

**SANBI Team Member:** Tsungai Zengeya  
**Supervisor(s):** John Wilson, Andrew Turner (Cape Nature)  
**Location:** Stellenbosch University  
**Level of project:** Masters or Doctoral  
**Working title:** Getting the measure of invasions and their control

## Background

South Africa spends significant amounts of money to control biological invasions (over ZAR1 billion per year, Zengeya & Wilson, 2020), but data on the outcome of these interventions are lacking. A few case studies have explicitly explored the effectiveness of these control measures (e.g. Fill et al. 2017; Kraaiji et al. 2017), and while the number of case studies is increasing, the data needed for effective monitoring is costly (Cheney et al. 2018). As part of the South African National Status Report on Biological Invasions, a number of indicators were developed to track invasion and the effectiveness of control measures over time (Wilson et al. 2018). The purpose of this project will be to use data from conservation agencies to assess how the level of invasions have changed over time, explore the value of rapid assessments of the extent of invasions and the effectiveness of control, and relate this to impacts. Specifically the project aims to:

- look at historical data on levels of invasion, score these using the proposed indicators, and assess management effectiveness;
- evaluate current monitoring on management effectiveness and develop protocols for its improvement;
- explore how levels of invasions relate to impacts; and potentially
- model how different management return intervals impact on success.

This project would suit a candidate interested in applied ecology with good skills in managing and analysing data, and an ability to think practically. In addition, a doctoral candidate would need to have experience/interest in using models to address conservation issues.

## Contacts

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## Further Reading

- Cheney C, Esler KJ, Foxcroft LC, van Wilgen NJ, McGeoch MA (2018) The impact of data precision on the effectiveness of alien plant control programmes: a case study from a protected area. *Biological Invasions* 20: 3227-3243. <https://dx.doi.org/10.1007/s10530-018-1770-8>
- Fill JM, Forsyth GG, Kritzinger-Klopper S, Le Maitre DC, van Wilgen BW (2017) An assessment of the effectiveness of a long-term ecosystem restoration project in a fynbos shrubland catchment in South Africa. *Journal of Environmental Management* 185: 1-10. <https://dx.doi.org/10.1016/j.jenvman.2016.10.053>
- Kraaij T, Baard JA, Rikhotso DR, Cole NS, van Wilgen BW (2017) Assessing the effectiveness of invasive alien plant management in a large fynbos protected area. *African Biodiversity and Conservation: Bothalia* 47: a2105. <https://dx.doi.org/10.4102/abc.v47i2.2105>
- van Wilgen BW, Fill JM, Baard J, Cheney C, Forsyth AT, Kraaij T (2016) Historical costs and projected future scenarios for the management of invasive alien plants in protected areas in the Cape Floristic Region. *Biological Conservation* 200: 168-177. <https://dx.doi.org/10.1016/j.biocon.2016.06.008>
- Wilson JR, Faulkner KT, Rahlao SJ, Richardson DM, Zengeya TA, van Wilgen BW (2018) Indicators for monitoring biological invasions at a national level. *Journal of Applied Ecology* 55: 2612–2620. <https://dx.doi.org/10.1111/1365-2664.13251>
- Zengeya TA, Wilson JR (2020) The status of biological invasions and their management in South Africa in 2019. South African National Biodiversity Institute, Kirstenbosch and DSI-NRF Centre of Excellence for Invasion Biology, Stellenbosch, 71 pp. <https://dx.doi.org/10.5281/zenodo.3947613>