

# Impact of veld fires on the environment in affected areas in the North-West Province, South Africa

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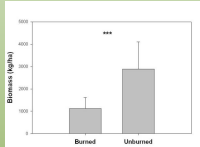


NORTH-WEST UNIVERSITY  
 YUNIBESITHI YA BOKONGE BOPHIRIMA  
 NOORDWES-UNIVERSITEIT  
 POTCHEFSTROOM CAMPUS

## Results: Rangeland productivity

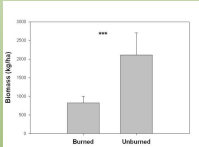
### Biomass

**Vegetation type 1 (grassland)**



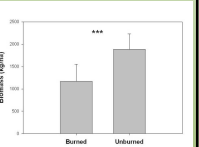
Mean ( $\pm$ SE) biomass.  
 \*\*\*Permutation t-test:  $p < 0.001$ .

**Vegetation type 2 (grassland)**



Mean ( $\pm$ SE) biomass.  
 \*\*\*Permutation t-test:  $p < 0.001$ .

**Vegetation type 3 (bushveld)**




Mean ( $\pm$ SE) biomass.  
 \*\*\*Permutation t-test:  $p < 0.001$ .

### Introduction

- In August 2011, veld fires swept through the North-West Province.
- Affecting the socio-economic and ecological environment.
- Declared a disaster area by national government.
- African Centre for Disaster Studies (NWU) launched a multidisciplinary study to assess damage.

### Aim

- quantify the extent to which wildfire has influenced the productivity and functionality of rangelands.



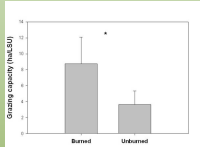
### Methods

- Surveys conducted 5 to 6 months after fires (Feb and March, 2012)
- FIXMOVE methodology (Morgenthal & Kellner, 2008).
- Data collection included measures of plant biomass, composition, frequency and density.

## Results: Rangeland productivity

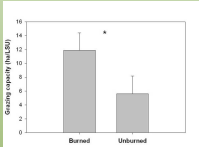
### Grazing capacity

**Vegetation type 1 (grassland)**



Mean ( $\pm$ SE) grazing capacity.  
 \*Permutation t-test:  $p < 0.05$ .

**Vegetation type 2 (grassland)**



Mean ( $\pm$ SE) grazing capacity.  
 \*Permutation t-test:  $p < 0.05$ .

**Vegetation type 3 (bushveld)**

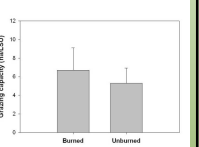
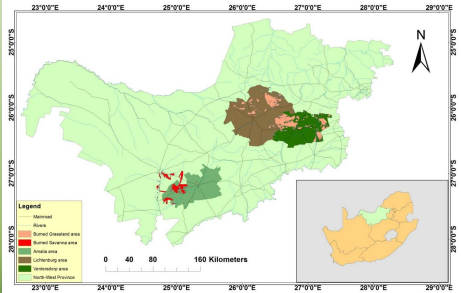


Figure: Mean ( $\pm$ SE) grazing capacity.

## Study area

- Vegetation type 1: Vaal-Vet Sandy Grassland (Ventersdorp)\*
- Vegetation type 2: Carletonville Dolomite Grassland (Lichtenburg)\*
- Vegetation type 3: Schweizer Reneke Bushveld (Amalia)\*

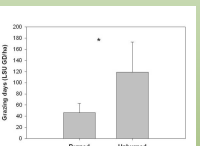


\*(Mucina & Rutherford, 2006)

## Results: Rangeland productivity

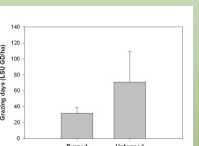
### Grazing days

**Vegetation type 1 (grassland)**



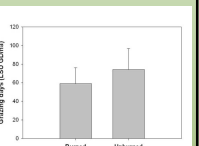
Mean ( $\pm$ SE) grazing days.  
 \*Permutation t-test:  $p < 0.05$ .

**Vegetation type 2 (grassland)**



Mean ( $\pm$ SE) grazing days.

**Vegetation type 3 (bushveld)**

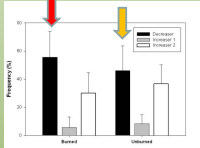


Mean ( $\pm$ SE) grazing days.

## Results: Rangeland Functionality

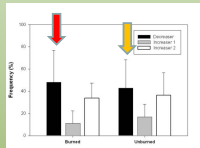
### Ecological status of grass species

#### Vegetation type 1 (grassland)



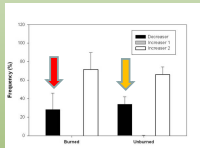
Mean frequency of ecological status of grass species. (Van Oudtshoorn, 2012).

#### Vegetation type 2 (grassland)



Mean frequency of ecological status of grass species. (Van Oudtshoorn, 2012).

#### Vegetation type 3 (bushveld)



Mean frequency of ecological status of grass species. (Van Oudtshoorn, 2012).

## Thank you

### Acknowledgements

- North-West University (Potchefstroom Campus)
- African Centre for Disaster Studies (NWU)



## Results: Rangeland Functionality

### Patch type distribution

#### Vegetation type 1 (grassland)

Mean proportion of bare and litter patches.

Patch type	Burned	Unburned
Bare	34	4
Litter	7	24

#### Vegetation type 2 (grassland)

Mean proportion of bare and litter patches.

Patch type	Burned	Unburned
Bare	33	15
Litter	5	20

#### Vegetation type 3 (bushveld)

Mean proportion of bare and litter patches.

Patch type	Burned	Unburned
Bare	35	13
Litter	8	31

## Conclusions

- Wildfires result in a **loss of biomass** leading to less available grazing material.
- Great economic losses experienced, as fodder needs to be purchased.
- Wildfire negatively affected rangeland functionality with respect to **erosion** protection.
- Little effect of fire on **ecological status** of grass species = good **regeneration** of grass species.
- Pattern of fire effect, same between the 3 vegetation types.
- Degree of damage differed.