COMMUNITIES AND WATER

The Muzi swamp reed cutters and their perspectives on a sub-surface peat fire

A current study funded by the Water Research Commission and led by the Agricultural Research Council (ARC), in partnership with Ezemvelo KZN Wildlife, is investigating the impact of peat fires on natural resource harvesting. Article by Jason le Roux, Ayabonga Gangathele, Catharine Hanekom, Althea Grundling.

Reeds harvested and bound into bundles or batches using rope made from sedge leaves. Credit: PL Botha

Natural resource harvesting, such as reed cutting, is widely acknowledged as an ecosystem service provided by wetlands (Bonn et al., 2016) and is practiced amongst some rural communities in South Africa (Kotze et al., 2007). Peatlands are scarce freshwater ecosystems in South Africa, comprising only 1% of the total wetland area in the country (Grundling et al., 2017). They consist of partially decayed vegetation or organic matter which contributes to a range of ecosystem services (Parish et al., 2008).

However, there have been few studies to determine how wetland degradation, associated with sub-surface peat fires, affects peatland functioning and associated natural resource harvesting. Given that there has been a significant increase in peat fires across South Africa, particularly in Maputaland, more research is needed to understand the implications of these sub-surface fires, which can only occur when a peatland is no longer saturated throughout the year due to a drop in the water table (Turetsky et al., 2015). The Agricultural Research Council (ARC), in partnership with Ezemvelo KZN Wildlife, is currently conducting a research study, financed through the Water Research Commission (**WRC Project No. 2019/2020-00098**), which aims to determine the consequences of peat fires and develop rehabilitation protocols for these ecosystems.

One of the project study sites is the Muzi Swamp, a long linear

Harvested reeds (Phragmites australis) and sedges from the Muzi Swamp. Credit: AT Grundling

peatland system located in the Tembe Elephant Park. This park falls under the uMhlabuyalingana Local Municipality within the uMkhanyakude Municipal District in northern KwaZulu-Natal, commonly known as Maputaland. It spans an area of 300 km^2, is a Big 5 reserve and the ancestral home of the Tembe people who own the reserve. The Muzi Swamp is the only permanent water source found within the park's boundaries, as there are no rivers that run through the park. The wetland pans within the park are seasonal and dependent on rainwater (Grundling et al., 2014). The Muzi Swamp is therefore essential in supplying water for Tembe Elephant Park.

One of the conditions in the proclamation agreement of the Tembe Elephant Park is access to harvesting of natural resources on a sustainable basis from the park by local communities. To ensure sustainable harvesting, Ezemvelo KZN Wildlife established a Resource Utilisation Operational Management Plan (Hanekom et al., 2008). The aim of this document was to reinforce and formalise the management actions relating to resource use within Tembe Elephant Park, which have been in place since the proclamation of the protected area in 1983.

Despite these restrictions, large sections of peat in the Muzi Swamp (to be surveyed under the current project) were exposed to sub-surface fires on three occasions between 2013 and 2017, which entered the park as arson fires from communal lands outside. The most recent sub-surface fire was also the most severe and burnt continuously for 18 months. Apart from the loss of carbon into the atmosphere, large areas on the surface of the peatlands remain bare of vegetation. Many of the common reeds (***Phragmites australis***) that are growing in the wetland are smaller in height and less dense than the reed stands observed in the past. In order to understand the hydrology of Muzi Swamp and how the sub-surface fires have impacted its hydraulics, the project team has installed a series of wells and piezometer nests as well as DFM moisture probes on site.

To assess the consequences of these peat fires on local communities, several reed cutters who mainly harvest reeds (***Phragmites australis***) and sometimes grasses and sedges from the Muzi Swamp were interviewed in September 2020 to understand the role that reed harvesting has in their lives and how the peat fires have affected them directly. The interviews took place on 8 and 9 September 2020 at the KwaMsomi gate, which is the most active of four access control gates for reed cutters.

Tembe Elephant Park regulations control where and when they are allowed to harvest reeds. Reed cutters are restricted to 35 people per day at KwaMsomi and must carry their harvested resources out of the park on the same day, to allow for monitoring of each day's harvest. Harvesting is also limited to six months a year (1 April to 30 September) from Monday to Friday up to around midday. We interviewed 22 reed cutters who were

divided into five groups (ranging between 3 and 5) as they were not comfortable to be interviewed individually.

The group of reed cutters was composed entirely of women aged between 28 and 61 (averaging about 50 years old) from five wards around KwaMsomi. Some of the respondents have been harvesting reeds in the Tembe Elephant Park for as long as 45 years. A few were born on the land before it was a protected area, and have been harvesting reeds since they were little girls. The women travel an average of two hours on foot, to and from the park, during harvesting days, and walk around an hour to where they harvest the reeds within the wetland.

Reeds and sedges are harvested using bush knives and are bound into bundles or batches using rope made from sedge leaves, also collected from the wetland, that are woven together. Reed bundles are sold for between R15 and R30 each, depending on the length and quality of reeds, and are bought by local community members for construction and thatching purposes. In a good month the reed cutters can make up to R400, whilst in some months not a single bundle is sold. The money generated from the sale of the reeds is for many reed cutters the only source of income for their households, which range from 4 to over 10 people (averaging about 8). Although gumboots are needed to walk in the wetland, only three of the respondents had such boots as the rest could not afford them.

When asked about the peat fires the reed cutters said that whilst they did not feel physically threatened, they feared for their livelihoods as the sub-surface fires were burning the roots (i.e. rhizomes) of the reeds. It concerned them as to why the fires took so long to die out and why they were so difficult to extinguish. For these reasons, the peat fires are seen as a mystery amongst locals. They also reported that as a result of these fires, the reeds do not grow anymore and that grass has taken over. When asked what would happen if the wetland ceased to exist, the reed cutters said that it would lead to extreme poverty, whilst some even said that it would lead to death.

The reed cutters went on to explain that the Muzi Swamp in Tembe Elephant Park is the only wetland in the region where reeds still grow, although the reed beds have been severely degraded. A majority of them believe that the degradation is caused by the wetland drying out due to the plantations adjacent to the park that use large amounts of water. Some were under the impression that the game in the park consumed all the water in the wetland and that the park pumps the remaining water into a waterhole for the animals. They also acknowledged that the drought in the area has dried out all local open water sources and that they buy their potable water from neighbours who have installed boreholes on their properties.

Reed cutters who were interviewed in September 2020. Credit: AT Grundling

Apart from the Muzi Swamp being the only permanent water source for Tembe Elephant Park, and essential for its existence, the reed cutters confirmed how important the wetland is for them to sustain their livelihoods, and what the potential consequences of additional peat fires could mean for them. Urgent interventions are therefore required and the ARC is grateful to the WRC for making funding available to better understand peat fires in South Africa. Whilst the best solution for sub-surface peat fires would be to mitigate against them occurring in the first place, the fact of the matter is that they have already occurred and, given the dry state of the peat in Muzi Swamp, are likely to occur again in the future. Upon the completion of this research project the ARC hopes to have determined how such fires affect the functioning of peatlands, and what can be done to these ecosystems to restore their function.

List of References

- Bonn, A., Evans, M., Joosten, H., Stoneman, R. 2016. Peatland restoration and ecosystem services: an introduction. In: Bonn, A. & Stoneman, R. (eds), Peatland Restoration and Ecosystem Services: Science, Policy and Practice. Cambridge University Press, United Kingdom, 1-6.
- Grundling, A.T., van den Berg, E.C., Pretorius, M.L. 2014. Influence of regional environmental factors on the distribution, characteristics and functioning of hydrogeomorphic wetland types on the Maputaland Coastal Plain, KwaZulu-Natal, South Africa. WRC Report No. 1923/1/13. Water Research Commission, Pretoria.
- Grundling, P., Grundling, A.T., Pretorius, L., Mulders, J., Mitchell S. 2017. South African peatlands: ecohydrological characteristics and socio-economic value. WRC Report No. 2346/1/17. Water Research Commission, Pretoria.
- Hanekom, C., de Goede, N., Tembe, M. 2008. Resource Utilisation Operational Management Plan, Tembe Elephant Park. EKZN Wildlife.
- Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.S., Collins, N.B. 2007. WET-EcoServices: A technique for rapidly assessing ecosystem services supplied by wetlands. WRC Report No. TT 339/08. Water Research Commission, Pretoria.
- Parish, F., Sirin, A., Charman, D., Joosten, H., Minayeva, T., Silvius, M., Stringer, L. (eds) 2008. Assessment on Peatlands, Biodiversity and Climate Change: Main report. Kuala Lumpur: Global Environment Centre; Wageningen: Wetlands International.
- Turetsky, M.R., Benscoter, B., Page, S., Rein, G., van der Werf, G.R, Watts, A. 2015. Global vulnerability of peatlands to fire and carbon loss. Nature Geoscience, 8(8). https://doi.10.1038/NGEO2325.