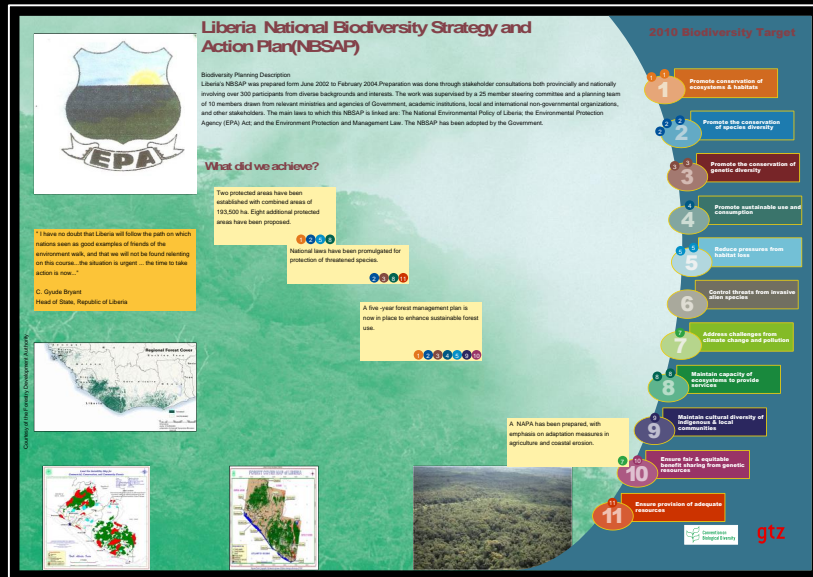
National Biodiversity Strategic Action Plan (2015)



1. Take appropriate measures to protect critical ecosystems against harmful effects or destructive practices for conservation of biological diversity;
2. To create biodiversity awareness among sectors of the society and promote international cooperation;
3. To commit the people to the sound and sustainable use of biological diversity to bring about socio-economic development;

Conservation Governance in Liberia

National Biodiversity Strategic Action Plan (2015)



4. To promote rational utilization and conservation of biological diversity;
5. To promote access to genetic resources and the fair and equitable sharing of benefits arising from their utilization;
6. To contribute to the fulfillment of the Millennium Development Goals through poverty alleviation, food security, and women empowerment in biodiversity conservation by 2015.

Conservation Governance in Liberia



Wildlife Conservation & Protected Areas Management Law (2016)

The objectives of this law are to:

- Manage wildlife and natural areas for the benefit, utilization, and enjoyment of all people in accordance with international accepted principles of ecologically based management;
- Conserve wildlife as a source of protein, revenue, and employment;



Conservation Governance in Liberia

Wildlife Conservation & Protected Areas Management Law (2016)

The objectives of this law are to:

- Protect, preserve, and manage animal and plant species threatened or endangered by extinction in Liberia;
- Preserve areas of outstanding scenic, natural, scientific recreational, and other values through the establishment of National Parks, Nature Reserves and other protected areas.
- Promote and provide education about wildlife and nature conservation.

Conservation Governance in Liberia

Land Rights Law (2018)

Under this law, communities can claim ownership of customary land by presenting evidence such as oral testimonies, maps, and signed agreements with neighbors



Conservation Planning: Assessing Threats

Government and non-government conservation organizations must pay attention to three broad questions:

- What targets should be conserved?
- How should conservation strategies be designed?
- Are conservation strategies effective in achieving conservation goals?



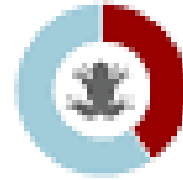
Conservation Planning: Assessing Threats

Threatened species lists are used to:

1. set priorities for resource allocation;
2. design reserve system;
3. guide development and management; and
4. report on the species status over time.

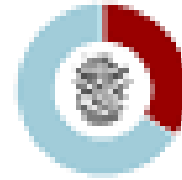
One in four species are at risk of extinction

Species assessed by the IUCN Red List



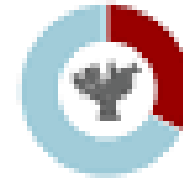
Amphibians

40%



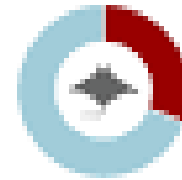
Conifers

34%



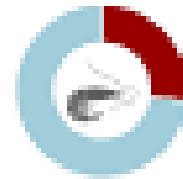
Reef corals

33%



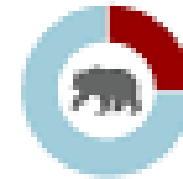
Sharks and rays

31%



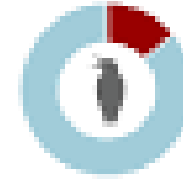
Selected crustaceans*

27%



Mammals

25%



Birds

14%

*Assessed species include lobsters, freshwater crabs, freshwater crayfishes and freshwater shrimps

Source: IUCN Red List of Threatened Species



Conservation Planning: Priority setting

- Threat assessment are an important component of conservation planning methods, helping to prioritize sites.
- Conservation International's Hotspots are defined on the basis of habitat loss (>70% of primary vegetation lost) and endemism.
- The Wildlife Conservation Society's Last Wild Places are identified using threat proxies (population density, accessibility, power infrastructure, and land transformation) for human influence.



Conservation Planning: Selecting a Strategy

A Conservation Plan provides the goals and objectives for managers to take, when they will be taken, and the budget and personnel needed to implement them. The plan should describe any specialized training needs of staff. An effective **Management Plan** has the following characteristics:

- **Impact oriented.** Actions that will produce desired changes in critical threat factors.
- **Measurable.** Definable in relation to some standard scale (numbers, percentages, fractions, or all/nothing states).
- **Time limited.** Achievable within a specific period of time.
- **Specific.** Clearly defined so that those involved in the project have the same understanding of stated objectives.
- **Practical.** Achievable and appropriate for the project site.

Conservation Planning: Selecting a Strategy

Usually a management plan is designed for a limited period of time, after which the plan is evaluated and modified. Annual workplans are developed during the implementation phase using the longer-term management plan as a guide. The management plan is a dynamic document subject to arrival of new circumstances and new information.



Conservation Planning: Results Chain

- A Results Chain can help teams make their assumptions behind an action explicit and positions the team to develop relevant objectives and indicators to monitor and evaluate whether their actions are having the intended impact.
- By using results chains, the conservation community can learn, adapt, and improve at a faster pace and, consequently, better address the ongoing threats to species, habitats, and ecosystems.



Conservation Planning

Results Chain

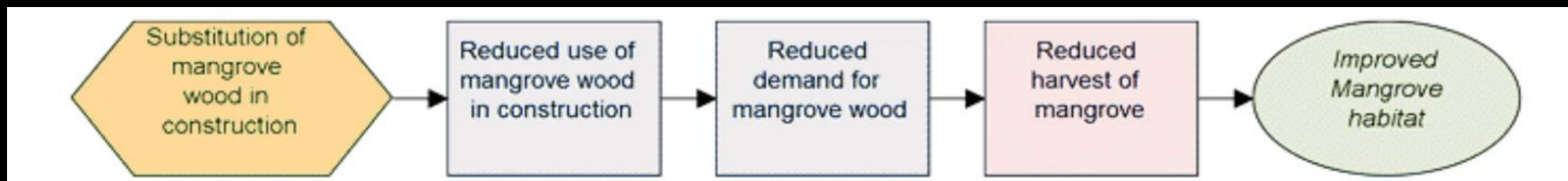
Below is a very simple results chain for improving mangrove habitat with the following **theory of change**: if we implement a strategy to substitute different wood, e.g., plantation grown 'Melina' instead of mangrove wood in construction projects ...

→ Then there will be reduced use of mangrove wood for construction; if there is reduced use of mangrove wood for construction

→ Then demand for mangrove wood will decline; if demand for mangrove wood declines

→ Then mangrove harvesting will be reduced; if mangrove harvesting is reduced

→ Then mangrove habitat will improve.



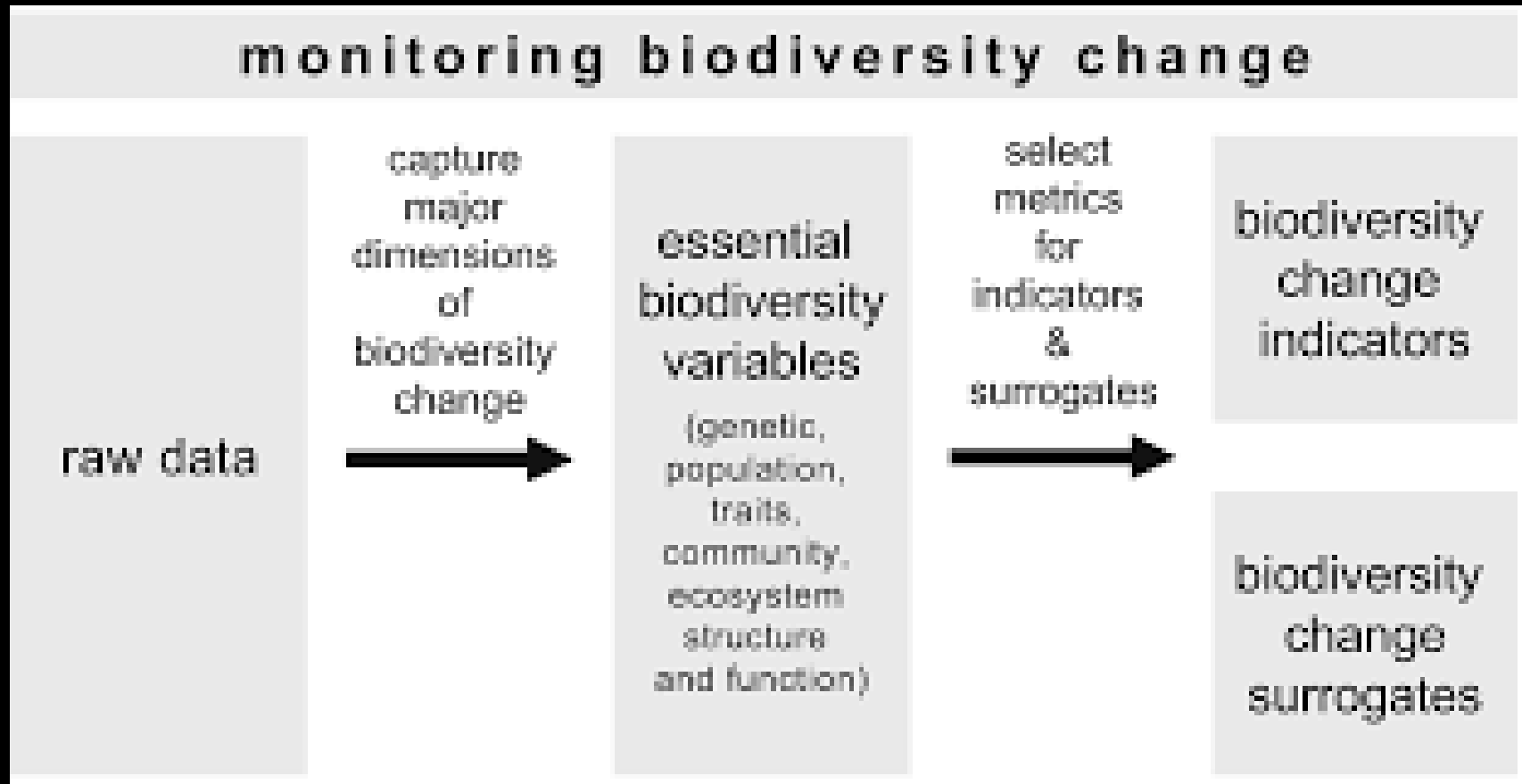
Conservation Planning: Monitoring and Evaluation

Monitoring is the collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a management objective.



Conservation Planning: Monitoring and Evaluation

Monitoring is essential to determining the extent to which protected areas are effective in conserving biodiversity or achieving other management objectives.



Conservation Planning: Monitoring and Evaluation

Monitoring is critical in ...

- managing endangered species
- measuring the effects of management activities and natural disturbances
- documenting compliance with regulatory requirements or contractual agreements.

Through monitoring, we can determine whether management was a success and should be continued or whether it was a failure and should be abandoned or altered.



Conservation Planning: Monitoring and Evaluation

There are a number of different topics for which the PA manager will require accurate, scientifically collected biophysical information before he or she can plan for the long-term management of a protected area. These topics include:

- 1) Baseline Information / Inventory
- 2) Species needs
- 3) Ecological relationships
- 4) Monitoring and Evaluation



Conservation Planning: Monitoring and Evaluation

Managers also need socio-economic information, including:

- 1) Resident and neighboring populations
- 2) Economic situation
- 3) Recreation and tourism



Conservation Planning: Monitoring and Evaluation

In recent years, conservation project managers, teams, and organizations have found themselves under increasing pressure to demonstrate the effectiveness of conservation and to provide measurable impacts that can be attributed to conservation projects. To do so, they need to answer three important questions:

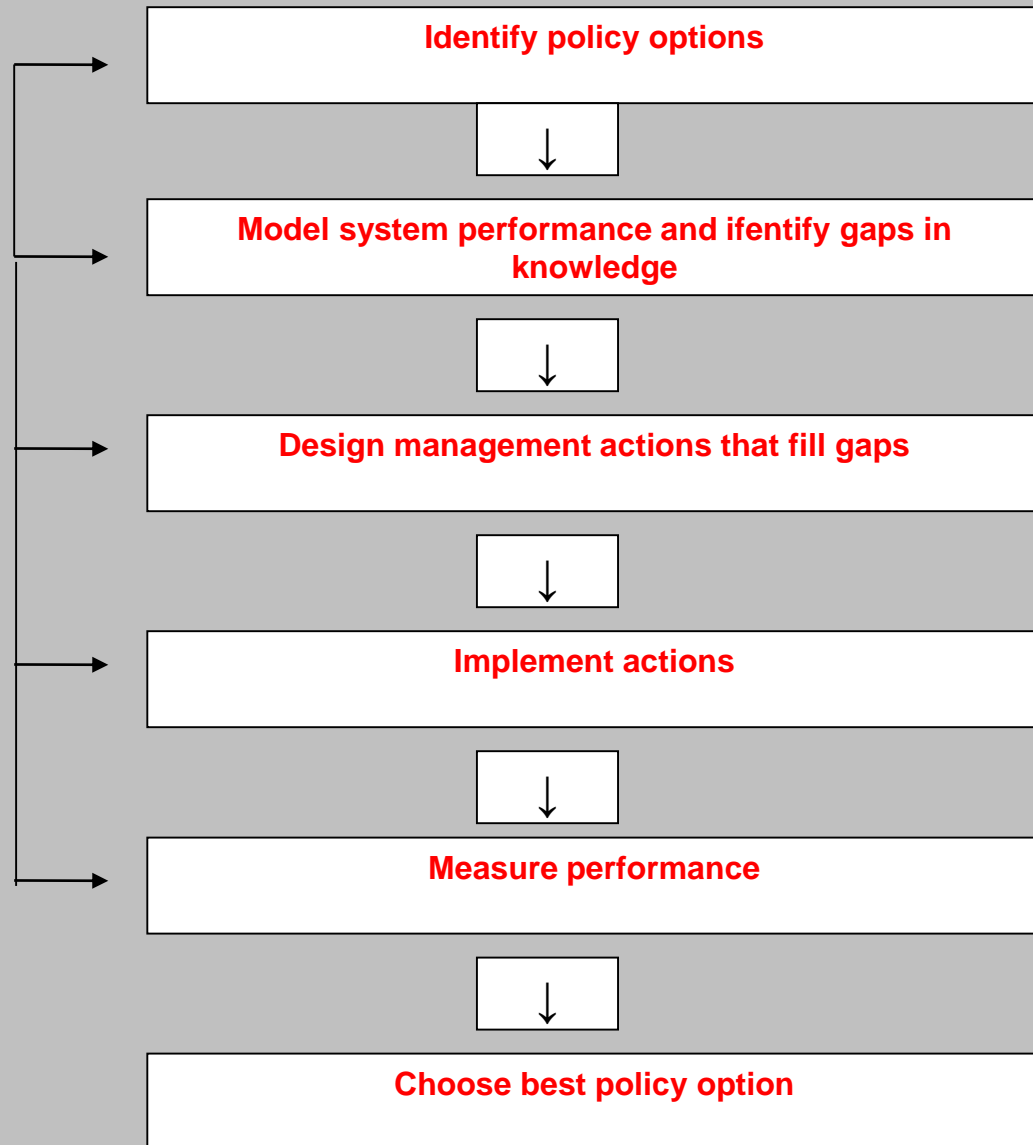
1. Are we achieving our desired impacts?
2. Have we selected the best interventions to achieve our desired impact?
3. Are we executing our interventions in the most effective manner?

Conservation Planning: Adaptive Management

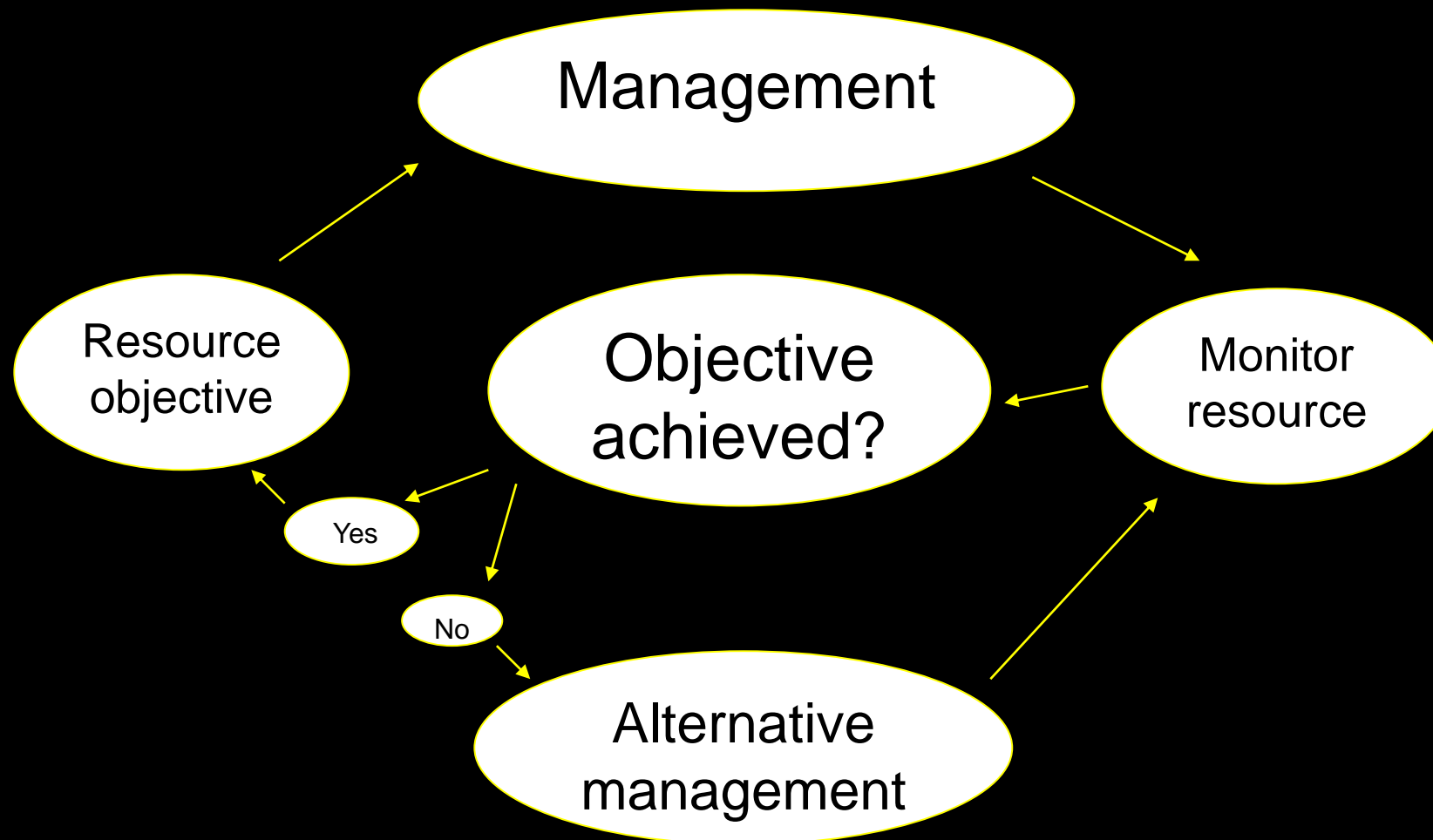
In **adaptive management**, monitoring is used to measure progress toward an objective, providing the evidence to decide whether to change or continue a specific management practice. Adaptive management in conjunction with monitoring is a “learning by doing” process.



What is adaptive management?



The Adaptive Management “Loop”



Adaptive Management: Six steps to success!



1. Establish a clear management goal
2. Develop a management plan identifying both threats to the target condition and activities to reduce these threats
3. Develop a monitoring plan focusing on the target condition, threats and activities.
4. Implement the management and monitoring plans
5. Data analysis and communication of results
6. Iterative use of results to adapt and learn

Adaptive Management

PRACTICUM:

MONITORING & ADAPTIVE MANAGEMENT

Habitat and hotspot approach to conservation (in-situ conservation)



- There has been a steady and significant increase in the area and number of protected areas in the past 50 years.
- The design of protected areas has evolved from the creation of small refuges for particular species to the protection of entire ecosystems.
- Protected areas remain the cornerstone of many conservation strategies aimed at limiting the destruction of biodiversity.



Habitat and hotspot approach to conservation (in-situ conservation)

- The long-term success or failure of PAs depends on the degree of ownership, engagement, and commitment of local communities, stakeholders, and local governments.
- Creating a protected area sometimes challenges the identity, values, and livelihoods of affected communities. Hence, understanding traditional power structures and resource tenure systems is critical for the success or failure of PAs.

Wildlife Management: in situ vs. ex situ conservation

in situ:

- Conservation of species in their natural habitat
 - e.g. natural parks, nature reserves

ex situ:

- Conserving species in isolation of their natural habitat
 - e.g. zoos, botanical gardens, seed banks



The advantages of in situ conservation

- The species will have all the resources that it is adapted too
- The species will continue to evolve in their environment
- The species have more space.
- Bigger breeding populations can be maintained.
- It is cheaper to keep an organism in its natural habitat.



Ex situ conservation

- Captive breeding of endangered species is a **last resort**.
- These species have already reached the point where their populations would not recover in the wild.
- It works well for **species that are easily bred in captivity** but more specialised animals are difficult to keep.
- Isolated in captivity **they do not evolve** with their environment.



Zoos: The land of the 'living dead'?

- They have a very small gene pool in which to mix their genes - **Inbreeding** is a serious problem
- Zoos and parks try to solve this by **exchanging specimens** or by artificial insemination where it is possible
- ***In vitro* fertilisation** and fostering by a closely related species has even been tried.
- Even if it is possible to restore a population in captivity **the natural habitat may have disappeared in the wild.**
- Species that rely on this much help are often considered to be “**the living dead**”.



Roles of protected areas in biodiversity conservation

The objective of protected areas is to preserve representative examples of rare, threatened, fragile or otherwise valuable species, habitats, and ecosystems, for example...

- pygmy hippos in Sapo National Park.
- 'flagship' species, such as elephants or chimpanzees;
- areas of intact rain forest surrounded by logging concessions or farmland, as is the case for many of Africa's rain forest protected areas;
- areas with fragile montane floras and faunas, which also have high tourist potential, such as Mt Nimba.





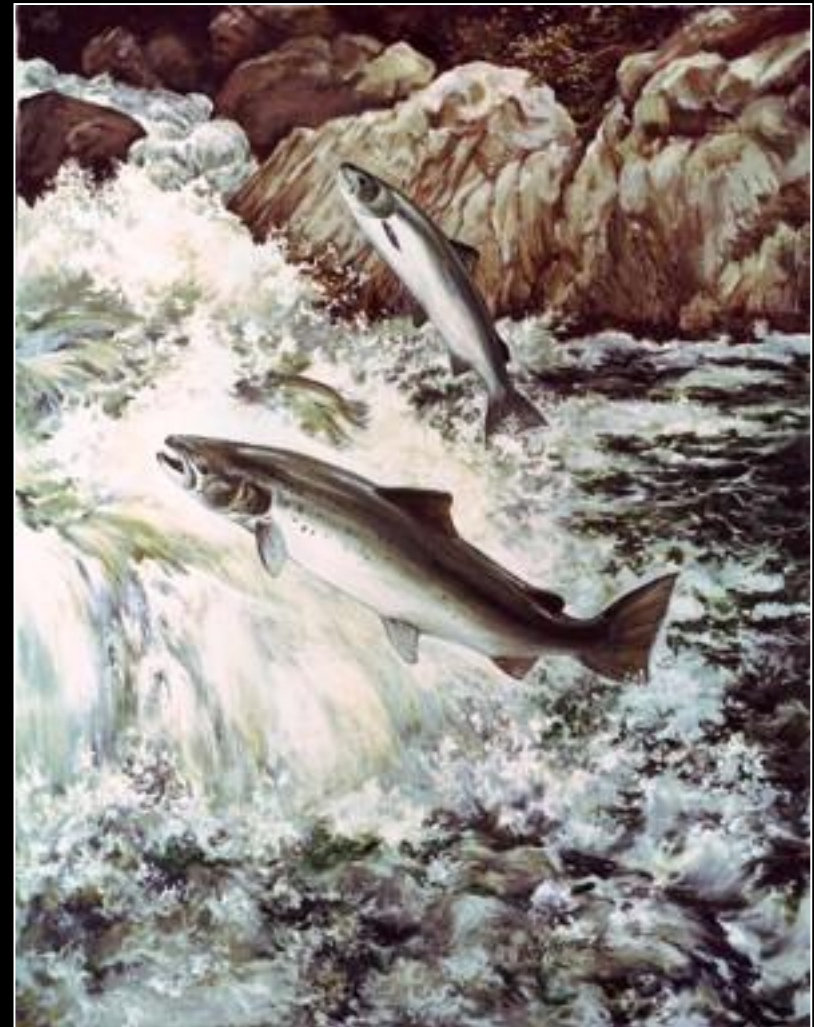
Roles of protected areas in biodiversity conservation

Protected areas serve to maintain ecosystem functions, by...

- reducing the intensity of floods and droughts, especially in areas where there has been significant deforestation;
- protecting the soil from erosion by maintaining vegetation cover;
- limiting the extremes of local climates.

Benefits of PAs

- Protect species and habitats from harvest, use, and other threats
 - species that play key ecosystem roles
 - critical habitats such as breeding and feeding grounds
- Provide ecosystem services such as clean water and air, food, and more.
- Benefits to people through recreation and education.



Roles of Protected Areas

Protected areas may also serve as refugia for useful or commercially valuable species, such as:

- wild plant species related to domesticated species like coffee (*Coffea* spp) and yams (*Dioscorea* spp.);
- wild relatives of domestic animals, or species with recognized potential for domestication;
- species harvested for food, medicine or other uses, and which are likely to become over-exploited;
- species vital for fulfilling functions on which other harvests depend, such as forest dwelling bees that pollinate crops such as coffee and cocoa;
- species providing known or potentially useful drugs.





Additional Roles of Protected Areas

Protected areas also provide areas where rural populations can continue to live their traditional lifestyles.

- Many African cultures have evolved in close association with the forest and there are many beliefs and traditions associated with the forest. *Reserves ensure cultural continuity.*



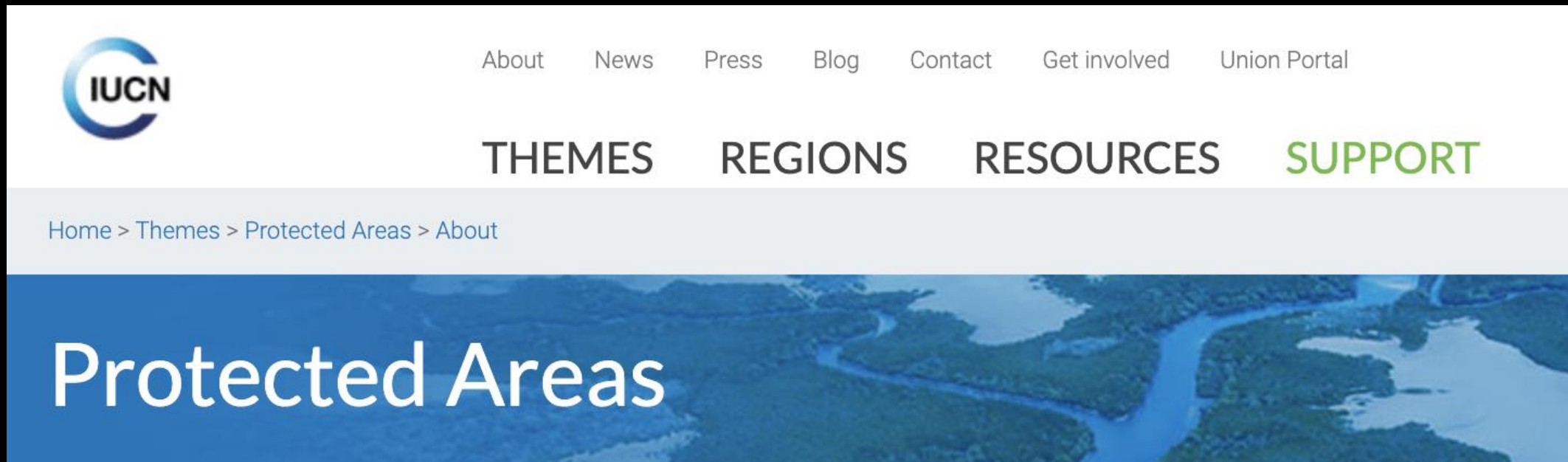
Additional Roles of Protected Areas

Protected areas also provide areas where rural populations can continue to live their traditional lifestyles:

- the forests of central Africa contain *rich archaeological remains*, a testimony to Africa's unwritten history, such as the Thulamela archaeological site, Kruger National Park, South Africa

Types of Protected Areas

IUCN has created a system of Protected Area categories. Some PAs are more strictly protected against consumptive human activities (e.g., **Categories I and II**), others allow for certain types of interventions such as the sustainable use of natural resources (e.g., **Categories V and VI**).



The image is a screenshot of the IUCN website's 'Protected Areas' page. At the top left is the IUCN logo. To its right is a navigation menu with links for 'About', 'News', 'Press', 'Blog', 'Contact', 'Get involved', and 'Union Portal'. Below this is a secondary menu with 'THEMES', 'REGIONS', 'RESOURCES', and 'SUPPORT', where 'SUPPORT' is highlighted in green. A breadcrumb trail reads 'Home > Themes > Protected Areas > About'. The main content area features a blue-tinted aerial photograph of a river delta with the text 'Protected Areas' overlaid in large white font.

Types of Protected Areas

Category I: Strict Nature Reserves / Wilderness Areas

Protected areas managed mainly for protection.

Category 1a Strict Nature Reserves

Areas of land and / or sea possessing some outstanding or representative ecosystems, geological or physiological features and / or species, available primarily for scientific research and / or environmental monitoring.

Category 1b Wilderness areas

These are protected areas managed mainly for wilderness protection. They include a large area of unmodified or slightly modified land (or sea), retaining their natural character and influence, without permanent or significant habitation and should be protected and managed so as to preserve their natural condition.

Types of Protected Areas

Category II: National Parks



- Protected areas managed mainly for ecosystem protection and recreation. This type of protected area represents the most common category of governance.
- Government agencies have the main responsibility for protected area systems. A government body, such as Liberia's Forestry Development Authority (FDA) holds the authority, responsibility, and accountability for managing the protected areas.

Types of Protected Areas

Category II: National Parks

Natural areas that are designated to:

- protect the ecological integrity of one or more ecosystems for present and future generations;
- exclude exploitation or occupation likely to degrade the area; provide a foundation for spiritual, scientific, education, recreational and visitor uses, all of which must be environmentally and culturally compatible.



Types of Protected Areas

Category II: National Parks

The objectives of management in National Parks include:

- to protect natural and scenic areas of national and international significance for spiritual, scientific, educational, recreational or tourist purposes;
- to perpetuate, in as natural a state as possible, representative examples of biotic communities, genetic resources and species, to provide ecological stability and diversity;
- to manage access for educational, cultural and recreational purposes at a level which will maintain the area in a natural or near natural state;
- to eliminate and thereafter prevent exploitation or occupation likely to result in degradation;
- to take into account the needs of indigenous people, including subsistence resource use, in so far as these will not adversely affect the other objectives of management.

Types of Protected Areas

Category III: Natural Monuments

Protected areas managed mainly for conservation of specific natural features. These are areas containing one, or more, specific natural or natural / cultural features which are of outstanding or unique value because of their inherent rarity, representative or aesthetic qualities, or cultural significance.

Category IV: Habitat / Species Management Areas

Areas of land and / or sea where active management interventions are undertaken so as to ensure the maintenance of habitats and / or to meet the requirements of specific species.

Types of Protected Areas

Category V: Landscapes and seascapes

- Protected areas where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural, and scenic value; and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other value).
- Category V protected areas recognize the value of human interactions with nature, and the role that humans have had in shaping many of the world's ecosystems. These areas can accommodate diverse management regimes, including customary laws governing resource management.
- Category V areas have proven to work well in places where strict PAs have failed due to lack of community support.

Types of Protected Areas

Category VI: Protected areas allowing sustainable use of natural resources

- Category VI protected areas conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems.
- They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.

Types of Protected Areas

Community Conserved Areas

- Community conserved areas (CCAs) can be broadly described as ecosystems that are conserved by indigenous and local communities through customary laws or other means.
- These ecosystems can be natural or modified, and may have significant biodiversity or cultural values, or provide ecological services. Typically, the communities involved have substantial dependence on the natural resources within these ecosystems for their livelihoods and cultural sustenance.



Types of Protected Areas

Community Conserved Areas

- CCAs enhance livelihood security by providing access to economic opportunities including natural resource-based enterprises (e.g., community-based ecotourism) and employment in conservation and land/resource management.
- CCAs allow access to ecological services that are critical for survival of human communities.
- Authority and responsibility for the management of CCAs rest with the communities through a variety of forms of governance or locally agreed upon organizations and rules. For instance, land may be collectively owned and managed, but other resources may be individually owned or managed.

Types of Protected Areas

Community Conserved Areas

The major factors in the success or failure of CCAs include:

- **Tenure security** - communities have legal ownership of the area, i.e., rights over resources or de facto control over the resources;
- **Equity and transparency in decision-making** - equal representation of all sections of the community in information sharing, and a transparent and impartial process of decision-making;
- **Local leadership** - local leaders who are apolitical and inclined to focus on the wider social good.

Types of Protected Areas

Transboundary Protected Areas

- A **transboundary protected area** is an ecological protected area that spans boundaries of more than one country.
- Transboundary protected areas are often established to preserve animal migration patterns, ensuring sufficient food and water sources for wildlife population growth.
- Transboundary protected areas also encourage tourism, economic development, and goodwill between neighboring countries, as well as making it easier for indigenous inhabitants of the area to travel.

Types of Protected Areas

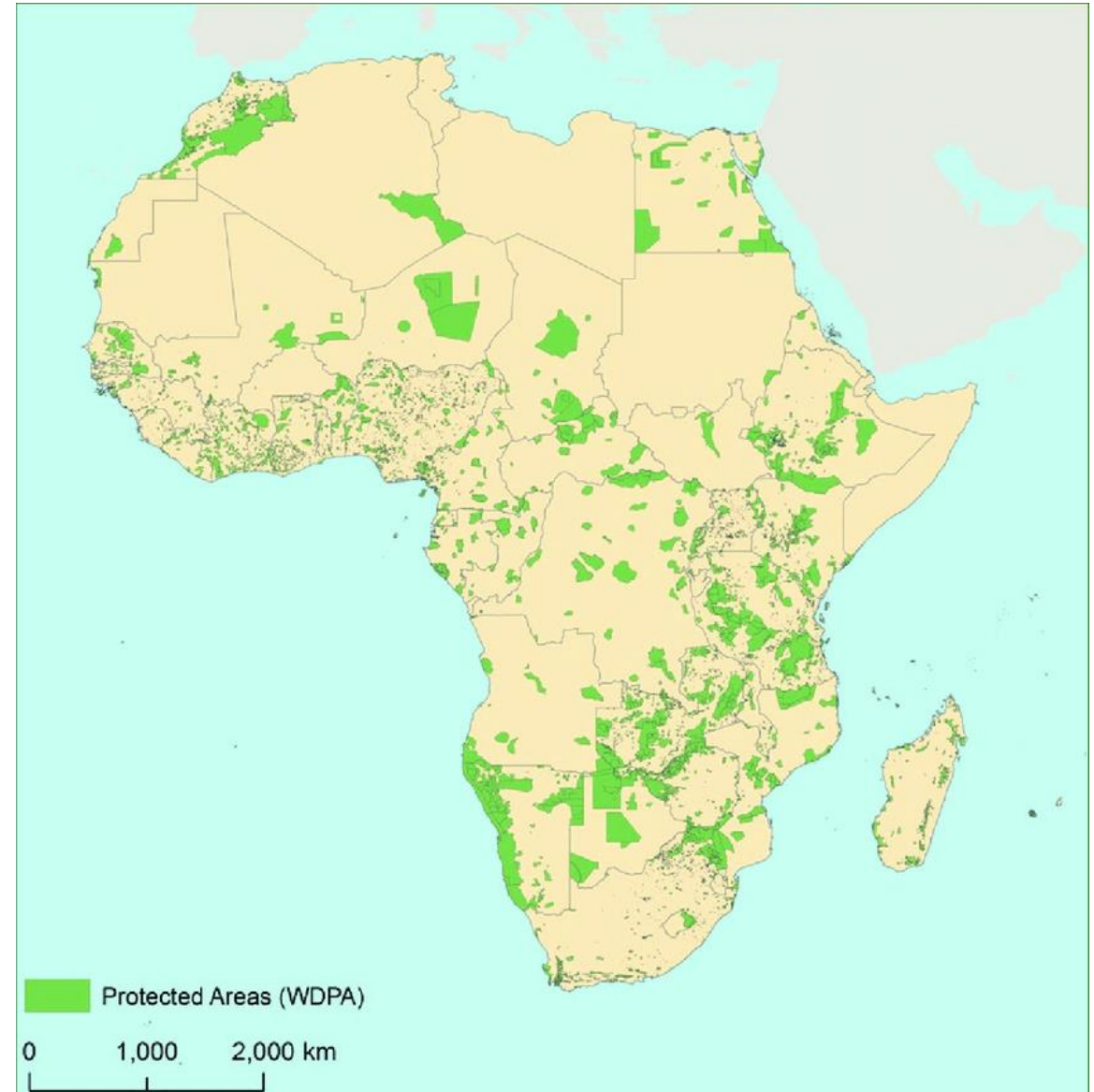


Transboundary Protected Areas

- Transboundary protected areas are also termed **peace parks**. They facilitate cooperation and exchange between (adversary) countries.
- Liberia shares transboundary protected areas with Sierra Leone, Guinea and Côte d'Ivoire.

Africa's Protected Areas

- The majority of protected areas in the African forest zone are either national parks (Category II), or forest reserves in which natural resources are managed for a sustained harvest (Category VI).
- Management of forest reserves for timber production has resulted in severe degradation.





Protected Area Administration

Roles of Protected Area Managers

- supervises the planning and monitoring of protected area management;
- liaises with major stakeholders in the protected area, including adjacent communities, donors and non-government organizations;
- develops a competent and motivated team of protected area staff;
- ensures proper financial management of the protected area;
- helps develop tourism.



Protected Area Administration

Roles of Protected Area Managers

- design and implement applied research and ecological monitoring, and ensure that management activities respond to the findings of this research program;
- ensure the safety of people within the protected area;
- ensure that wildlife are adequately protected within and in the vicinity of the protected area;
- ensure the development and implementation of a community conservation program, to build local support for the protected area and to enable neighboring communities to benefit in appropriate ways;

Protected Area Design: Size and Shape

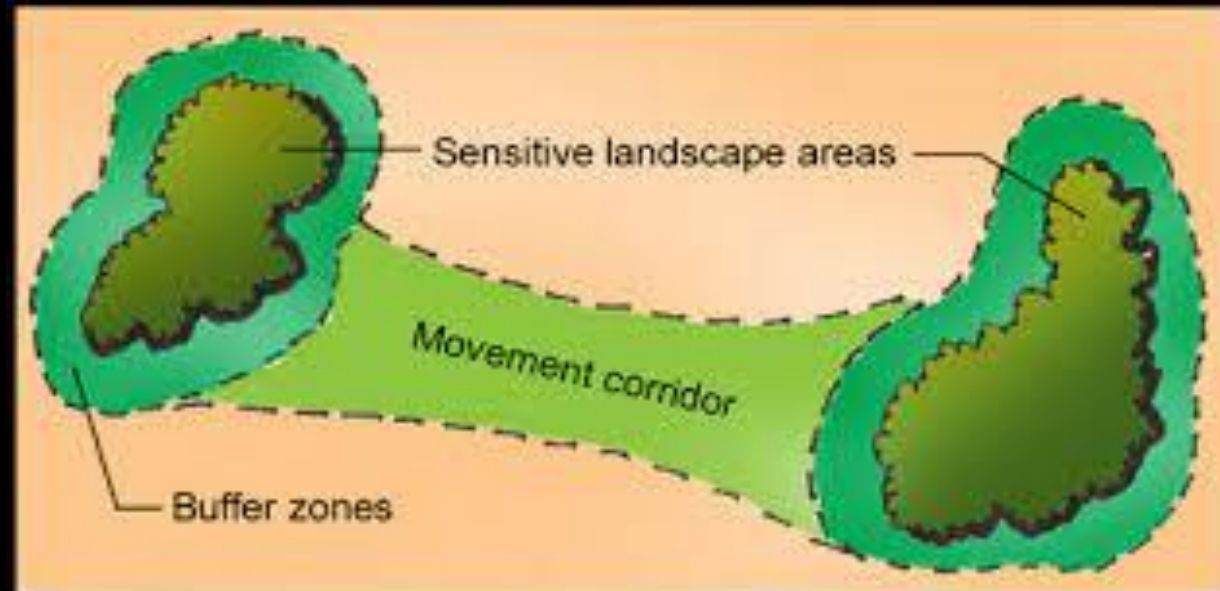
Interactions between spatial features have important effects on biodiversity within protected areas. It is not only **size** that matters when planning a protected area, other spatial features such as **shape** are also critical to the number of species found there. Studies show that while larger areas tended to host more species, this effect increases if the area is an irregular shape rather than a compact one.



Protected Area Design

Corridors and Connectivity

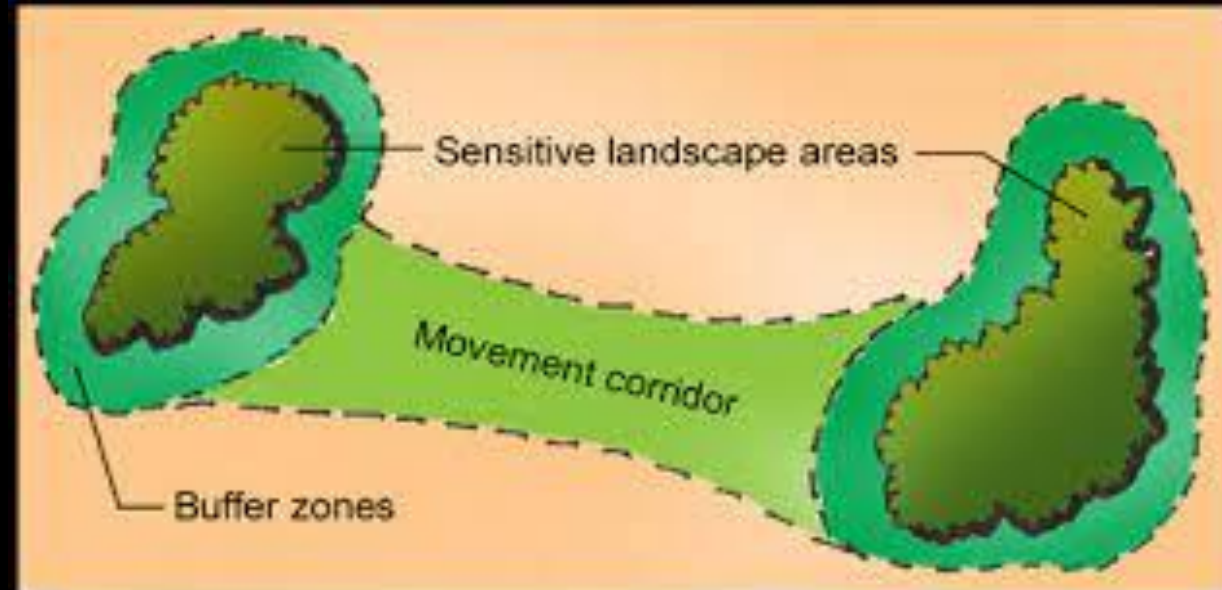
- One way to increase connectivity is by creating **wildlife corridors**.
- **Corridors** are strips of land that allow species to move among different habitat types for breeding, birthing, feeding, roosting, annual migrations, dispersal of young animals away from their parents, and as an escape path from predators or disturbance.



Protected Area Design

Corridors and Connectivity

- **Connectivity** between protected areas is critical as few of them are large enough to sustain species on their own.
- Four basic species movements are important to consider in ensuring landscape connectivity: **daily, small-scale home range movements; annual seasonal migrations; dispersal of young from their parents; and geographic range shifts.**

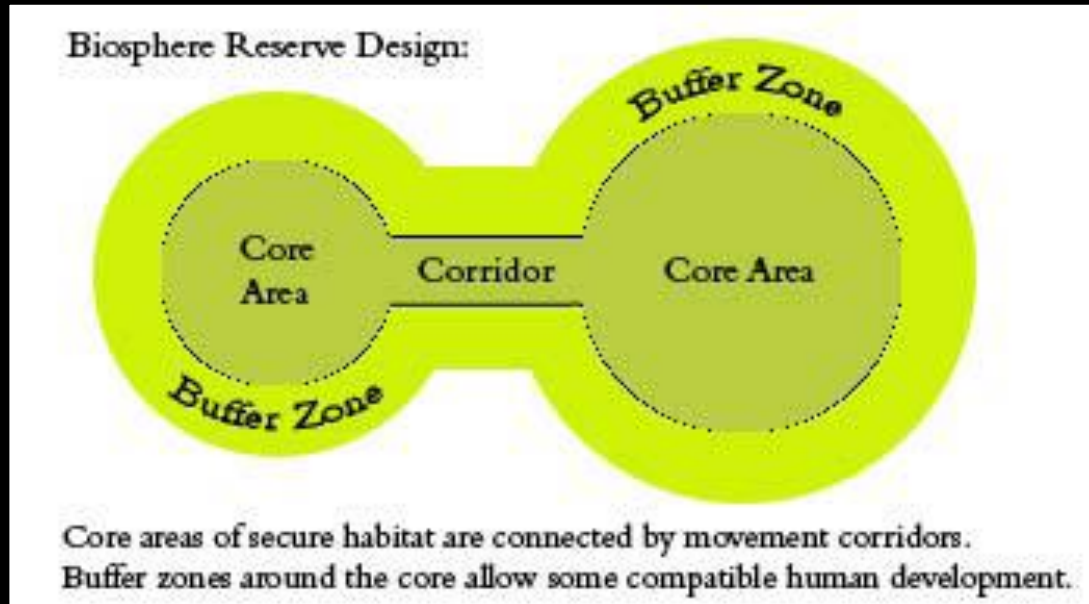


Protected Area Design

Corridors and Connectivity

- When areas of land are broken up by human interference, population numbers become unstable and many animal and plant species become endangered. By re-connecting the fragments, the population fluctuations can decrease dramatically.
- Corridors can contribute to three factors that stabilize a population:
 1. **Colonization**—animals are able to move and occupy new areas when food sources or other natural resources are lacking in their core habitat.
 2. **Migration**—species that relocate seasonally can do so more safely and effectively when it does not interfere with human development barriers.
 3. **Interbreeding**—animals can find new mates in neighboring regions so that genetic diversity can increase and thus have a positive impact on the overall population.

Protected Area Design: Zoning



Effective zoning allows for multiple uses. Zoning can be year-round or seasonal, permanent or temporary.

Protected Area Design

Corridors and Connectivity

- Example of a connectivity goal for elephants in West Africa:
 - Conserve a total population of 5000 elephants, at 1 elephant per 5 km² in their wet season habitats (savanna), and 1 elephant per 1 km² in their dry season habitats (watering holes).
 - To allow for movement among seasonal habitats, habitats should at minimum be connected by clear wooded corridors, at least 200 meters wide and with no gaps more than 200 meters wide, and should not be separated by more than 10km (maximum corridor length determined by annual movement abilities).

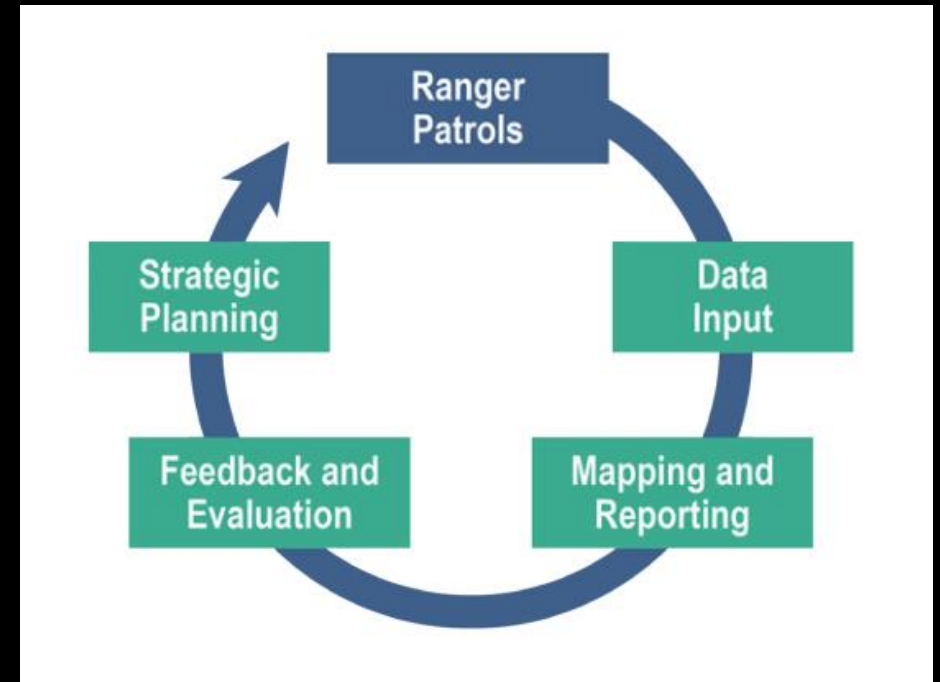
Isolation and connectivity

- Connectivity helps to incorporate dispersal, migration, daily, seasonal, yearly movement patterns into reserve.
- Risks to corridors including sinks and traps, edges, disease, pests, predators, invasive species, and fire.

Tools for Conservation

SMART conservation software

SMART (Spatial Monitoring and Reporting Tool) is a data collection method and set of best practices that help protected area managers monitor, evaluate, and adaptively manage patrolling activities. **SMART** improves the ability of protected area agencies to combat poaching and other illegal activities.



Financing Protected Areas

- Adequate financial support is key for effective PAs
- Lack of resources to effectively address threats results in “paper parks”



Financial sustainability for PAs

Sufficient, stable and long-term financial sustainability can be realized through...

1. Diverse, stable, secure funding portfolio
2. Improving financial administration
3. Comprehensive view of PA costs and benefits



Protected Area Financing Mechanisms

- Annual allocations from a government's budget for PAs
- User fees and environmental taxes
- Grants and donations from individuals, corporations, foundations, NGOs



PA Financing Mechanisms

- Park Entry Fees
- Fees and Taxes on Resource Extraction
- Carbon Emissions Trading



Case Study: Botswana

Botswana increased park entry fees to foreigners from US \$3 to \$30 per person per day. The number of foreign visitors actually rose by 49%, resulting in a dramatic increase in total revenues.

Resource extraction Fees

- Royalties and concession fees for extractive operations such as logging and mining
- Permit and license fees for recreational hunting, fishing or harvesting of wild plants



International Donor Mechanisms for Conservation

Conservation Trust funds

- Provide financing for recurrent costs
- Catalyze policy reform
- Decentralized decision-making
- Design is a complex, political process

Debt-for-Nature Swaps

- Mechanism to reduce debt, generate funds for conservation
- Transparent, accountable, multi-stakeholder mechanism
- PA managers retain some control over allocations
- Complex instruments to negotiate, set up and administer

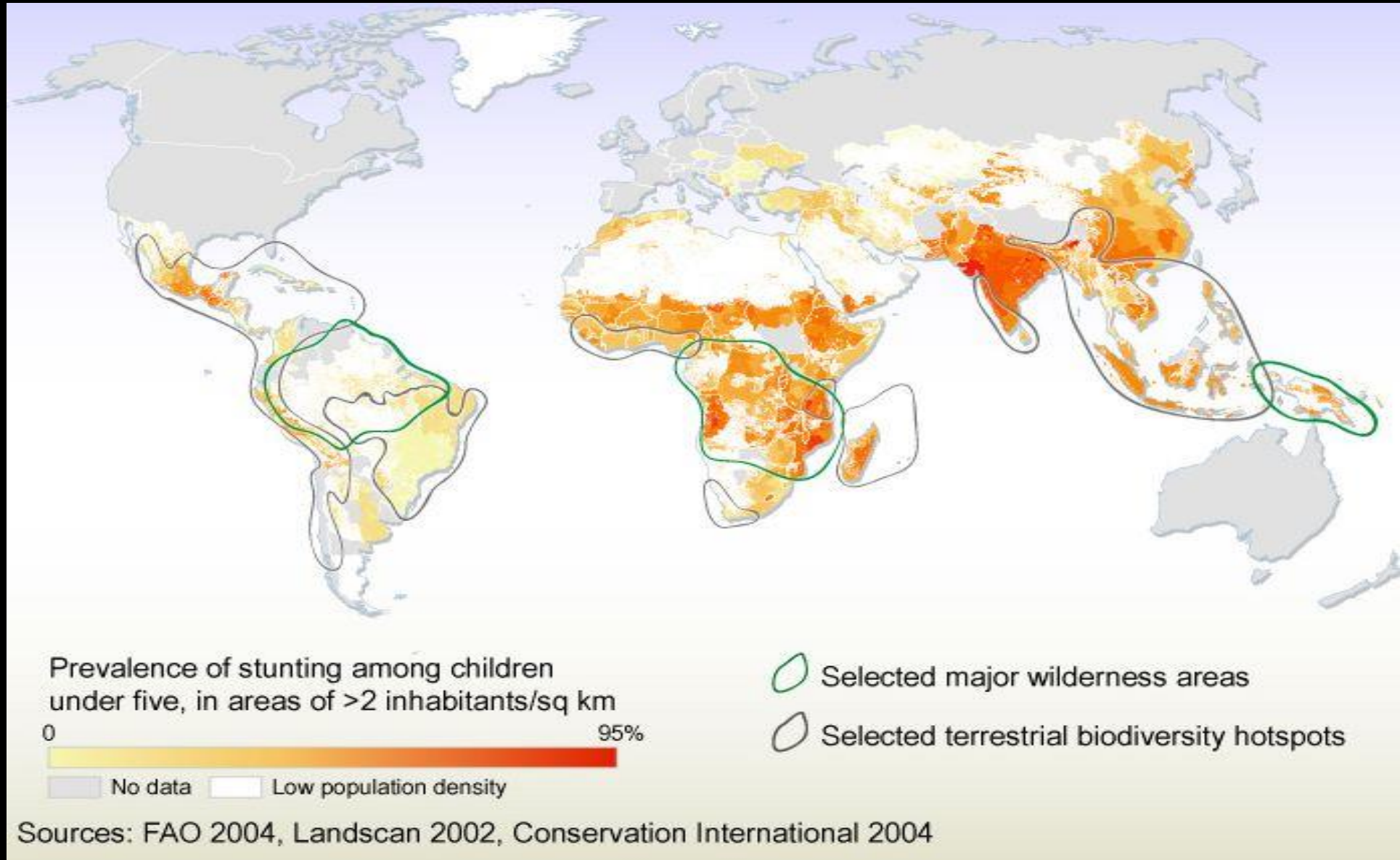
Payments for Ecosystem Services

Financial incentives to promote voluntary adoption of activities for environmental benefit

Examples of Ecosystem Services

- Natural water filtration function of wetlands
- Carbon sequestration in forest biomass

SPATIAL OVERLAP: POVERTY AND BIODIVERSITY



Parks and People

- Poverty alleviation: a necessary condition for biodiversity conservation
- PAs have typically been established at the expense of local communities
- Skewed distribution of park benefits against the poor

Can PAs help alleviate poverty in resident and neighboring human communities?



Parks vs. People

PAs must contribute significantly to economic development.



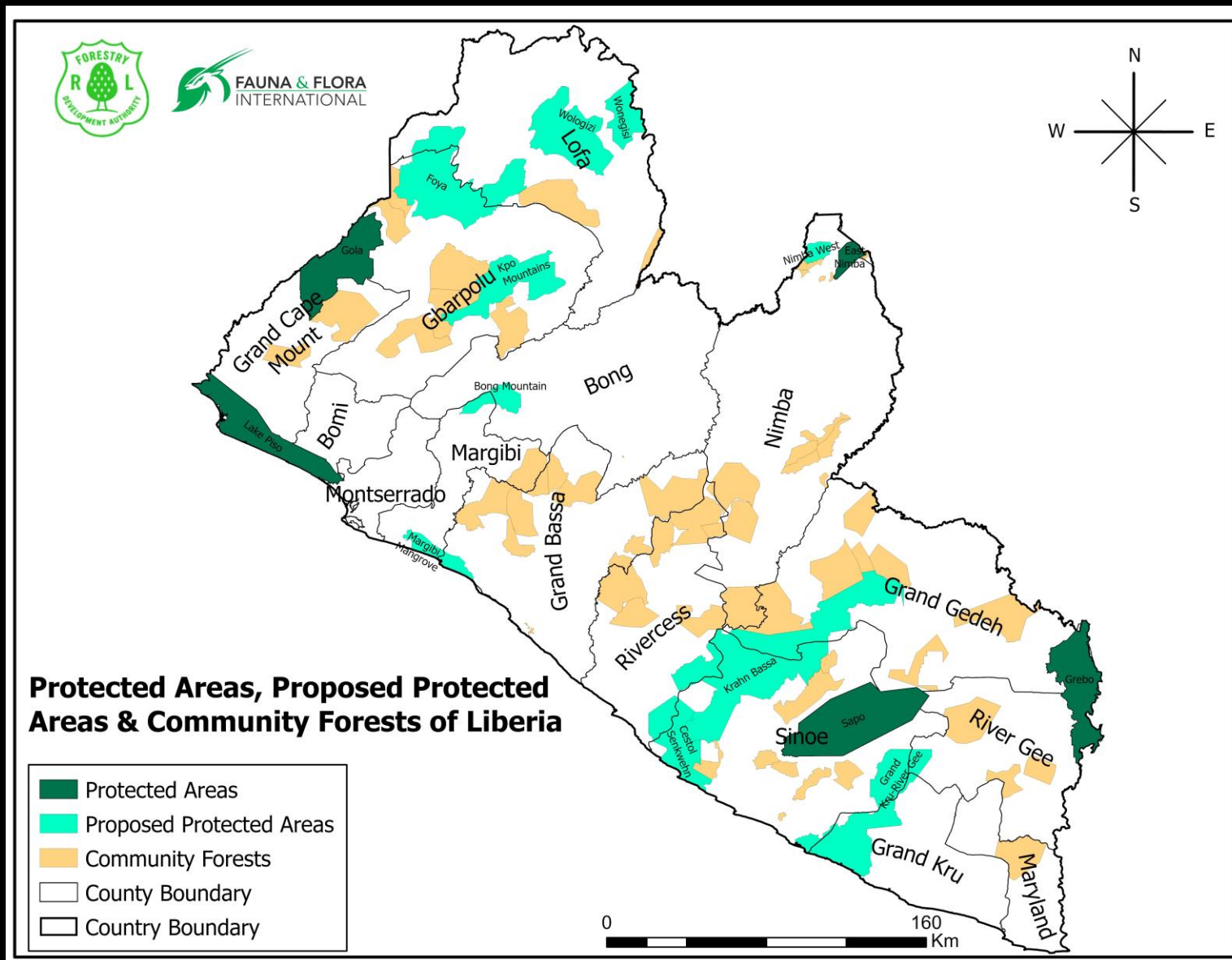
Are economic development goals and biodiversity conservation goals in conflict?

READINGS

Bruner et al, “Effectiveness of Parks in Protecting Tropical Biodiversity”

Bowker et al, “Effectiveness of Africa’s tropical protected areas for maintaining forest cover”

Protected Areas in Liberia



Protected Areas in Liberia

Protected Area categories

- a. Multiple Sustainable Use Reserve
- b. National Forest Reserve
- c. National Parks
- d. Nature Reserve
- e. Strict Nature Reserve
- f. Natural Monument
- g. Habitat/Species Management Area
- h. Protected Landscape/Seascape
- i. Any other category that the Authority in collaboration with the EPA and relevant agencies deems necessary

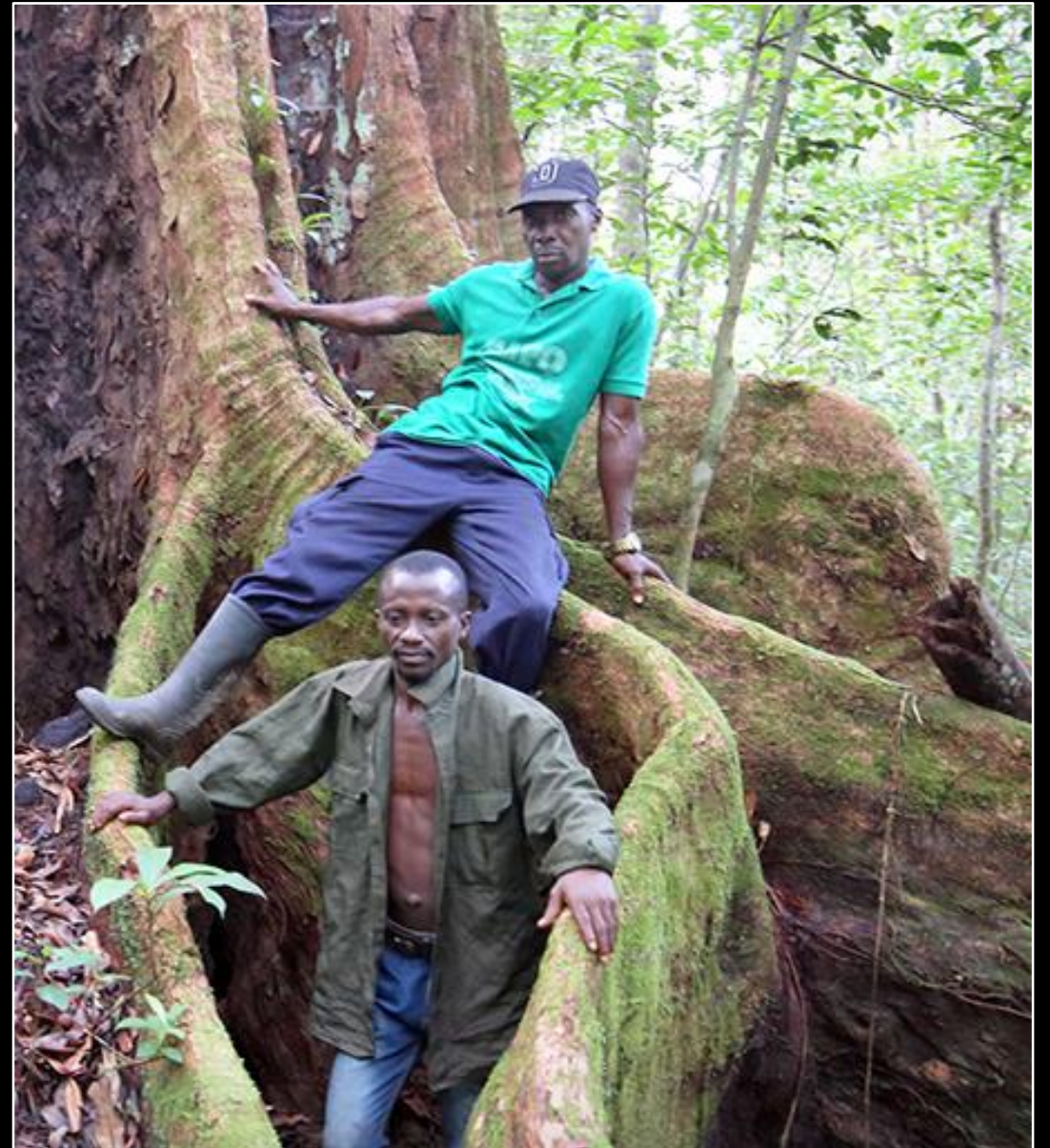


(Liberia's Wildlife Law 2016, Section 5.3.1)

Protected Areas in Liberia

Protected Area categories

- a. **Multiple Sustainable Use Reserve:** area set aside by regulation for a fixed period, to allow sustainable use of forest products including subsistence, and potentially, licensed and community forestry schemes
- b. **National Forest:** area legally set aside for sustainable regulated commercial forest product extraction, hunting and the preservation of essential environmental functions performed by the forest.



Protected Areas in Liberia

Protected Area categories

- c. **National Park:** area of sufficient size to form a complete ecological unit, legally set-aside for the preservation and enjoyment of features that have outstanding natural beauty, cultural, or biological significance.
- d. **Nature Reserve:** area that does not represent a complete ecological unit, legally set-aside for the preservation and enjoyment of features that have outstanding natural beauty, cultural or biological significance, which may require some management intervention.



Protected Areas in Liberia

Protected Area categories

- e. **Strict Nature Reserve:** area possessing outstanding or representative features. Ecosystems and/or species, legally set aside primarily for scientific research and/or environmental monitoring, requiring strict protection and minimum intervention.



Protected Areas in Liberia

Protected Area categories

- f. **Buffer Zone:** a transitional zone (e.g., Communal Forest, Game Reserve, Multiple Sustainable Use Reserve) surrounding a more strictly protected zone, intended for low-impact sustained human use to reduce the impact of outside human disturbance, to protect the boundaries from encroachment, and to preserve the natural state of the more strictly protected zone it surrounds.



Protected Areas in Liberia

Protected Area categories

- g. **Communal Forest:** area set aside for the sustainable use of non-timber forest products by local communities on a non-commercial basis.



Protected Areas in Liberia

Protected Area categories (Wildlife Law 2016):

- h. **Cultural Site:** an area set-aside by regulation for the reservation and enjoyment of features with a local or national cultural significance.
- i. **Conservation Corridor:** within a Game Reserve, Multiple Sustainable Use Reserve, or any other protected area, this category ensures that large blocks of the Protected Forest Area Network remain contiguous for the purpose of maximum genetic exchange between blocks.
- j. **Game Reserve:** an area set aside for a fixed period, to immediately protect an important feature or to allow the recovery or growth of natural species.

Protected Areas in Liberia

READING

GoL, “Guidelines for Gazetting Proposed Protected Areas in Liberia”

Protected Areas in Liberia

Table 10: The protected and proposed protected areas in Liberia

Protected Areas	Area (Hectares)	Year Gazetted
East Nimba Nature Reserve	13,569	2003
Gola Forest National Park	88,130	2016
Lake Piso Multiple Use Reserve	97,975	2011
Sapo National Park	184,406	1983
Total:	384,080	
Proposed Protected Areas		
Grebo Forest National Park	97,136	Gazetement scheduled for 2016
Wonegizi Nature Reserve	37,979	
Foya Proposed Protected Area	164,628	Gazetement scheduled for 2017
Grand Kru River Gee PPA	135,100	
Cestos/Senkwhen Proposed PA	80,348	
Gbi PPA	88,409	Part of Proposed Protected Area Network scheduled for gazetement by 2017
Kpo Mountains (near Zelekai)	83,709	
Bong Mountains (Yoma)	24,813	
Margibi Mangroves "Marshall Islands"	23,813	
West Nimba PPA	10,482	
Total:	746,417	

Source: FDA

Protected Areas in Liberia



Mount Nimba Nature Reserve

- Nimba is an important bird area and a designated world heritage site.
- Located on the northeastern border of Liberia, Mount Nimba Nature Reserve was created in October 2003. Dominated by a semi-montane and deciduous forest, it is one of the 14 centers of plant endemism within the Upper Guinea Hotspot.

Protected Areas in Liberia

Mount Nimba Nature Reserve

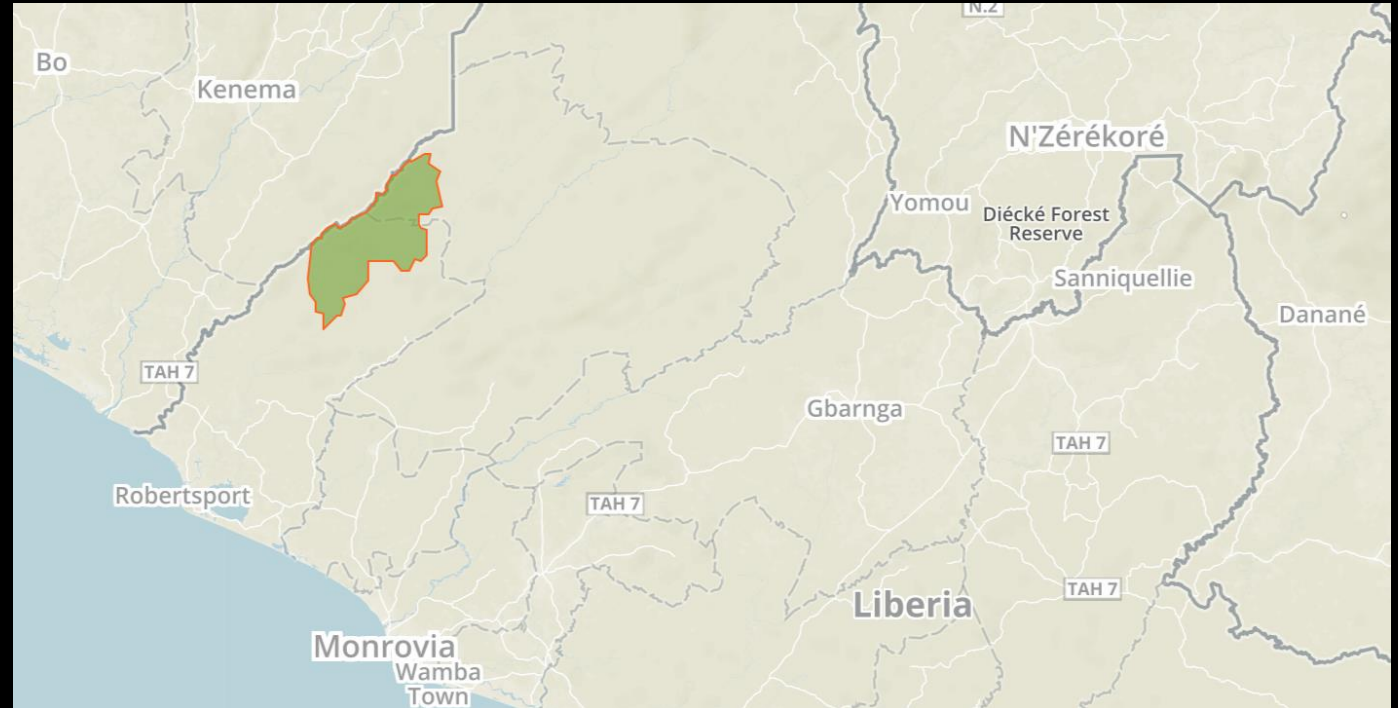
- Due to its higher altitude, the area has a milder temperature during most of the year than the rest of the country.
- The hills and mountain ranges of Nimba are important migration and wintering sites for **paleartic** migrant bird species.



Protected Areas in Liberia

Gola Forest National Park

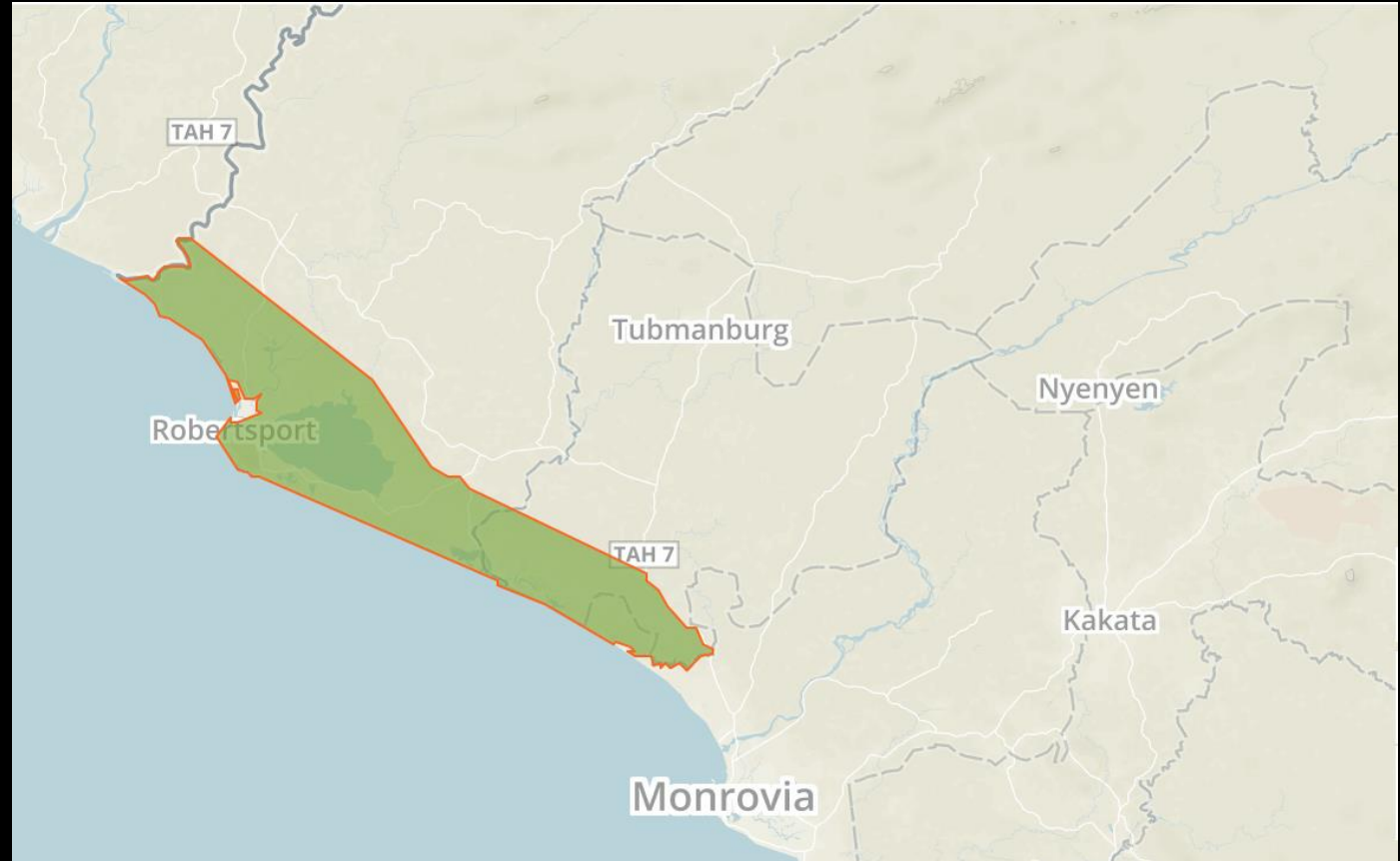
- Gola Rainforest is a global biodiversity hotspot, and listed as an Important Bird Area.
- The Park is linked to the Gola Rainforest National Park in Sierra Leone, creating a unique transboundary Peace Park covering over 2,000 km².
- The Park is an important collaborative opportunity between the two neighboring countries for promoting conservation and sustainable management across the politically divided ecosystem.



Protected Areas in Liberia

Lake Piso Multiple Use Reserve

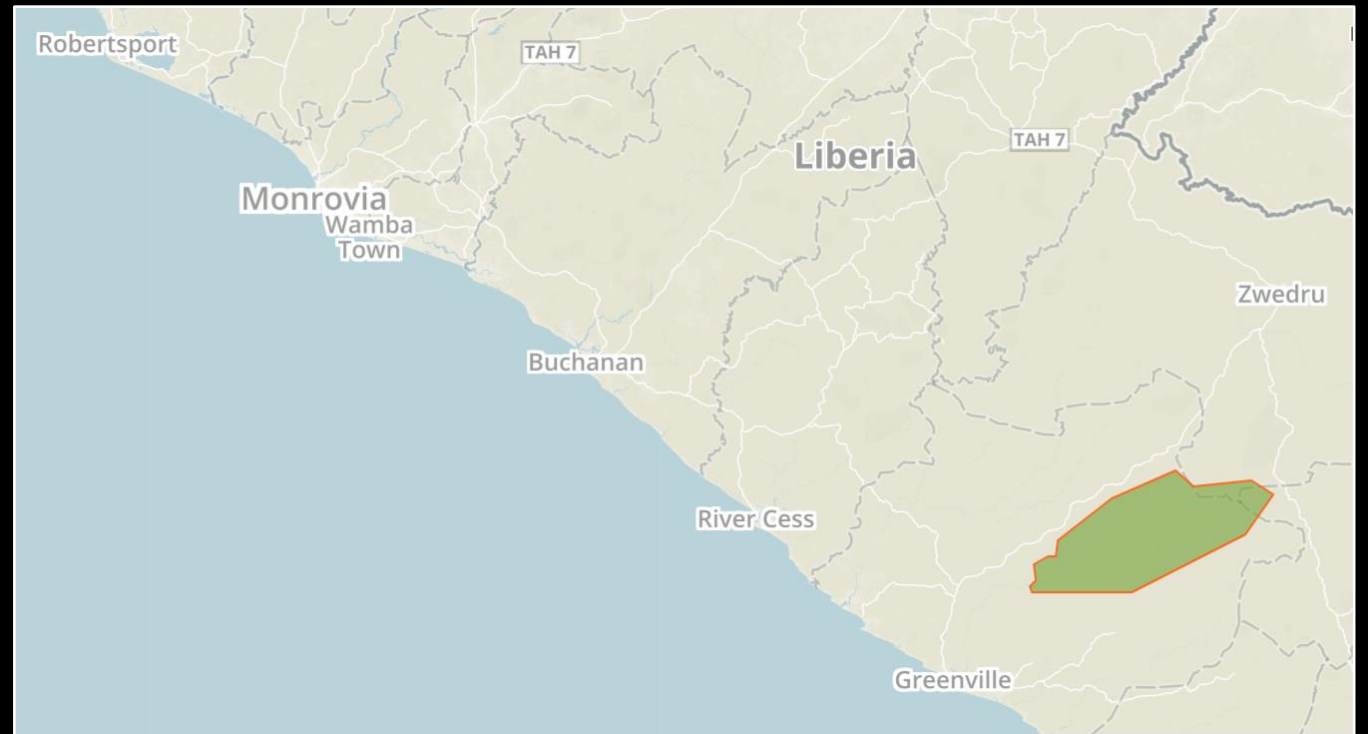
- Lake Piso is a tidal lagoon in Grand Cape Mount County in western Liberia, near Robertsport.
- It is the largest lake in Liberia, 103 km² (40 mi²).
- The Lake Piso wetlands, are Liberia's most important designated wetland of international importance.



Protected Areas in Liberia

Sapo National Park

- Located in Sinoe County in southwestern Liberia, Sapo National Park, covers an area of 1,804 km² (697 mi²).
- The park is bounded to the north by the Putu Mountains and to the west by the Sinoe River.



Protected Areas in Liberia

Sapo National Park

- The park is rich in flora species, with many endemic species.
- A 1983 survey of the park determined it to be composed of more than 60% primary and mature secondary forest.



Protected Areas in Liberia

Sapo National Park

- A "regional center of endemism" and biodiversity, with ~125 mammal species and 590 types of bird, including a number of threatened species.
- The park is also home to the African civet, African fish eagle, grey parrot, giant forest hog, great blue turaco, speckle-throated otter, water chevrotain, 3 species of pangolin, 7 species of monkey (including the endangered Diana monkey), crocodiles, leopards, bee-eaters, egrets, hornbills, kingfishers, rollers, and sunbirds.



Brown Cheeked Hornbill

Protected Areas in Liberia

Sapo National Park

- The Park has seven species of duiker antelopes, including the vulnerable Jentink's duiker (*Cephalophus jentinki*) and zebra duiker (*Cephalophus zebra*). Bay duikers (*Cephalophus dorsalis*) and Maxwell's duikers (*Cephalophus maxwellii*) are reported to be locally abundant.



Zebra duiker
(*Cephalophus zebra*)

Protected Areas in Liberia

Sapo National Park

- The Park contains populations of the pygmy hippopotamus (*Hexaprotodon liberiensis*), an endangered species which has legal protection in Liberia under the Wildlife and National Park Act of 1988. Unique to West Africa, the wild population of pygmy hippopotamuses is thought to number less than 3,000 individuals.



Protected Areas in Liberia

Sapo National Park

- The endangered African forest elephant (*Loxodonta cyclotis*) population estimates range from 300-500.
- Various surveys have confirmed the populations of the common chimpanzee (*Pan troglodytes*) in Sapo National Park, primarily in the park's central and western areas, with estimates of the population ranging from 500 to 1,640.
- The culture of the local Sapo people includes a reverence for the chimpanzee and, therefore, a taboo against their hunting.

Protected Areas in Liberia: Traditional Conservation

There are numerous practices of traditional conservation in Liberia, including:

- Sacred sites (Poro societies, Sande societies)
- Totem species
- Taboos against killing of wildlife species, e.g., chimpanzees in Sapo/Zor

Protected Areas in Liberia: Traditional Conservation

READING: Fraser et al (2016), “Cultural valuation and biodiversity conservation in the Upper Guinea forest, West Africa”

Protected Areas in Liberia: Monitoring and Evaluation

- The Liberia **Species Working Group** (SWG) consists of local and international conservation experts.
- The **SWG** supports the development and implementation of pygmy hippopotamus, elephant and other species national/regional action plans.
- The **SWG** builds standardized data collection protocols to harmonize data collection, assimilation, input and analyses.
- The SWG shares relevant data and information with authorities, partners, and policy makers.

Protected Areas in Liberia: Tools for Conservation

The **Liberia Forest Atlas** (<https://lbr.forest-atlas.org/>) is a dynamic forest monitoring system that provides up-to-date information on Liberia's forest sector. The **Liberia Forest Atlas** strengthens forest management and land use planning by integrating information on major land use categories onto the one GIS platform.

Summary

- PAs will continue to represent important cornerstones for biodiversity conservation.
- Continuing need for the design and implementation of innovative and inclusive approaches for management, governance, financing, monitoring conservation.

