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Exploring aquatic weed coexistence using Sentinel-2 satellite data for informed aquatic weeds management for inland waterbodies

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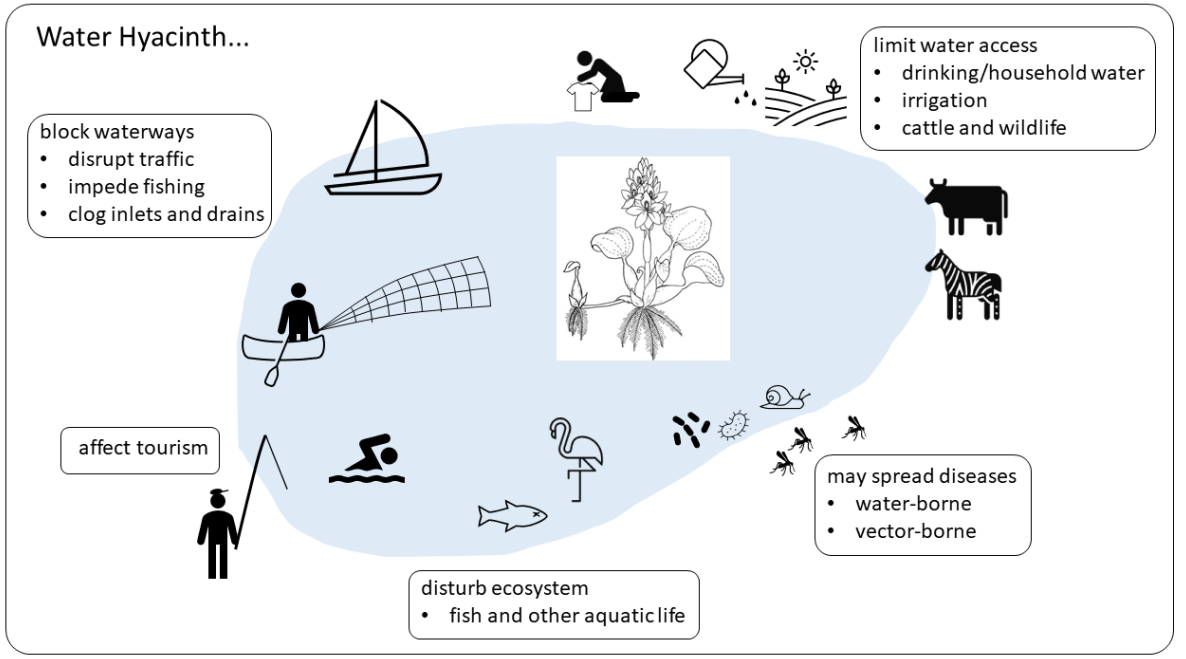
24/09/2024

Introduction

- Aquatic weeds pose significant challenges to surface water bodies

HARTEBEESPOORT HYACINTH CRISIS CONTINUES



- They compromise the provision of ecosystem goods and services
- Their co-existence also presents a challenge in their control
- Remote sensing presents a valuable approach for aquatic weeds mapping

Aim and specific objectives

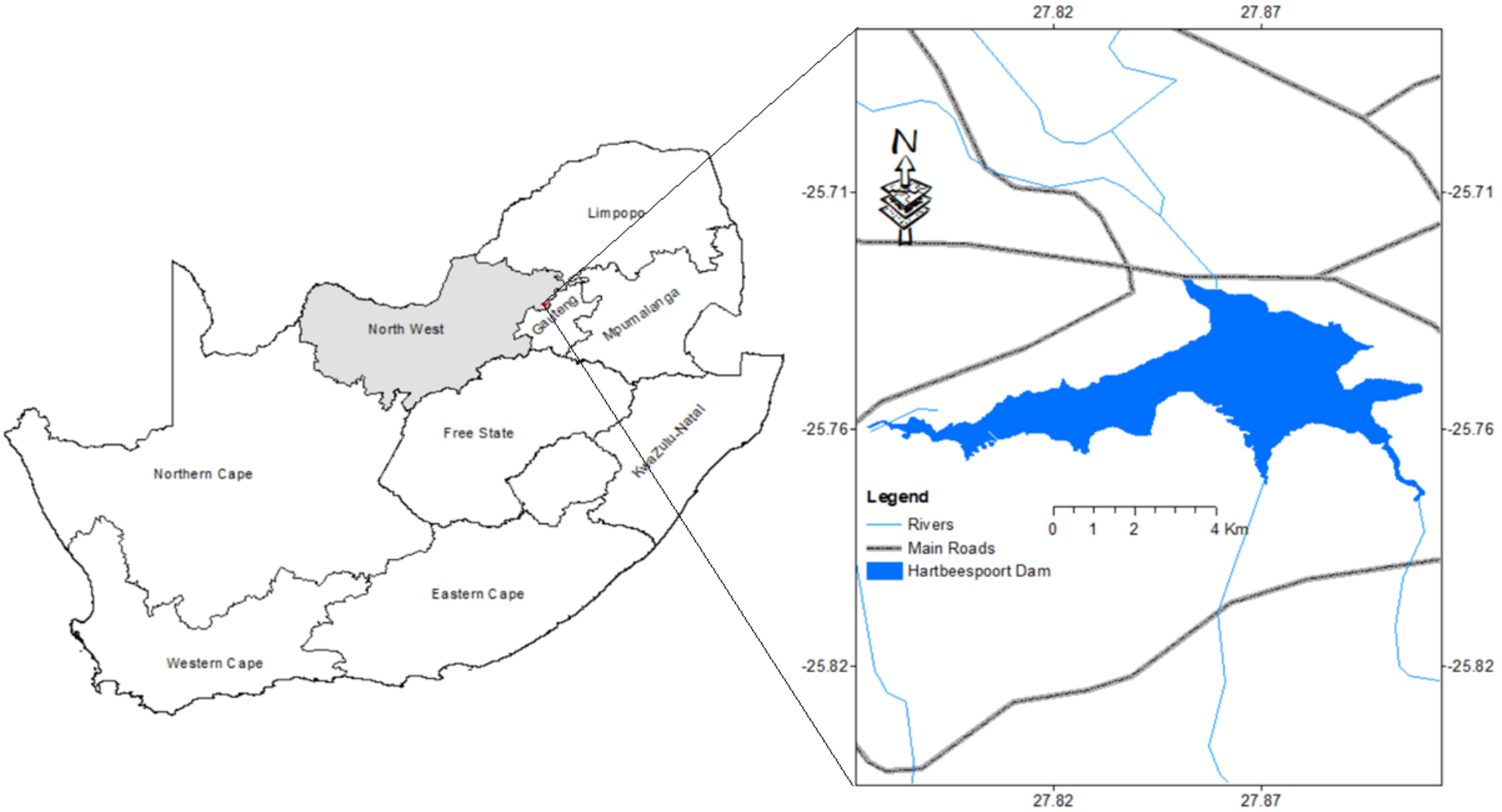
Aim

- Map the temporal coverage of aquatic weeds and their discrimination from remotely sensed data

Specific objectives

- Assess the spatial and temporal distribution of aquatic weeds from Sentinel 2
- Discriminate between Water hyacinth and Salvinia

Study Area: The Hartbeespoort dam



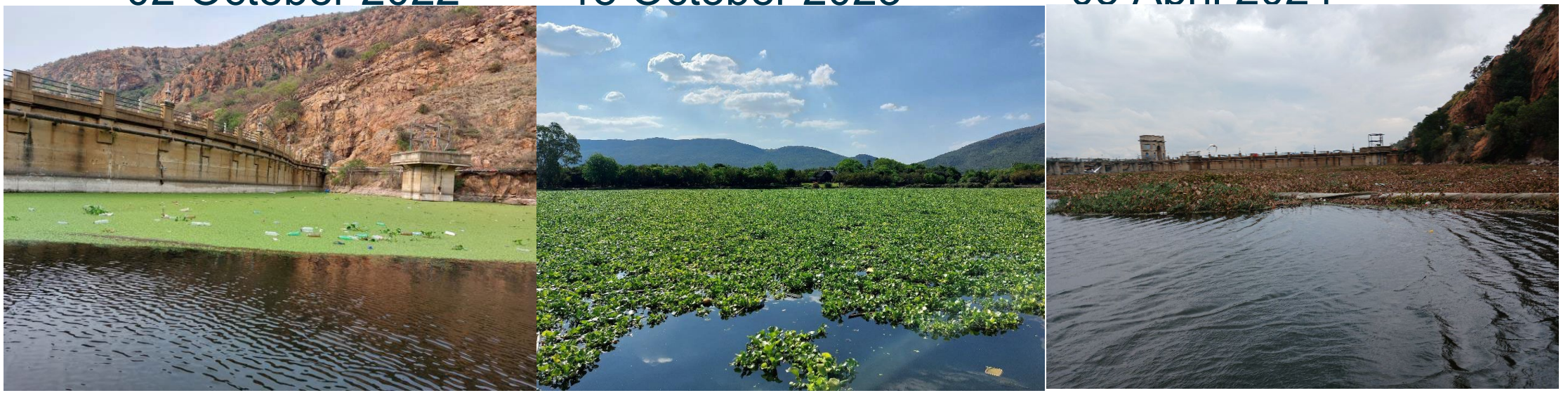
Study area description

- Provides major water source for irrigation, domestic & leisure
- Experiences cold dry winters and wet summers
- Temperatures vary from as low as 1 in winter, to as high as 30 degrees summer
- Lowest temperatures are experienced in July, whereas December is associated with highest temperatures
- However, aquatic weeds compromise the sustainability of the dam

Methodology: Data collection & analysis

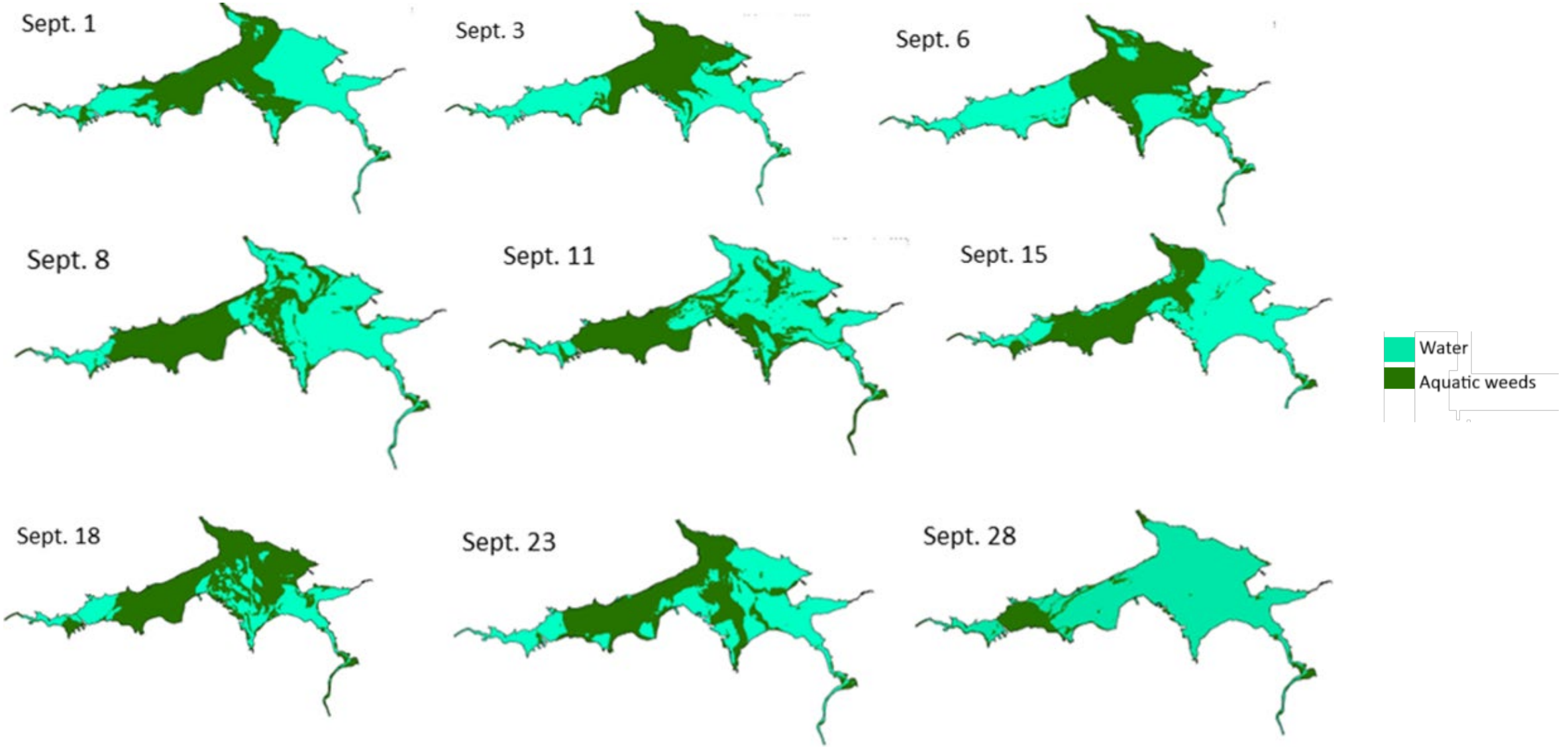
- Field-based observation

02 October 2022 | 18 October 2023 | 05 April 2024

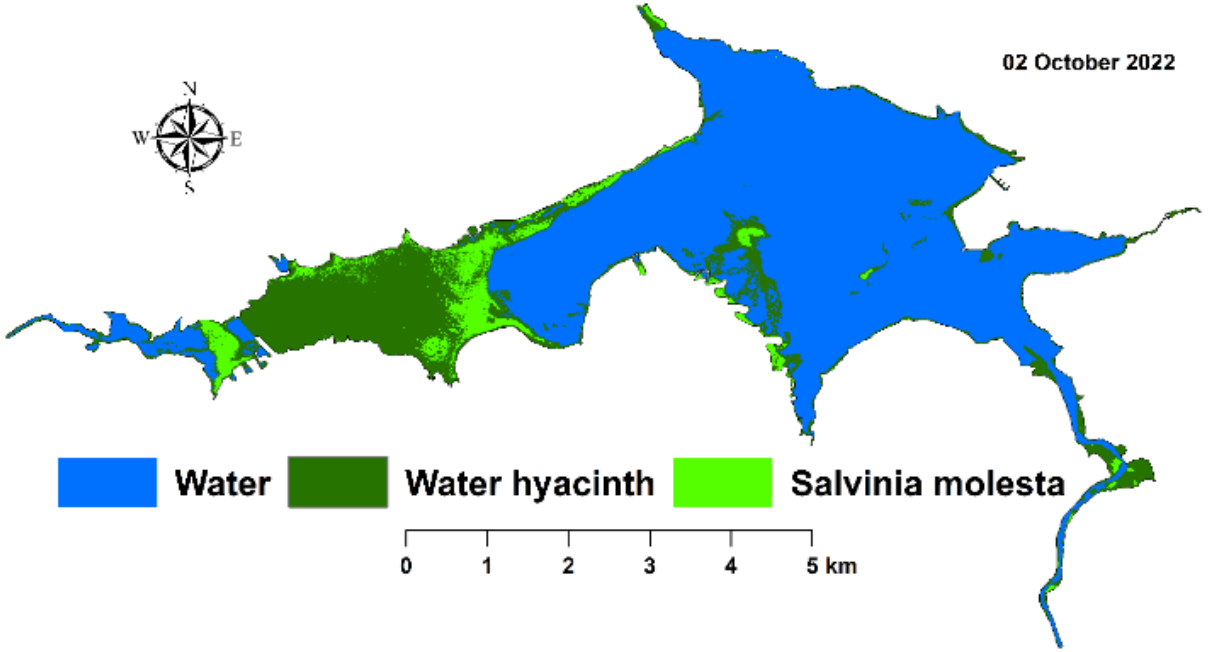


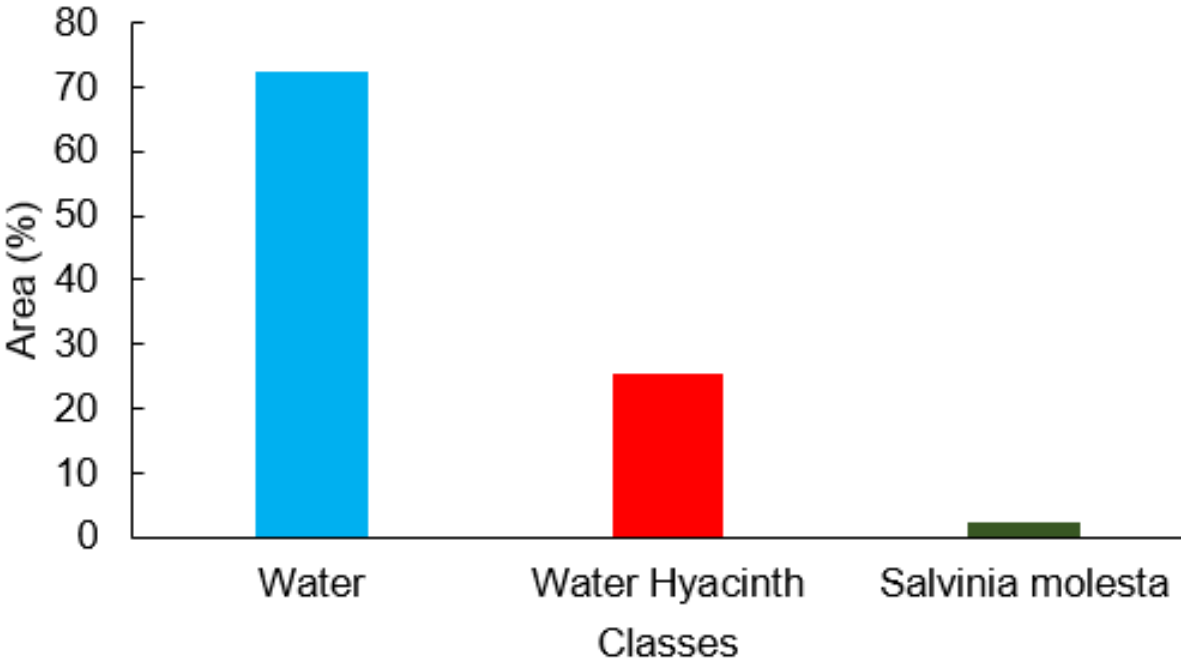
- Cloud-free Sentinel 2 MSI data
- Analysis was conducted in Google Earth Engine using spectral bands and NDVI

Results: Long term series of Aquatic weeds in Sept. 2022

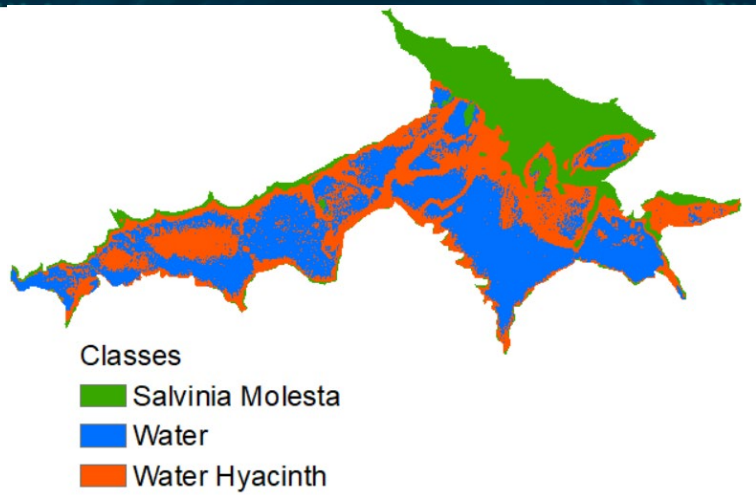


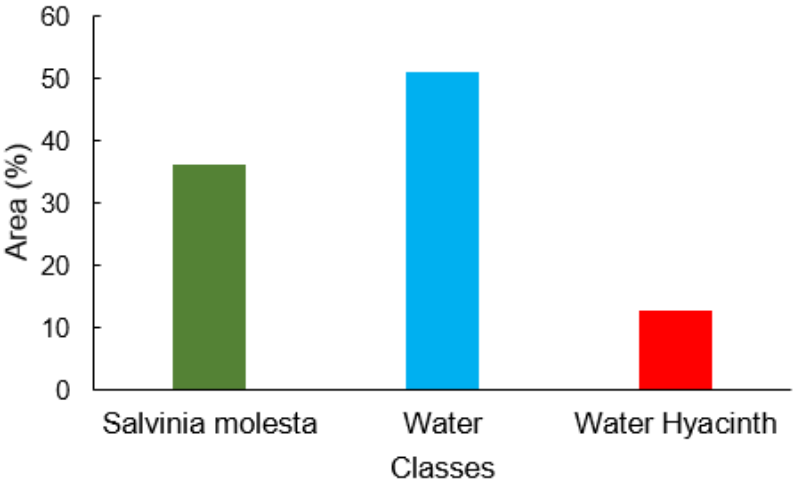
Results: WHY discrimination from Giant Salvinia

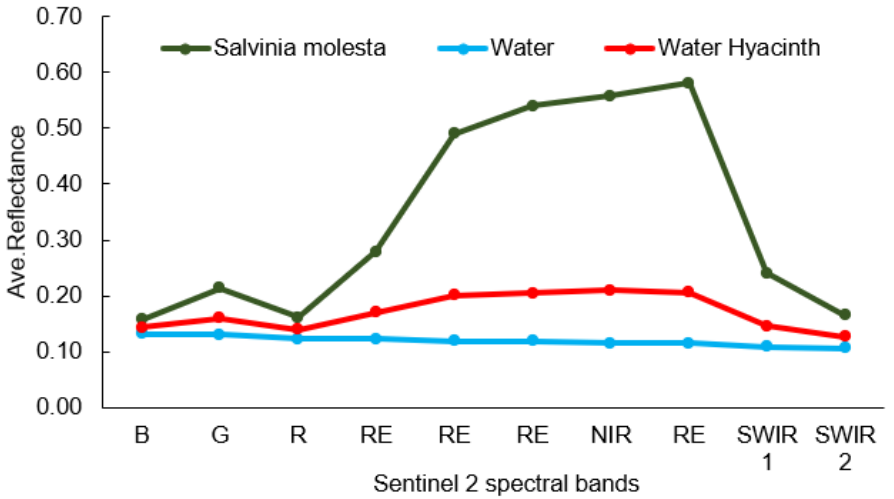




Species discrimination: 21 Oct. 2022







Conclusion

- Aquatic weeds can be mapped from remotely sensed data using the Normalized Difference vegetation index
- Sentinel 2 managed to discriminate between water hyacinth and Salvinia using spectral bands
- However, the discrimination between different weeds remains a challenge especially when their spatial distribution becomes patchy

Research Team

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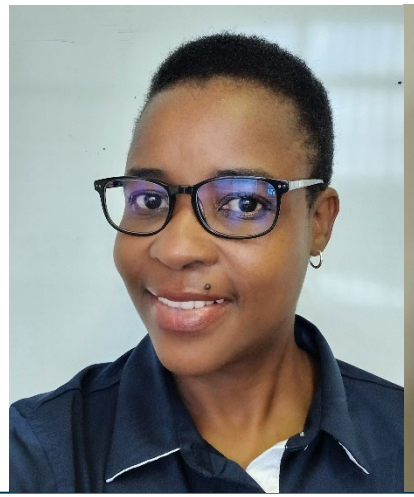


Acknowledgements

Thank you