

Plankton diversity in Pans in the Khakhea-Bray Trans boundary Aquifer

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Introduction

- Temporary wetlands are systems characterized by frequent drying.
- The key environmental factors driving the structure of ecological communities in temporary wetlands are:
 - 1.duration
 - 2.timing
 - 3.frequency of wet & dry phases



Introduction

- Temporary wetlands are unique.
- They contain highly specialized assemblages of specialist, localised plant and animal species.
- Sustainable biodiversity in these systems is essential in providing ecosystem services.



Importance of temporary wetlands

1. Wildlife habitat
2. Source of water
3. Flood control
4. Water filtration
5. Cultural services



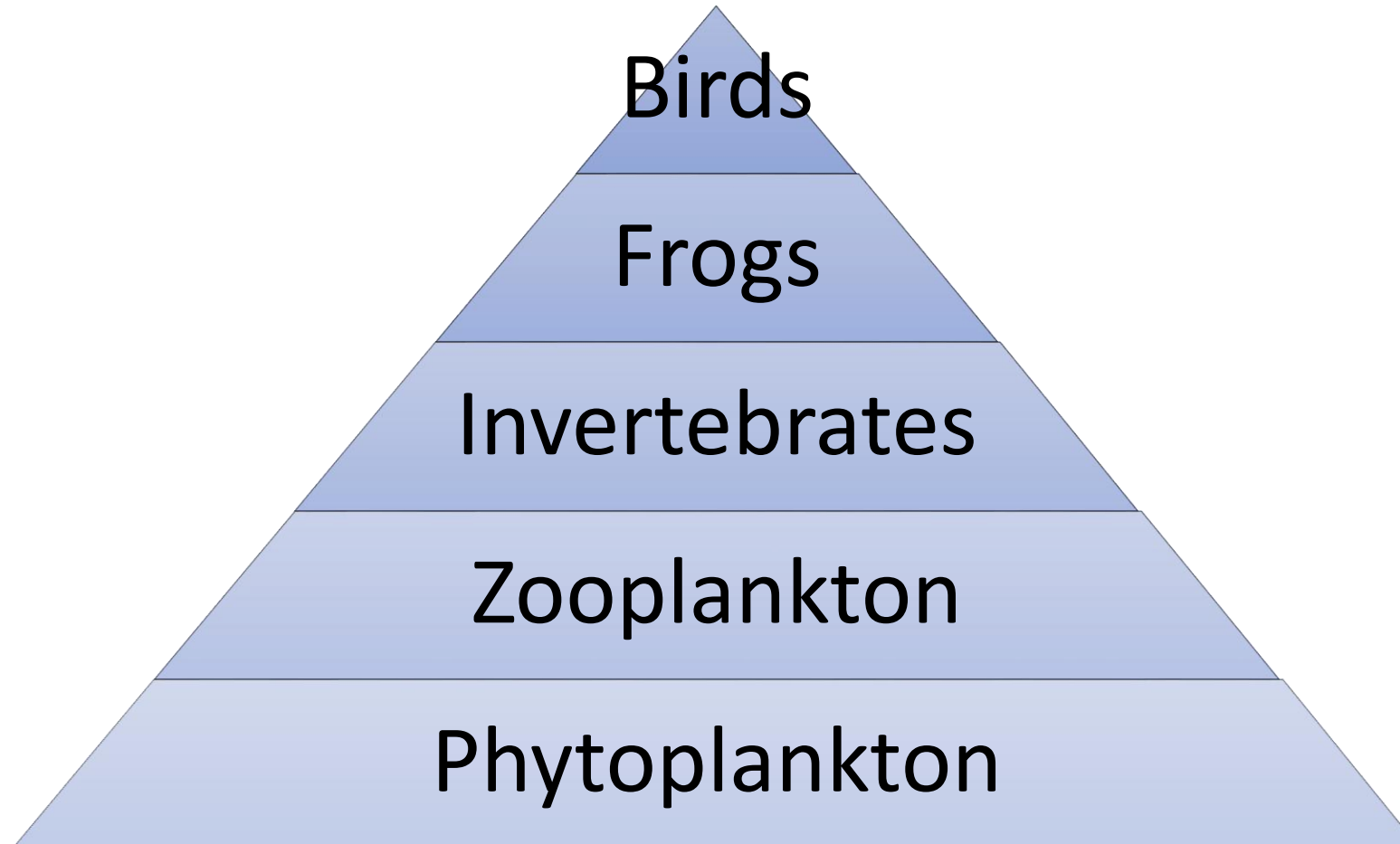
Biodiversity in temporary wetlands

Phytoplankton

Zooplankton



Aquatic ecosystems food web



Threats to temporary wetlands

- Ecosystem loss and degradation from urbanization and livestock
- Water extraction through irrigation
- Pollution
- Salinization (Climate change)



Problem Statement

- Plankton fauna from temporary wetlands remain poorly understood.
- Knowledge on plankton is important to know patterns in pan biodiversity to develop sound conservation policies.
- Plankton and micro benthos are a highly neglected part of temporary wetland science.

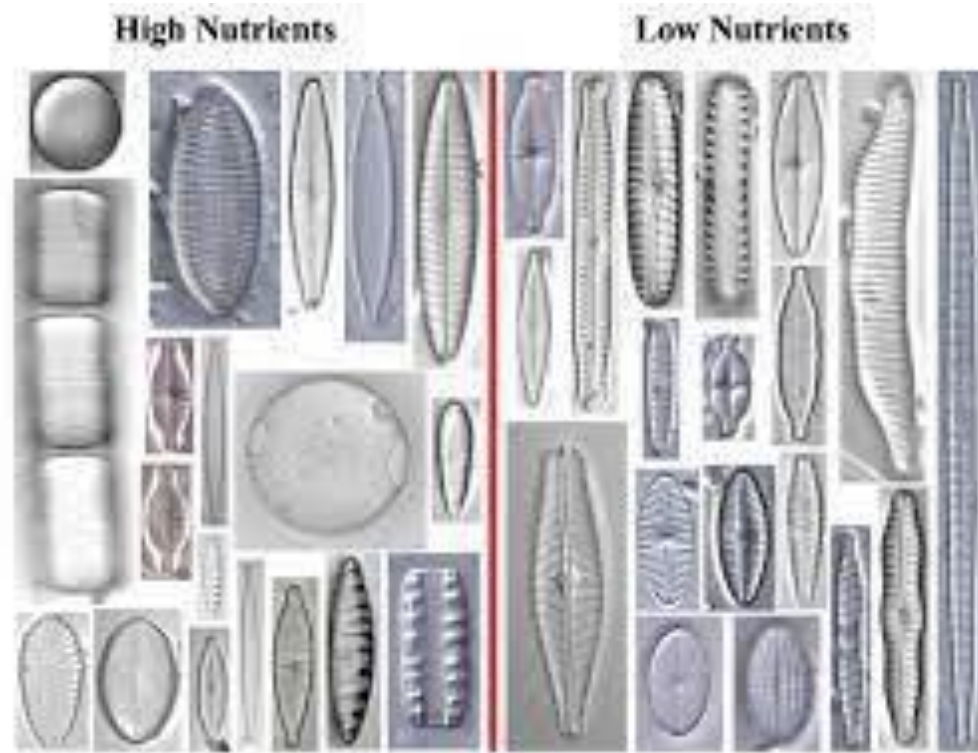
Research aim

- To characterise the species composition of plankton assemblages in the Khakhea-Bray Trans boundary Aquifer



Significance of the study

- Plankton as bio indicators.
- Understanding plankton diversity in the wetlands is necessary to identify future land use and management regimes.

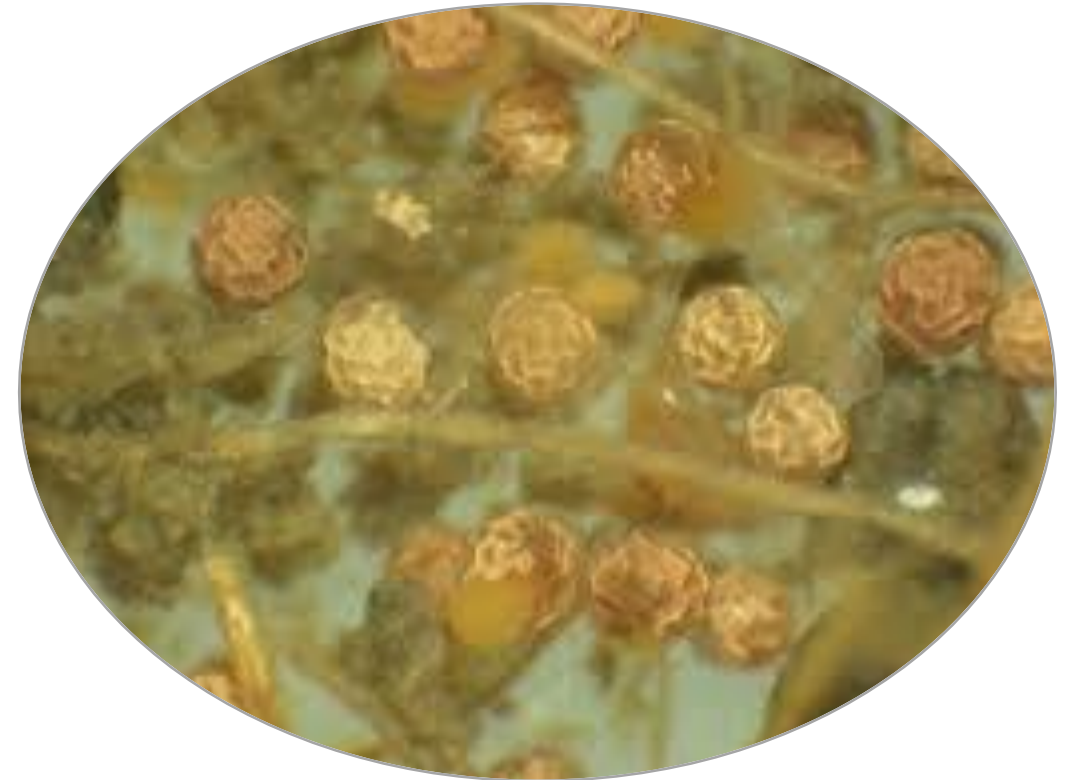


Objectives

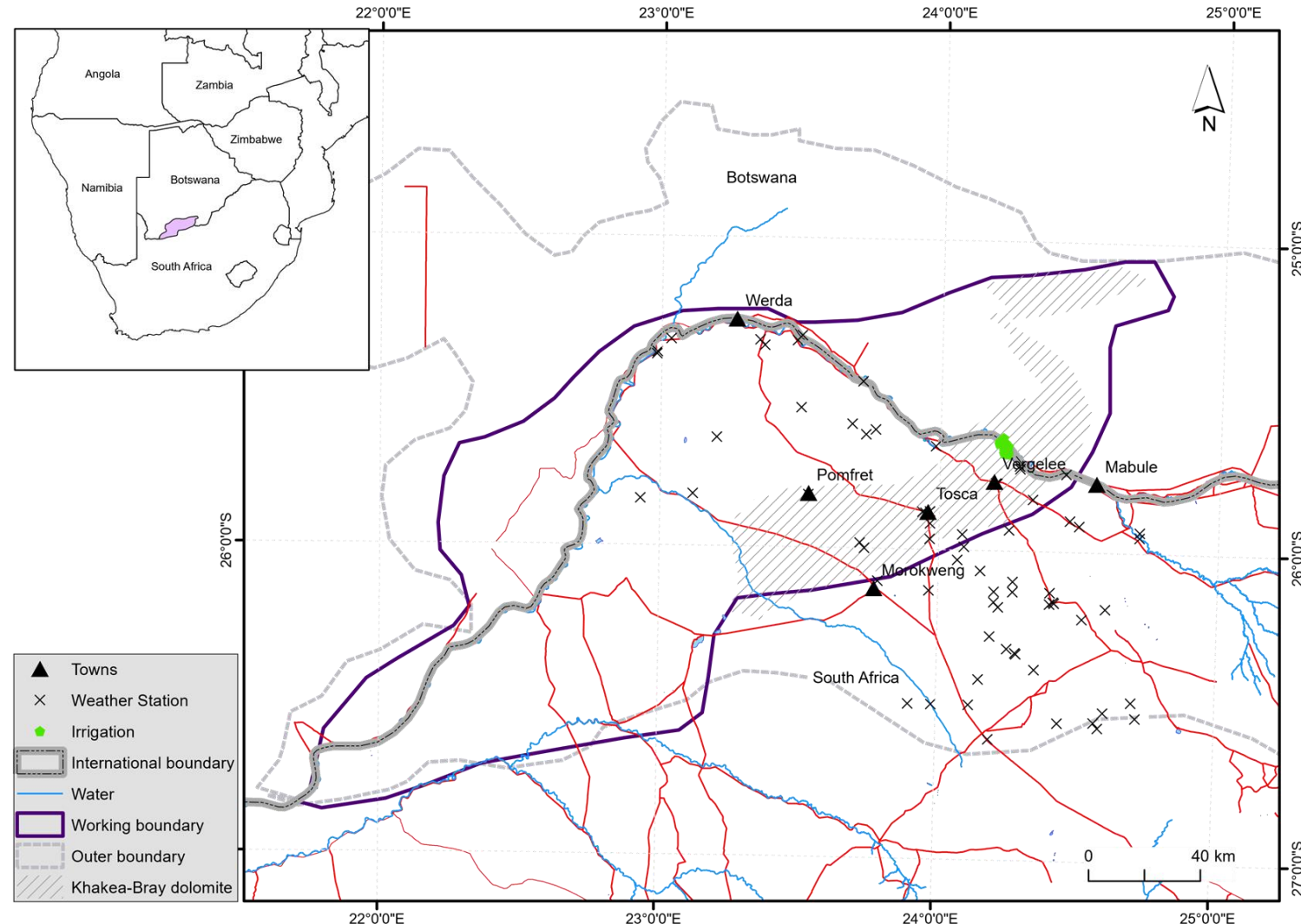
1. To determine benthic and pelagic phytoplankton diversity in the temporary wetlands across different sized pans
2. To determine the zooplankton diversity in the Khakhea Bray Pan system.
3. To determine food web structures in the pan systems in the Khakhea Bray Trans boundary Aquifer.

Objectives

- To determine the germination success of phytoplankton at different salinity gradients.
- To determine the hatching success of zooplankton at different salinity gradients.



Study Area (Khakhea-Bray Trans boundary Aquifer)



Methods

1. Phytoplankton
diversity (Benthic +
Pelagic)

2. Zooplankton diversity
(Benthic + Pelagic)

3. Food Web Structures
(Stable isotope
analysis)

4. Phytoplankton
germination
experiments at
different salinity
gradients

5. Zooplankton
hatching experiments
at different salinity
gradients

1. Phytoplankton diversity

- Phytoplankton samples collected through horizontal tows of 20 μm phytoplankton net for 10m tow per pan during the wet and dry phase.
- Cell counts with inverted microscope



2. Zooplankton diversity

- Zooplankton samples collected through horizontal tows of 64 μm zooplankton net for 10m tow per pan during the wet and dry phase.
- Cell counts with combination of dissecting & inverted microscope



3. Food web structures

- Samples of organic and inorganic materials will be collected from the pans.
- Stable isotope analyses will be conducted at the University of Pretoria stable isotope lab using mass spectrometry.
- Stable isotopes will show the flow of energy through the food web.

4. Plankton hatching experiments

- Sediment samples collected from 10 dry pans in the Khakhea Bray basin.
- Propagule hatching
- Aquaria cultures with salinity treatments from 0.5 g L^{-1} - 10 g L^{-1} .
- Sampling twice per week in each aquaria during a period of 28 days after rehydration to see hatching success.

Timeline

Activity	2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Proposal Writing												
Data Collection												
Data Analysis												
Thesis Write up												

Anticipated outputs

- Doctoral thesis
- Contribution towards the diversity database with plankton species from pan systems of Khakhea-Bray Transboundary Aquifer
- Publish 3 peer-reviewed articles
- Conference presentations

THANK YOU!!!!!! TINOTENDA!!!!!!

Acknowledgements

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Wetland Ecology Lab



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