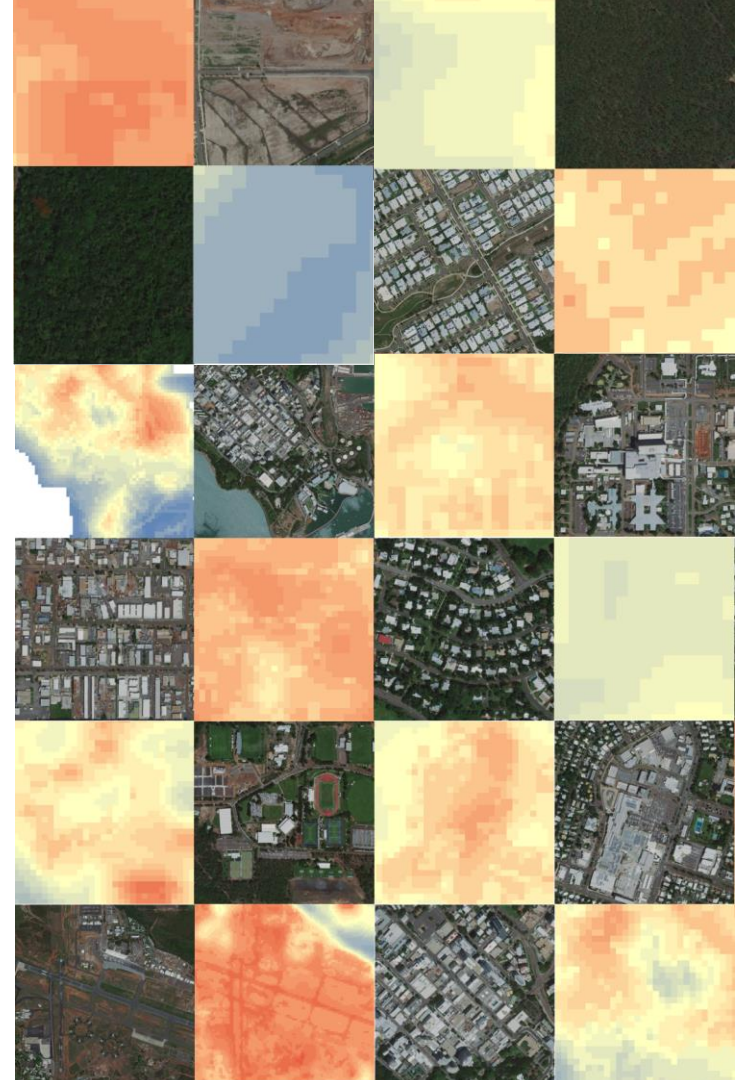




Land surface temperatures & heat vulnerability in Darwin

Jacqui Meyers, Art Langston, Drew Devereux | 12 December 2019

Australia's National Science Agency

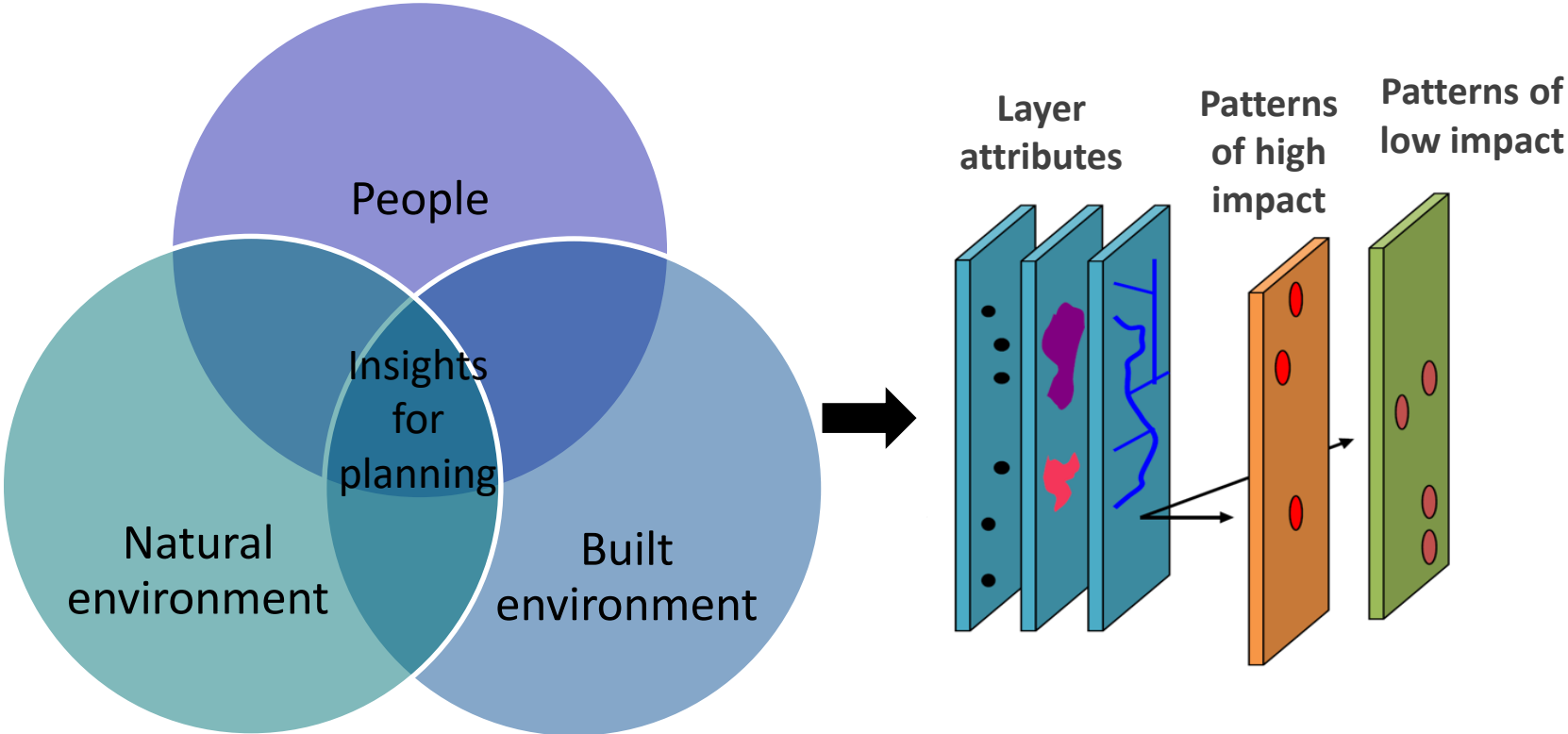


Scope

- Map land surface temperatures
- Identify hot & cool spots and related factors
- Identify neighbourhoods with potentially higher heat-health vulnerability risk



Integrated social and environmental data



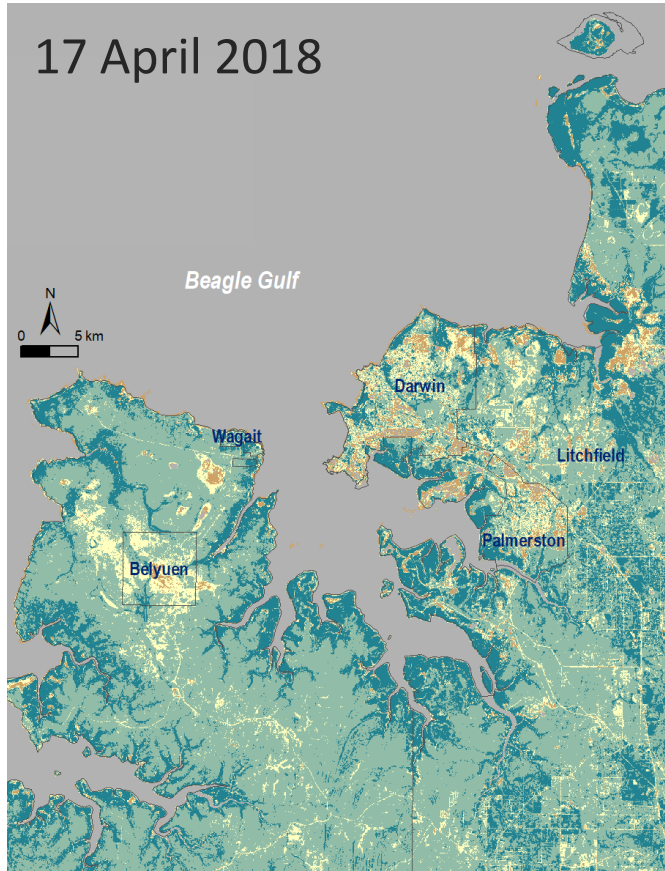
Landsat 8 satellite thermal sensor

- Every 16 days at ~10.50am
- Surface not air temperature
- A snapshot in time
- 100m resolution downscaled to 30m
- Birds-eye view
- Cloud free images; dry season only



Seasonal change in vegetation 'vigour'

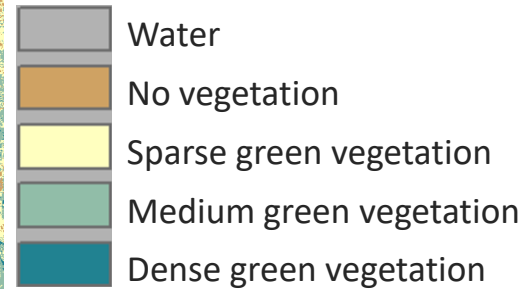
17 April 2018



7 August 2018

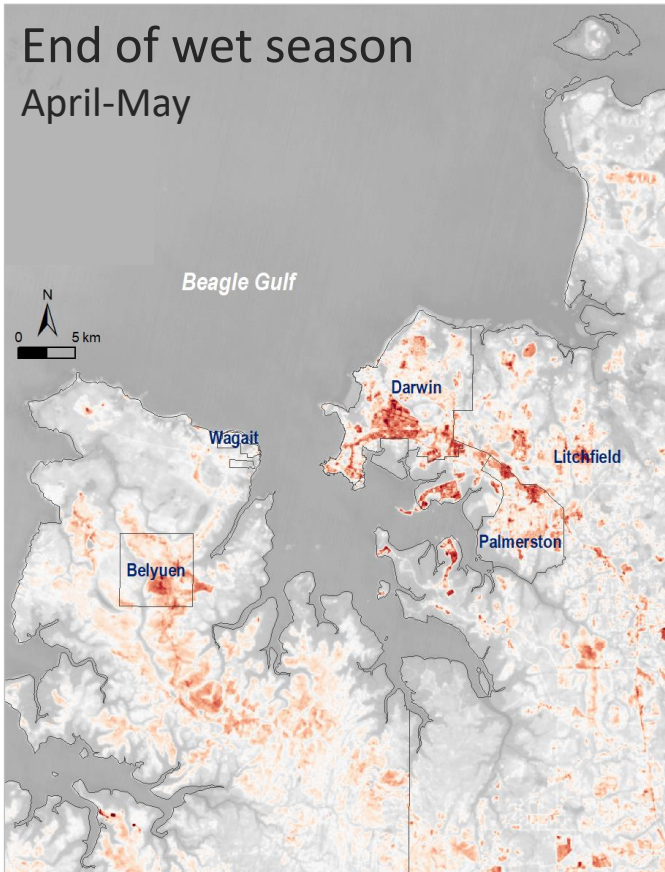


Vegetation Index

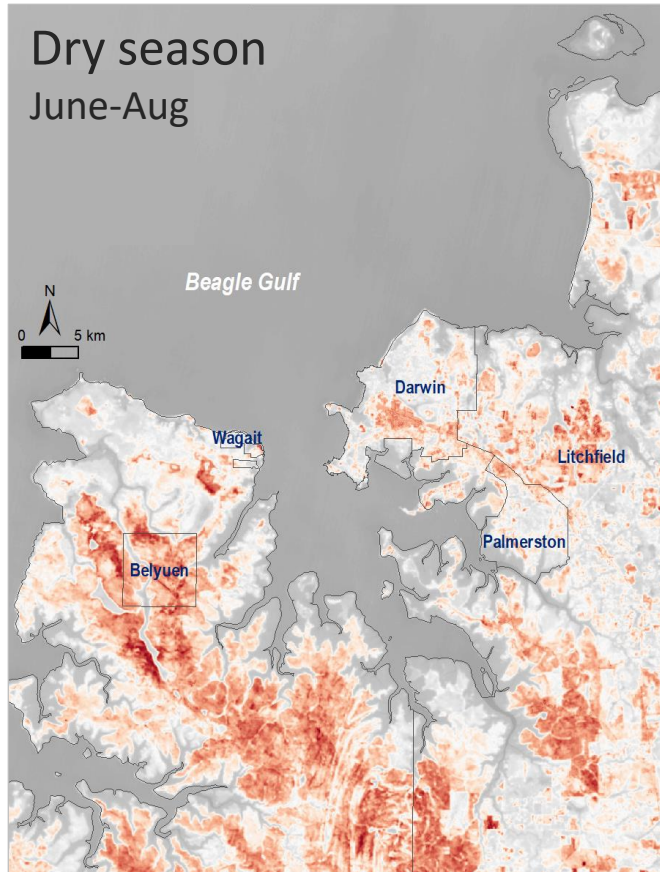


Seasonal Land Surface Temperatures

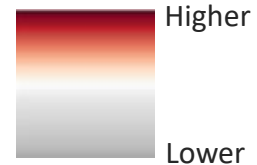
End of wet season
April-May



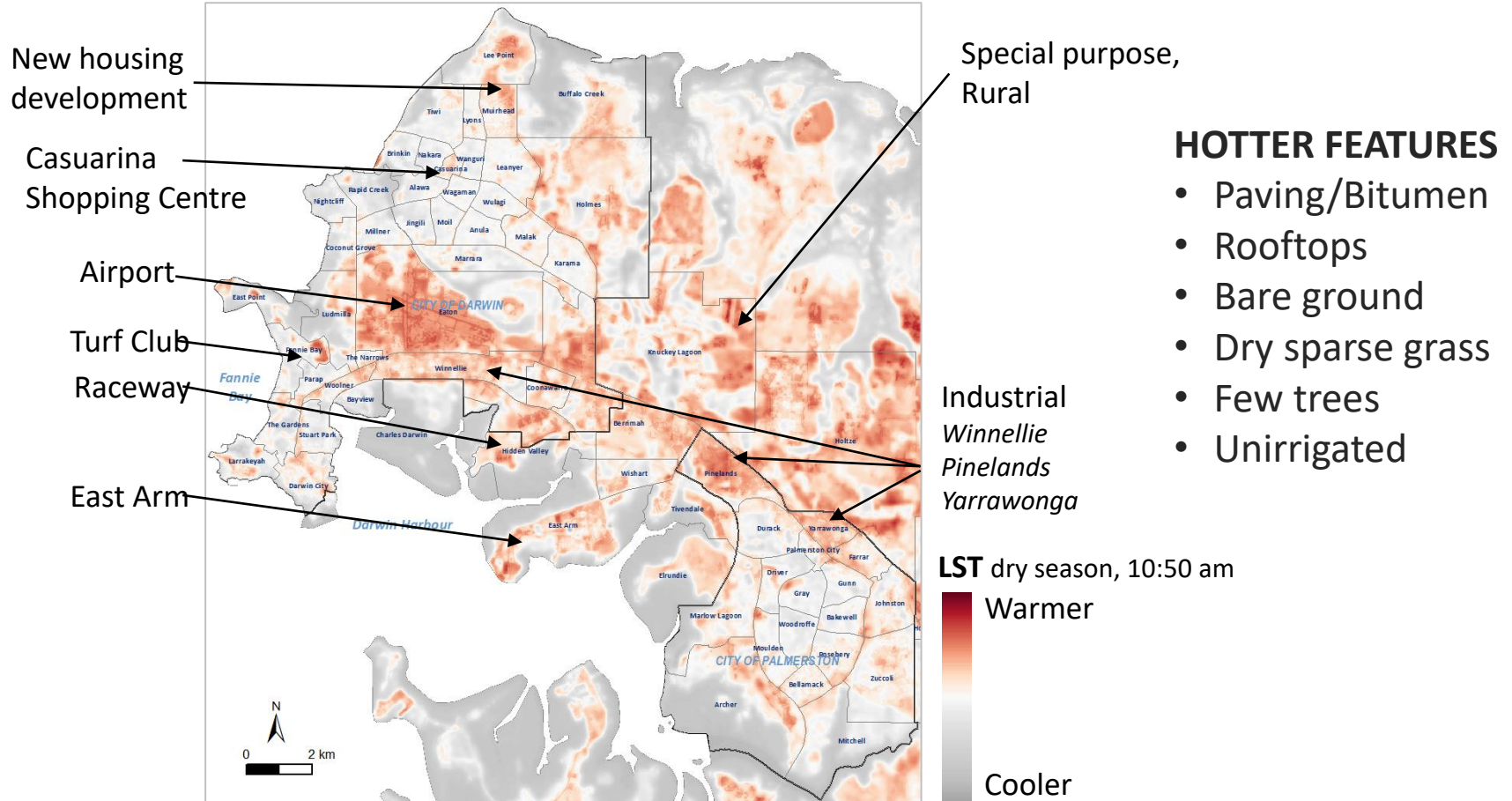
Dry season
June-Aug



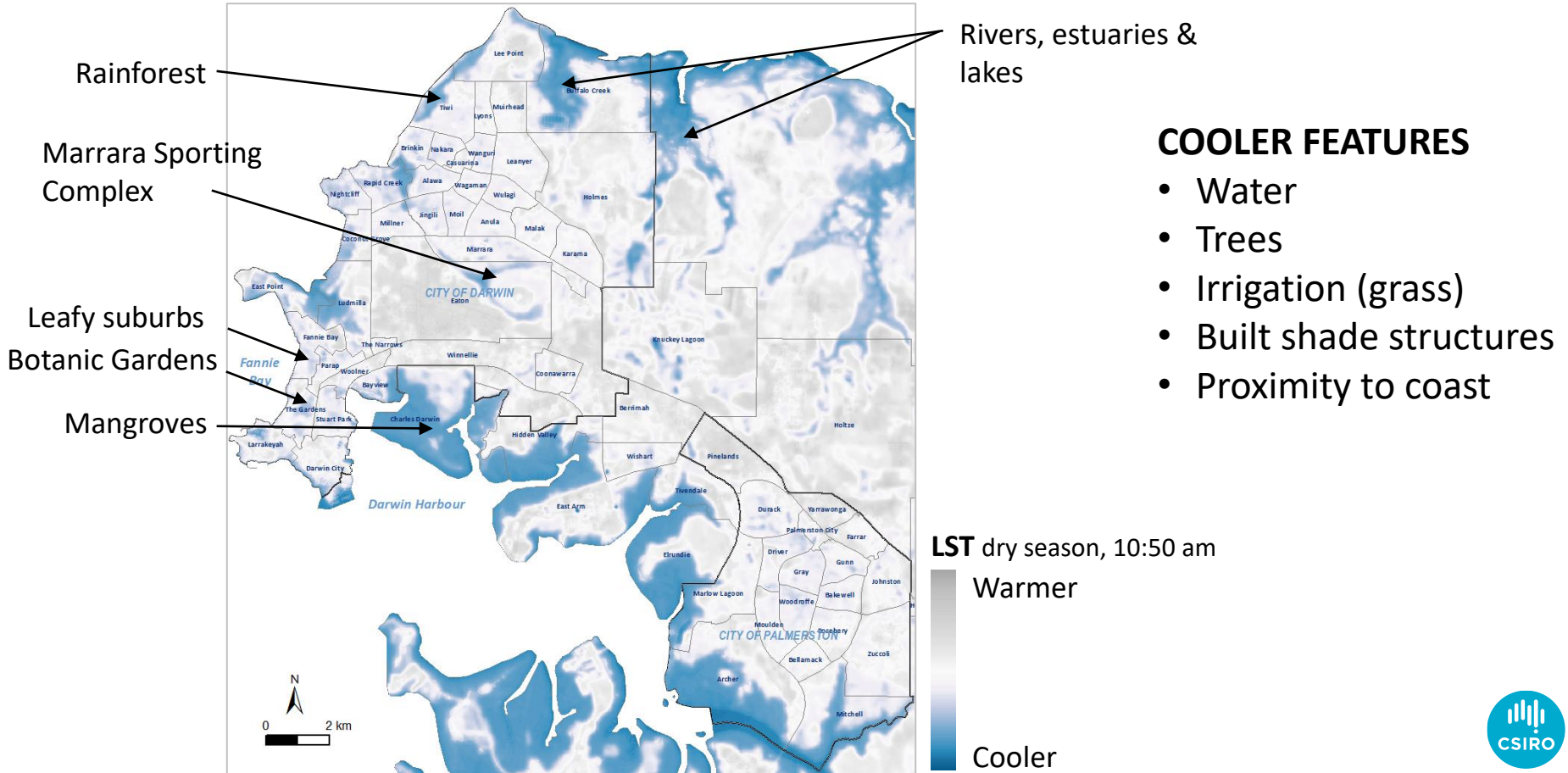
Land Surface Temperature
10:50 am, 2018-19



Land surface temperature hot spots



Land surface temperature cool spots

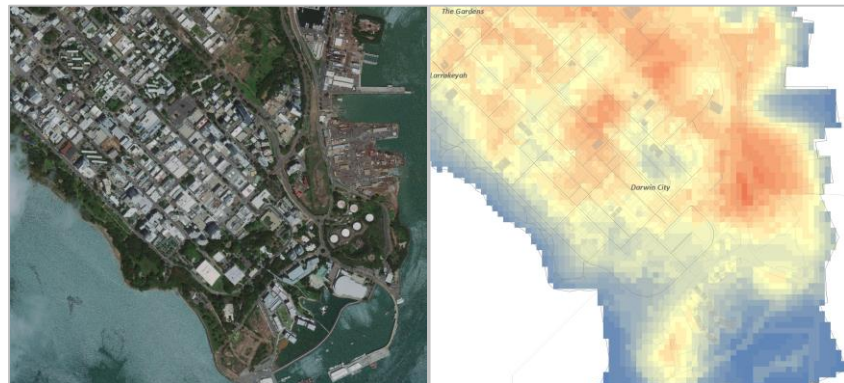


Key areas in Darwin

Royal Darwin Hospital



Darwin City

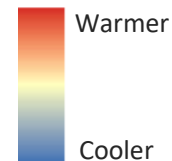


Darwin International Airport

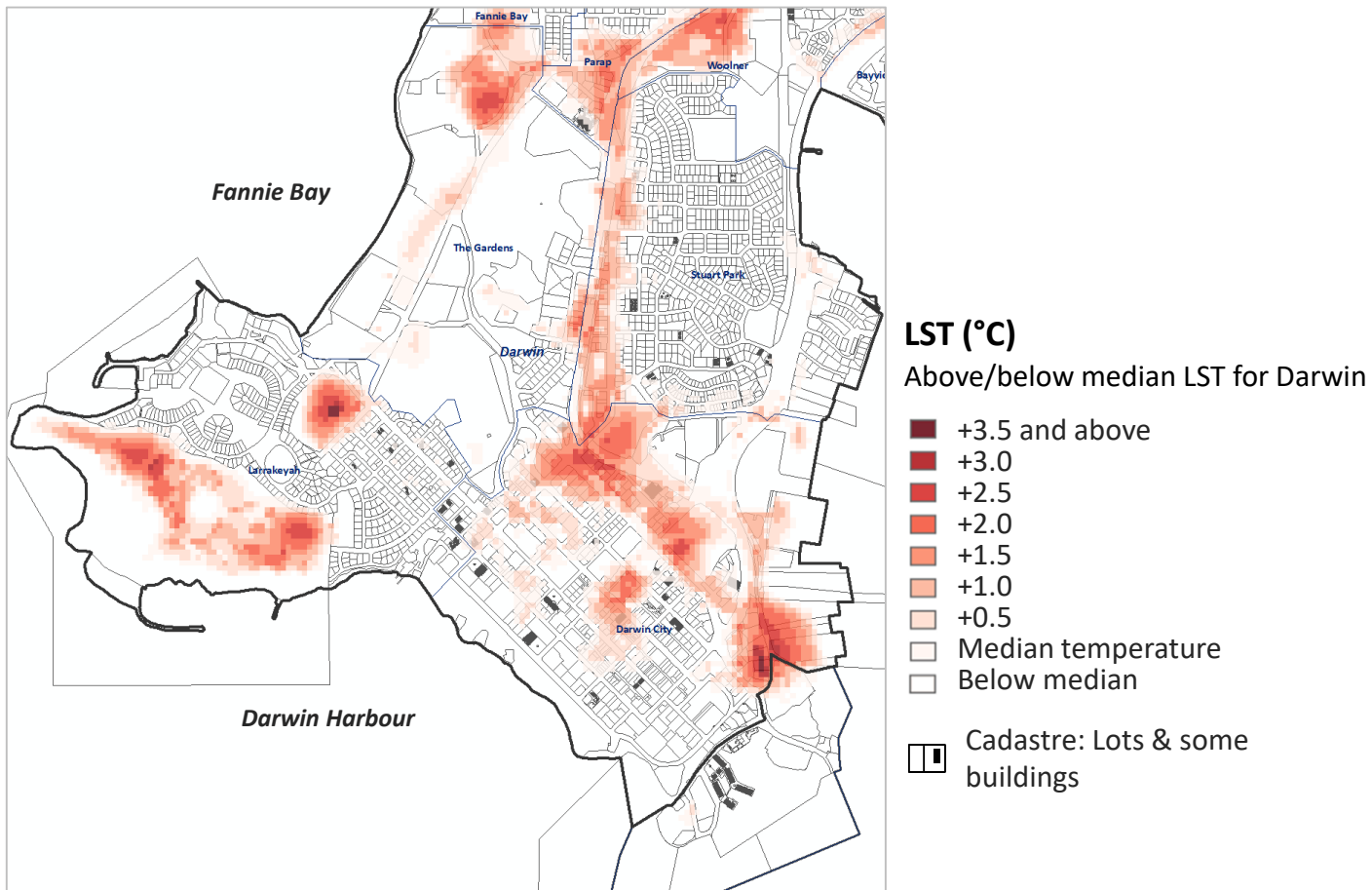


Land surface temperature

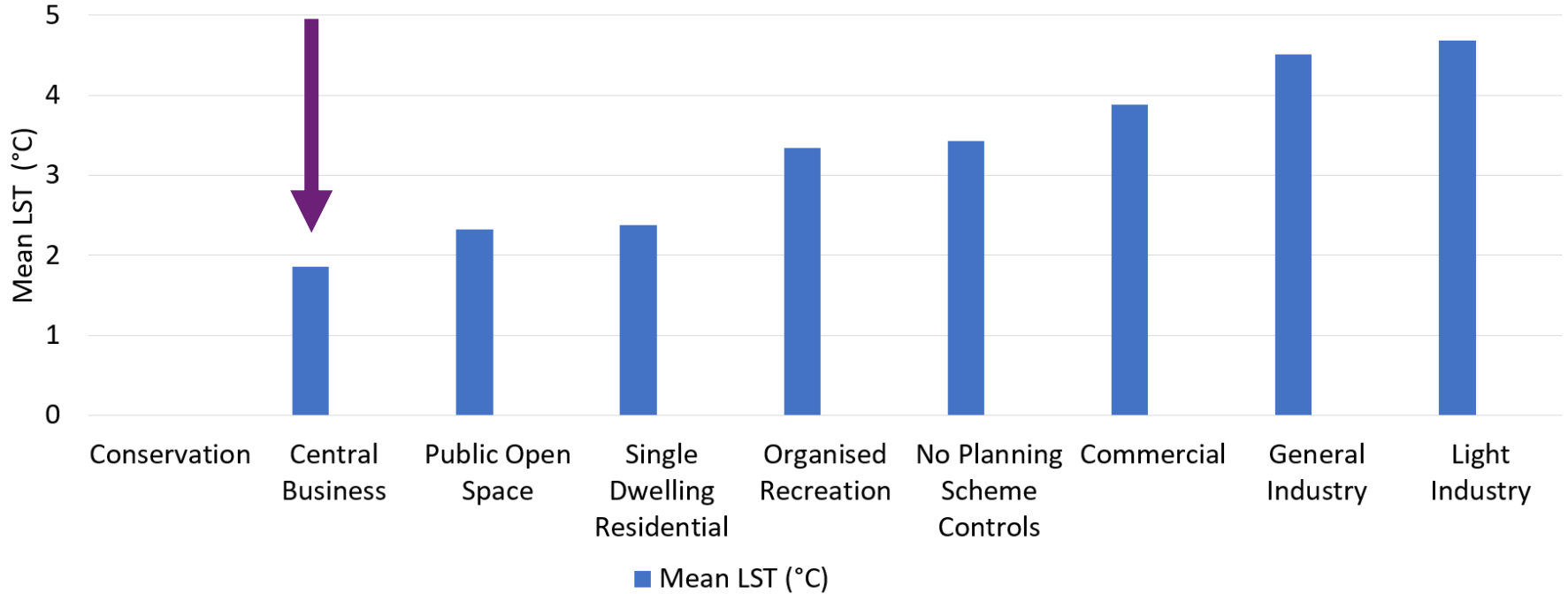
Dry season 2018-19 10:50 a.m.



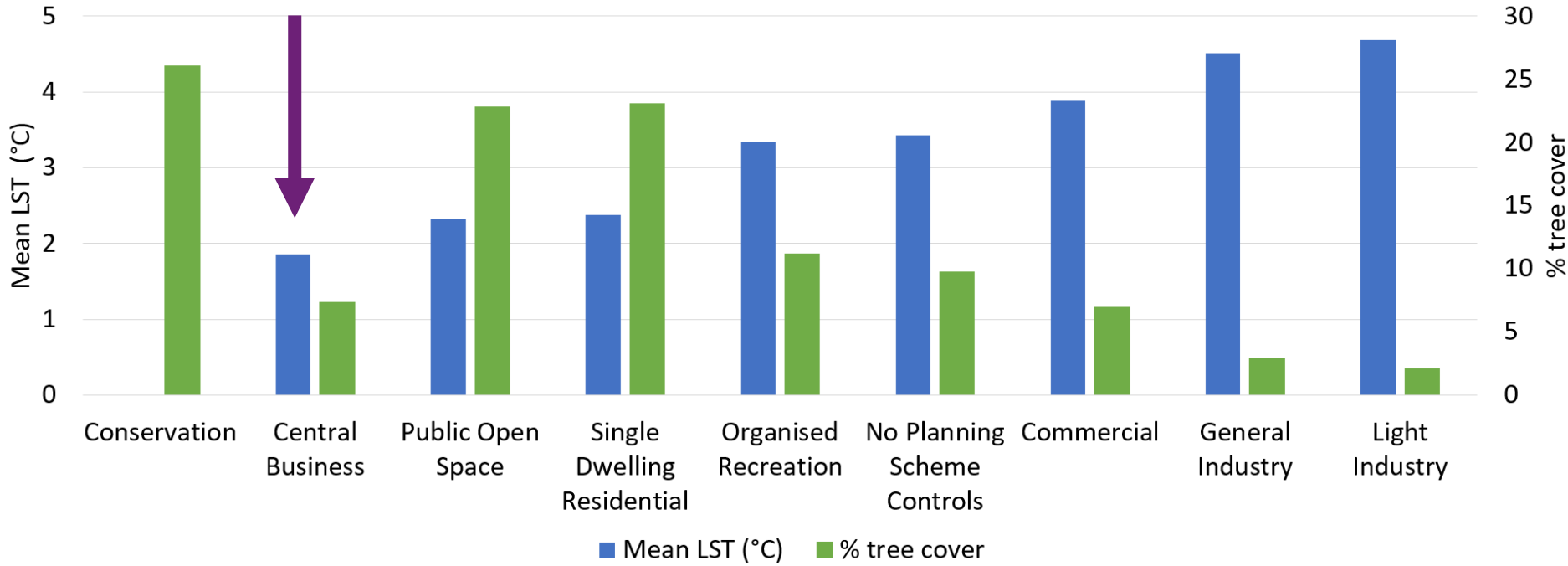
Darwin City hot spots (dry season 2018-19)



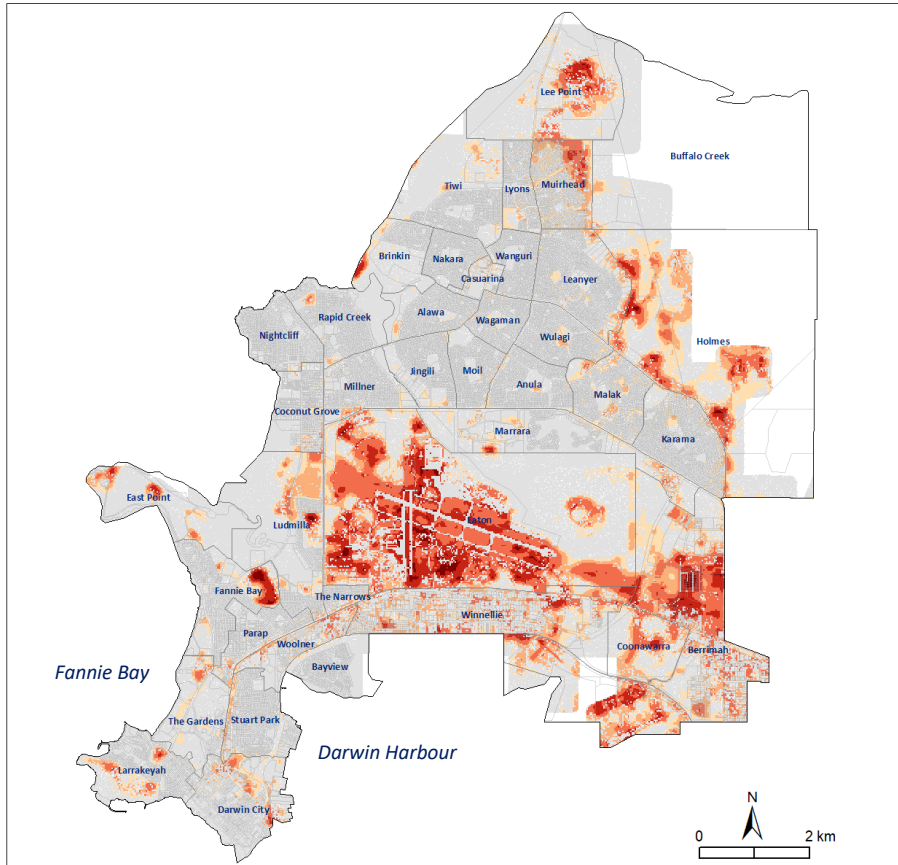
How much hotter or cooler?



How much hotter or cooler?










'Potential' tree planting areas



Trees could be planted in some (but not all) areas with bare ground or grass to reduce surface temperatures

LST (°C)

Above/below median LST for Darwin

-  > 4 °C above median LST
-  3 – 4
-  2 – 3
-  1 – 2
-  0 – 1 °C above median LST
-  Below median LST
-  No data



Heat-health risk

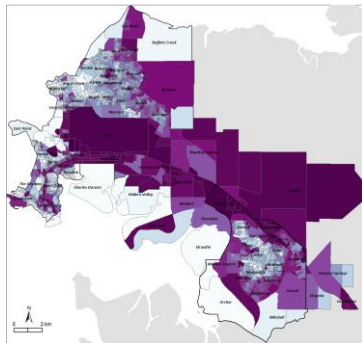
Higher risk of adverse heat-related health outcomes from prolonged exposure to high temperatures:

- Lower ability to shed heat (elderly, very young, unable to self-care)
- Comorbidities (e.g. renal, cardiovascular)
- Lower capacity to cool environment (lower socioeconomic)

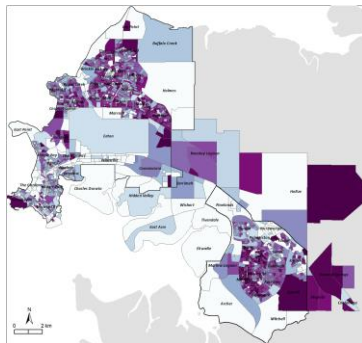
Neighbourhood Heat Vulnerability Index (NHVI)

Dry season 2018-19, ABS 2016 Census Mesh Blocks, Darwin Urban Centre Locality

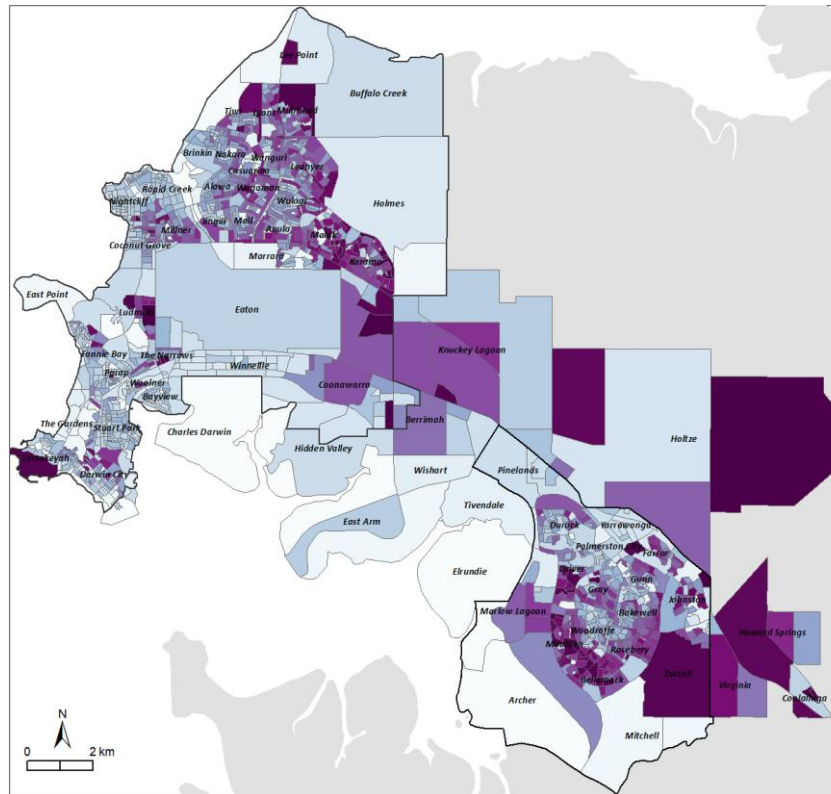
Exposure (median LST)



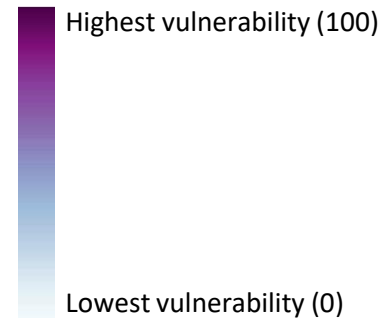
Population Heat-Health Risk



Neighbourhood Heat Vulnerability Index



NHVI estimate





Conclusion

Spatial layers and report will be provided to the government to assist them with heat mitigation planning

Thank you

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Australia's National Science Agency

