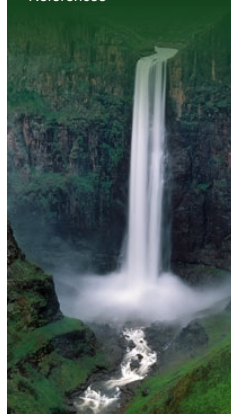


Orange-Senqu River Awareness Kit

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The River Basin

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Ecology and Biodiversity: Biodiversity:

Alien Invasive Species

Environmental threats to the Senqu and the Orange in South Africa have been widely presented in the country's state of the environment reports. Reports by DEAT (2009a) and (Mokuku *et al.* 2002) have provided information on potential invasive species (along with endemic species) for South Africa and Lesotho respectively. The recently completed study by ORASECOM through UNDP and GEF (UNDP-GEF 2008) reported on the existence and transboundary character of alien invasive species and their effects on the Orange-Senqu River basin ecosystem.

Alien invasive species within the Orange-Senqu River basin can be broadly grouped in two categories: aquatic and riparian.

Aquatic species

The most common aquatic invasive species in the Orange-Senqu River basin are:

- *Eichhornia crassipes* (Water hyacinth)
- *Azolla filiculoides* (Water fern)
- Trout species *Salmo trutta*
- Trout species *Oncorhynchus mykiss*

Eichhornia crassipes, widely known as water hyacinth, is a non-native plant in the region. It has spread from the upper-middle parts of the Vaal to areas near the confluence with the Orange River in recent years and invasions of the Lower Orange River are a distinct possibility (UNDP-GEF 2008). *Eichhornia crassipes* is also present in Botswana but the impact is not yet significant. Water Hyacinth is also discussed in the section on [Plants](#).

Azolla filiculoides, known as Water Fern, has also invaded sections of the Upper Orange-Senqu River and its tributaries. Effects of invasion by this plant are similar to that of *crassipes* although its distribution is limited to the upper catchments (UNDP-GEF 2008).

The introduction of two trout species (*Salmo trutta* and *Oncorhynchus mykiss*) to the upper reaches of the Orange-Senqu River basin in South Africa and Lesotho has affected populations of indigenous minnow species in these areas (UNDP-GEF 2008).

Arundo donax L., the giant reed or Spanish reed, is found in the Lower Orange River and in the Fish River downstream of the Hardap Dam in Namibia (Bethune *et al.* 2004).

Riparian Species

Riparian vegetation (the zone of vegetation along the river banks) has been notably disturbed along the Orange-Senqu River and most of its tributaries. The former dominance of riparian woody species such as Cape willow (*Salix mucronata*), buffalo thorn (*Ziziphus mucronata*), wild olive (*Olea europaea*) and white karee (*Rhus viminalis*) have been compromised through a combination of:

- Clearing for small-scale alluvial mining
- Wood collection for fuel and building material
- Agriculture on the river banks
- Colonisation by alien species

Institutions in South Africa, particularly CSIR, South African National Biodiversity Institute (SANBI) and Department of Water Affairs (DWA), monitor and undertake research on aquatic ecosystems. Some of these studies have confirmed that the riparian areas of all Southern African rivers have suffered from invasion by alien plant species (Le Maitre *et al.* 2000).

Tributaries of the Orange such as the Vaal and the Senqu Rivers originate in wetter regions and alien species are frequently a greater problem in these areas. Typical riparian invasive plants are the woody plant species *Acacia dealbata* (Silver wattle), *Acacia mearnsii* (Black wattle), *Populus sp.* (Grey poplar), *Eucalyptus spp.* (Blue gum), *Melia azederach* (Syringa), *Jacaranda mimosifolia* (Jacaranda) (UNDP-GEF 2000), and *Prosopis glandulosa* (Mesquite).



Invasive reeds in the Fish River downstream of Hardap Dam.

Interactive

Basin Map

Explore the sub-basins of the Orange-Senqu River

[enter](#)

Video Tour

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

[enter](#)

Geography Maps

Investigate land cover and terrestrial ecoregions in the basin

[enter](#)

Water Cycle

Examine how the hydrologic cycle moves water through and around the earth

[enter](#)

Food Web

Explore the interactions of living organisms in aquatic environments

[enter](#)

Acacias and Mesquite – Thirsty Invaders

Alien tree species that threaten groundwater levels can be found growing beside rivers as well as far away from them. Because the scarcity of trees in South Africa, settlers from Europe introduced fast-growing Australian acacia varieties to provide wood for mining, construction and fire. Today these acacias are a widespread problem. Their longer roots give them an advantage over other plants and animals, allowing them out-compete indigenous species by reaching deeper groundwater, while other species cannot survive. In some areas (like around Tsabong in Botswana), alien acacia trees have driven their roots so deep that they grow in large numbers, lowering the water table.

Even worse than the acacias is the rampant growth of mesquite in Southern Africa. Several species of this shrub and tree were imported into the sub-continent from Mexico, and until the 1960s they were considered a botanical enrichment. This fast growing plant quickly greens desert and semi-desert landscapes. Its legumes make good fodder; its flowers provide excellent nectar for honey bees, and its wood is suitable for fences, furniture and charcoal. While ideal for these purposes, its growth and spread must be strictly controlled. However, mesquite spread rampantly across Southern Africa from the outset. Many animals eat the plants, but excrete its undigestable seeds. The seed immediately begin growing, and in time its roots extend horizontally for up to 300 metres. The extremely thirsty mesquite has been known to spread rapidly in areas fed by fresh and saline aquifers. The plant has no natural enemies in Southern Africa, and as it spreads it quickly displaces other species.

Mesquite is so invasive that it is estimated to now occupies two million hectares in South Africa alone. In many parts of the Orange River basin, it has created impenetrable thickets, protected by its thorns which cause inflammation. Along the Auob and Nossob Rivers, mesquite threatens to displace the endemic camel thorn tree species. Along the Fish River in Namibia, below the Hardap Dam, its dense, difficult to clear, communities interfere with flood management. Finally, along the lower Orange River it has been known to rapidly over-grow landing sites for canoeists.

To make matters even worse, mesquite is unusually difficult to control. New shoots grow quickly from the stumps of the freshly cut plants following clearing efforts. It is largely resistant to herbicides, and to date no effective biological control methods have been discovered. This makes the campaign against its aggressive growth a lot more complicated and expensive.

In her book, Leonie Joubert (Joubert 2009) suggests that the existing laws regulating the handling of alien invasive species and their implementation are insufficient and ineffective. She draws a conclusion that can be applied to other invasive trees such as eucalypts, pines and poplars - "We should probably ban many of these invasive species. No one should be permitted to plant them. But if we do that, our powerful forest and nursery industry will cry foul. And we cannot simply ignore their arguments – particularly in a region where we require wood, but have very few suitable indigenous trees."

[Next: Biodiversity Resources](#) ►