

# Drought

## The Lowveld's worst drought in 33 years? Understanding the long-term impacts

*The South African Lowveld tends to experience drought in cycles every few years, with the latest dry spell being one of the worst. Dr Tony Swemmer of the South African Environmental Observation Network (SAEON) sheds some light on what this means for the region in the longer term.*

*Cattle that have died of starvation are becoming a common sight in the rural areas of the Lowveld.*



*All photographs courtesy SAEON*

As severe drought unfolds across most parts of the country, reports on its impacts on urban and agricultural systems are regularly making their way into the mainstream media... rural villages without water, maize fields bare and unplanted, images of dead livestock...

Impacts to natural areas – from protected areas to rural rangelands – have not received as much attention. But in these areas the long-term impact of the drought may turn out to have equally important repercussions for both people and nature in rural areas.

The Lowveld region of South Africa is currently experiencing as severe a drought as any other part of the country, and provides a microcosm for recording and researching the impacts of the drought in many parts of southern Africa.

Climatological data for Phalaborwa provides an example of the severity of the current drought. The 2014-15 rainfall year was one of the driest on record, with just 255 mm of rain recorded compared to the long-term average of 533 mm. So far, the 2015-16 summer is turning out to be even drier, with all months except one receiving below-average rainfall. Over the past 12

months, only two have received average or above-average rainfall.

Two consecutive years of such low rainfall is extremely rare in the highly erratic rainfall history of Phalaborwa. The last time this occurred was in the severe drought of 1982 to 1984. The combined rainfall for those two years was 602 mm, while the current two-year total is just 404 mm.

Given that the long-range forecasts are for continued below-average rainfall for the next few months, it is unlikely that the current two-year total will catch up to the 662 mm of 1982-1984, meaning that this drought will go down as the most severe in Phalaborwa since record keeping began in 1954.

Extreme heat is also contributing to the severity of the drought this year, with an unusually large number of very hot days that result in greater evaporation of the little rain that has fallen. Figure 2 shows the number of days that maximum temperatures have exceeded 40 °C for each summer since 1960-61. This

summer (red bar) still has a few months to go, but eleven 40+ °C days have already been recorded, far more than any summer in the past.

**Impact on vegetation**

The most obvious impact of the drought in and around Phalaborwa, so far, is the pitiful grass production in both protected areas and rural rangeland. Normally by this time of the year, grasses are reaching their maximum sizes and consist of tufts of bright green foliage.

Currently, throughout the Lowveld, most grasses, such as Themeda triandra, have no or few green leaves and many may have already died. The re-establishment of large, productive tufts of grasses such as these will take many years, resulting in increased soil erosion, altered water and nutrient cycles, and reduced forage for grazing herbivores for many years after the drought ends.

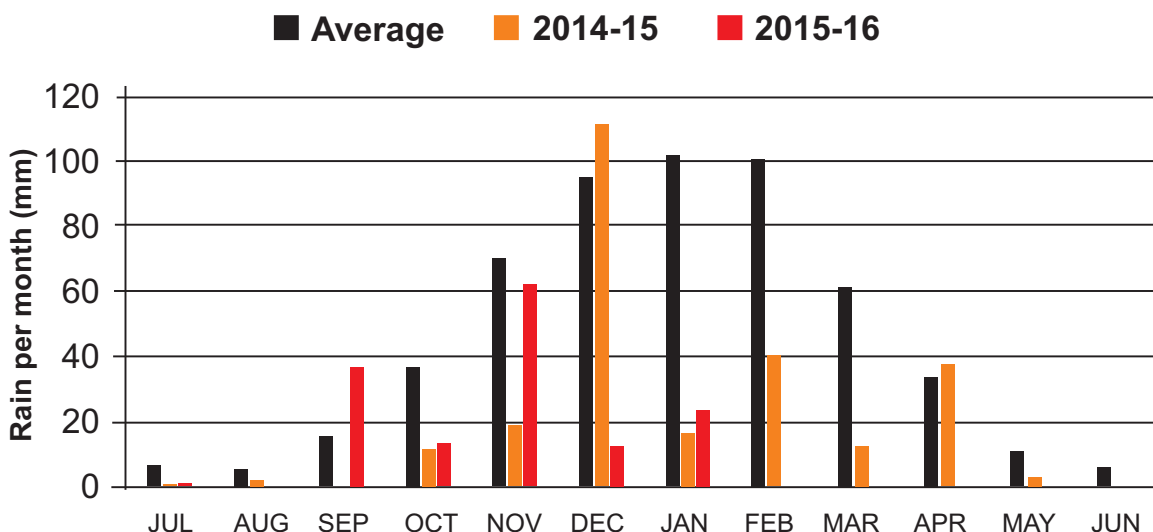


Figure 1 – Rainfall patterns for Phalaborwa for the years 2014/15 and 2015/16.

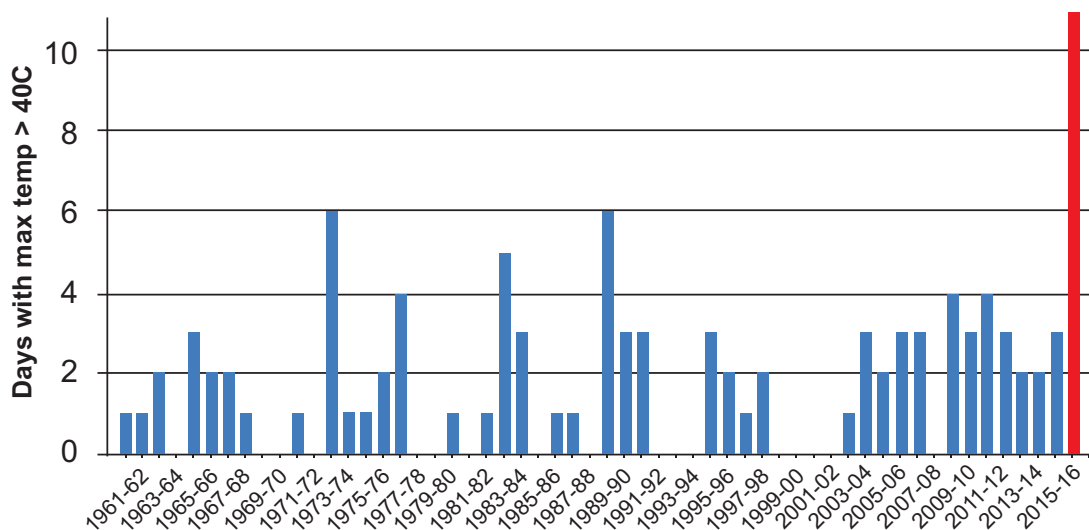


Figure 2. Number of days that maximum temperatures have exceeded 40 °C.

## Herbivore mortalities

The inevitable impact of reduced grass growth is the death of grazing herbivores, such as cattle in rural rangelands and many of the large species of antelope in protected areas. Cattle that have died of starvation are now becoming a common sight in many rural areas in the central Lowveld, with reports of thousands of animals already lost in the Giyani area.

Cattle have been maintained at high numbers in the region for many years, due to good rains in the first part of the millennium, a multitude of dams and the increasing tendency of cattle owners to buy feed for their cattle in the winter.

However, this year feed was exceptionally expensive and is already in short supply. In addition, many of the dams scattered through the rural rangelands have dried up, and cattle need to be moved to other areas to survive, at great expense to local cattle owners. A dramatic decline in cattle numbers now seems inevitable.

While cattle owners constitute a relatively small part of the rural population, the drought impacts rural livelihoods in other ways. For example, Mopane worms make an important contribution to the diets of thousands of rural households during late December or early January when the adult worms are harvested, dried, sold and eaten. This year, very few worms emerged and most of those that did, perished before reaching their adult size.

This is the first summer that no worms have been recorded on Mopane trees, since surveys began in 2009 at a benchmark site in the Kruger National Park.

The death of wildlife in private game reserves and the Kruger National Park has also begun, with reports of hippo dying in the

Kruger Park as the smaller dams and rivers dry up. Other grazing animals which depend on a high quantity or quality of grass, such as buffalo and impala, are already emaciated in numerous parts of the park, and many are likely to perish during the coming winter.

## Rivers and freshwater ecosystems

The effects of the drought on the rivers and freshwater ecosystems in the Lowveld are now developing rapidly, with low rainfall in the catchment areas to the west contributing both directly and indirectly to low flows at a time when river flows normally begin to peak (the indirect effects stem from reduced outflows from dams upstream, as dam managers attempt to maintain as much water as possible for the coming dry season).

The Olifants River, the largest of the region, is close to drying up and flow for the month of January was the lowest it has been for at least 18 years. Figure 3 shows the average and minimum monthly flows for the river (in blue), as recorded at Mamba Weir where the river enters the Kruger National Park, as well as the monthly flows for the 2015-2016 rainfall year (in red).

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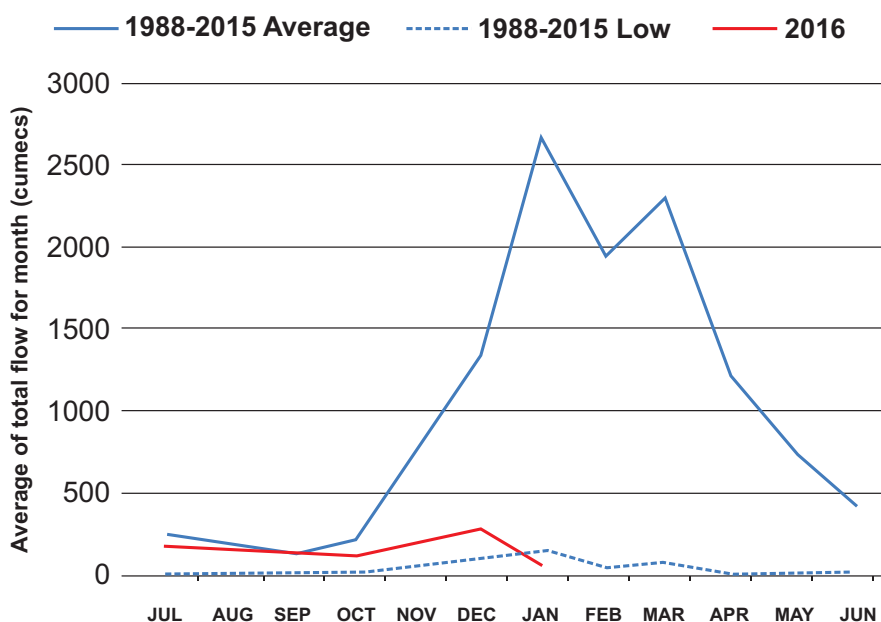


Figure 3. Average and minimum monthly flows for the Olifants River.





*The carcasses of a variety of fish species that died when the Letaba River ceased flowing upstream of the Kruger National Park in early January of this year.*

*“The long-term impact of the drought may turn out to have equally important repercussions for both people and nature in rural areas.”*

The Letaba River, another major perennial river of the Lowveld, has run dry within the Kruger National Park. By December 2015 the flow had already reduced to a trickle within the wide expanse of the floodplain of this normally expansive river. Fish deaths are an inevitable consequence of the prolonged low flows experienced.

#### **The positives of droughts**

In the field of ecology, theories have been developed as to the positive role of droughts in ecosystems, savannas in



*Few mopane worms have emerged this year due to the drought.*

particular. Droughts can regulate populations of herbivores, thus preventing overgrazing and degradation of the vegetation in the long term. In addition, severe droughts may kill off many trees in savannas, thus helping to maintain a favourable balance between trees and grasses.

The widespread death of trees and shrubs such as Mopane trees seems tragic, but is actually a positive effect of the drought, counteracting decades of bush encroachment throughout the region, and promoting the re-establishment of a vigorous grass layer.

Due to the rarity of droughts that are severe enough to have such impacts, there is little data to test these ideas. SAEON is now well positioned to document the impacts of a severe drought and provide the type of data needed to understand the long-term role of climate - and climate change - in controlling natural and semi-natural ecosystems.

*This article originally appeared in the February 2016 newsletter of SAEON. Visit. [www.saeon.ac.za](http://www.saeon.ac.za)*



*Large sections of vegetation, such as these tufts of Themeda triandra in the Kruger National Park, have died off due to the drought conditions.*