Responding to heat stress in flying-fox camps

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Flying-fox die-offs are an important wildlife management issue

- Extreme heat events are a major cause of death for flying-foxes (Tidemann & Nelson 2011)
- They can place enormous demands on land managers and wildlife carers
  - There is an urgent need to streamline management responses!

Welbergen et al, The Conversation 24-2-2014
Responding to flying-fox heat stress events

Before

During

After
Responding to flying-fox heat stress events

Before | During | After
• Built in collaboration with the University of Melbourne, CSIRO, and the Australian Bureau of Meteorology

• Predicts up to 72 hours into the future where known flying-fox roosts are likely to be exposed to extreme heat (T > 42°C)

• Mortality forecasts have high accuracy (24 hrs = 77%; 48 hrs = 73%, as tested against past mortality data)
Before - The flying-fox heat stress forecaster

Outputs

- **Maps** of affected areas
- **Lists** of priority colonies (ranked by date, temperature, size)
- **Temperature profiles** of priority colonies

Outputs help direct wildlife carers, land managers, and health officials towards where and when flying-fox die-offs are likely to occur.
Responding to flying-fox heat stress events

Before

During

After
Spraying of individuals by hand can cool highly distressed animals.

But can disturb other bats.

During spraying,
During - wholesale misting of camps

- Decreases temperature but raises humidity, which risks a *net increase* in heat stress for the bats
- Effectiveness not proven at present
- Can disturb bats!
Entering a camp may lead to increased heat stress and mortality when animals are forced to leave their cooler microhabitats.

Disturbance is a serious issue and should not be underestimated.
Many animals will recover without intervention.

All heat stressed individuals in this cluster of young survived 47° C
At very high temperatures it is not clear whether the benefits of intervention to individuals outweigh the risks posed by disturbance to the colony.

Therefore, it is precautionary not to intervene, unless animals are still unresponsive after temperatures have dropped below ~37°C.

During - removing animals from a camp
Responding to flying-fox heat stress events

Before

During

After
Citizen Science Data:

- Contributes to more effective management
- Improves the heat stress forecaster
- Helps create a better understanding of the long-term impacts on flying-foxes
After – disposal of bodies

• Dead bodies should quickly be collected by ABLV vaccinated people and with appropriate PPE

• Carcasses can be dropped at registered landfill sites

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