

AQUATIC HABITATS IN AFRICA

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Summary

Although, Africa has abundant freshwater resources, 14 countries are subject to water stress (1700 m^3 or less per person per year) or water scarcity (1000 m^3 or less per person

per year), and another 11 countries are expected to join this list in the 2025. This chapter highlights the major aquatic habitats in Africa, including the main rivers, lakes, lagoons and wetlands. The economic importance and human interaction with the water of these aquatic habitats are discussed. A combination of climatic changes, human population growth, unsustainable resource use, and desertification is threatening the African ecosystems and ability to supply crucially needed natural resources to the people of Africa. Unfortunately, the human pressure on African aquatic ecosystems is expected to increase as populations grow, unless strategic action plans are put in place for their conservation. National and international efforts are required to manage these habitats.

1. Introduction

Although the presences of large rivers and lakes such as the Congo, the Nile, the Zambezi, the Niger, Lake Victoria (the world's second largest), Lake Chad, Lake Tanganyika, etc., Africa is the second driest continent in the world, after Australia, and millions of Africans still suffer from water shortages throughout the year. Shortages are often due to problems of uneven distribution (sometimes there is much water where there are fewer people) and also to management of existing supplies that could be improved (WWF, 2002).

Aquatic habitats are defined as water bodies supporting aquatic life. They include: rivers, streams, lakes, ponds, cave water, springs, floodplains, and wetlands (bogs, marshes, and swamps) that provide water for drinking, sanitation, agriculture, transport, electricity generation and recreation (CBD 2005). They provide valuable but often unaccounted for, regulation of floods, drought, nutrient and sediment deposition. They are also habitats for diverse faunas and floras which constitute a vital and important source of food and fiber that sustains incomes and livelihoods, particularly for rural communities in all developing countries (CBD, 2005).

Africa is the second-largest continent after Asia and is currently considered among the most strategic regions in terms of global development opportunities. The vast landscape of Africa contains a host of natural wonders and rich resources. Its grasslands, wetlands, mountains, deserts, rainforests and marine areas are home to thousands of species of plants and animals. Africa is rich in freshwater systems comprising natural lakes, man-made lakes or reservoirs and rivers.

The major lakes (Fig. 1) include in alphabetical order Albert, Bangwuelu, Chad, Chilwa, Edward, George, Kivu, Kyoga, Malawi (Nyasa), Mweru, Nasser-Nubia, Tanganyika, Turkana, and Victoria. The major man-made lakes include: Cahora Bassa (*Also spelt Cabora Bassa.*), Kariba, Kainji, Nasser-Nubia and Volta. The larger natural lakes of the rift valley include Albert, Edward, George, Kivu, Tanganyika and Turkana. In addition, the rift valley has a number of smaller lakes including Baringo, Bagotia, Nakuru, Naivasha, Magadi, Natron, and Manyara (Ogutu-Ohwayo and Balirwa 2006). The African Great Lakes include Victoria which is the second largest lake in the world, Lake Tanganyika which is the second deepest lake in the world. Other smaller lakes such George, Nakuru, Naivasha have been useful in understanding the production processes in African lakes. The African lakes such as those of the Rift valley are amongst the oldest on earth (e.g. Lake Tanganyika: 2-20 million years BP) and are

sensitive to climatic and physico-chemical changes. Lake Victoria is reported to have dried up about 12,500 years ago (Johnson et al, 1996) while 6000 years ago Lake Chad was 20 times larger and its maximum depth was 154 m compared with about 4 m today (ILEC, 2003). As recent as the 1960s, the environments (particularly water level) of Lakes Victoria, Kyoga, Tanganyika and Malawi have changed in response to variable rains. The African lakes contribute significantly to poverty reduction and food security. They are a source of dietary proteins and water, they provide revenue through fish harvest, export and tourism, and are used as avenues for transport of people and goods. The lakes also provide water for irrigation, agriculture and hydropower projects. Lakes Malawi, Tanganyika and Victoria harbour diverse endemic fish faunas of ecological and scientific importance.

During this century, African lakes have experienced declines in fish catches, reduction in fish species diversity and deterioration in water quality. Much effort has already been put in mitigating these threats but there is still need to strengthen these efforts.

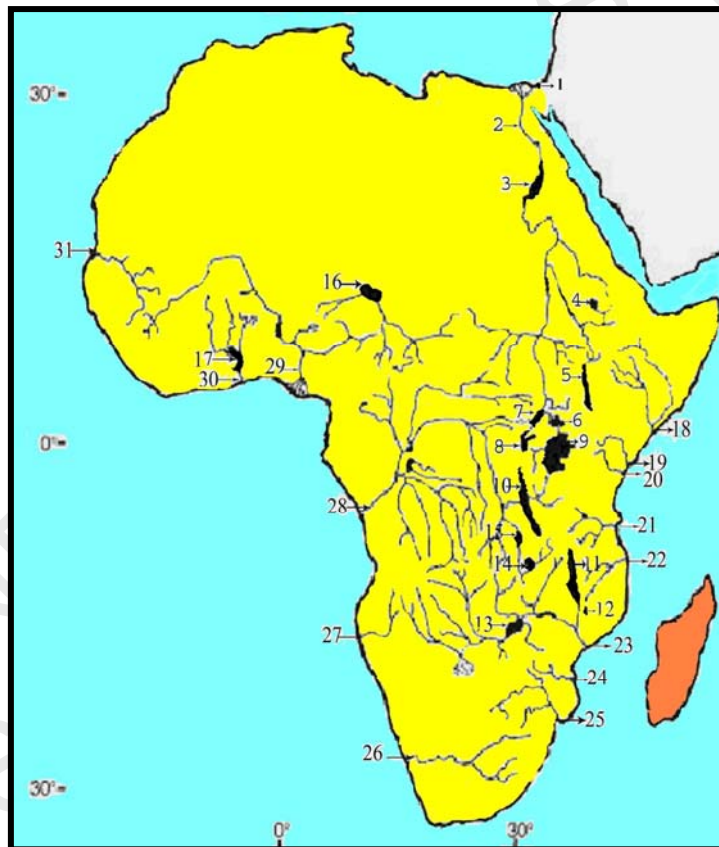


Figure 1. The main rivers and lakes in Africa (Modified from Ogutu-Ohwayo & Balirwa, 2006)

Lakes : 1 - Bardawil lagoon; 3 - Nasser-Nubia; 4- Tana; 5 - Turkana; 6 - Kioga; 7 - Albert; 8 - Edward; 9 -Victoria; 10 - Tanganyika ; 11 - Malawi ; 12 – Chilwa; 13 - Kariba; 14 - Bangwelu ; 15 - Mweru ; 16 - Chad; 17 - Volta

Rivers : 2 - Nile ; 18 - Juba-Schebele ; 19 - Tana ; 20 - Athi ; 21 - Ruaha ; 22 - Ruvuma ; 23 - Zambezi; 24 - Save (Sabi-Lundi) ; 25 - Limpopo ; 26 - Orange; 27 - Kunene; 28 - Zaire; 29 - Niger; 30 -Volta; 31 - Senegal.

2. African Aquatic Habitats

Aquatic ecosystems consist of living organisms together with their nonliving habitat. Although the ecosystem concept is a useful one, the exact definition is somewhat arbitrary. For example, an ecosystem can range in size from a small water droplet to the vast oceanic ecosystem, and the upper, lower, and horizontal boundaries are often not well established. Similarly, the temporal aspects of ecosystems are often fuzzy. For example, a vernal (spring) pond is a temporary wetland filled with rainwater, and is transformed from an aquatic ecosystem into a terrestrial one when it dries up during the summer. An intermittent stream is one that sometimes is full of water and at other times dry. Ecosystems are not always self-sustaining. For example, fish and other aquatic animals in streams depend on leaves and insects falling from terrestrial (land) ecosystems as energy sources. Just as no single life form (species) is sufficient unto itself, neither is any one ecosystem. Ecosystems and their plant and animal life are not independent from one another in time, space, or energy. The four basic parts of any ecosystem, whether aquatic or terrestrial, are: • abiotic (nonliving) substances (mainly inorganic and organic compounds), producers (largely green plants), • consumers (animals), and decomposers (bacteria and fungi). Plants, animals, decomposers, and organics are interdependent with one another.

Any large geographic region characterized by a certain type of ecosystem is known as a Biome. Aquatic biomes may be freshwater (lakes, ponds, rivers and streams), Freshwater/brackish (estuaries and wetlands) and marine (inter-tidal regions, coral reefs, oceanic pelagic zones and abyssal zones). An ecosystem is generally defined as a community of organisms living in a particular environment and the physical elements in that environment with which they interact. Within each ecosystem, there are habitats which may also vary in size. A habitat is the place where a population lives. A population is a group of living organisms of the same kind living in the same place at the same time. All of the populations interact and form a community. The community of living things interacts with the non-living world around it (soil, water, air and energy), to form the ecosystem. The habitat must supply the needs of organisms, such as food, water, temperature, oxygen, and minerals. If the population's needs are not met, it will either die off or move to a better habitat. The processes of competition, predation, parasitism, cooperation, and symbiosis occur and characterize habitats.

Country	No. of lakes	Percentage
Uganda	69	10.0
Kenya	64	9.5
Cameroon	59	8.7
Tanzania	49	7.2
Ethiopia	46	6.8
South Africa	37	5.5
Rwanda	29	4.3
Ghana	29	4.3
Morocco	26	3.8
Madagascar	25	3.7
Egypt	16	2.4

Nigeria	16	2.4
Mali	15	2.2
Tunisia	15	2.2
Zaire	15	2.2
Malawi	13	1.9
Botswana	12	1.8
Gabon	8	1.2
Others	134	20.0
Total	677	100

Source: World Lakes Network (2004)

Table 1. Principal lakes in Africa

Inland aquatic habitats, such as rivers, lakes, ponds and wetlands, provide a range of important ecosystem services and benefits to society. However, the unsustainable use of aquatic habitats, including by the urban water management sector itself, tends to alter and reduce their biodiversity and thus their ability to provide services, including clean water, protection of human health from waterborne diseases and pollutants, protection of urban areas from flooding, and the maintenance of aesthetic and recreational ecosystem services. Spurred by increasing urbanization, population increases and climate change, this is a global issue that is likely to grow more and more serious over the coming years, in particular in the South. If it is not addressed, there is the threat that several of the Millennium Development Goals will not be reachable (Wagner et al, 2007).

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