

MSc Opportunity Internship

Project: "Landscape Modelling in the Absence of Prickly Pear Control in South African Savanna"

Project description:

Human movements across the world have promoted the spread of species outside their native biogeographical ranges, intentionally or accidentally, leading in some cases to biological invasion (Lockwood, 2005; Alpert, 2006). Invasive alien species are able to invade new ecosystems thanks to their highly competitive and adaptive abilities and represents a threat to ecosystems and native species across the world (Sinclair and Walker, 2003; He et al., 2011). These invaders can notably exclude less competitive native species from a system, and eventually disrupt ecological functions and interspecific interactions (He et al., 2011). Invasive alien plant species are well known and studied in South Africa and management measures have been established across the country to control and monitor their spread (Lotter and Hoffmann, 1998). In Olifants West Nature Reserve (OWNR), 14 category-1 invasive aliens plant species have been identified and are subject to adapted management measures, in accordance with the regulations set out in the Conservation of Agriculture Resources Act of 1983 (CARA), which requires category 1 plants to be removed & destroyed. Since 2018, Transfrontier Africa treated or retreated alien invasive plants more than 10,000 times within the reserve and is actively monitoring their populations. The spread of prickly pears (*Opuntia* sp.) has been identified as the main threat to biodiversity in the reserve, in terms of invasive vegetation, and requires dedicated attention and efforts. In order to improve the control of this species, Transfrontier Africa is looking for a motivated intern with a background in coding and modelling, to develop a predictive model of the spread of this invasive species across the landscape, with and without additional control, using data collected over the years and habitat suitability variables.

This research seeks to identify spatial patterns in the distribution of the species and priority areas to improve the effectiveness of control methods and aims to achieve the following objectives:

1. Predictive modelling of the spatial spread of prickly pear populations in Olifants West Nature Reserve.
2. Integration of two possible scenarios to measure the efficacy of control methods on prickly pear populations dynamics in the reserve.
3. Production of a guideline document to improve the implementation of alien vegetation control methods in South African savanna.

The research will follow a systematic approach comprising the following steps:

1. Model identification

Conduct a brief literature review to better understand the context of the project and identify a suitable model to predict the spatial spread of prickly pear populations with and without additional control in Olifants West Nature Reserve. Identify relevant habitat suitability factors in the literature that may influence the

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current distribution and future spread of prickly pear in the reserve. Shortlist those factors for which data are available.

2. Spatial spread modelling

Build and run the model identified to predict the spatial spread of prickly pears in Olifants West Nature Reserve, with two different scenarios (in the presence and absence of control). Produce a scientific report to document the project and facilitate the implementation of such a model to other problematic invasive species.

3. Guidelines for future implementation of control methods

Produce a guideline document to assist Transfrontier Africa, reserve managers and landowners to protect the reserve's native biodiversity by improving prickly pear control methods. The aim of the document is to popularise the findings of this research, to ensure that priority areas are clearly identified and targeted by the efforts of all stakeholders, and that the intrinsic value of controlling alien vegetation is emphasised. This approach will contribute directly to the protection of indigenous biodiversity in the Great Kruger Park.

Transfrontier Africa NPC:

Transfrontier Africa (TA) is a non-profit environmental conservation organisation founded in 2006. The organisation aims to improve wildlife conservation and ecosystem sustainability by combining research, ecological monitoring, landscape security, community and women empowerment, and environmental awareness. TA is based in Olifants West Nature Reserve, in the Greater Kruger National Park and extends its actions to the Blyde Olifants Confluency Conservation Area and neighbouring communities.

For more information, please visit our website: <https://transfrontierafrica.org/> and consult the attached Interns / Students Information Package.

Position Details

Role title: MSc Intern.

Reporting to: Paul Allin, Research Coordinator, and Elwenn Le Magoarou, Research Assistant.

Duration of position: 5 months – from February to June 2024.

Deadline: 10 January 2024.

Location: Transfrontier Africa NPC, Nonwane Research Centre, Olifants West Nature Reserve, R40, Hoedspruit 1380, South Africa.

Accommodation: Shared accommodation with private room in Nonwane Research Facility (Olifants West Nature Reserve). Interns have the opportunity to buy their own food in town once a week or twice a month, depending on needs and availability of vehicles. Transport from and to O.R. Tambo Airport (Johannesburg) and a night in an hotel near the airport can be arranged at the expense of the intern.

Cost: R33,975 for 3 months and R11,250 per additional months (prices are indicative and subject to change from April 2024) – Covers accommodation in Nonwane, two

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TA t-shirts, supervision in the field (fuel & labour costs) and internship supervision **(food remains at the charge of the student)** – possibility to do this internship remotely, at no cost.

Minimum requirements:

To apply for participation in this research, the minimum requirements include:

- BSc or higher degree in a relevant field, such as Bioinformatics, Computer Science, Biological Data Science, Applied Computing, or a related discipline.
- Strong coursework and understanding of modelling principles and statistical analysis.
- Prior experience or coursework in ecological research is preferred.
- Proficiency in conducting thorough literature reviews to gather relevant information on the research project background.
- Proficiency in using R statistical software program, or similar software, for modelling purposes and ability to identify suitable models in the literature.
- Familiarity with Geographic Information System (GIS) software, such as ArcGIS or QGIS, for basic spatial analysis and mapping.
- Strong written and verbal communication skills to effectively present research findings in English.
- Ability to write scientific reports or research papers and contribute to project documentation.
- Ability to work independently as well as collaboratively with research team members as part of a multi-cultural and multi-disciplinary team.
- Ability and willingness to learn independently and proactively acquire new knowledge and skills necessary for the research project.
- Capacity to adapt to new methodologies, software, and analytical techniques as required by the study.
- High motivation and capability of working under remote field conditions.
- Ability to apply safety rules to ensure a safe working environment in the field and research station.

Application:

Application documents, including a Curriculum Vitae and a cover letter, should be submitted before 10 January 2024 to Paul Allin(research@transfrontierafrica.org) and Elwenn Le Magoarou (ecology@transfrontierafrica.org), with the subject 'Application – Landscape Modelling in the Absence of Prickly Pear Control in South African Savanna'. For any further information, please do not hesitate to contact us. Shortlisted candidates will be contacted for an interview during the week following the application deadline.