



# GeoSpatial Solutions for Biodiversity Conservation

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## ABOUT BIOGIS

BioGIS is a sole-proprietorship, started by myself in 2015, focussed on providing practical GeoSpatial Solutions for Conservation initiatives. These include tailor-made solutions for environmental decision making, monitoring, research and map production using a wide range of GeoSpatial tools and techniques. Starting as a research assistant in the Kruger National Park's (Kruger) Scientific Services Division in 1998, I have more than 20 years of conservation experience culminating in my position as South African National Parks' (SANParks') GeoSpatial Analyst in 2014. I resigned from SANParks in 2014 to pursue a joint PhD in landscape ecology with Stellenbosch University in South Africa and Vrije University Amsterdam in the Netherlands. I am passionate about conservation and have a special interest in macroscale ecosystem dynamics and applied spatial statistics for biodiversity conservation and the support of protected areas researchers. For more information or a full curriculum vitae, contact me at [sandra@biogis.co.za](mailto:sandra@biogis.co.za) | Cell: 079 463 4220 | Fax: 086 760 7243

## SERVICES OFFERED

**Science Support** – Provide science support to managers, students and academics [e.g. spatial statistics, remote sensing and basic R programming].

**Spatial Data Creation and Management** – Develop customised GIS solutions using open source software [e.g. QGIS, MapWindows GIS and/or Diva-GIS]. These may include the creation and maintenance of local GIS data, field surveys and mapping projects.

**Map Production** - Basic static map creation for reports, publications and presentations as well as interactive maps (e.g. <https://heterogeneity.shinyapps.io/globalheterogeneity/>) to help explore results from larger-scale projects.

**Field Monitoring Systems** – Develop and implement customised monitoring systems from field data collection, data cleaning, data summation and reports to information dissemination using open source software like CyberTracker (<http://www.cybertacker.org/>). This include the design and completion of field surveys [e.g. biodiversity assessments or invasive plant species mapping/monitoring].

**GIS and CyberTracker Training** – Customised GIS or field monitoring courses are also available on request. These include basic through to advanced GIS skills (either ESRI or open source software), as well as CyberTracker field and desktop operations.

## PAST CLIENTS | PROJECTS



## EDUCATION

2014 - present	PhD: Stellenbosch University & Vrije University Amsterdam (joint-degree) Ecology (Botany & Zoology)
2008 - 2010	MSc: Vrije University Amsterdam Identifying Priority Protection Zones within Protected Areas: A Biodiversity Sensitivity-Value Analysis (cum laude) <a href="https://spinlab.vu.nl/websites/unigis/downloads/msc/Sandra%20MacFadyen.pdf">https://spinlab.vu.nl/websites/unigis/downloads/msc/Sandra%20MacFadyen.pdf</a>
2008 - 2009	Diploma: Vrije University Amsterdam (UNIGIS) Postgraduate Diploma: Geographic Information Science <a href="https://unigis.net/">https://unigis.net/</a> and/or <a href="https://unigis.labs.vu.nl/">https://unigis.labs.vu.nl/</a>
2001 - 2002	BTech: Tshwane University of Technology Baccalaureus Technologiae: Nature Conservation <a href="https://www.tut.ac.za/faculties/science/departments/nature-conservation/">https://www.tut.ac.za/faculties/science/departments/nature-conservation/</a>
1997 - 1999	Diploma: Tshwane University of Technology National Diploma: Nature Conservation <a href="https://www.tut.ac.za/faculties/science/departments/nature-conservation/">https://www.tut.ac.za/faculties/science/departments/nature-conservation/</a>

## WORK EXPERIENCE

<b>2006 - 2013</b> South African National Parks (SANParks), Scientific Services	<b>GIS &amp; Remote Sensing Analyst</b> Manage SANParks GIS – RS Lab in Skukuza. Planning, design and implementation of GIS and RS research projects and oversee the production and maintenance of all geospatial data. Design and implementation of the SANParks CyberTracker Program. Oversee the provision and management of scientific GIS and RS support for SANParks' conservation and environmental decision-making.
<b>2003 - 2006</b> SANParks, Scientific Services	<b>GIS &amp; Remote Sensing Technician</b> Collection, storage and dissemination of geospatial data in support of SANParks' biodiversity conservation mandate
<b>2000 - 2003</b> SANParks, Scientific Services	<b>Data Technician</b> Collection, storage, maintenance and dissemination of scientific data in support of SANParks' biodiversity conservation mandate

## PUBLICATION HISTORY

- MacFadyen S, Hui C, Van Teeffelen AJA, Verburg PH (2018) Heterogeneity Tracker: Using Shiny R to monitor global landscape heterogeneity differences. <https://heterogeneity.shinyapps.io/globalheterogeneity/>
- MacFadyen S, Zambatis N, Van Teeffelen AJA, Hui C (2018) Long-term rainfall regression surfaces for Kruger: A spatio-temporal review of patterns 1981-2015. *Int. J. Climatol.* 38(5): 2506-2519. <https://doi.org/10.1002/joc.5394>
- Foxcroft LC, Pyšek P, Richardson DM, Genovesi P and MacFadyen S (2017) Plant invasion science in protected areas: progress and priorities. *Biol. Invasions* 19: 1353-1378. <https://doi.org/10.1007/s10530-016-1367-z>
- MacFadyen S, Hui C, Verburg PH, Van Teeffelen AJA (2016) Quantifying spatiotemporal drivers of environmental heterogeneity in Kruger. *Landscape Ecol.* 31(9): 2013-2029. <https://doi.org/10.1007/s10980-016-0378-6>
- Le Roux JJ, Foxcroft LC, Herbst M and MacFadyen S (2014) Genetic analysis shows low levels of hybridization between African wildcats and domestic cats in SA. *Ecol. Evol.* 5(2): 288-299. <https://doi.org/10.1002/ece3.1275>
- van Wilgen B, Govender N, Smit IPJ and MacFadyen S (2014) The ongoing development of a pragmatic and adaptive fire management policy. *J. Environ. Manage.* 132: 358-368. <https://doi.org/10.1016/j.jenvman.2013.11.003>
- Smit IPJ, Smit CF, Govender N, van der Linde M and MacFadyen S (2013) Rainfall, geology and landscape position generate fire pattern. *Ecography* 36(4): 447-459. <https://doi.org/10.1111/j.1600-0587.2012.07555.x>
- Jarošik V, Pyšek P, Foxcroft LC, Richardson DM, Rouget M and MacFadyen S (2011) Predicting Incursion of Plant Invaders into Kruger National Park. *PLoS ONE* 6(12): e28711. <https://doi.org/10.1371/journal.pone.0028711>
- Hui C, Foxcroft LC, Richardson DM and MacFadyen S (2011) Defining optimal sampling effort for large-scale monitoring of invasive alien plants. *J. Appl. Ecol.* 48(3): 768-776. <https://doi.org/10.1111/j.1365-2664.2011.01974.x>
- Kruger J and MacFadyen S (2011) Science support within the South African National Parks adaptive management framework. *Koedoe* 53(2): 178-184. <https://doi.org/10.4102/koedoe.v53i2.1010>
- Foxcroft LC, Richardson DM, Rouget M and MacFadyen S (2009) Patterns of alien plant distribution at multiple spatial scales in a national park. *Divers. Distrib.* 15: 367-378. <https://doi.org/10.1111/j.1472-4642.2008.00544.x>
- van Wilgen B, Govender N and MacFadyen S (2008) An assessment of the implementation and outcomes of recent changes to fire management in Kruger. *Koedoe* 50(1): 22-31. <https://doi.org/10.1010/4102/koedoe.v50i1.135>
- Peel MJS, Kruger JM and MacFadyen S (2007) Woody vegetation of a mosaic of protected areas adjacent to the Kruger National Park. *J. Veg. Sci.* 18: 807-814. <https://doi.org/10.1111/j.1654-1103.2007.tb02597.x>
- Wessels KJ, Prince SD, Zambatis N, MacFadyen S, Frost PE and Van Zyl D (2006) Relationship between herbaceous biomass and AVHRR NDVI. *Int. J. Remote Sens.* 27(5): 951-973. <https://doi.org/10.1080/01431160500169098>

