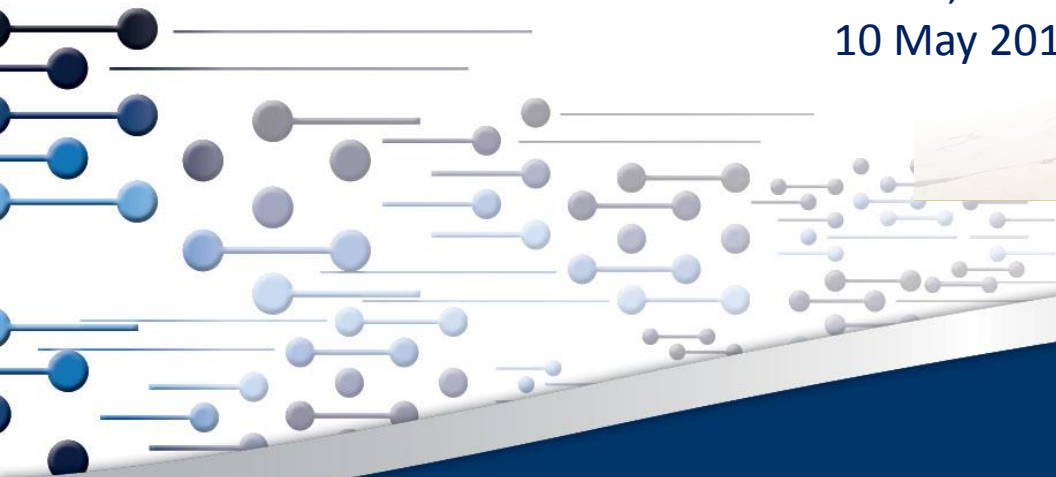


ASSESSMENT OF COASTAL VEGETATION DEGRADATION IN FALSE BAY, SOUTH AFRICA, USING WV-2 IMAGERY

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Cikizwa Mbolambi

ISRSE-37, Tshwane
10 May 2017



The coastal zone

The coastal zone -

- Is the interface between the ocean, land and atmosphere
- Is sensitive because of exposure to all 3 spheres
- Highly productive and high biodiversity
- Provides important ecosystem services for human well being

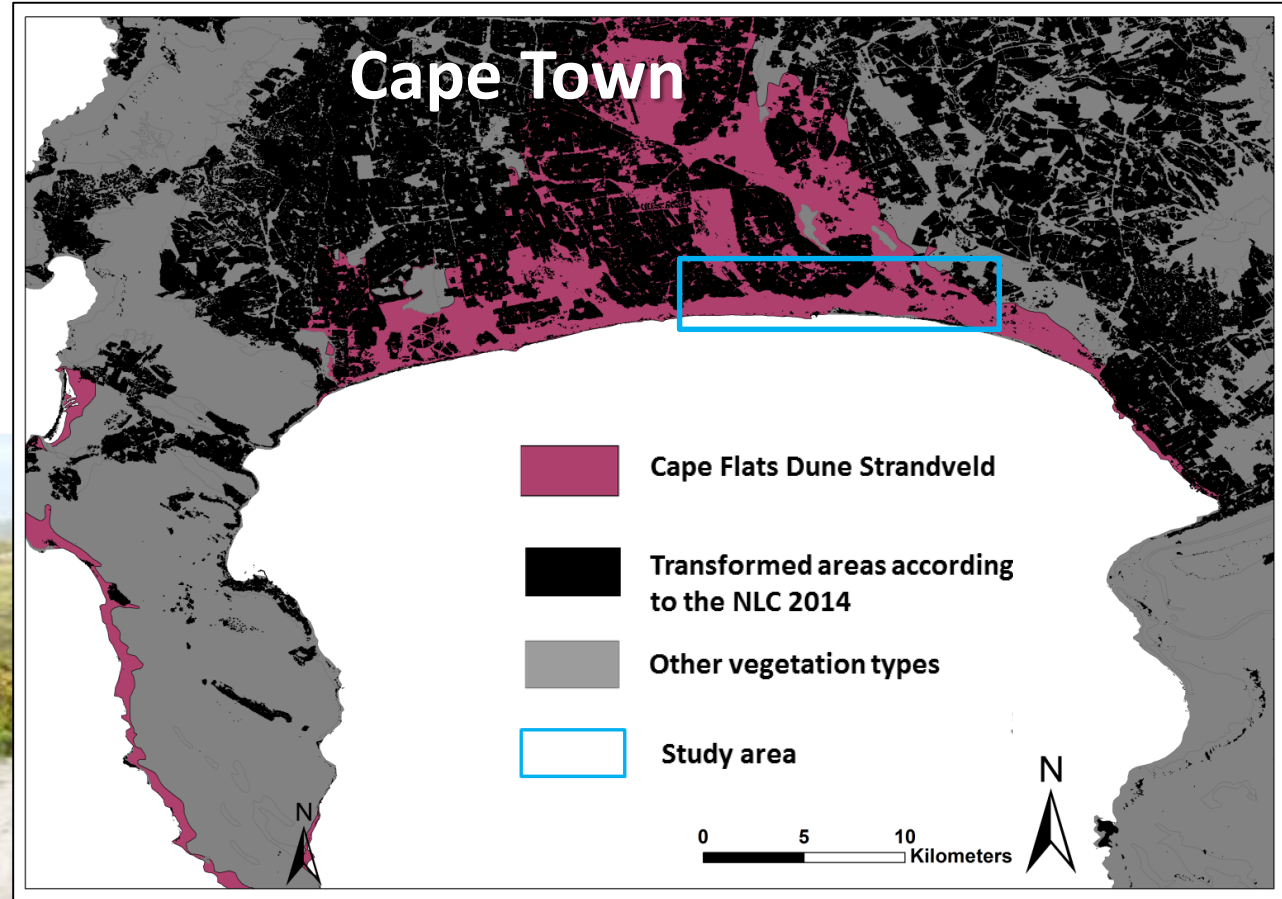
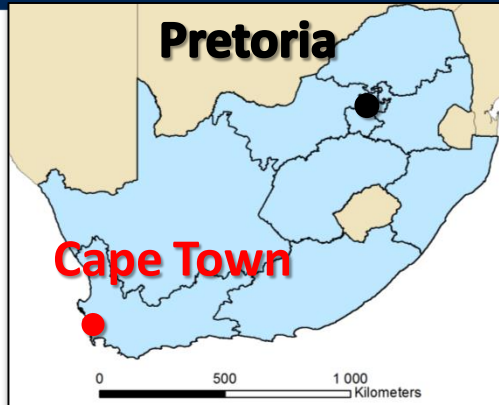
**→ Is massively exposed to human
impact and exploitation**



The problem

- Human impact and exploitation lead to **degradation** of natural environments and vegetation
- **Loss of functionality**
- Coastal **management** – taking place at municipal level – should protect environmental intactness & functionality
- **BUT: information available not spatially detailed enough to do so!**

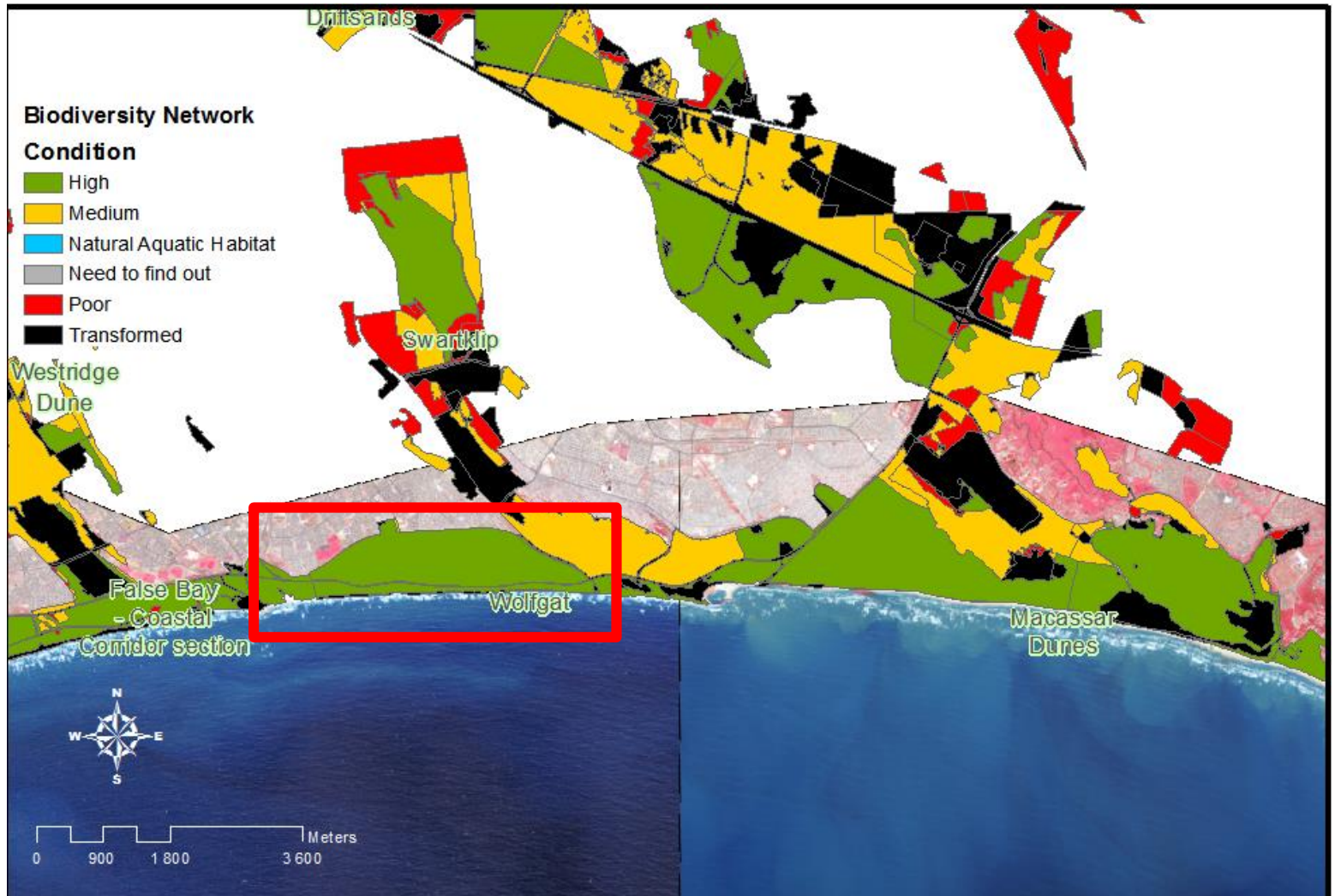
Cape Flats Dune Strandveld (CFDS)



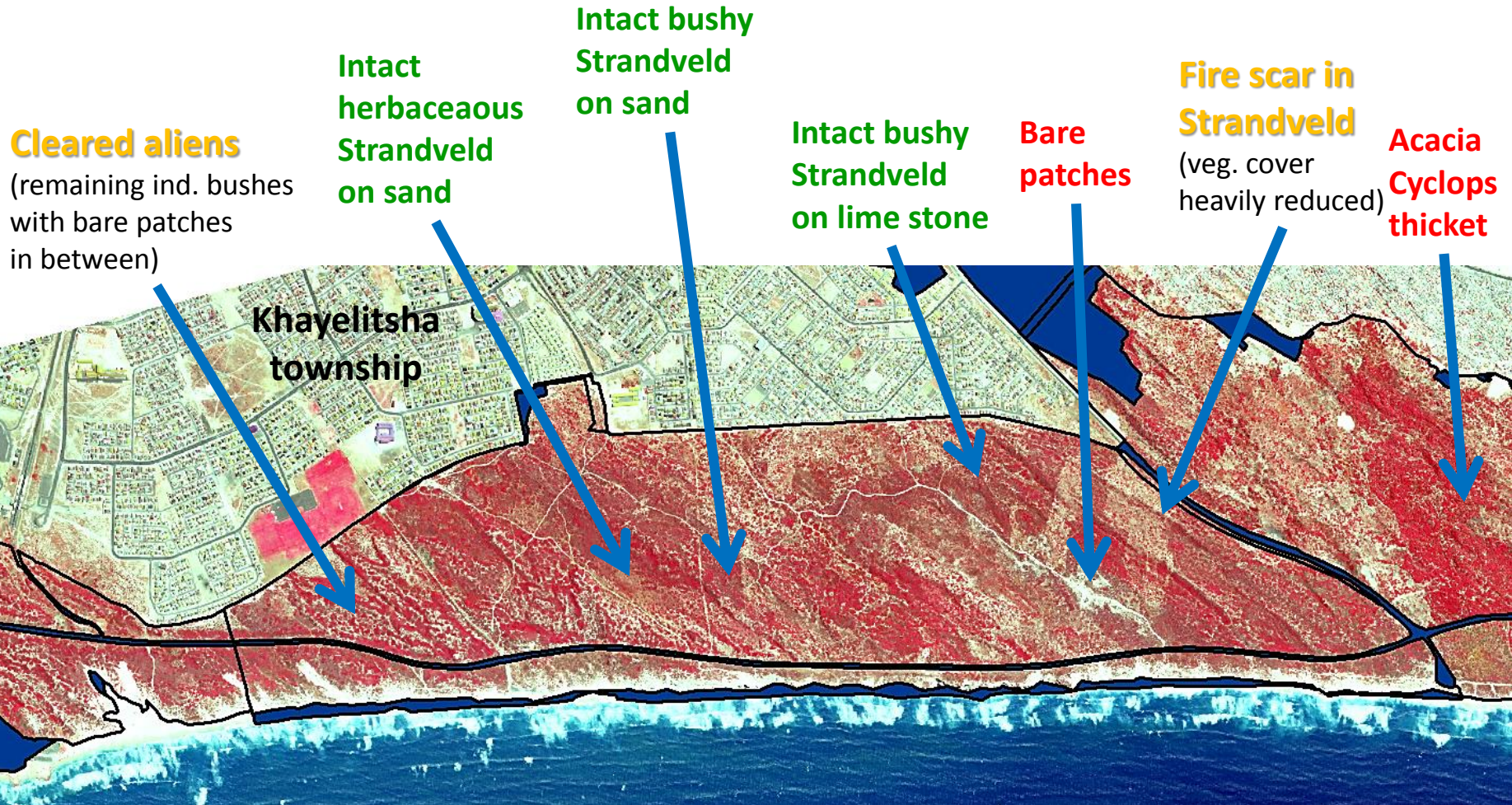
CFDS in False Bay



Existing vegetation condition maps



Degradation patterns in the CFDS

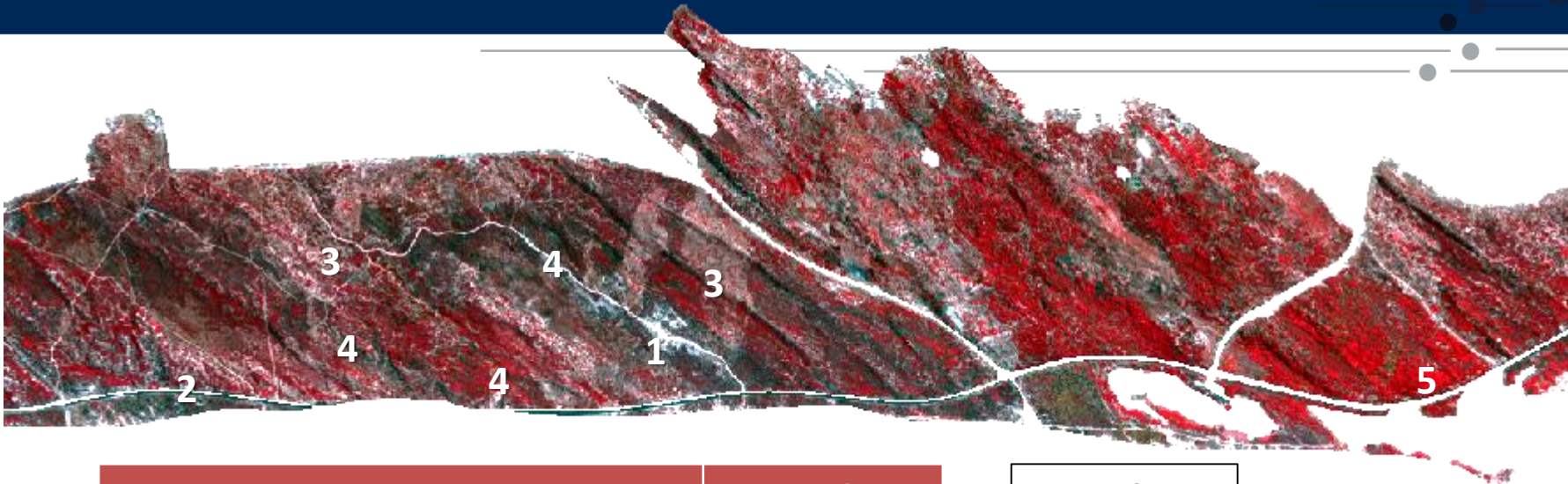


WorldView-2 image from Feb. 2014, bands 7-5-3

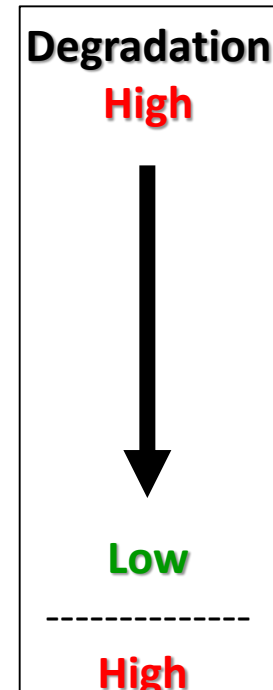
The project

- **Assess vegetation degradation** for the **Cape Flats Dune Strandveld** vegetation in False Bay (Cape Town Area) **using 2m resolution WorldView-2 imagery**
- For provision of spatially detailed information for local coastal management and conservation

Field observation based Degradation Classes

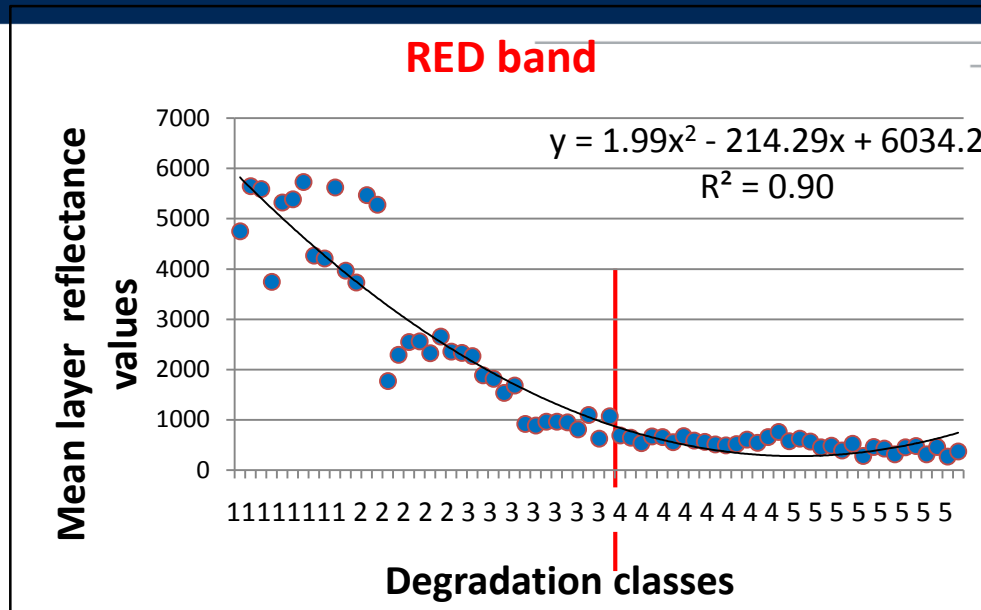


Description	Degr. Class
Bare Soil	1
Cleared Vegetation	2
Fire scar on sand	3
Fire scar on limestone	3
Nat. herbaceous vegetation	4
Natural vegetation on limestone	4
Natural vegetation on sand	4
Alien vegetation	5

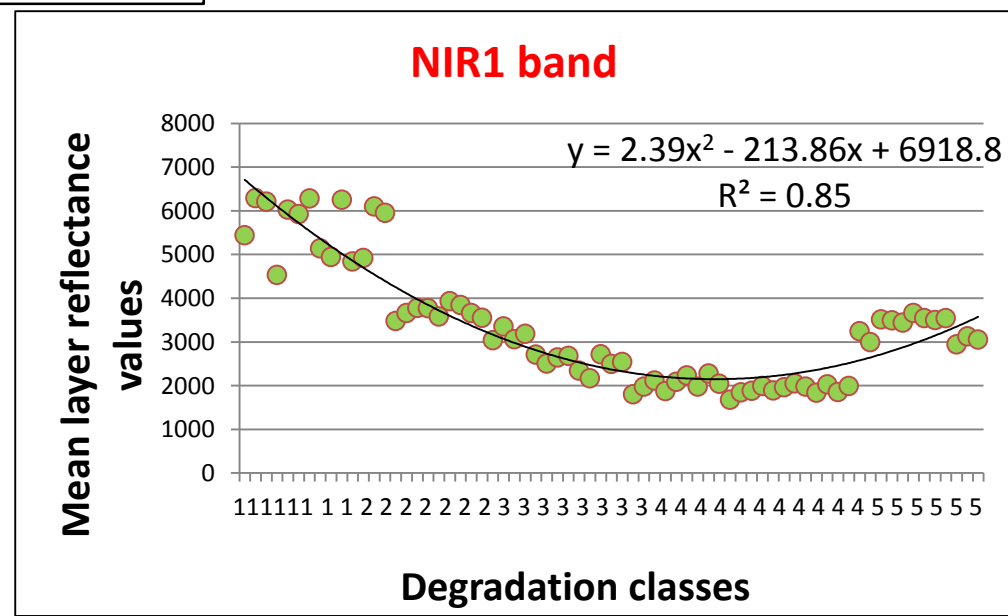


Regression plots

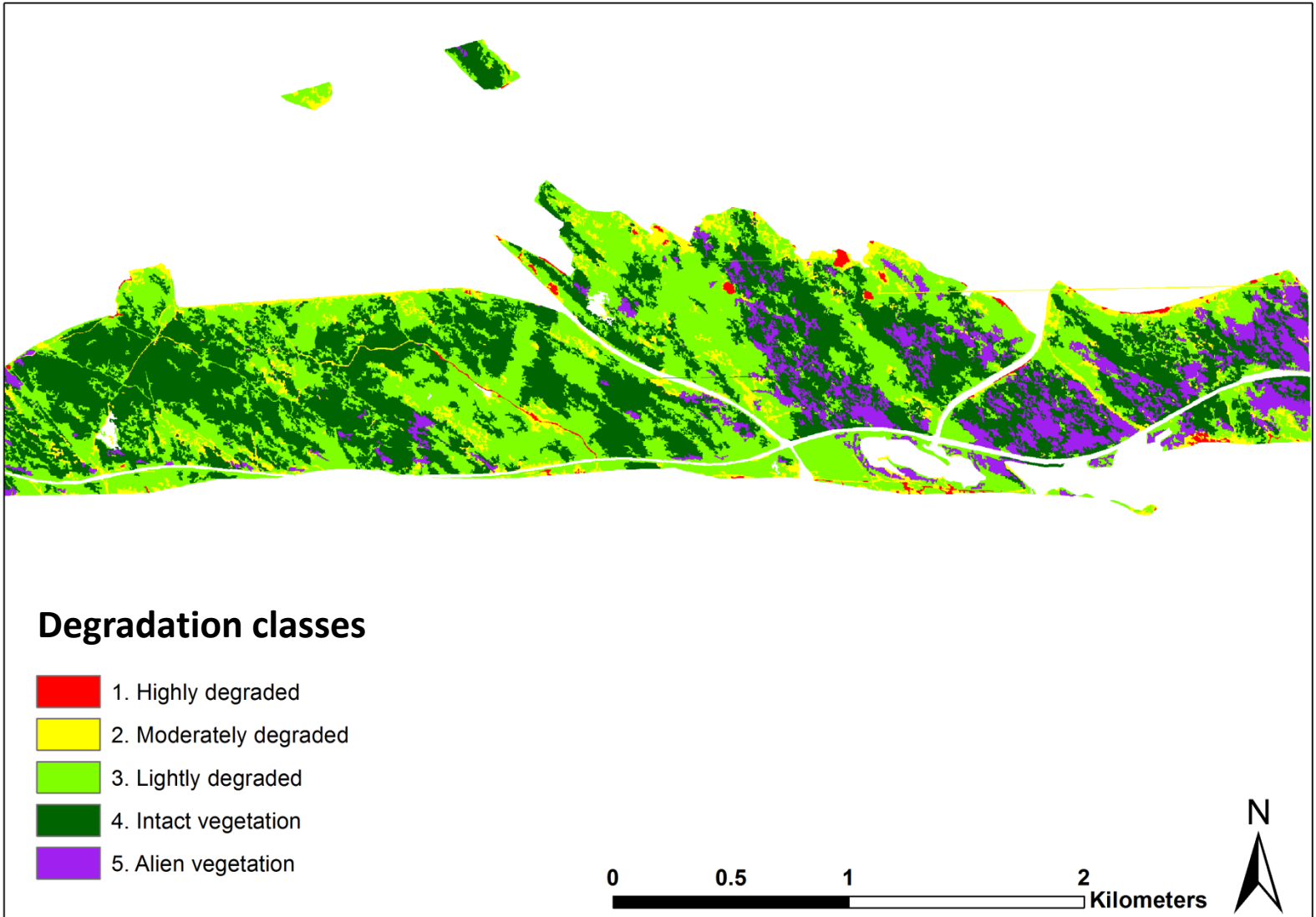
Description	Degr. Cl.
Bare Soil	1
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Natural vegetation lime	4
Natural vegetation sand	4
Alien vegetation	5



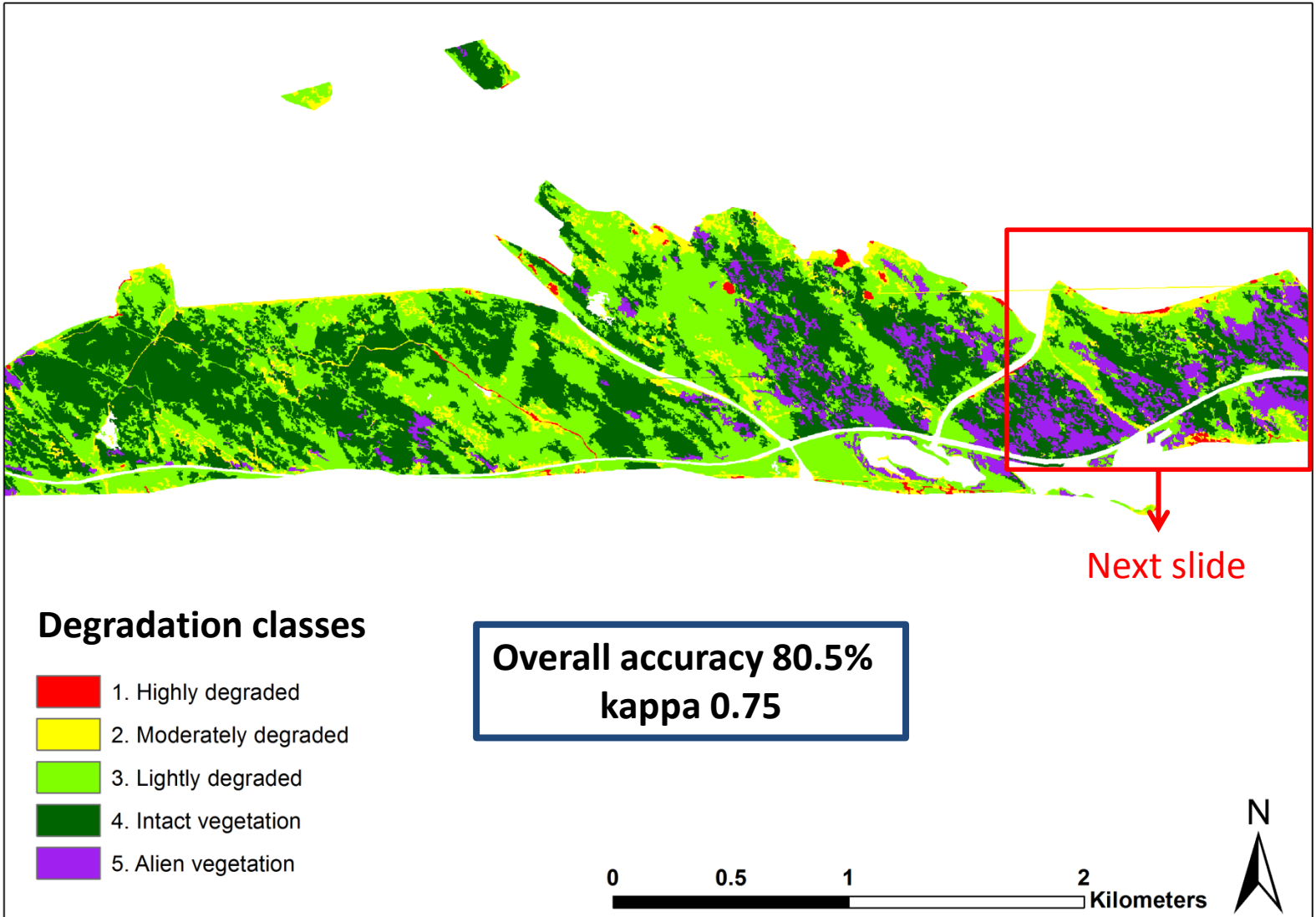
- Regression plots on all 8 WV-2 bands to inform decision tree classification
- Multispectral bands all +/- the RED or NIR1 trend



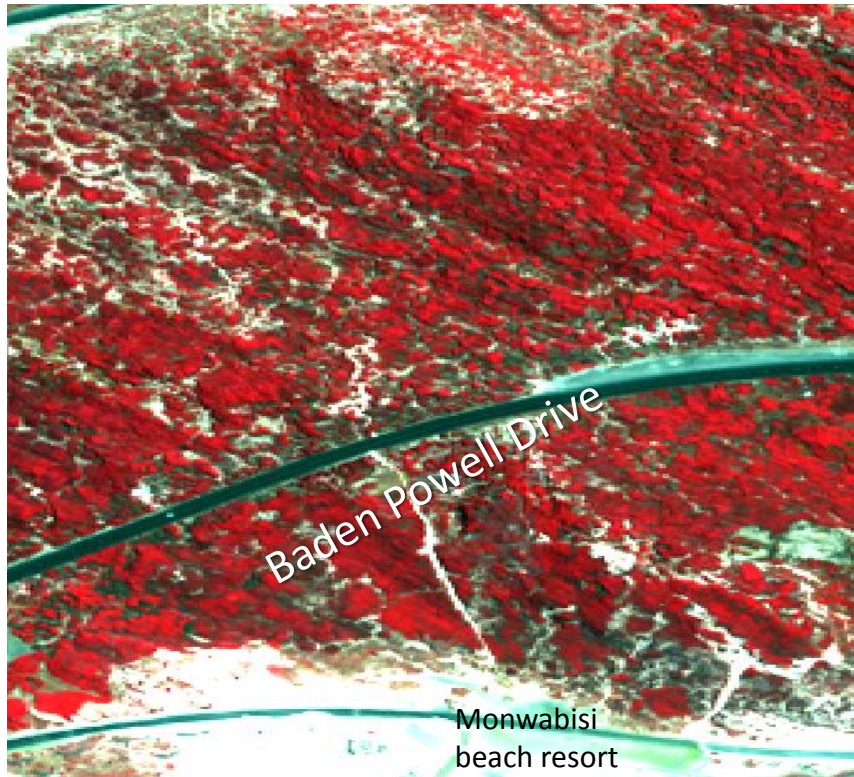
Results for Feb 2014 image



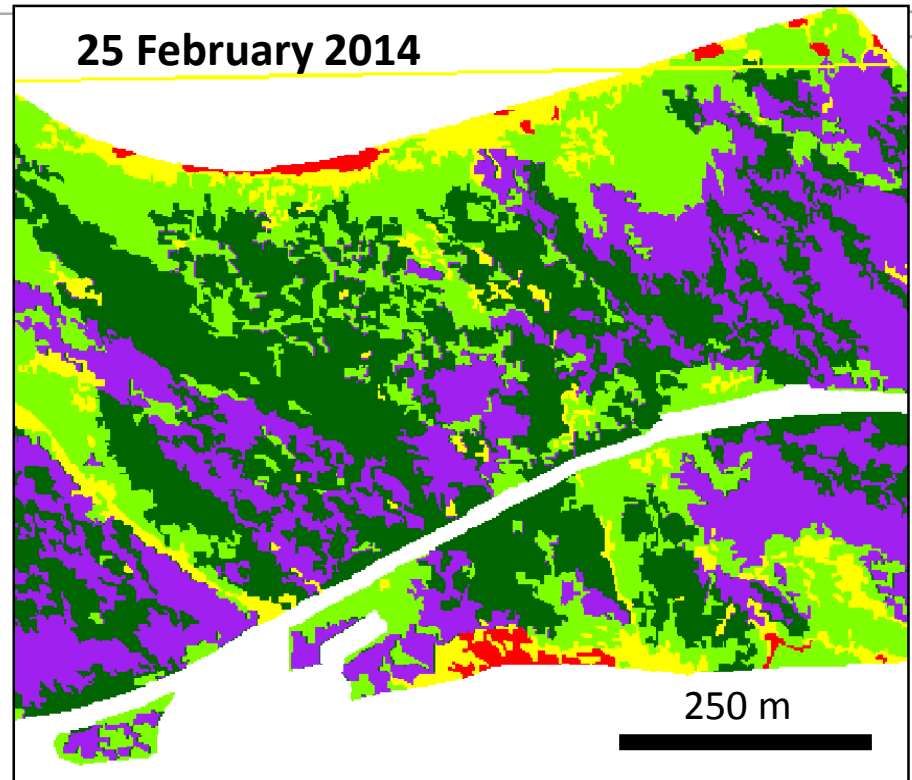
Results for Feb 2014 image








Results for Feb 2014 image



Subset WorldView-2
2m resolution
Bands RGB 7 – 5 – 3



Degradation classes

-  1. Highly degraded
-  2. Moderately degraded
-  3. Lightly degraded
-  4. Intact vegetation
-  5. Alien vegetation

Degradation: alien invasive vegetation



Undisturbed diverse CFDS

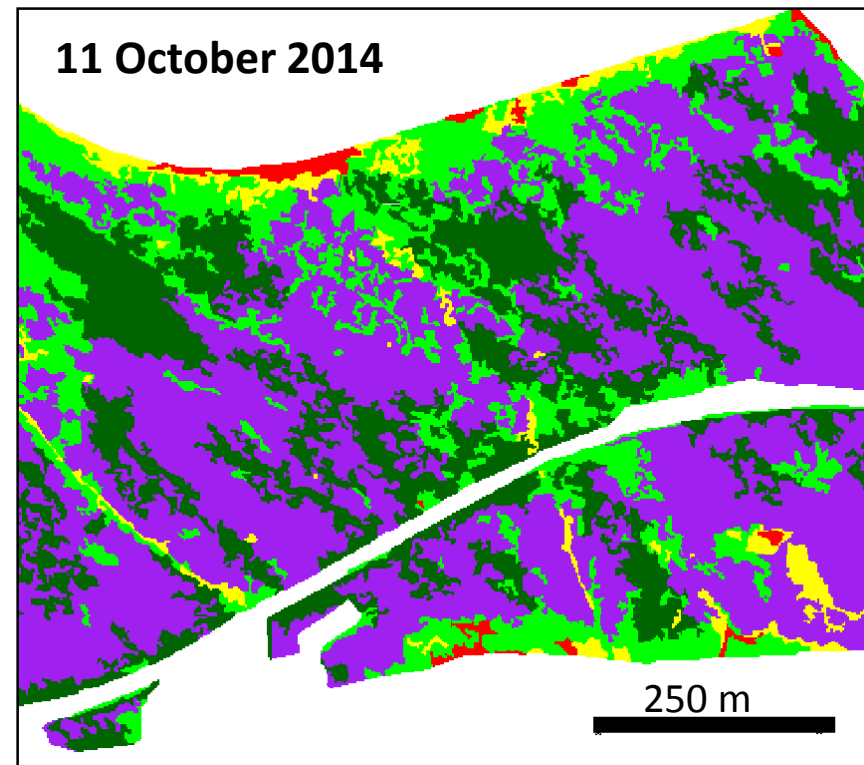
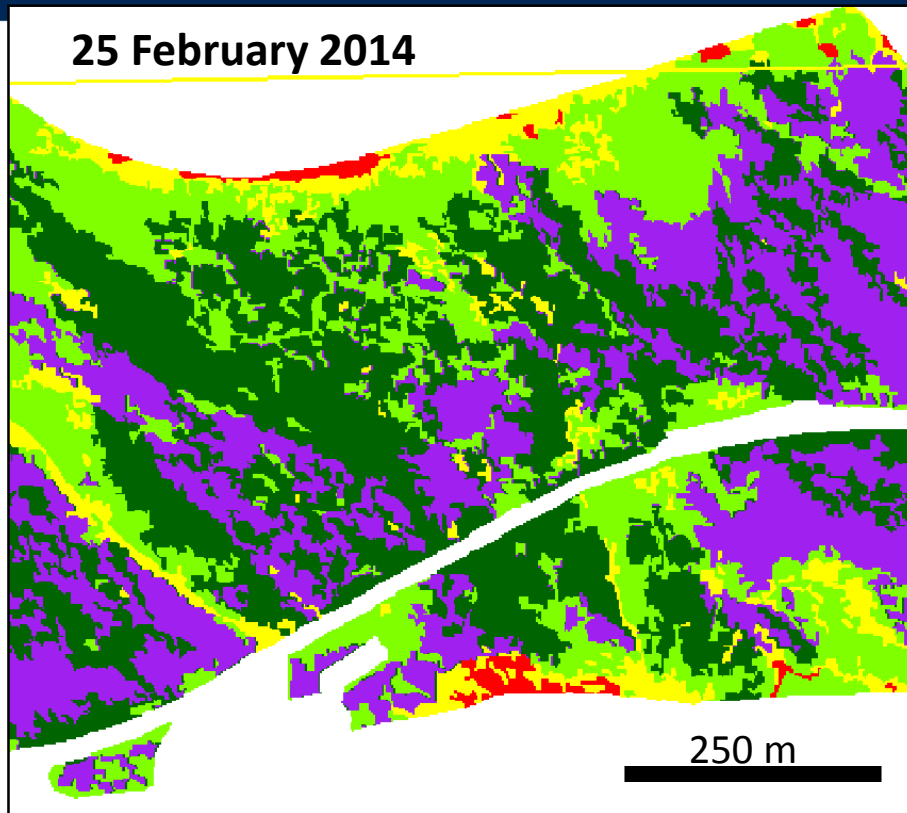


Acacia cyclops (Rooikrans) thicket






Image Source: Richard Cowling

(<https://mbgecologicalrestoration.wordpress.com/tag/acacia-cyclops/>)

Comparison Feb and Oct 2014 results



Degradation classes

-  1. Highly degraded
-  2. Moderately degraded
-  3. Lightly degraded
-  4. Intact vegetation
-  5. Alien vegetation

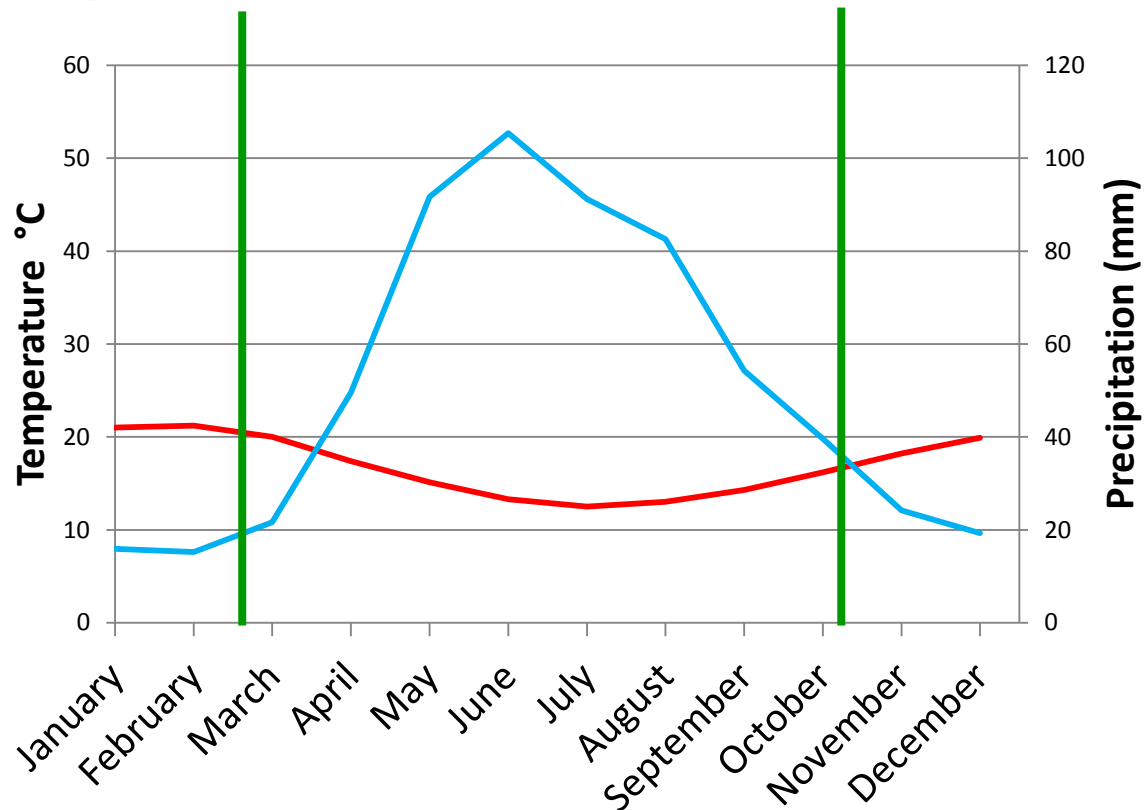


True change?

... or just phenology!

Feb. image = dry season

Oct. image = wet season



Climate diagram
of Cape Town

— Temperature
— Precipitation

Conclusions

- WV-2 imagery can be used to provide high detailed vegetation degradation information
 - with satisfactory accuracy
 - for coastal management
- alien invasive species detection more accurate with dry season imagery





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Thank you

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