# Lake Profile Brief

This is based on the results of Multiple Lake Threat Assessment
and its Scenario Analysis. Refer to the Technical Report for details.

Lake Congo River   Geographic Information

Lake Congo River was determined on the basis of GIS-based spatial analysis of the transboundary Congo River. It is not unequivocally clear that it can be considered a transboundary lake in the common usage sense. Nevertheless, it occupied a sufficiently large areal extent along the course of the river that it could constitute a lentic waterbody, at least for the identified section of the river. There is very little information, however, regarding environmental or other transboundary issues for the lake, although the entire Congo River System may be of interest for support through the GEF. A first step in regard to considering management interventions would be to confirm how the lake is assessed and considered within the Congo River transboundary system.
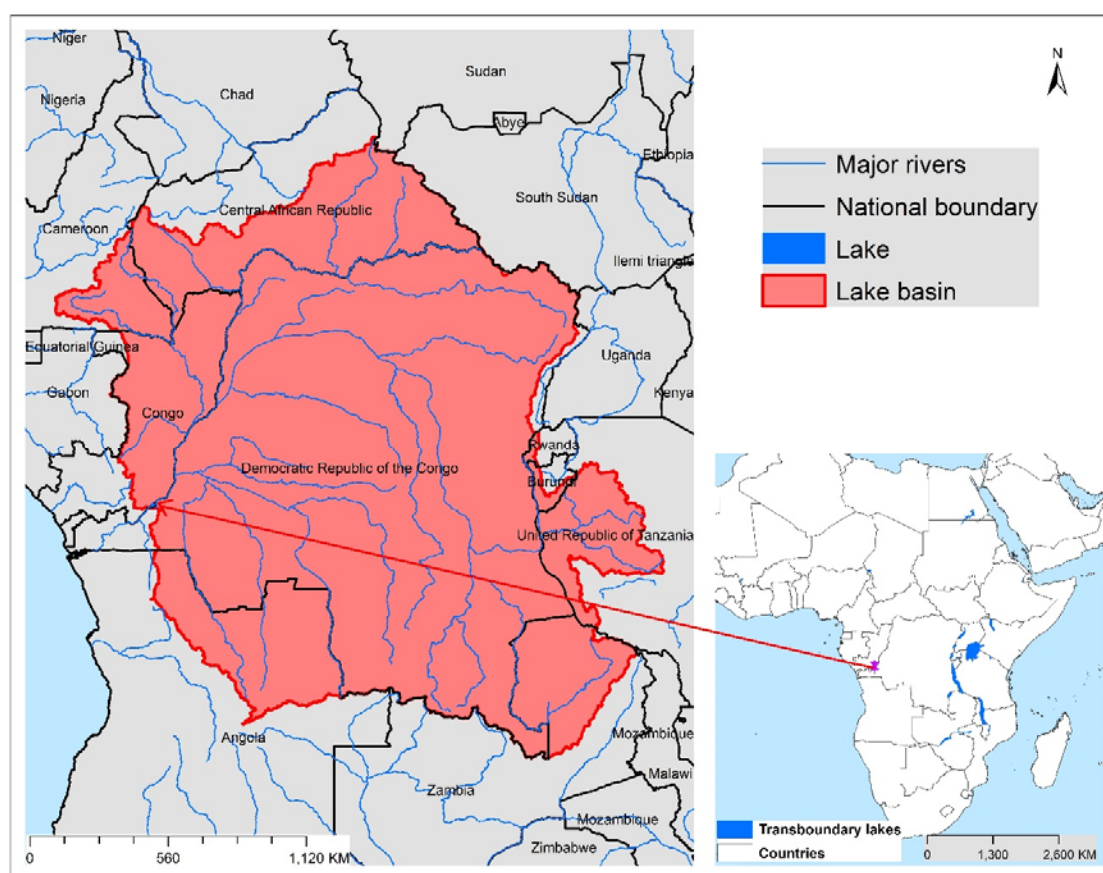

TWAP Regional Designation	Eastern & Southern Africa		Lake Basin Population (2010)	76,295,784
River Basin	CongoO/Zaire		**Lake Basin Population Density (2010; # km⁻²)**	18.2
Riparian Countries	Democratic Republic of Congo, Congo		**Average Basin Precipitation (mm yr⁻¹)**	1,533
Basin Area (km²)	2,972,599		**Shoreline Length (km)**	725.5
Lake Area (km²)	306.0		**Human Development Index (HDI)**	0.34
Lake Area:Lake Basin Ratio	0.001		**International Treaties/Agreements Identifying Lake**	No

Lake Congo River Basin Characteristics
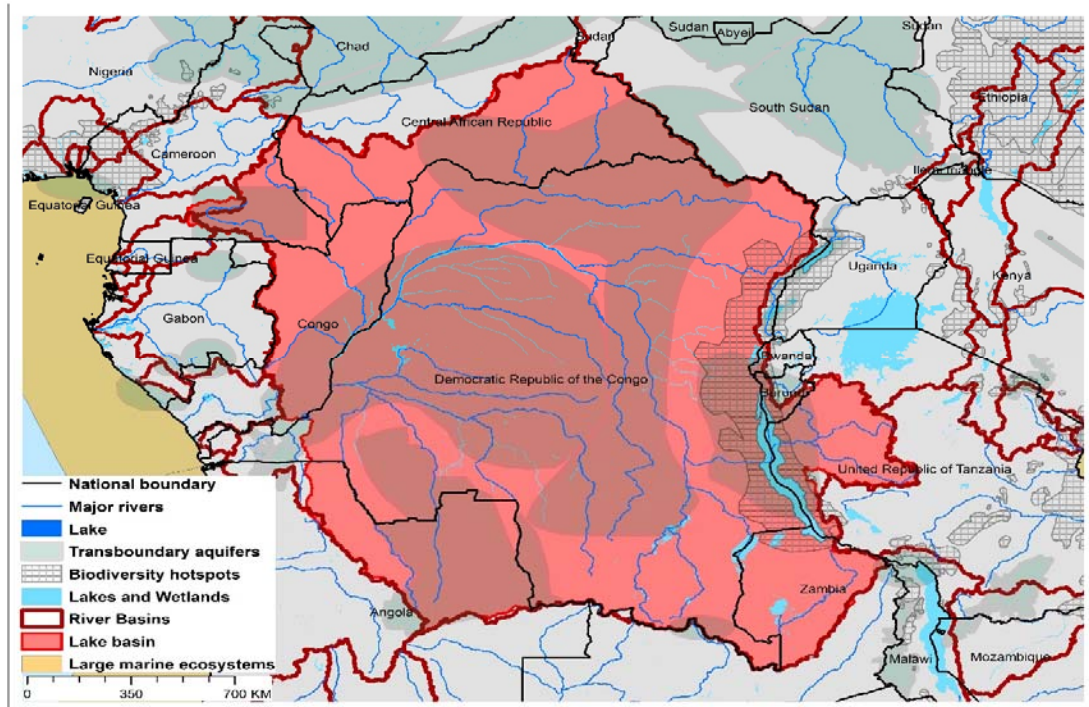
(a) Lake Congo River basin and associated transboundary water systems
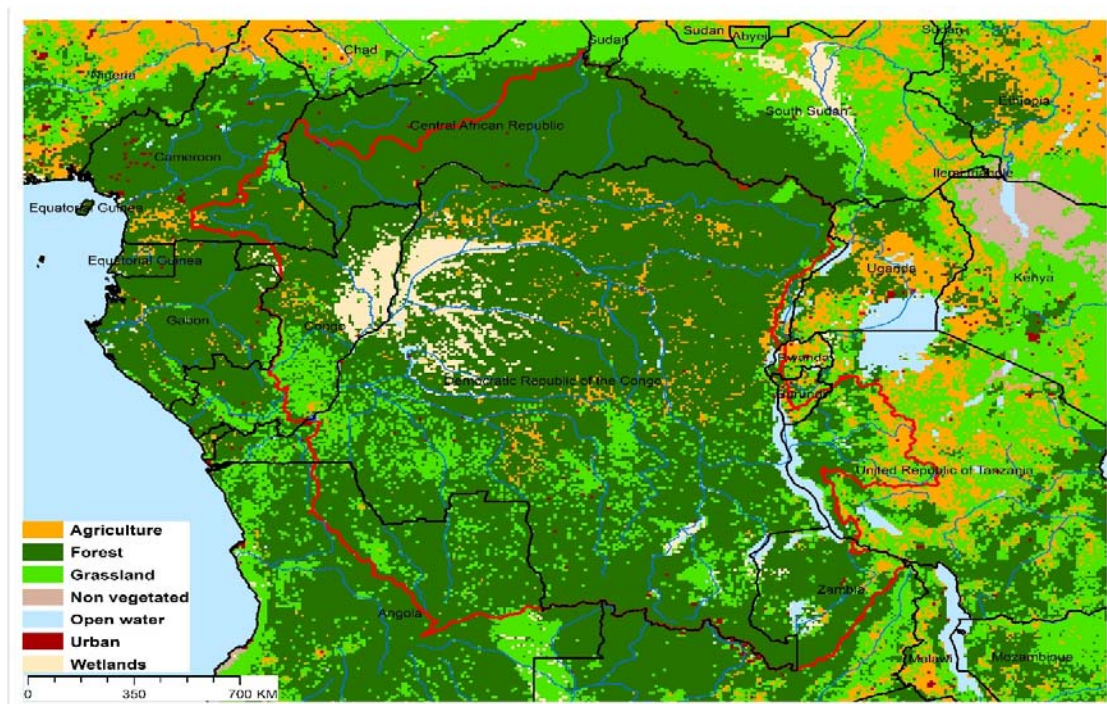
(b) Lake Congo River basin land use

Lake Congo River Threat Ranking

A serious lack of global-scale uniform data on the TWAP transboundary in-lake conditions required their potential threat risks be estimated on the basis of the characteristics of their drainage basins, rather than in-lake conditions. Using basin characteristics to rank transboundary lake threats precludes consideration of the unique features that can buffer their in-lake responses to basin-derived disturbances, including an integrating nature for all inputs, long water retention times, and complex, non-linear response dynamics.

The lake threat ranks were calculated with a spreadsheet-based interactive scenario analysis program, incorporating data and information about the nature and magnitude of their basin-derived stresses, and their possible impacts on the sustainability of their ecosystem services. These descriptive data for Lake Congo River and the other transboundary lakes included lake and basin areas, population numbers and densities, areal extent of basin stressors on the lake, data grid size, and other components considered important from the perspective of the user of the data results. The scenario analysis program also provides a means to define the appropriate context and preconditions for interpreting the ranking results.

The Lake Congo River threat ranks are expressed in terms of the Adjusted Human Water Security (Adj-HWS) threats, Reverse Biodiversity (RvBD) threats, and the Human Development Index (HDI) score, as well as combinations of these indices. However, it is emphasized that, being based on specific characteristics and assumptions regarding Lake Congo River and its basin characteristics, the calculated threat scores represent only one possible set of lake threat rankings. Defining the appropriate context and preconditions for interpreting the lake rankings remains an important responsibility of those using the threat ranking results, including lake managers and decision-makers.

Table 1. Lake Congo River Relative Threat Ranks, Based on Adjusted Human Water Security (Adj-HWS) and Reverse Biodiversity Threats, and Human Development Index (HDI) Score

(Estimated risks: red – highest; orange – moderately high; yellow – medium; green – moderately low; blue – low)

Adjusted Human Water Security (Adj-HWS) Threat Score	Relative Adj-HWS Threat Rank		Reverse Biodiversity (RvBD) Threat Score	Relative RvBD Threat Rank		Human Development Index (HDI) Score	Relative HDI Rank
0.75	38		0.80	1		0.34	1

It is emphasized that the Lake Congo River rankings above are discussed here within the context of the management and decision-making process, rather than as strict numerical ranks. Based on its geographic, population and socioeconomic assumptions used in the scenario analysis program, the calculated Adj-HWS score for Lake Congo River indicates a moderately low threat rank compared to other priority transboundary lakess.

The Reverse Biodiversity (RvBD) for Lake Congo River, which is meant to describe its biodiversity sensitivity to basin-derived degradation, places the lake in a high threat rank, compared to the other transboundary lakes, suggesting a large sensitivity to human disturbances. Management interventions directed to improving the biodiversity status must be viewed with caution, however, since we lack sufficient

knowledge and experience to accurately predict the ultimate impacts of biodiversity manipulations and preservation efforts. Further, the RvBD scores indicate the relative sensitivity of a lake basin to human activities, and high threat scores *per se* do not necessarily justify management interventions. Such interventions may actually increase biodiversity degradation, noting that many developed countries have already fundamentally degraded their biodiversity because of economic development activities. Thus, activities undertaken to address the Adj-HWS threats may actually degrade the biodiversity status and resources, even if the health and socioeconomic conditions of the lake basin stakeholders are improved as a result of better conditions, thereby increasing stakeholder resource consumption.

The relative Human Development Index (HDI) places the Lake Congo River basin in a high threat rank in regard to its health, educational and economic conditions.

Table 2. Lake Congo River Threat Ranks, Based on Multiple Ranking Criteria
(Scores for Adj-HWS, RvBD and HDI ranks are presented in Table 1; the ranks may differ in some cases because of rounding of tied threat scores; Estimated risks: red – highest; orange – moderately high; yellow – medium; green – moderately low; blue – low)

Adj-HWS Rank	HDI Rank	RvBD Rank		Sum Adj-HWS + RvBD	Relative Threat Rank		Sum Adj-HWS + HDI	Relative Threat Rank		Sum Adj-HWS + RvBD + HDI	Overall Threat Rank
35	1	1		36	18		36	19		37	8

When multiple ranking criteria are considered together in the threat rank calculations, the Adj-HWS and HDI scores considered together place Lake Congo River in the upper third of the threat ranks. The situation is similar to the calculated threat rank when the Adj-HWS and RvBD threats are considered together. Considering all three ranking criteria together, however, Lake Congo River exhibits an overall high threat ranking.

Further, a series of parametric sensitivity analyses of the ranking results also was performed to determine the effects of changing the importance of specific criteria on the relative transboundary lake rankings. This analysis involved increasing or decreasing the weights applied to the threat ranks derived from multiple ranking criteria to reassess the relative impacts of the weight combinations on the threat ranks. For example, in determining the sensitivity of the Adjusted Human Water Security (Adj-HWS) and Biodiversity (BD) ranking criteria, the threat rank associated with the first was assumed to be of complete (100%) importance (i.e., rank weight of 1.0), while the other was assumed to be of no (0%) importance (i.e., rank weight of 0.0). The relative importance of the two ranking criteria was then successively changed, with weight combinations of 0.9 and 0.1, 0.8 and 0.2, etc., until the first ranking criteria (Adj-HWS) was assumed to be of no importance (rank weight of 0.0) and the second (BD) was of complete importance (rank weight of 1.0). In the case of Lake Congo River, the 0.5 and 0.5 weight combinations for three cases of parametric analysis for Lake Congo River resulted in respective threat rankings of 23rd, 9th and 23rd, respectively, among the total of 23 African transboundary lakes in the TWAP study (see Technical Report, Section 4.3.3, pp44-49).

In essence, therefore, identifying potential management intervention needs for Lake Congo River must be considered on the basis of both educated judgement and accurate representations of its situation. A fundamental question to be addressed, therefore, is how can one decide that a given management intervention will produce the greatest benefit(s) for the greatest number of people in the Lake Congo

River basin? Accurate answers to such questions for Lake Congo River, and other transboundary lakes, will require a case-by-case assessment approach that considers the specific lake situation and context, the anticipated improvements from specific management interventions, and its interactions with water systems to which the lake is linked. To this end, it is noted that the African transboundary lakes as a group merit special attention in regard to management interventions, with some lakes requiring more immediate attention than others.