



UNIVERSITY of the
WESTERN CAPE

Use of multispectral satellite data to assess impacts of land management practices on wetlands in the Limpopo Transfrontier River Basin, South Africa

Student: Tatenda Dzurume (3459290@myuwc.ac.za)

Degree: MSc Environmental and Water Sciences

Supervisor: Prof T.Dube

Co-supervisor: Prof D.Mazvimavi



INTRODUCTION

- Wetlands are unique ecosystems that are considered among the world's most productive and important ecosystem (Ollis et al., 2013).



- The 1975 Ramsar Convention
- The South African National Environmental Management Act 107 of 1998 (NEMA)
- The National Water Act 36 of 1998 (NWA)
- The environmental provisions of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA)
- The 2006 Environmental Management Act of Zimbabwe that provides for the protection of wetlands



COMPARISON OF METHODS

Traditional methods



Remotely sensed



AIM

To assess the impacts of land use and land cover (LULC) changes on two wetland systems (Makuleke and Nylsvlei Nature Reserve) in the Limpopo Transfrontier River Basin (LTRB) in South Africa between 2014 and 2018.

OBJECTIVE

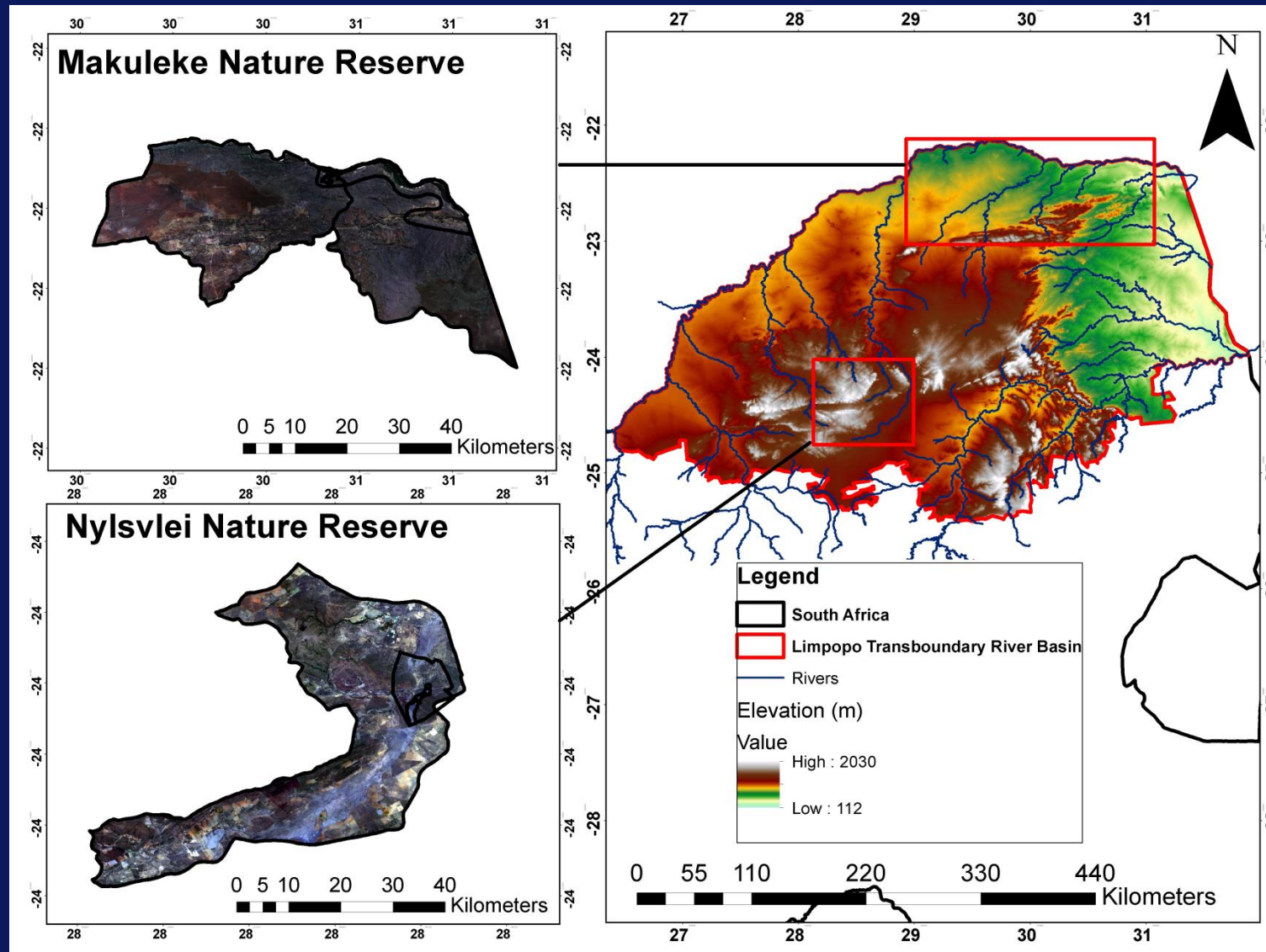
Landsat images were used to estimate the rate of LULC changes in Makuleke and Nylsvlei wetland ecosystems during the study period.



WHY THESE TWO WETLANDS?



SELECTED STUDY AREAS



METHODS USED

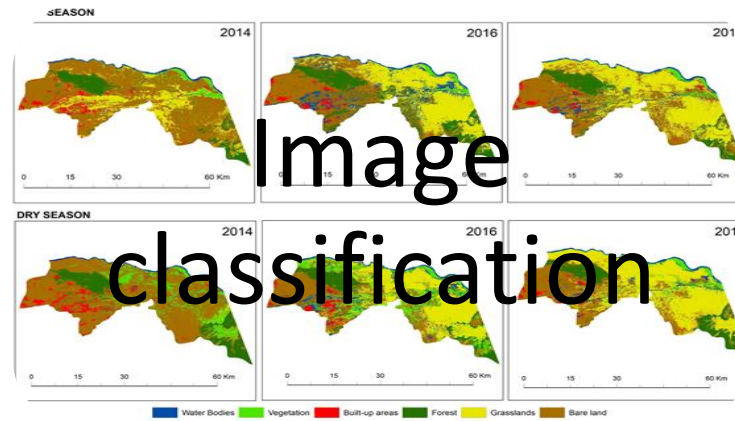


Image classification

classification

Classification A

Class	Crop	Water	Pasture	Fallow	Forest	Urban	Total
Crop	34	4	5	3	1	1	48
Water	23	29	5	6		4	67
Pasture	7	2	22	9			40
Fallow	23	4	5	75	1		108
Forest	1						81
Urban	1					10	13
Total	89	41	38	95	79	18	357

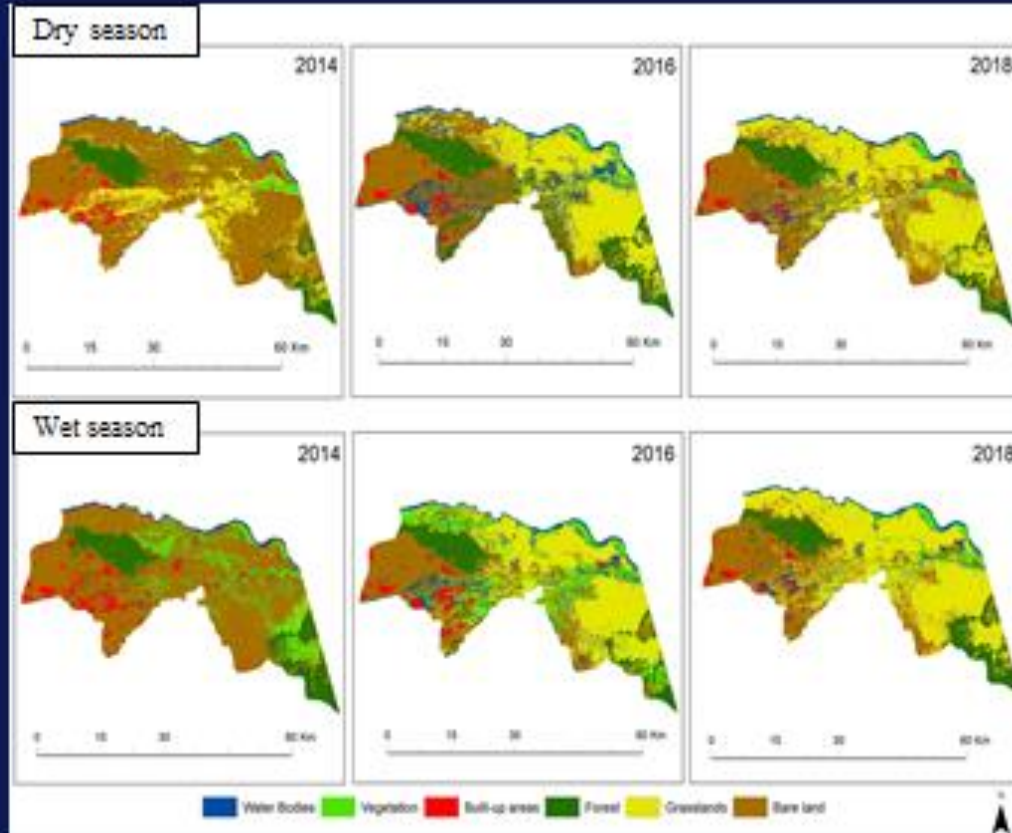
Accuracy assessment

Classification B

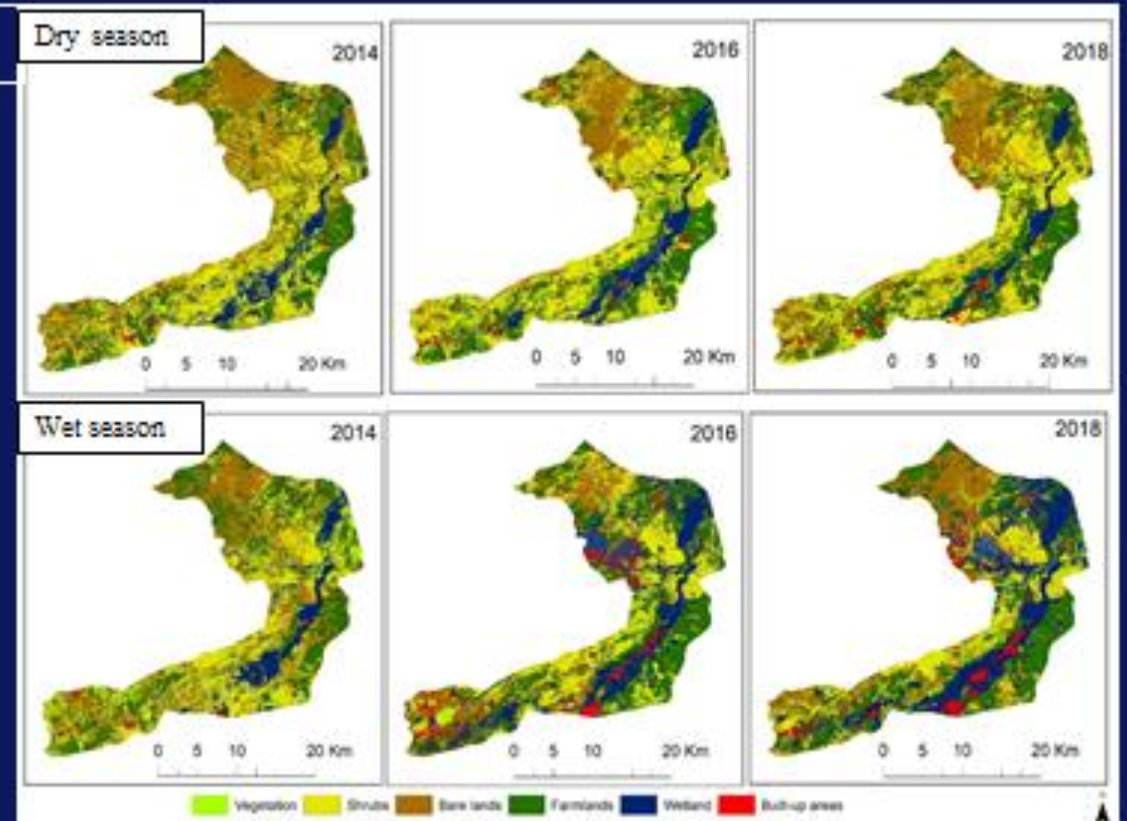
Class	Crop	Water	Pasture	Fallow	Forest	Urban	Total
Crop	73	4	3	11	2		82
Water	6	30	3	11			64
Pasture	1	2	30	19			53
Fallow	5	2	5	59	1		72
Forest			1	2	74		77
Urban		1			1	7	9
Total	89	41	38	95	79	15	357

SPATIOTEMPORAL MAPPING OF LULC CHANGES ON PROTECTED WETLANDS

a



b



COMPARISON BETWEEN THESE TWO WETLANDS



CONCLUSION

- Landsat data managed to map wetland ecosystems for Makuleke and Nylsvlei with high classification accuracy.
- It was observed that major changes in wetland extent decrease in natural vegetation and portion of the area are converted to farmlands.
- Even though these wetlands are protected (Makuleke and Nylsvlei) they are not free from threats which are intensified by the expansion of LULC changes within and around the protected boundaries.



FIELD PICTURES



THANK YOU!

