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Tree Canopy Project

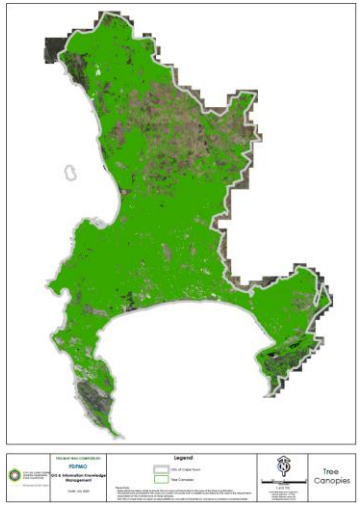
The Institute of Environment and Recreation Management

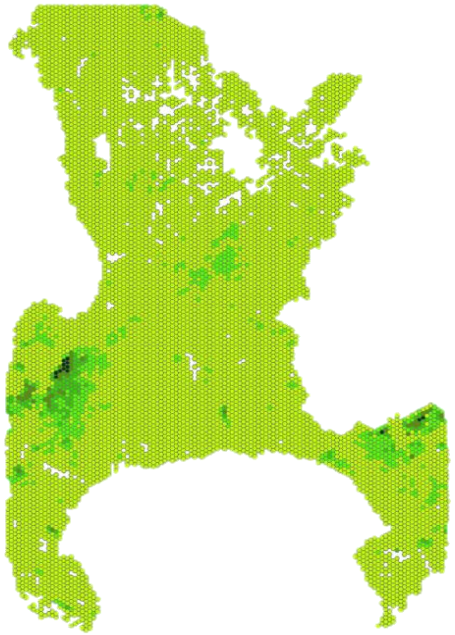
September 2022

Making progress possible. Together.

Agenda

- Welcome and Introduction
- Project Background
- Project Methodology
- Lessons Learned
- Recommendations For Action
- Future Considerations





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Project Background

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Project Background

- Requirement to map tree canopies across the City of Cape Town
- Fieldwork at metro scale would be too labour intensive & costly, hence an automated solution was required
- Use of remote sensing techniques & GIS to create a tree canopy dataset

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Project Methodology

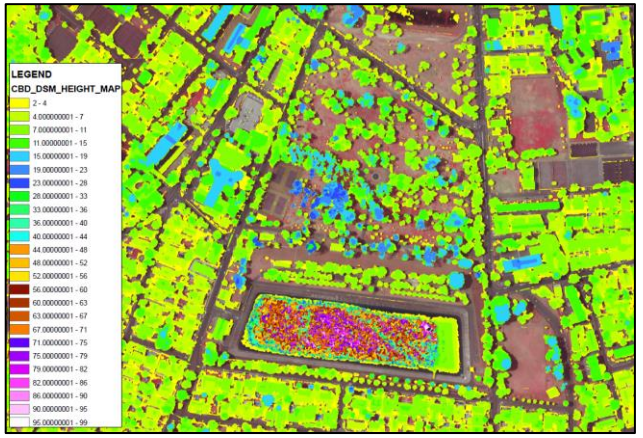
Project Methodology

- Remote Sensing CIR to map tree canopies, capture polygons
- Apply height mask to remove non-tree features
- Smoothing technique to give the tree canopy polygons a natural look
- Split data into manageable grids
- Edge-match & digitize undesirable features in GIS
- GIS layer and database
- Final edits & summary statistics

Colour Infrared Image

Generate polygons
(canopy shape)

Apply a height mask
(removes anything <2.75m – shrubs, bushes etc.)



Lessons Learned

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Lessons Learned

- Amount of canopies (>3 million) = Big Data
- Many challengers across all phases of project due to the nature of the data
- High error output with the automation
- Refine data design:
  - Better ways to share the data
  - Naming convention
  - Add more information to each canopy

Common Errors

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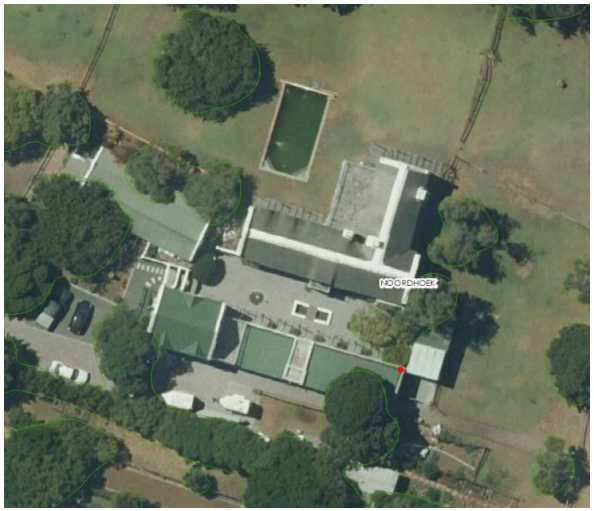
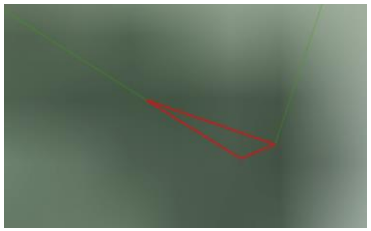
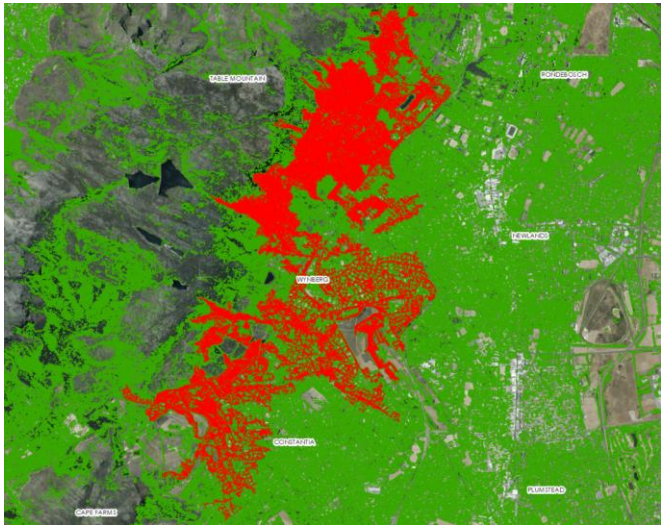
Size of Canopies





- Over 30 000 canopies were < 1 square metre – All deleted
- Seen as ‘gremlins’ in the dataset

- Largest polygon – ~8 square kilometres
- Difficult to edit due to the size of the polygon



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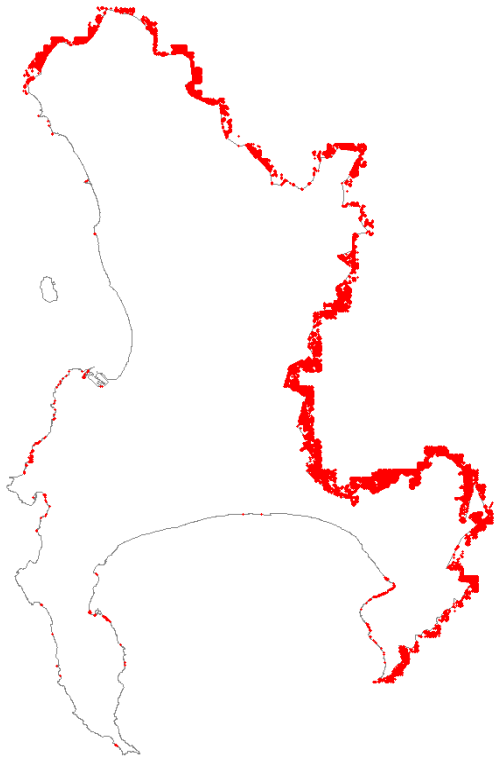
Recommendations For Action

Recommendations

- Need to anticipate Big Data
- Look at different imagery, cheaper alternatives

- Consider:
  - **High detail** = **Slow performance**
    - Longer processing time
    - Large dataset
  - **Lower detail** = **Better performance**
    - Quicker processing time
    - Smaller dataset

- Clean up City boundary first
- Merge features to reduce records



Future Considerations

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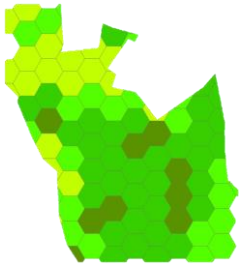
Future Considerations

- Follow up study (5 – 10 year interval)
- 2018 Western Cape drought = Less canopy coverage
- Current dataset as a foundation:
  - Review tree planting initiatives
  - Compare suburbs of similar size
- Target field verification :
  - Identify trees affected by Polyphagous Shot Hole Borer
  - Tree vitality, Species, Height
- Various analysis
  - Heat maps to analyse carbon sequestration

Suburb Comparisons

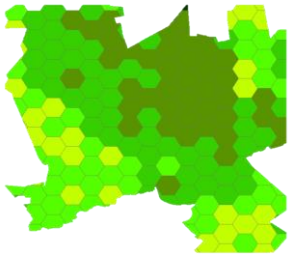
Athlone –
19.09 sq. km
9.5% Cover

Welgemoed –
19.83 sq. km
16.7% Cover

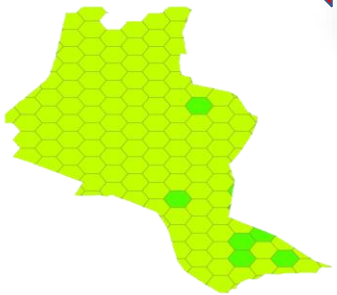


Khayelitsha –
38.71 sq. km
3.5% Cover

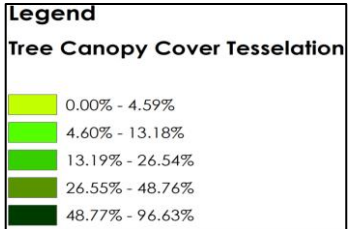
Somerset-West –
37.04 sq. km
21.5% Cover



Blue Downs –
31.41 sq. km
2.2% Cover



Hout Bay –
31.94 sq. km
21.8% Cover



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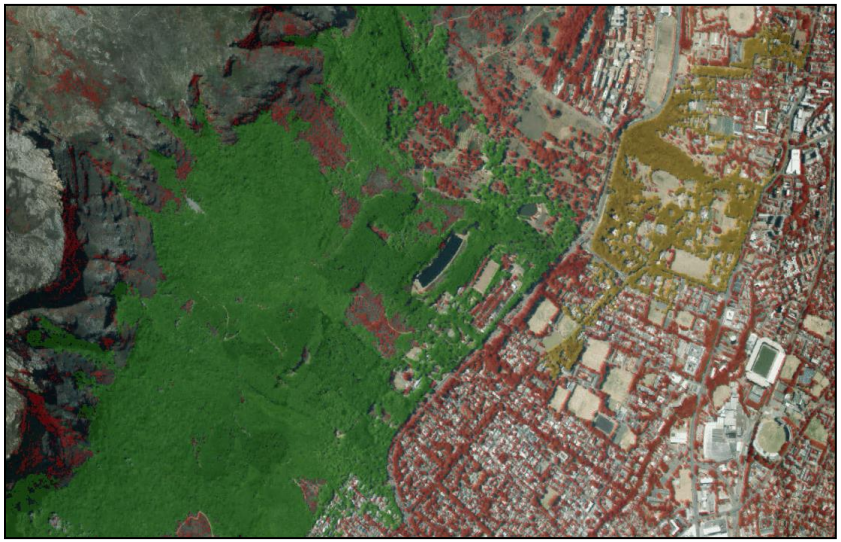
Various Outputs



- Different outputs to show the data
- Raster ECW image
- Each pixel = tree canopy density
- Pixelated when zoomed in

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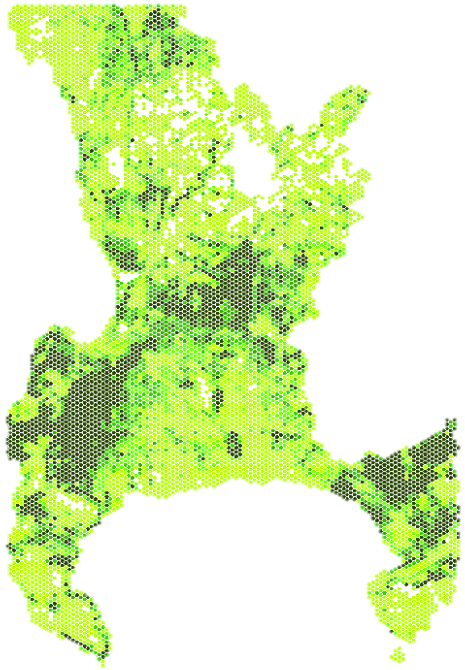

Thank You

Any enquiries contact Ziyaad.Lalla@capetown.gov.za

Making progress possible. Together.