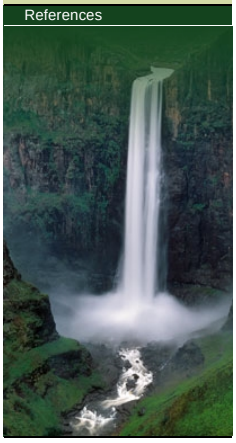

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Ecology and Biodiversity: Classification of Organisms:

Invertebrates

Invertebrates include all animals without a backbone**.** Invertebrates are far more diverse and abundant than vertebrates, and many groups of invertebrates are found in aquatic systems. Those living on or in aquatic sediments are termed benthic invertebrates. Benthic invertebrate communities are often used as indicators of aquatic ecosystem health, by measuring their population, abundance, and diversity.

Worms

Worms are an informal collection of three major groups, including **flatworms** (Platyhelminthes), **roundworms** (nematodes), and **segmented worms** (annelids). Flatworms include a major group that is free-living and often predatory (Turbellaria), and two major groups, Trematoda (flukes) and Cestoda (tapeworms), that are entirely parasitic as adults although their intermediate stages may be aquatic. The roundworm *Dracunculus medinensis*, also known as Guinea worm, is common to Africa as is the fluke worm Schistosoma.

Molluscs

Molluscs include the familiar groups of **snails** (gastropods) and **bivalves** (clams and mussels). A hard shell encloses, wholly or in part, the bodies of most molluscs. Snails feed by scraping biofilm from surfaces, collecting organic matter deposited in the sediment, consuming macrophytes, or feeding on decaying animals. Bivalves have gills, which they use both for breathing and for collecting small particles from the water.

Snails serve as intermediate hosts in the life cycle of Schistosomiasis in Africa.

Insects

Insects are a highly diverse group and occupy most ecosystem niches. Most insects are terrestrial, while some have life stages that are aquatic (e.g., dragonflies and mosquitoes). A few insects are entirely aquatic (e.g., aquatic beetles). While most aquatic insects live on or near the bottom of waterbodies, some (such as the larvae of the phantom midge *Chaoborus*) can swim higher in the water column. Most aquatic insects have gills and need water with dissolved oxygen; others, such as mosquito larvae, breathe through the surface film of still waters. Insects may be herbivores, carnivores, or detritivores. Stream and river insects are crucial in the processing of organic matter. Some scrape biofilm, others shred larger leaves into smaller particles, while still others filter or collect these smaller particles. This chain of processing reduces large organic matter to successively smaller and smaller particles.

Zooplankton

Zooplankton are aquatic animals that cannot swim against water currents, typically because they are too small to do so. However, many zooplankton can swim significant distances in fairly still waters. Because they cannot swim against currents, they are more important in lakes than in running water, as running water usually carries them downstream faster than they can reproduce. They can, however, be abundant in large slow flowing rivers. Zooplankton are heterotrophic and are significant sources of energy and nutrients to carnivorous invertebrates and some vertebrates.

Box: Assessment of macro-invertebrates in the basin

Macro-invertebrates were sampled at 45 sites throughout the Orange-Senqu River System.

We did not find any unimpacted or pristine sites in the system, and even sites in the high mountain regions show some impacts. In Lesotho macro-invertebrates are affected by the changed flow patterns from the Katse and Mohale Dams. (The site on the Senqu River just before it flows into South Africa shows less species diversity, but those that are present tend to be sensitive to pollution, giving an artificially high reading.) Sites in the upper regions of the Grootdraai and Wilge Rivers are in a largely natural state.

For the most part, the rest of basin is in a moderately modified ecological state. However, some sites in or near large urban centres in South Africa show a largely modified state. At some sites in the lower Vaal River System seriously modified conditions are due to localised habitat related impacts. Sites in the lower Orange and Caledon Rivers show a moderately modified state. However, the site near Upington shows a largely natural condition, in part because of the good habitat at this site.

The results from the Fish River in Namibia (using NASS2) suggest a moderately modified system, but macro-invertebrate communities in that river are influenced by fact that the river only flows for a short time after heavy rains, making direct comparisons difficult.

Source: ORASECOM 2011

To access an overview of the water quality situation in the Orange-Senqu River basin, please consultant the: *"The State of the Orange Senqu River system – A Report on ORASECOM's First Joint Basin Survey JBS-1, Centurion 2011",* in the Document Library.

Interactive

Basin Map

Explore the sub-basins of the Orange-Senqu River

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Video Tour

Tour video scenes along the Orange-Senqu River related to the River Basin

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Geography Maps

Investigate land cover and terrestrial ecoregions in the basin

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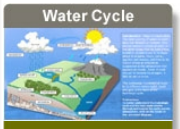
Water Cycle



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Food Web

Explore the interactions of living organisms in aquatic environments

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Trichoptera Caddisfly pupae are found in lakes, rivers and streams.
Source:Martin 2005
(click to enlarge)

Next: Vertebrates