

Developing a Darwin Heat Mitigation Strategy

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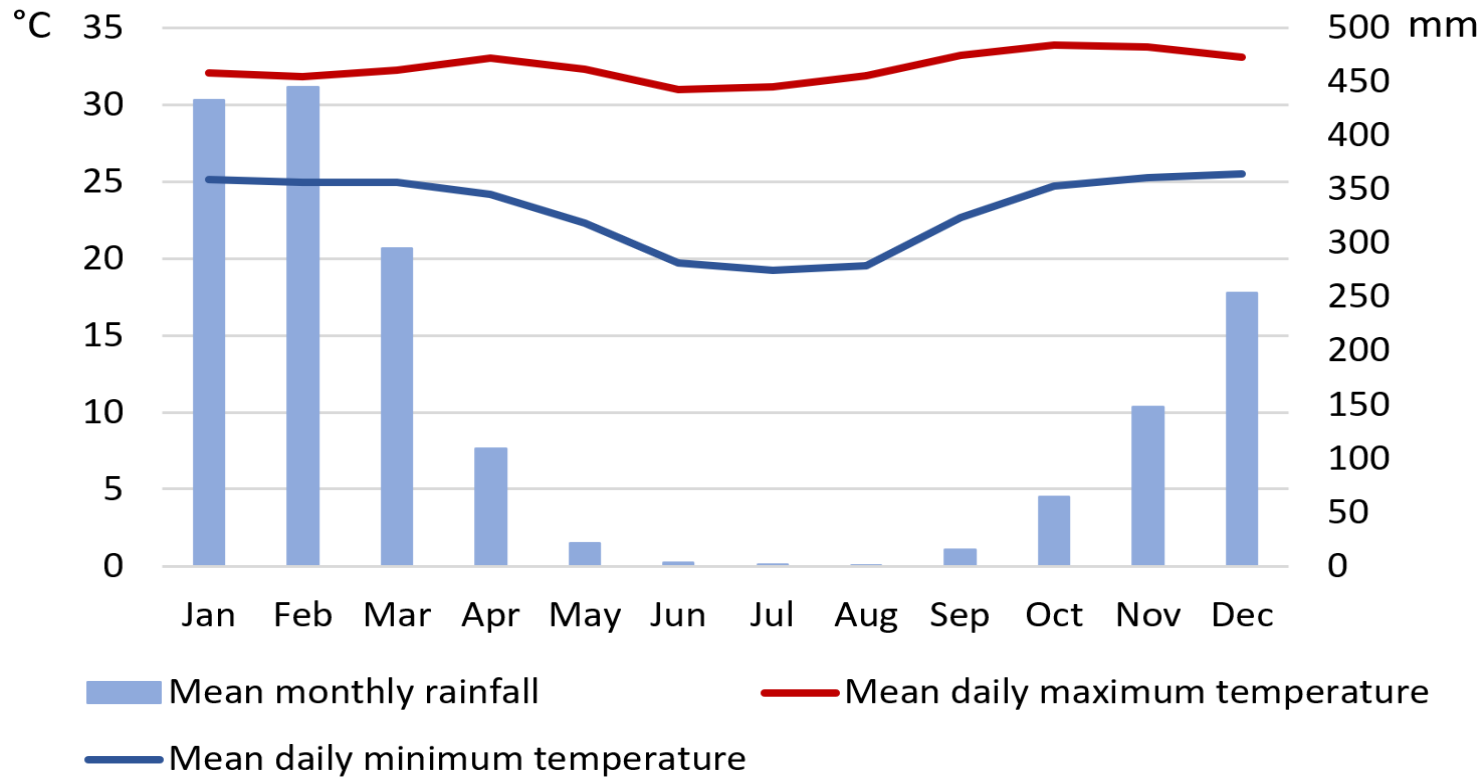


Photo: Tourism NT/Shanaa McNaught

Darwin

- Capital city of the Northern Territory
- 34% of the NT's population
- Darwin is a multicultural city with a unique culture and heritage.
- The Larrakia have strong cultural connections with the land and are an important part of the past, present and future of Darwin

Darwin Airport - 20 year average



Darwin has two distinct seasons: a Wet and a Dry season

Köppen-Geiger climate classification *Aw*.

Darwin's Climate



Future Climate

(<http://www.climatechangeinaustralia.gov.au/>) accessed October 2019)

- **Temperature**

- Number of days above 35°C will increase to 141-308 days in 2070

- **Precipitation**

- Increase in the intensity of extreme rainfall events
- Cyclones less frequent but more intense



Photo: Tourism NT/Chris Frankenfeld

The Urban Heat Island Effect

- Higher temperatures than the surrounding areas
- Darwin CBD is already 2°C - 3°C warmer than the surrounding suburbs
- As Darwin City grows, it will increasingly experience the effects of Urban Heat Island

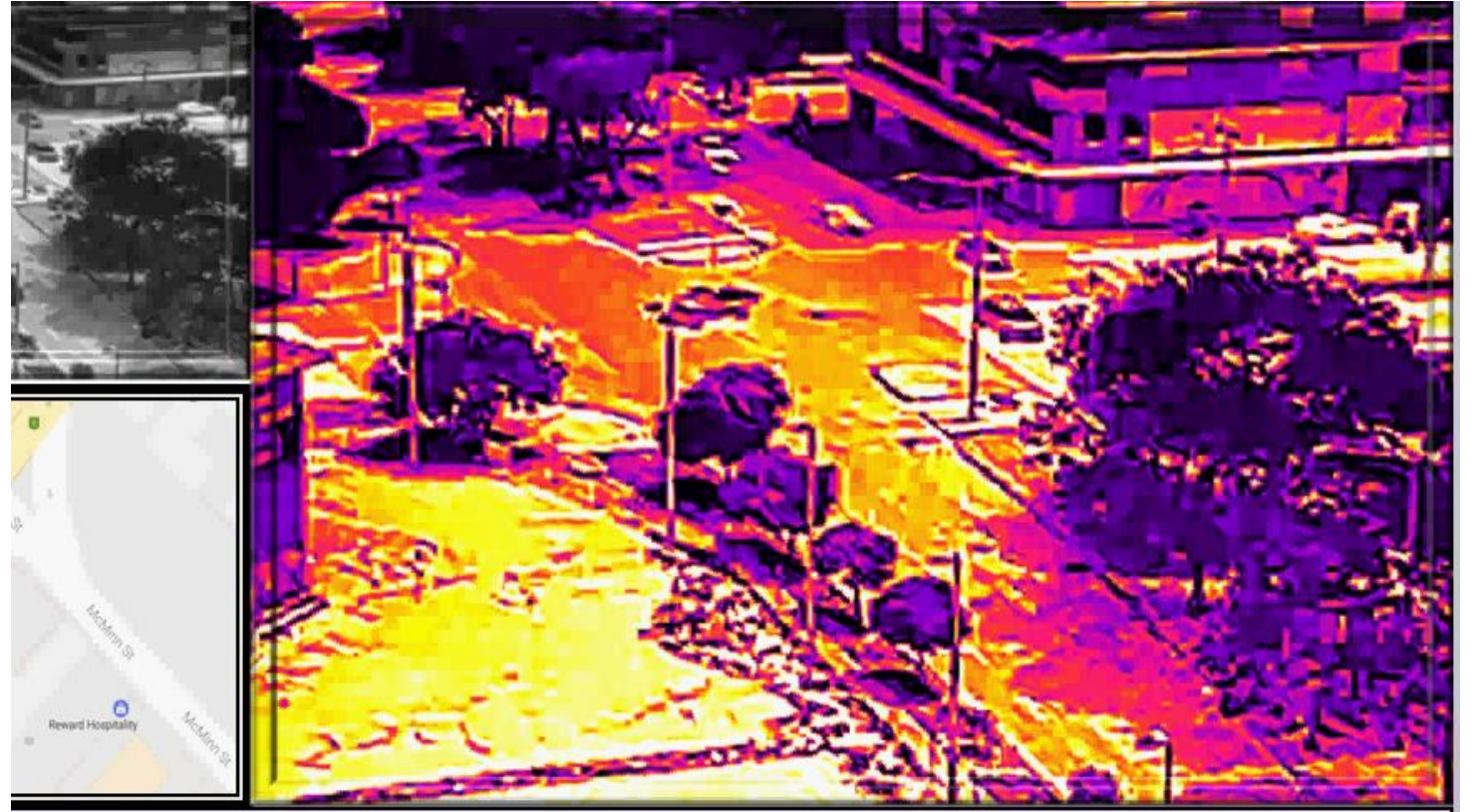
Existing work



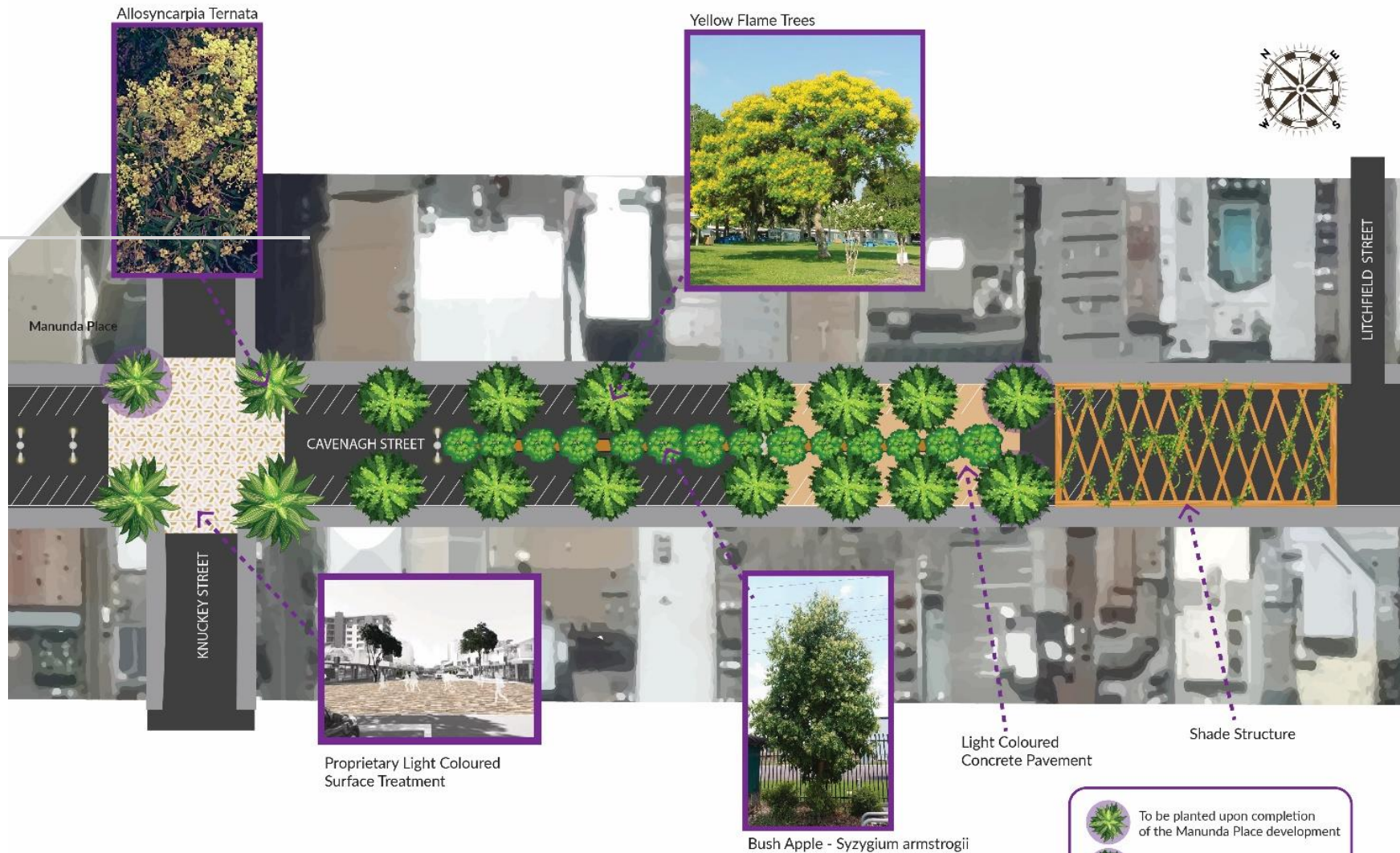
Photo: Tourism NT/Chris Frankenfeld

Previous climate measurements in Darwin CBD

- The Faculty of the Built Environment of the University of New South Wales
- Identification of hot spots
- Evaluation of urban heat island mitigation scenarios
- Propose optimum urban heat island mitigation solutions tailored for the city of Darwin



Cavenagh Street Heat Mitigation



Cavenagh Street Redevelopment STAGE 2

***Artist's impression

Switching on Darwin

- \$10M project delivering smart technology
- Infrastructure deployment completed in May 2019
- Commissioning is ongoing





Potential Strategies



Photo: Tourism NT/Shanaa McNaught

Darwin City Deal Heat Mitigation Strategy

- Darwin City Deal
 - Darwin Living Lab
 - Darwin Heat Mitigation Strategy

Project Partners:

- CSIRO
- Northern Territory Government
- City of Darwin



Heat Mitigation Strategy

Heat mitigation treatments:

- Cool buildings
- Water Features
- Vegetation
- Cool road and paths
- Education and Awareness



Cool Buildings

- Designing buildings to reduce temperatures and increase passive cooling
- Building design can provide numerous opportunities in promoting liveable environments
- The building layout, the location of urban elements, the building height and geometry are variables that condition the thermal performance of the urban area



Photo: Tourism NT/Shanaa McNaught

Water features

- Water bodies and features are well-established as cooling measures
- Natural surface water accumulation, water catchment areas, water sprinkling and evaporative cooling can all reduce the ambient temperature of urban areas
- Water cools the ambient temperature of urban areas in two parallel ways



Vegetation

- Plants mitigate heat because they have high albedos, low heat admittance and regulate air movement and heat exchange
- Larger plants provide shade and plant evapotranspiration cools the surrounding area
- Increased vegetation can decrease the temperature in urban centres
- Urban greening has the added benefits of masking noise, filtering pollutants, stabilising the soil, reducing erosion and improving amenity



Cool roads and paths

- Conventional materials absorb 80-95% of sunlight
 - This increases the temperature
- Alternative materials and shading can increase the albedo (solar reflectance) of urban surfaces
 - Surfaces stay cooler, release less heat and providing an effective cooling option
- Street shading reduces solar radiation from reaching street level



Photo: Tourism NT/Nick Pincott

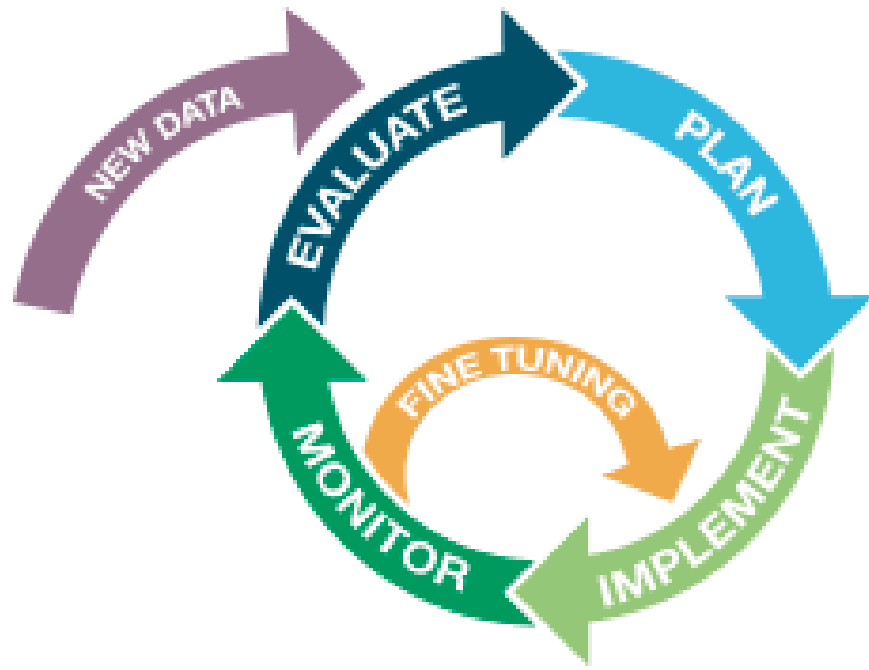
Education and Awareness

- Due to the increase in hot days it is important that the community is informed of how to deal with heat events
- Possible options:
 - Campaigns, fact sheets, online resources and collaborating with already existing community organisations to promote heat awareness
- Communication campaigns on how to stay cool during heatwaves could also be very effective, especially for visitors and the vulnerable



Supporting Research

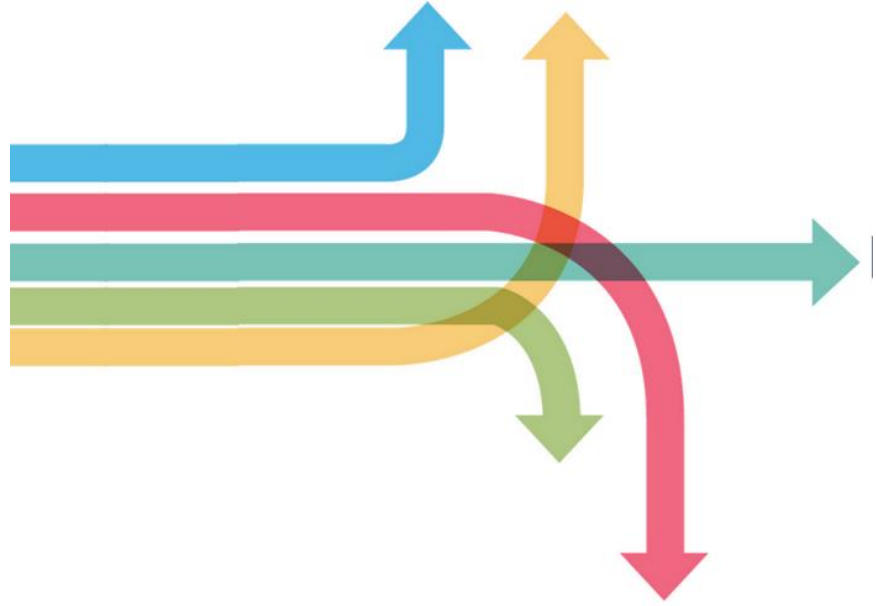
- Landsat 8 land surface temperature estimates for the City of Darwin LGA
- Identification of the socio-demographic and individual risk factors for health impacts during urban heat
- Development of a spatially-explicit model to map patterns of vulnerability and resilience
- Targeted literature review



Adaptive management

Monitoring and Evaluation

- Periodically reviewed
- Analysis of effectiveness of actions shape recommendations for future priorities
- The Heat Mitigation Strategy is an iterative process that combined with experiments, allows us to understand how the combination of actions and strategies affect the ongoing management of city development



Developing Adaptive Pathways

- Darwin is a dynamic city with multiple needs and stakeholders
- Being adaptive will allow the NTG and Darwin City Council to be flexible and respond to new challenges as the climate change into the future



What's next?

How to engage with developing the strategy

- Further consultation to occur early 2020
 - Community engagement and workshops
 - Stakeholder interviews
- Finalisation and release of the heat mitigation strategy in 2020



Photo: Tourism NT/Shana McNaught



Join us for our workshop

- Friday, December 13th 2019
- 8:50-9:30am