Adelaide Airport heat reduction trial

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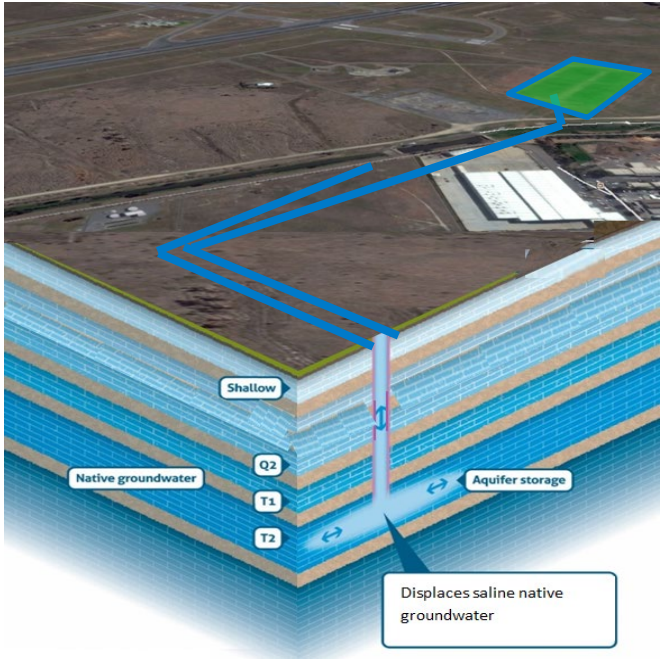
SA Water

Introduction

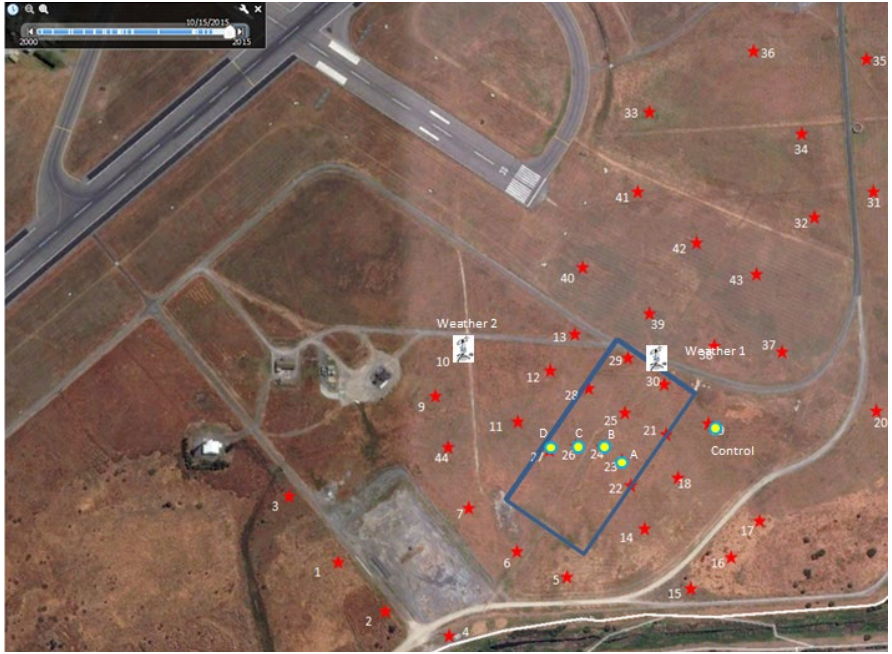
- A four hectare trial using alternative water to demonstrate cooling affect of irrigated vegetation
- Data being used to determine the benefits obtainable from this method

Trial water source

- Trial using stormwater for the first stage (from ASR scheme)
- Using around 20ML/year
- Expansion of the trial would require the use of recycled water (up to 1.5GL/year)
- Stormwater will always play a part
  - Shandying to reduce salinity
  - Use of airport run-off to reduce costs



Monitoring equipment



Unirrigated vs. Irrigated: Spatial difference

Unirrigated area

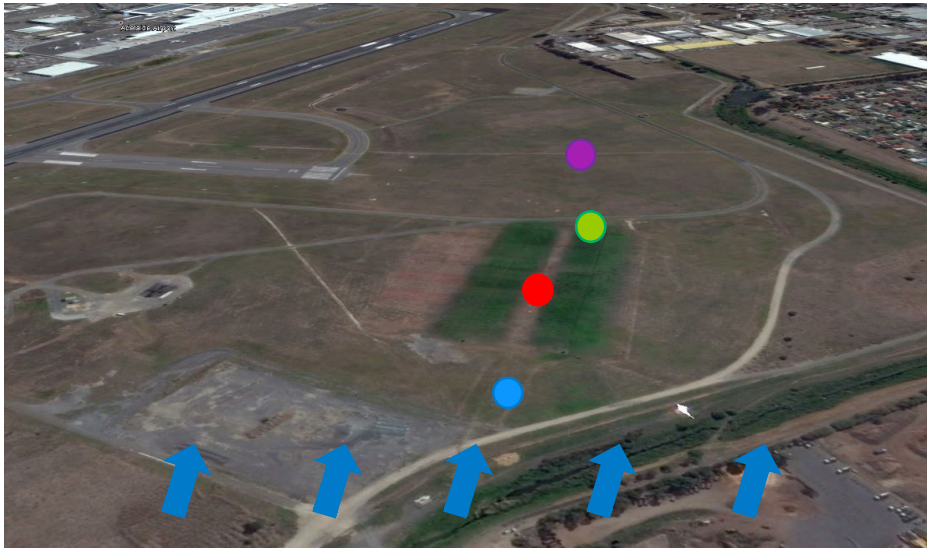
Irrigated area

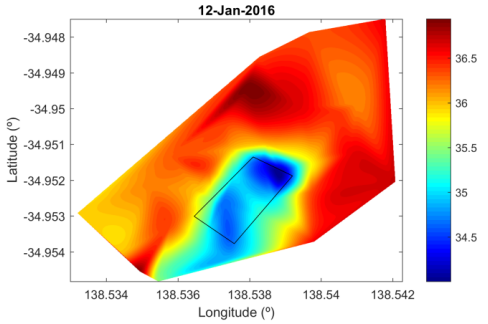
Before and after: Temporal difference

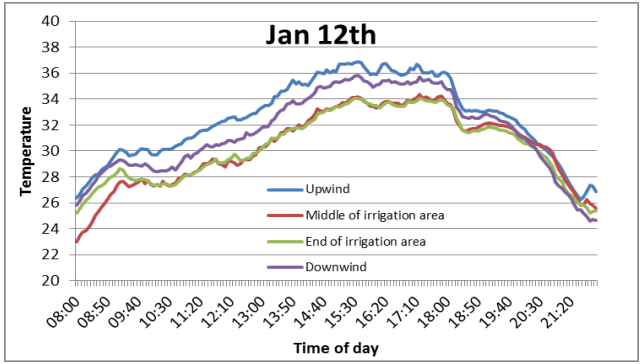
Start of trial

3 months later

Daily temperature readings: Hot day

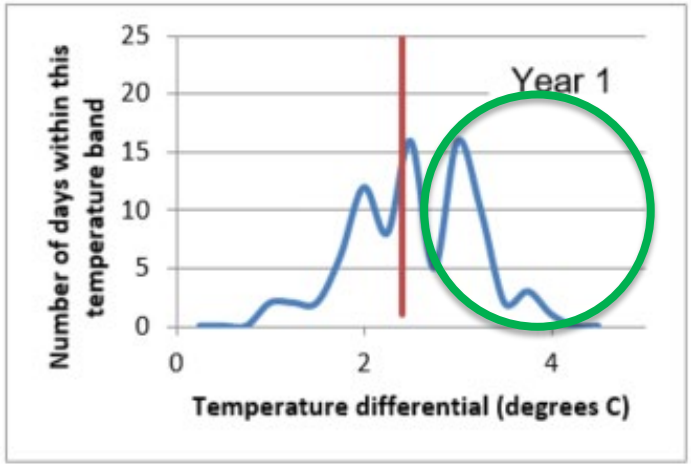


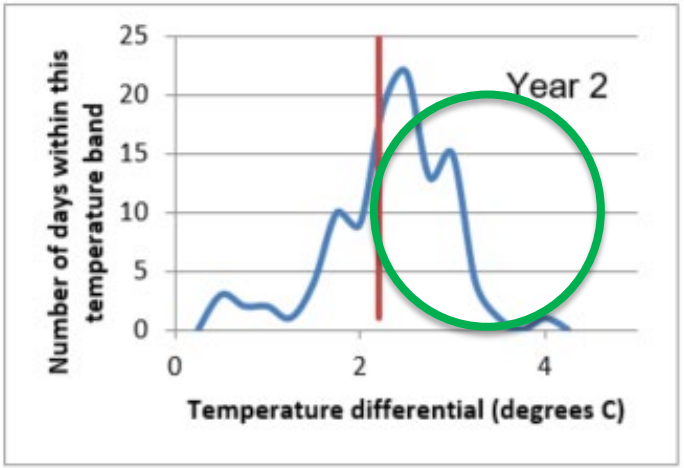




Air temperature during irrigation season

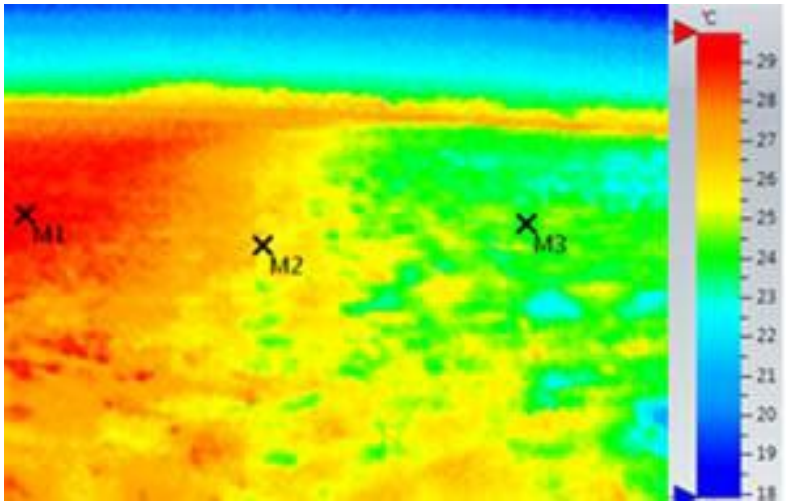
The average temperature difference was 2.4 degrees Celsius in Year 1 and 2.2 degrees Celsius in Year 2.





Surface temperature

More than 8 degrees Celsius difference between irrigated and unirrigated plots.

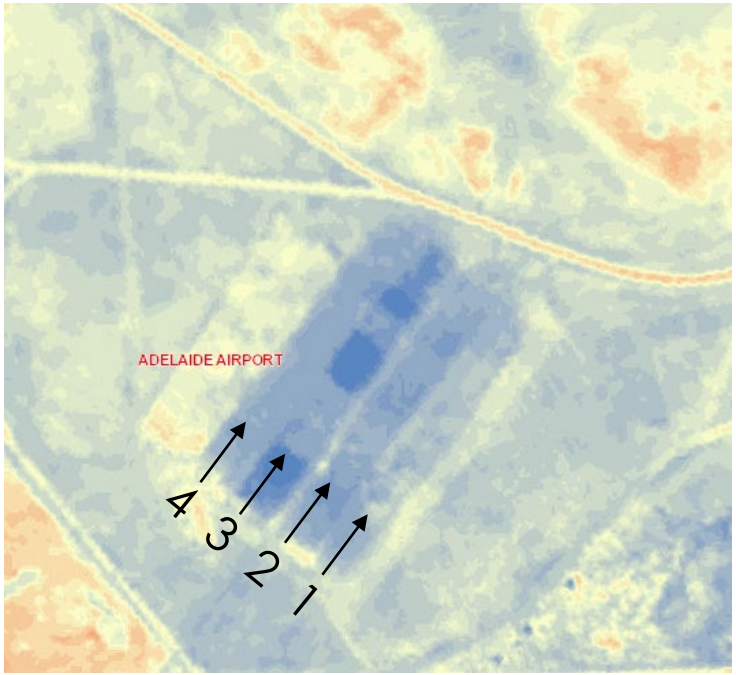


Surface temperature

Aerial heat map

Surface temperature

- 50 shades of blue
- Area 1 contains the “irrigated control”
- Area 3 contains three good areas of lucerne
- This demonstrates that just adding water is only half of the story



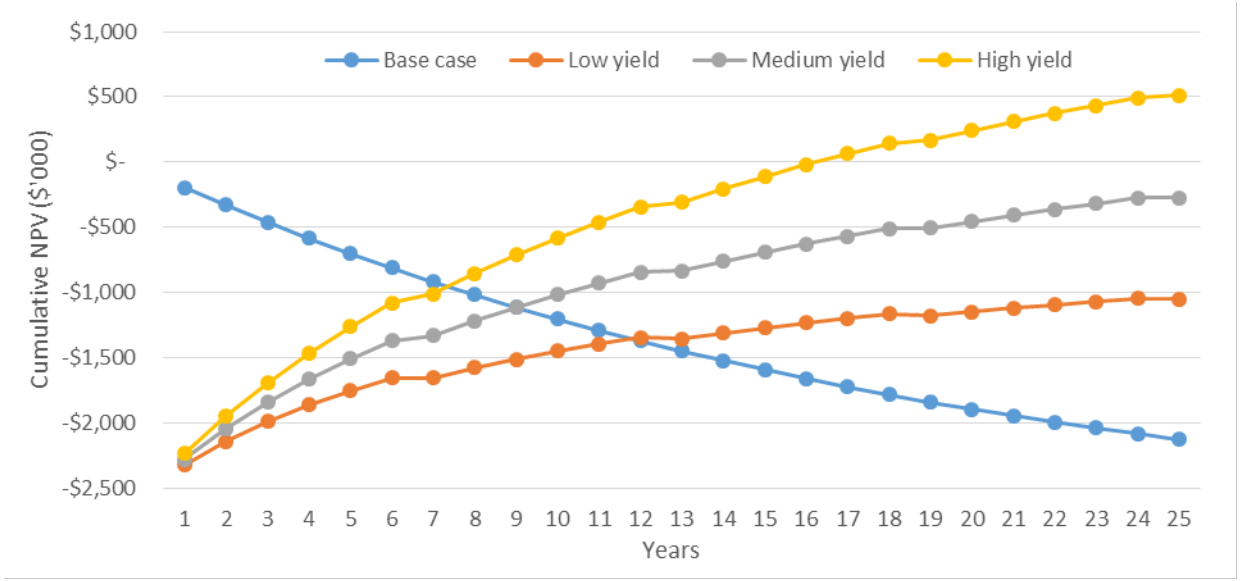
Economic analysis

- Used a number of assumptions
  - Reaching a stable temperature reduction of 4 degrees Celsius
  - Consistent through the vertical temperature profile
  - Airline would undertake some behavioural change (acknowledge the temperature reduction in flight plans)
- Focused on the benefit to airport operations and aircraft performance

Stantec

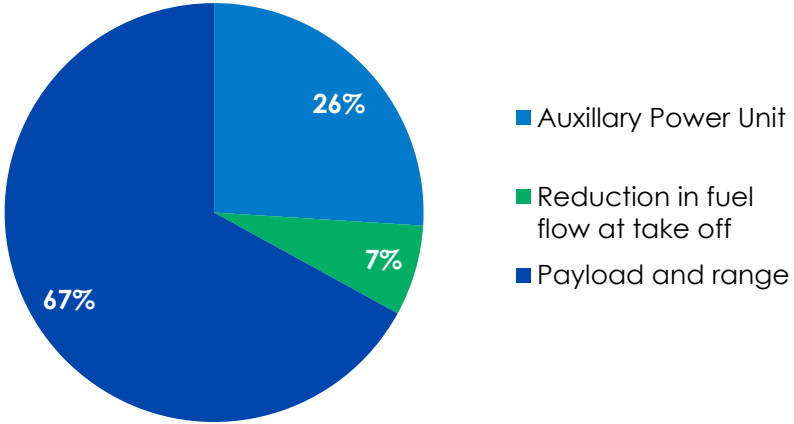
Airport operations benefit

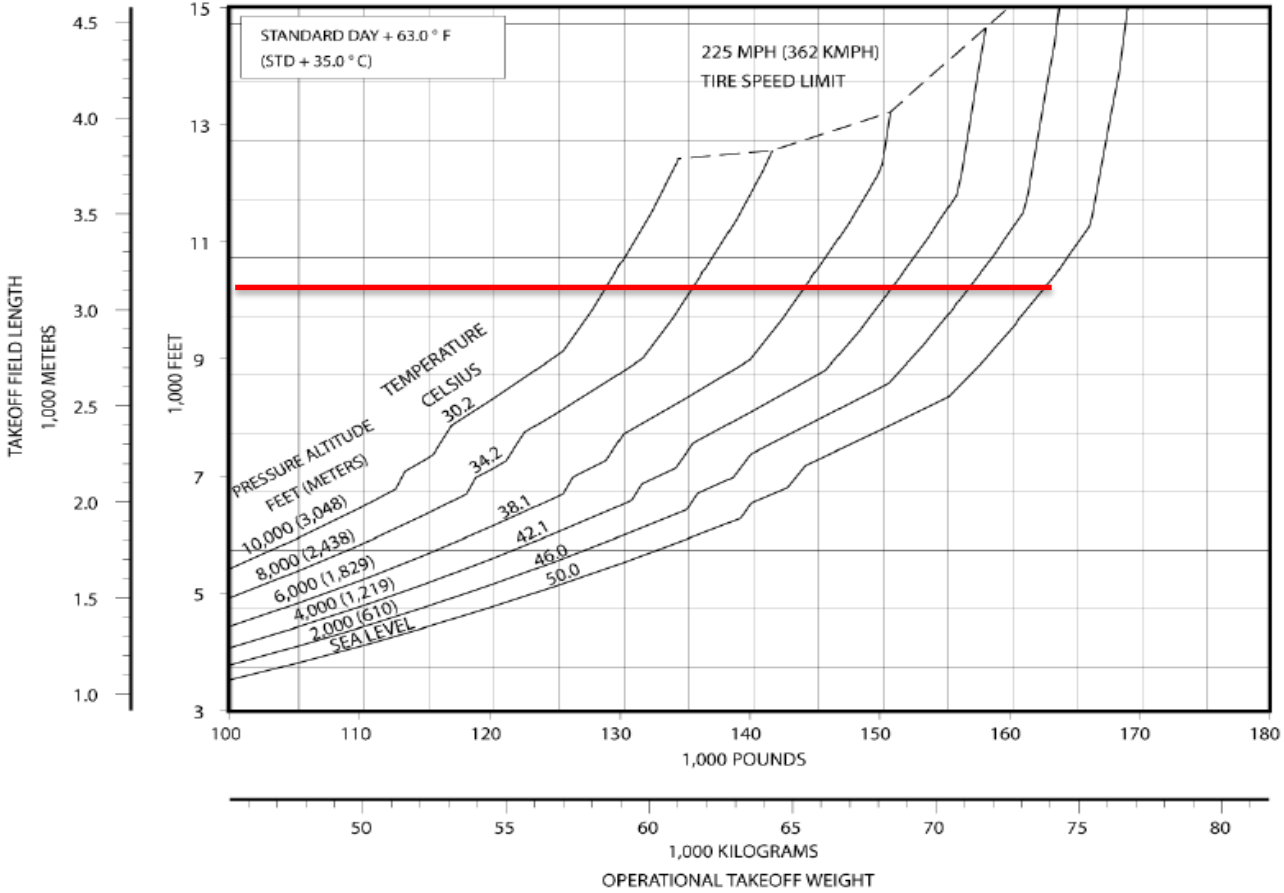
Lucerne production



Aircraft performance

- Main benefit – payload retention on hot days
- Some benefit reduction in fuel and APU usage





Other benefits not quantified

- Wear and tear on aircraft tyres, brakes and engines
- Reduction in energy in airport terminal cooling towers
- Improved aesthetics and customer experience
- Reduction in wildlife risk
- Reduction in risk of flight cancellations

Benefits with full expansion

IMPROVED CUSTOMER EXPERIENCE

REDUCED AIR TEMPERATURE

REDUCED RUN TIMES IN COOLING TOWERS

REVENUE FROM SALE OF RECYCLED WATER

IMPROVED AIRCRAFT PERFORMANCE

REVENUE FROM SALE OF CROP

REDUCED DISCHARGE TO SEA

REDUCED WILDLIFE RISK

Next steps and way forward

- Determine carbon farming benefits
- Discuss willingness to invest with airlines
- Undertake modelling to improve cooling
- Spread the word
- Applying to other settings – private and public open space

Questions?