



ICG2022-618, updated on 28 May 2023

<https://doi.org/10.5194/icg2022-618>

10th International Conference on Geomorphology

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Urban Anthropogeomorphological Wetlands – South African Case Studies

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Urban development in the interior of South Africa is historically centred around mining development such as gold, uranium and platinum-group metals and can only be sustained by amongst other, providing a reliable constant supply of potable water for human use and industrial development alike. Therefore, several water transfer schemes were initiated since the 1970's to pump water from the well watered eastern parts of South Africa and the Kingdom of Lesotho to the drier central industrial and mining hubs of the Pretoria Witwatersrand Vereeniging urban complex in the Gauteng province, and the Rustenburg mining hub in the North-West province. Furthermore, post-apartheid era progress was made to provide access to improved water supply to previously marginalised communities in urban areas – many of which has grown significantly in recent years as people move to urban areas in search of employment opportunities.

These urban developments have not only extensively transformed land cover resulting in changed runoff characteristics of catchments and watercourses but has also in altered the flow regimes of these watercourses. Notably ephemeral and seasonal streams and wetlands started to receive a copious supply of nutrient rich water from aging water infrastructure: leaking pipelines, overflowing or inefficient water treatment plants and uncontrolled release of industrial and effluent waste into streams. Consequently, streamflow increased, resulting in erosion of channels, and desiccation of wetlands in lowering base levels. The oversupply of sediment has resulted in new wetlands further downstream in the landscape. Moreover, the steady supply of nutrients and sediment allowed vegetation species such as Phragmites and Typha to expand and dominate valley bottom systems. Consequently, the footprint of these anthropogeomorphological wetlands has expanded as a positive feedback loop ensued with an increase of surface roughness, diffused water flow, sediment trapping and nutrient cycling. Although these natural processes now interact to form wetlands which clearly provide valuable ecosystem services in an urban environment it remains to be seen if these systems will be self-sustaining if the anthropogenic hydrological drivers are altered with future urban change.

The change in volume and nature of water released from different catchments greatly influences wetlands in affected catchments. South African case studies that will be shared include the effluent affected areas of Rietvlei, Soutpanspruit, and Colbyn, wetlands in Gauteng province; the water transfer scheme affected area of Liebenberg spruit; and the potable water leak wetland of Kgaswane Mountain reserve, North West province.

Keywords: Urban sprawl, water supply, anthropogeomorphological wetland

