

Nigeria's pristine freshwater ecosystems need protection before they are lost

April 21 2022, by Emmanuel O. Akindele



Oowu Waterfall, Kwara state, Nigeria. Credit: [Foreboiz/Wikimedia Commons](#), [CC BY-SA 4.0](#)

As human populations grow, pure freshwater systems are becoming [rare](#) around the world. Urbanization and infrastructure development have had [an impact](#) on the natural environment in African countries, as elsewhere. Many species have become [extinct](#).

In Nigeria, various environmental pressures have [jeopardized](#) freshwater biodiversity in recent years. Undisturbed freshwater systems have become scarce, as [human activity](#) has destroyed many rivers, lakes and streams.

Cutting down trees, using water for domestic and industrial purposes, farming on river banks, dumping garbage and washing are some of the activities that [contribute](#) to reducing freshwater biodiversity.

[Studies](#) have found that the animals in Nigeria's freshwater ecosystems are mostly species that indicate low or moderate water quality. In the waters studied, there are fewer species that indicate excellent water quality. Larvae of non-biting midges, soldier flies and hover flies are examples of [species that indicate poor water quality](#). But biological indicators of excellent water quality, such as mayflies, stoneflies and caddisflies, are [frequently underrepresented](#).

My research group recently [conducted an ecological study](#) of the freshwater systems of three waterfalls in Nigeria's remote regions. They are all far from [human settlement](#) and are situated in Nigeria's different vegetation and geographical zones. Our findings revealed that the streams had exceptional biological water quality, which is unusual in Nigeria.

It's important to protect these places because pristine freshwater ecosystems are becoming rarer globally.

Freshwater systems in Nigeria

Three insect orders are frequently employed as [indicators](#) of high-quality freshwater habitats.

Ephemeroptera (commonly known as mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) [make up](#) the indicator. In most cases globally, pristine freshwater systems have no fewer than [10 species](#) of the three insect groups. The three insect groups are used as the benchmark for identifying top-quality sites. Such sites should support a wide range of species of the three insect orders. The higher the indicator value, the richer a freshwater system is in terms of biological diversity.

At Arinta Waterfalls in Ekiti State, southwest Nigeria, we discovered 19 species indicating excellent water quality. At Ekor Waterfalls in Cross River State, southern Nigeria we found 13. We discovered 29 indicator species at Oowu Waterfalls in Kwara State, north-central Nigeria. These records exceeded [the benchmark](#) for freshwater systems with excellent ecological integrity. In Nigeria it's rare to exceed this benchmark.

Our findings also revealed that the three sites had very high conservation value. An index value of not less than 20 is the standard. At all three locations, the index was greater than 20. The conservation index has been applied in Britain and Ireland for identifying freshwater systems of conservation importance. Its application has been [recommended](#) for international use. This study is the first application of the index in tropical Africa.

Freshwater environments with high conservation value have great promise for both terrestrial and freshwater biological diversity. They also bode well for human survival. Many insects [require clean water](#) to survive as larvae before maturing into adults and moving to forested areas near water. They become part of the food chain in these forests, passing their chemical energy to other animals. The larval insects are also [essential food](#) for fishes.

When present in significant numbers, the indicator group is a [clear signal](#) of natural freshwater with preserved riparian forests—little [altered](#) by human activity. Such freshwater systems [imply](#) a high level of naturalness and make an excellent ecotourism destination.

Potential for ecotourism

Apart from their biodiversity value, the three locations we studied have the potential to become ecotourism destinations in Nigeria. At present, ecotourists under-appreciate the sites, and ecologists under-report them. Only the Arinta Waterfalls site is under the close supervision of Ekiti State Tourism Board. The Abia village community in Cross River State is responsible for managing the Ekor Waterfalls site. Though the Kwara State Government recognizes the Oowu Waterfalls as an ecotourism site, poor management and a poor road network leading to the site indicate that it is neglected.

Among the three, Oowu Waterfalls is [remarkable](#) for being the steepest and one of the highest waterfalls in West Africa.

The absence of well-organized management at the locations foreshadows a serious threat to these exceptional freshwater systems. There are already symptoms of uncontrolled [human activity](#) such as deforestation and tourist garbage dumping, albeit on a small scale.

Concerned governments should devise ways to protect and conserve these excellent streams. [The goal](#) is to identify freshwater habitats of high ecological integrity for conservation before they are spoilt by human activities. Protecting biodiversity will also meet other human needs like tourism, agriculture and mining.

The authorities need plant and animal ecologists to take an inventory of the sites' terrestrial and aquatic biodiversity. This baseline data is critical

to draw up conservation plans, monitor naturalness and protect sites during future infrastructure developments.

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