Taking action – Where to intervene and what actions are most effective?

Case Study #1 - Australia

Setting UHI targets and quantifying intervention effectiveness

CRC for Water Sensitive Cities

EDGE

Mark Siebentritt and Ma

Urban heat in an Australian context

Like other parts of the world, Australia experiences extreme heat in many of its capital cities

Climate change projections suggest that by the middle of the century, Sydney, Melbourne and Adelaide will experience temperatures exceeding 50’C

The experience of urban heat is made worse by how our cities have grown and are being redeveloped, which encourages the development of urban heat islands

WORLD

Parts of Sydney may be too hot to live in 'within decades'

6:30 pm on 24 January 2021

As the planet warms and summers represent an existential threat to

ANALYSIS

Heatwaves are Australia's deadliest natural hazard and many of us are unprepare

The Conversation / By Andrew Gissing and Lucinda Coates, Macquarie University

Posted Thu 18 Jan 2018 at 1:04pm

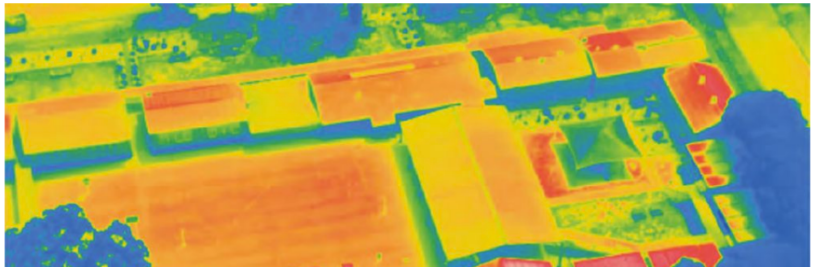
Our climate is going to get warmer, and we need to protect ourselves from heat-related illness. from shutterstock.com

Email

Our climate is becoming hotter. This is our reality. Extreme heat is already
of deaths every year. It's a big environmental killer, an
Australian cities are expected to double in the next 40

Sizzling playground surfaces at Sydney school hit 70C

By Emily McPherson • Senior Journalist | 10:43am Jan 28, 2021



Soaring temperatures could derail Australian sports in the next 20 years, the Climate Council warns

Australian cricket vice-captain Pat Cummins is one of many high-profile athletes to lend their weight behind the report. Source: PA Wire

Urban heat in an Australian context

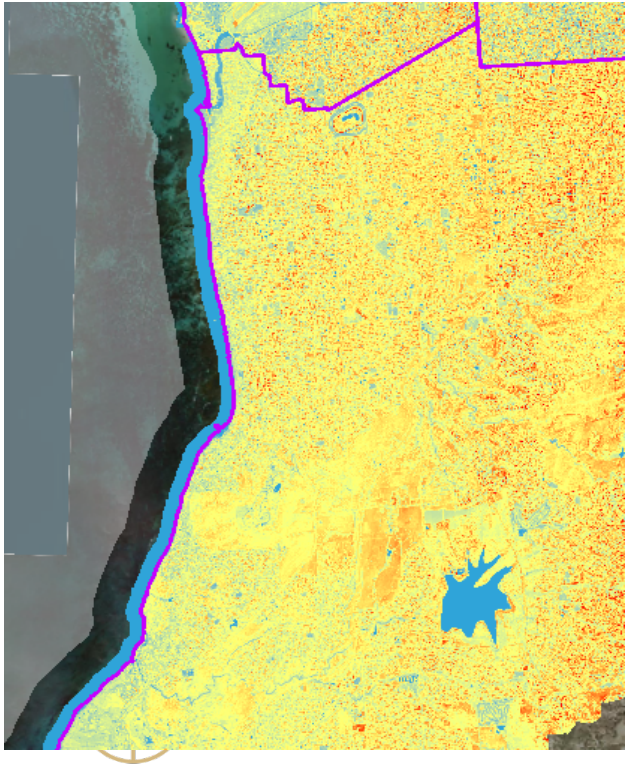
As the science behind the impacts of urban heat grows, decision makers and the broader community are developing a better understanding of why heat needs to be managed

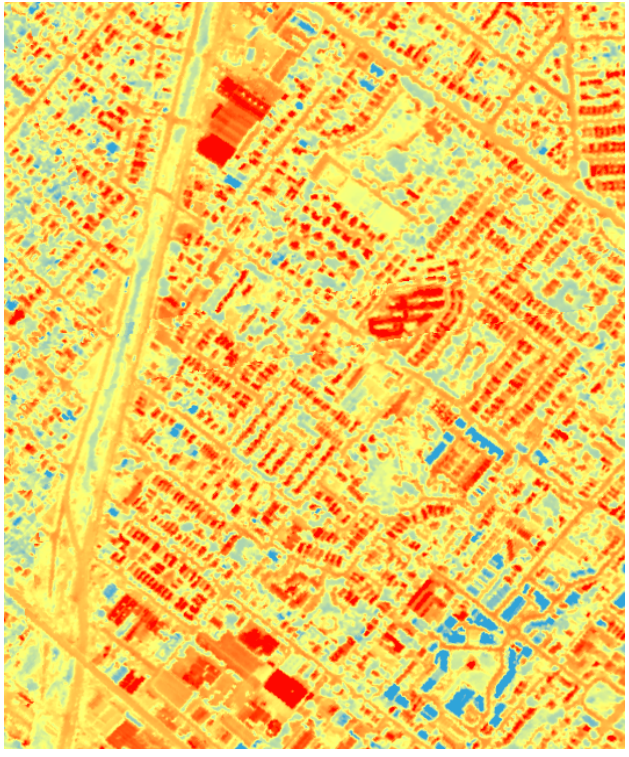
But knowing where to intervene and what actions are most effective is still being resolved

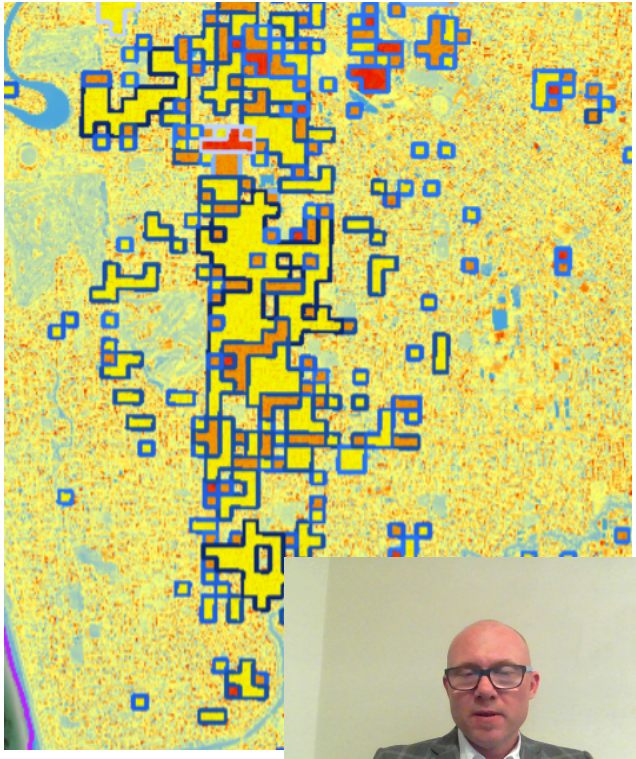
So how is Australia moving from increased awareness to action on ground?

Case study #1 – Material selection impacts on surface temperature

Heat mapping has led to increased awareness



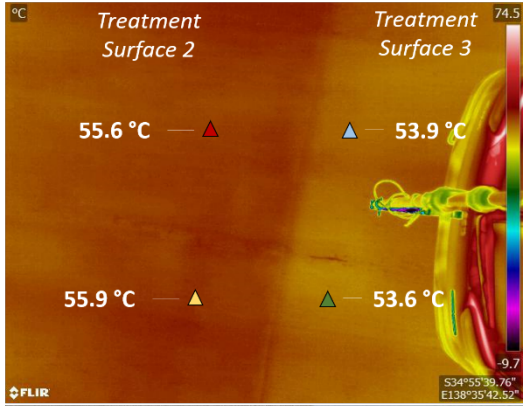


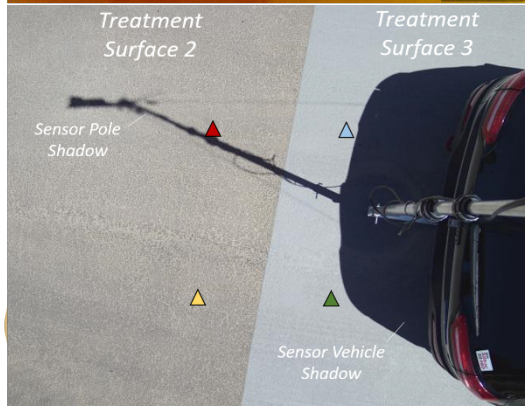


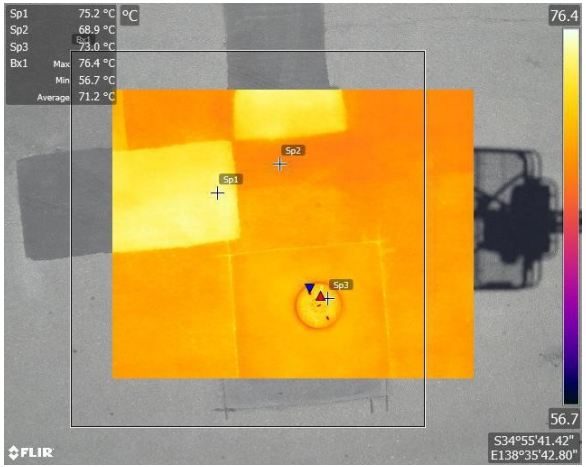
2 m resolution thermal data

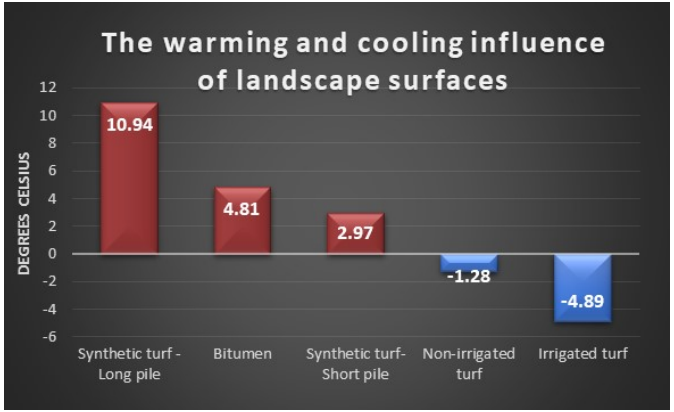
Social vulner

Understanding the impact of material selection on temperature

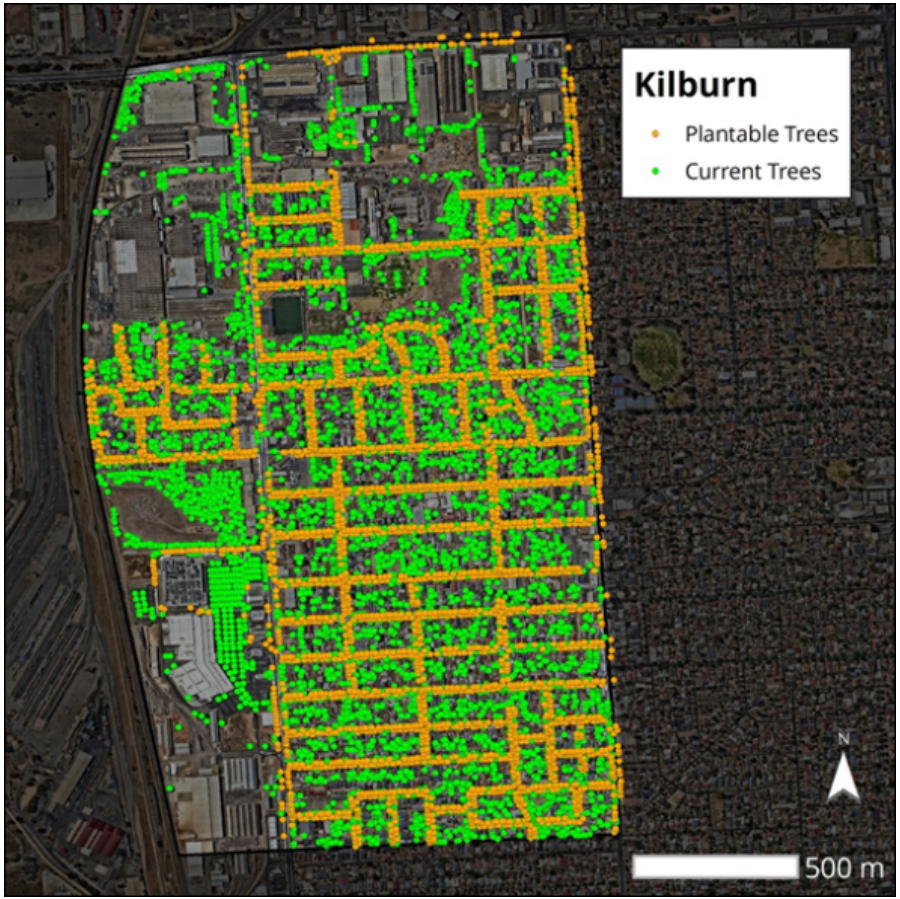






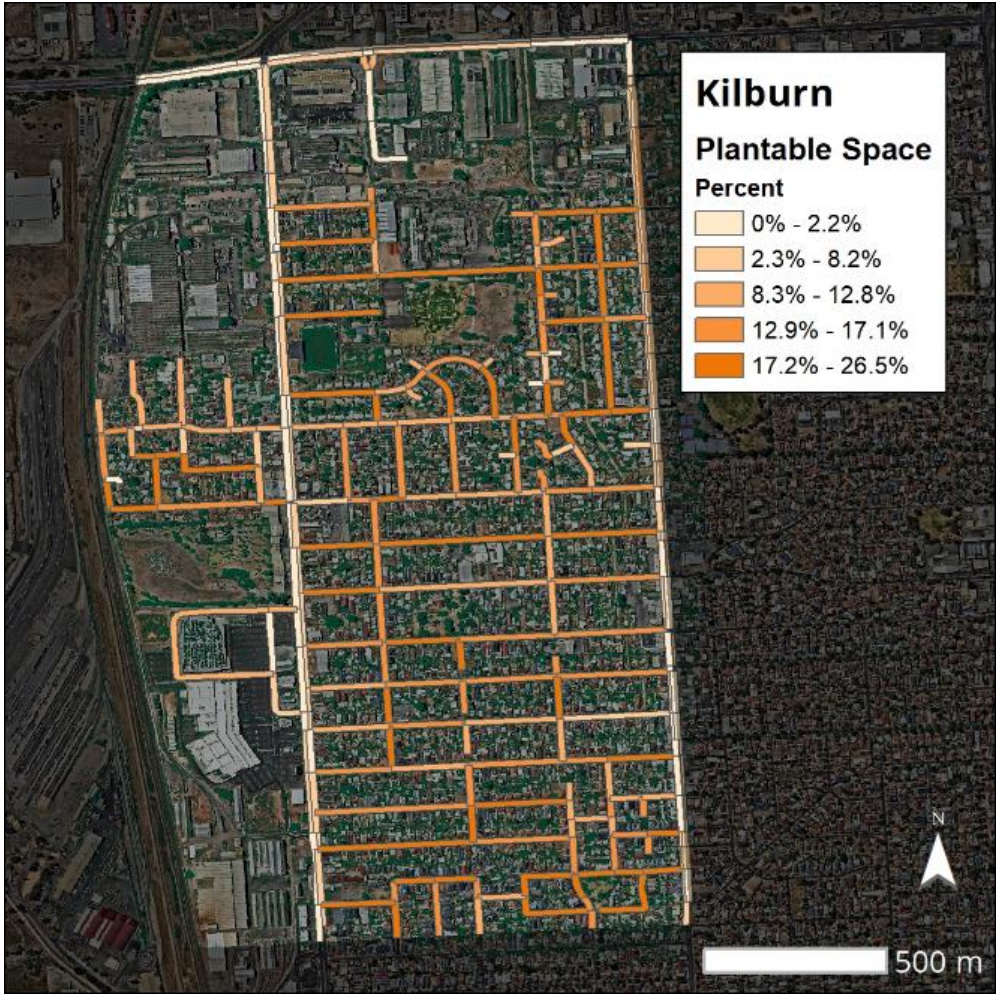


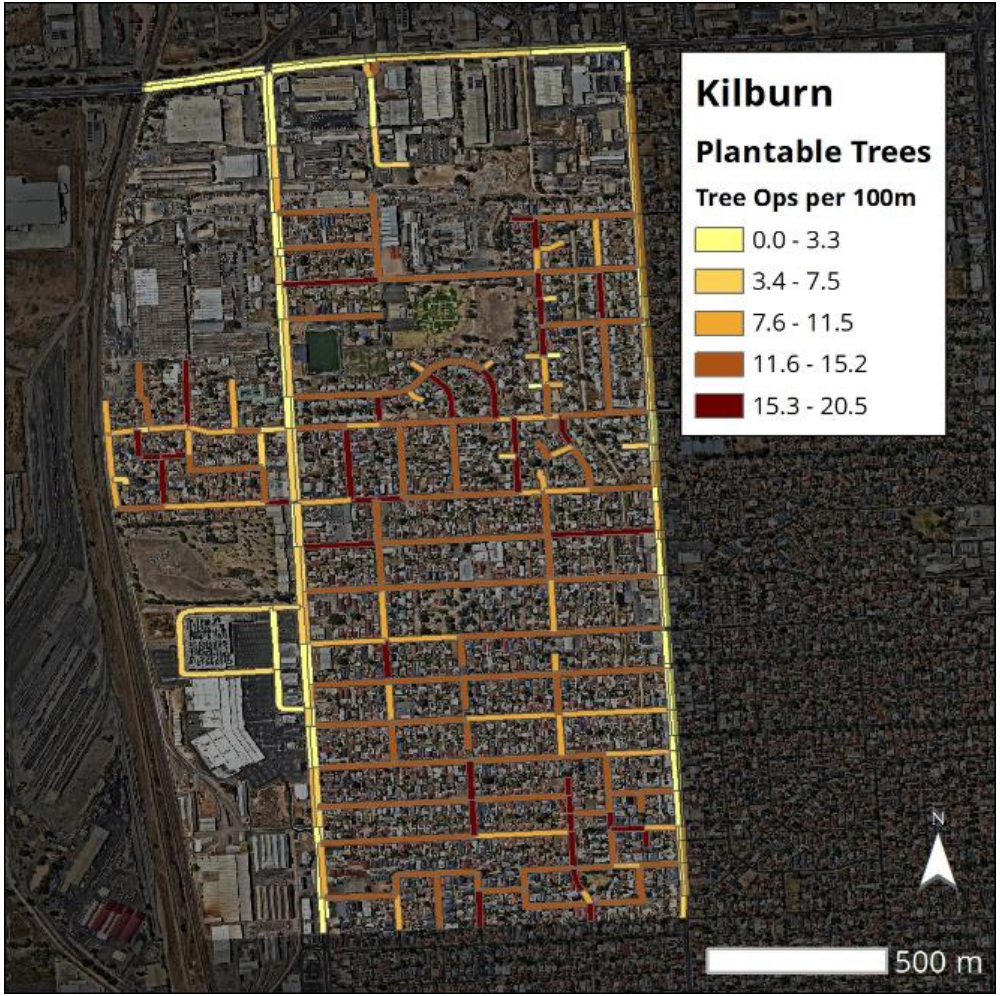
Case study #2 – Using urban heat data to inform streetscape planning

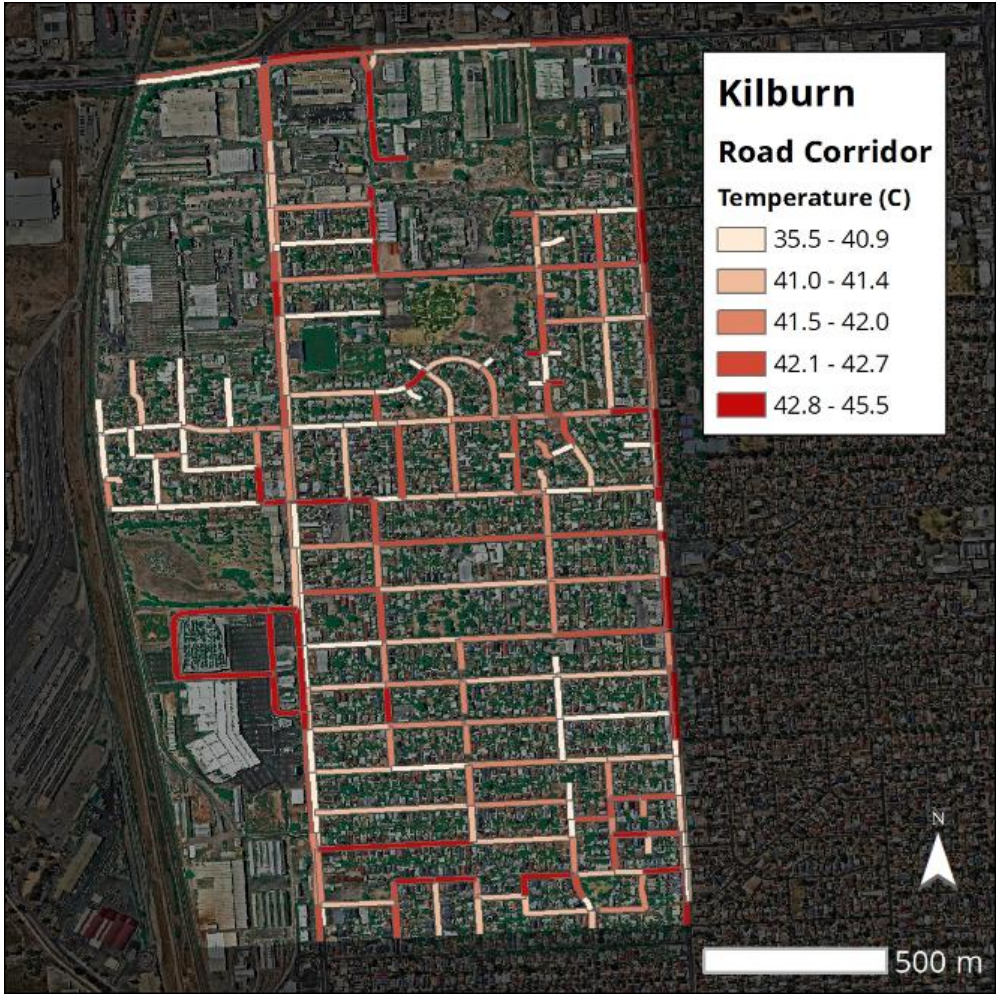


Tree inventory and plantable opportunities map

Plantable space could be planted with an additional 3,307 trees, identified as “plantable opportunities”.


Kilburn
Plantable Space
Percent
0% - 2.2%
2.3% - 8.2%
8.3% - 12.8%
12.9% - 17.1%
17.2% - 26.5%
N
500 m


Kilburn
Plantable Trees
Tree Ops per 100m
0.0 - 3.3
3.4 - 7.5
7.6 - 11.5
11.6 - 15.2
15.3 - 20.5
N
500 m


Kilburn
Road Corridor
Temperature (C)
35.5 - 40.9
41.0 - 41.4
41.5 - 42.0
42.1 - 42.7
42.8 - 45.5
N
500 m

Locations of top 100 priority plantable spaces.

Road Name	Top 100 Plantable Opportunities	Average Temperature (C)	Average Canopy (%)	Total Plantable Opportunities
PROSPECT	25	44.89	5.26	201
NORTHCOTE	13	44.63	5.81	115
CHURCHILL	10	44.65	4.33	165
LEICESTER	10	46.29	13.47	28
BROOKLYN	9	45.57	11.17	89
NELSON	5	45.48	9.58	84
SOLENT	4	45.74	12.97	36
BLACKBURN	3	45.60	12.68	31
CROMWELL	3	45.39	12.85	123
LE HUNTE	3	46.36	13.26	117
WATTLE	3	44.98	10.63	22
BREYNARD	2	46.18	13.43	16
GOODMAN	2	45.45	9.11	91
GRAND JUNCTION	2	46.49	8.78	46
HASTINGS	2	44.83	5.13	18
BRUNSWICK	1	45.22	11.64	114
CARROLL	1	45.47	13.12	52
GLADSTONE	1	46.60	13.82	110
HORLEY	1	44.63	9.64	54

Objective:

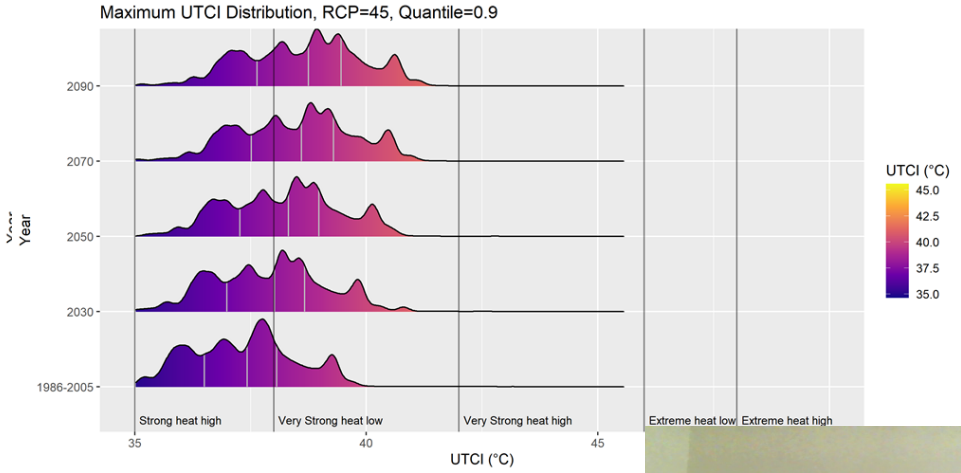
For this project we need to identify how many trees can be planted per year, and ideally generate a multi-year planting schedule.

Factor in what is optimal from a coordination perspective e.g. does it make sense to plant up streets in a similar location?

Case study #3 – Landscape planning approaches

Urban heat landscape planning approaches

New and emerging assessment tools for urban cooling strategies (example: WSC Scenario Tool)



Cool Suburbs Project: Tool development

1. Reviewing the science

- Review the evidence for the most effective interventions to contribute to urban cooling, adapting and responding and
- Translate findings into metrics

2. User and business needs

- Evaluate business and user needs for the tool to determine workflow
- Ensure stakeholder requirements are met

3. Tool development

- Develop ‘design support tool’ that will provide a rating of the resilience of a place to extreme heat compared to ‘business as usual’
- Test and refine tool prototype
- Finalise

Key tool development considerations:

- Open access ✓
- Industry, government and community engagement ✓
- Tool alignment (BASIX, Landcom PRECINX, GBCA Greenstar, etc.) ✓

Urban heat landscape planning approaches

Urban Cooling Rating Tools (example: *Cool Suburbs Rating Tool)

* in development

1. **Awareness** involves assessing the physical conditions in the area, and the vulnerability of residents and urban infrastructure to heat.
2. **Reduce:** this involves reducing average ambient temperatures as much as possible in the design and making of the physical environment.
3. **Adapt:** At most, we can reduce heat at the city scale by only approximately 2°C, so it is also important to design to help people survive heatwaves and thrive in hotter conditions.
4. **Respond**: There will still be residual heat-related risk in extreme events, and therefo[illegible] need emergency preparedness an[illegible] measures, particularly to help [illegible] vulnerable people in the community.

Urban heat landscape planning approaches

Urban Cooling Rating Tools (example: *Cool Suburbs Rating Tool)

* in development

Credit categories and credit names	Reduce	Adapt		Respond
		Thrive	Survive	
Urban Design Credits:				
UD1: Wind Paths	X	X	-	-
UD2: Wind Buffering/Filtering	X	X	-	-
UD3: Street Canyons	X	X	-	-
UD4: Green and blue open space	X	X	-	-
UD5: Retention of existing tree canopy	X	X	-	-
UD6: Water Sensitive Urban Design	X	X	-	-

Urban heat landscape planning approaches

Urban Cooling Rating Tools (example: *Cool Suburbs Rating Tool)

* in development

Credit categories and credit names	Reduce	Adapt		Respond
		Thrive	Survive	
Cool Streets Credits:				
CS1: Shade	X	X	-	-
CS2: Evaporative Cooling (Irrigation)	X	X	-	-
CS3: Cool Pavements	X	X	-	-
CS4: Porous Pavements	X	X	-	-
Cool Parks Credits:				
CP1: Shade	X	X	-	-
CP2: Evaporative Cooling (Irrigation)	X	X	-	-
CP3: Cool Pavements	X	X	-	-
CP4: Porous Pavements	X	X	-	-

Urban heat landscape planning approaches

Urban Cooling Rating Tools (example: *Cool Suburbs Rating Tool)

* in development

Credit categories and credit names	Reduce	Adapt		Respond
		Thrive	Survive	
Cool Buildings Credits:				
CB1: Site Coverage	X	X	-	-
CB2: Site Shade	X	X	-	-
CB3: Site Irrigation	X	X	-	-
CB4: Passive Cooling	-	X	-	-
CB5: Cool Envelope (including green roofs/walls)	X	X	-	-
CB6: Cool Pavements	X	X	-	-
CB7:Porous Pavements	X	X	-	-
CB8: Alternative energy supply	-	X	X	-

Urban heat landscape planning approaches

Urban Cooling Rating Tools (example: *Cool Suburbs Rating Tool)

* in development

Credit categories and credit names	Reduce	Adapt		Respond
		Thrive	Survive	
Innovative New Technology Credits:				
INV1: New technologies	X	X	-	-
INV2: Data Collection and Analytics	-	X	-	X

Urban heat landscape planning approaches

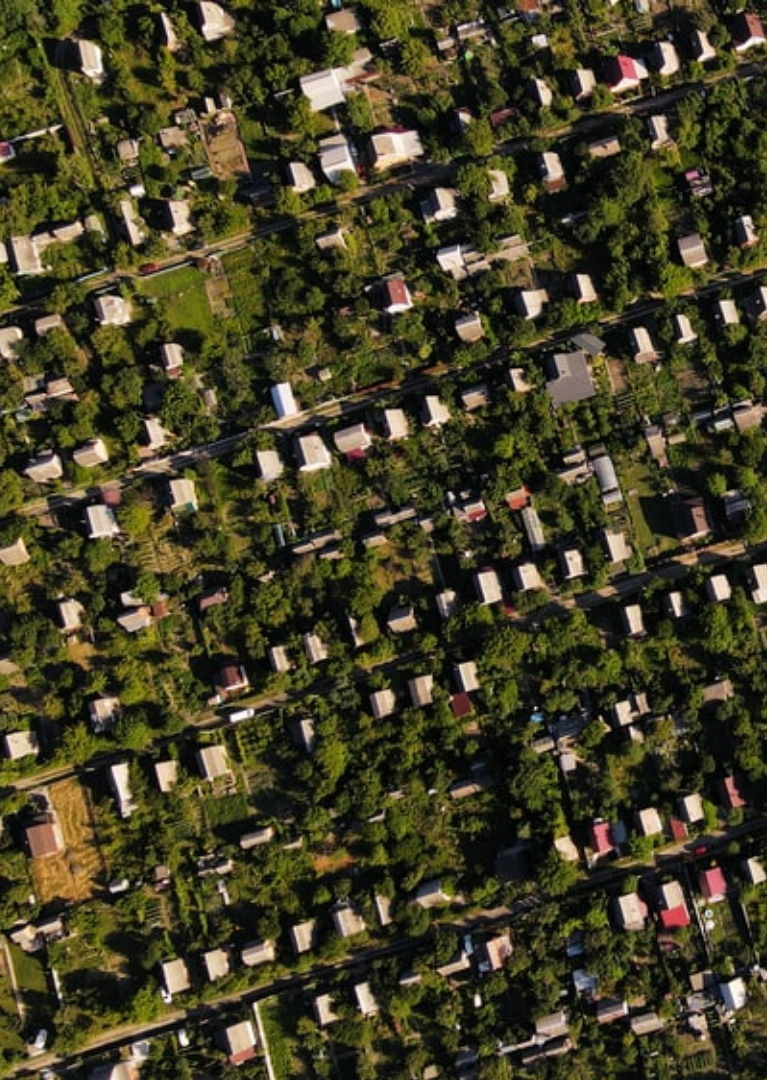
Urban Cooling Rating Tools (example: *Cool Suburbs Rating Tool)

* in development

Categories and credits

Each credit is structured as follows:

- Outcome of Credit: Outlines the issue that the credit is targeting, the guiding principles behind the credit, and the desired outcomes of the credit.
- Credit Criteria: Explains requirements that must be met and proposed pathways to achieve these.
- Applicability and guidance: Describes the method for demonstrating compliance with the 'Credit Criteria'. It includes relevant standards and references. The guidance in this section also provides additional information relevant to demonstrating the credit outcome and criteria have been met.



Summary

1. **Urban heat mapping has provided an entry point for awareness raising**

2. **Land surface temperature data has started to inform more onground action, from material selection to tree placement**

3. **The focus is moving to landscape scale panning approaches that integrate multiple drivers of heat in a way that is a resilience approach**

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Santiago

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