A Freshwater Conservation and Management Blueprint for the Ogooué Basin

The Ogooué River Basin contains a globally important array of species and natural communities dependent upon its many freshwater rivers, streams, and wetlands. The Ivindo River tributary system alone supports approximately 325 known fish species and nearly a third of the fish species within the Ogooué Basin are nowhere else on earth.

A significant portion of the people of Gabon's rely directly on freshwater systems for their livelihoods and health, and a key test of Gabon's sustainable development vision (called *Gabon Vert*) is whether a balance between people and nature can be maintained into the future in the Ogooué River Basin. The biodiversity and the benefits that nature provides in the Ogooué Basin are at risk if development in the forestry, mining, hydroelectric energy, and infrastructure sectors proceeds in an unplanned fashion or information vacuum. Fortunately, the Gabonese government is undertaking critical activities, such as the National Land Use Plan process, that have the potential to chart a course for sustainable development in the Basin. These planning activities provide an excellent opportunity to provide the government, and other stakeholders, with freshwater resource information in readily usable forms.

The **Ogooué Freshwater Conservation and Management Blueprint** (i.e., Freshwater Blueprint) will inform economic development and freshwater conservation actions in Gabon so they can proceed in a manner that effectively maintains the natural heritage of the Ogooué Basin into the future. The Freshwater Blueprint is, at its core, a decision-support tool that synthesizes spatial models and expert consensus to produce a suite of digital maps that - along with clear documentation - can help to guide sustainable development of the basin.

The Nature Conservancy (TNC) has a history of leading collaborative Freshwater Blueprint projects throughout the world, most recently in major river basins such as the Magdalena (Colombia), Upper Mississippi (United States), and the Yangtze (China). Example applications of Freshwater Blueprints include:

- Assisting the development of siting scenarios for major infrastructure (e.g., hydropower dams) using TNC's "Smart Development" or similar approaches
- Informing biodiversity offset and mitigation systems
- Defining key areas to focus on freshwater conservation action, inside and outside of protected

areas

Some common elements to the Freshwater Blueprint methodology have evolved over time and practice. In all cases, however, TNC has worked with partners from government, academics, and other NGOs to develop and deliver products in formats that are easily understood and used to guide decision making.

Typical steps in the methodology include:

1. Identifying and mapping of freshwater biotic elements of concern or high value using the best available data, including species (e.g., rare, endangered and endemic fish, water birds, and amphibians) and habitats (e.g., critical reproduction areas or migratory stopover sites, intact floodplains).

2. Aquatic ecosystem classification and mapping of freshwater ecosystems to represent the physical and ecological patterns and processes, and distribution of habitats, that are characteristic of the basin and support a range of benefits to people who live within the basin.

3. An assessment of the relative ecological integrity and level of disturbance of watersheds and river reaches using available spatial data such as land use, existing infrastructure, population density, and protected areas to identify the most intact examples of species, habitats, and ecosystem types.

4. Definition of quantitative goals for the number and geographic representation of species, habitats and ecosystems necessary to maintain ecological and evolutionary potential over time.

5. Expert workshops, involving local, regional, and international experts in freshwater biodiversity and conservation, to fill data gaps in information and to suggest priority areas necessary for the conservation of species, habitats, and ecosystems.

6. Using a combination of GIS analysis and expert input, identify a set of conservation priority areas that capture the best condition examples of river segments and catchments and meet representation goals for species, habitats, and ecosystems while optimizing for the functionality of the basin.

7. Highlighting of the major threats and their levels of impact to the selected areas to identify the relative urgency for action and inform conservation strategy development.

The final set of **priority areas** is often called a "**Conservation Blueprint**", because it guides investment and planning for freshwater resource conservation and management. This blueprint can be used in a number of different ways depending on the near-term priorities of government and other stakeholders, but in all cases it is a long-term vision for ecological sustainability. Importantly, the initial blueprint can, and should, be updated over time based on new information, review and use of its component parts, and changing ecological conditions. In addition, it can inform the development and evaluation of potential future development scenarios to help weigh outcomes and to inform critical decisions that will influence sustainability, such as selecting sites for hydropower dams, which is how blueprint information is being used as part of a project currently underway in Mexico.

To enhance the Ogooué Freshwater Conservation and Management Blueprint, an **ecosystem service assessment** will be included in the project to quantify the benefits that natural systems provide to people who live in the basin and depend on its freshwater resources. Once quantified and mapped, ecosystem service

values, such as sediment reduction and water yield can play a valuable role in determining avoidance and mitigation measures that may be necessary and can directly support natural capital accounting. TNC has strong experience in environmental service accounting around the globe as part of the Natural Capital Project.

The illustration below provides an example of some of the key elements of a recent Freshwater Blueprint process for the Yangtze River in China which was completed with support of the government and in conjunction with the Chinese Academy of Sciences, Yangtze Water Resources Commission, and conservation NGOs including TNC. Many of these elements will be used in an Ogooué Blueprint.

In Gabon, the potential uses of the Ogooué Freshwater Conservation and Management Blueprint include, but are not limited to:

- A key data layer to inform the National Land Use Planning process for Gabon,
- A repository of information that can be used to inform the creation of environmental impact statements, and provide a template to facilitate their review
- As a framework to support any future Gabonese sustainable development law, including the avoidance and offsets of critical habitats and ecosystem services
- A first step towards completion of the proposed National Wetlands Management Plan for Gabon
- A basis for creating and evaluating alternative scenarios of benefits and impacts from new infrastructure, such as hydropower dam and road development
- A basis to guide monitoring and survey efforts in an efficient way, and as spatial database for managing new spatial information for the basin (e.g. ecological, land use/cover)
- Information to support Ramsar site and National Park management plan development and implementation
- A basis for siting new—or adjusting the boundaries of existing protected areas
- A foundation for education and awareness-building across disciplines and sectors in Gabon, and for capacity building in aquatic ecology and conservation

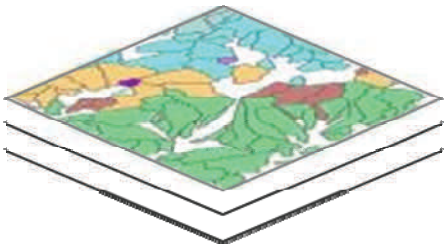
As with all Freshwater Blueprint projects, some of the key technical challenges will be gathering and digitizing widely-dispersed data, and accounting for data gaps. Fortunately, key institutions and experts within Gabon (e.g., Jean-Daniel Mbega, CENAREST, USTM) and internationally (e.g., John Sullivan, Yves Fermon) will contribute to this endeavor. The Freshwater Blueprint will also build upon a recent WWF project to characterize the fish communities in basins across Gabon.

The **Ogooué Freshwater Conservation and Management Blueprint** effort will be one of the first products of the Ogooué River Basin Sustainable Management Project under the Great Rivers Partnership (GRP). As such, it should benefit from not only from GRP staff, but participation of Agence Nationale des Parcs Nationaux, Direction Générale de l'Environnement et de la Protection de la Nature, Ministère des Eaux et Forêts, Centre National de la Recherche Scientifique et Technologique Wildlife Conservation Society-Gabon (WCS), World Wide Fund for Nature-Gabon (WWF) and The Nature Conservancy-Africa (TNC). This Blueprint of important freshwater sites will empower stewardship enabling the long-term persistence of one of the world's most wild and intact river basins.

Simplified Illustration of the Yangtze River Basin Freshwater Blueprint Methodology

MAP BIODIVERSITY ELEMENTS

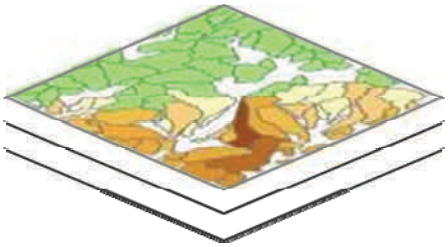
SET REPRESENTATION GOALS



Ecosystems (Coarse Filter)

Species (Fine Filter)

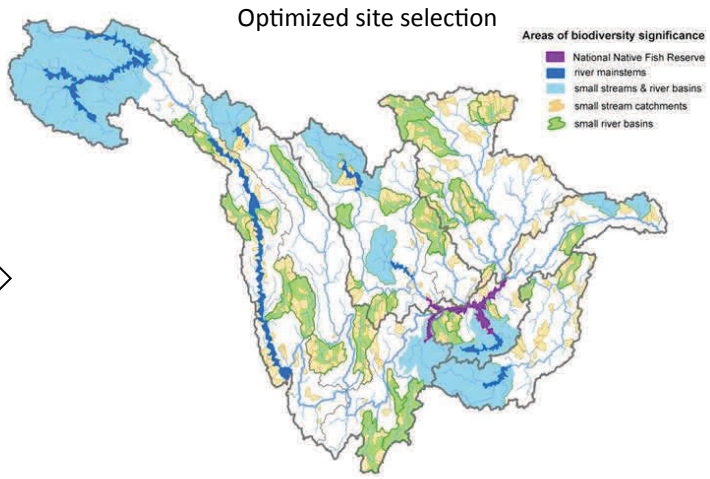
ASSESS THREAT & ECOLOGICAL INTEGRITY



Condition/Disturbance Index

- Infrastructure
- Population Density
- Land Use
- Irrigated Agriculture
- Protected Area Status
- Dams
- Village Density

DESIGN BLUEPRINT OF CONSERVATION AREAS



FINAL EXPERT REVIEW AND REFINEMENT