'Spycams' to help protect native trees and wildlife

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Scientists are using 'spycams' as a cheap, accurate way to watch over Australia's native forests and woodlands as they come under increased pressure from climate change, feral animals and bushfires.

Using cameras to capture images of trees at specific time intervals,

researchers are developing a detailed view of how Australia trees respond to environmental stress.

This information can then be used to help protect the trees – and in turn, the animals and birds that depend on them for food and shelter – from droughts, fires, rising temperatures, weeds and feral animals, says Dr Tim Brown of the Australian Centre for Ecological Analysis and Synthesis (ACEAS) and The Australian National University (ANU).

In today's ACEAS Grand Workshop, held at the Shine Dome in Canberra, Dr Brown will discuss how Australia can use the leading-edge surveillance technology at a nationwide scale to monitor and manage the natural environment cost-effectively.

"The conventional way to track the changes of landscapes and forests is through satellite surveillance, or else a researcher going into the field and observing the trees one by one," says Dr Brown.

"However, satellite images don't always provide sufficiently high quality data due to low resolution, or cloud cover. At the same time sending teams of scientists into the field is expensive and takes a lot of valuable time."

A network of 'phenocams' – cameras that monitor life cycle changes in living things – spread across the continent could provide invaluable, up-to-the-minute reports on environmental changes and their effects on tree growth, he suggests.

Dr Brown explains that setting up cameras to continuously capture photos is a cheaper and easier way to monitor the trees. "You can set up a camera on a tower, or place trail cameras around the area. This provides consistent, clear images– we're talking about photos of millions of pixels for an area that might only be one or two pixels in a satellite image."

"Trees in Australia change a lot as they adapt to their environment – they just do so subtly," he says. "For instance, the colour changes of our tree

leaves are more subtle than in temperate forests of the northern hemisphere – but it can still be seen with a camera.

"So it's important to monitor the lifecycle of individual trees for information that we can't get otherwise."

Dr Brown explains that by matching the images to what's happened in an area, such as changes in rainfall or soil salinity, invasion by feral animals or weeds, or bushfire impacts, scientists can pinpoint trees that are doing better than others, and learn why.

"It's also crucial to find out which trees or forests might survive best under future climate conditions," he says.

"In addition, having a 'zoom-in' view of individual trees, as opposed to the whole forest, can help us identify specific trees that might have the genes to fight water shortage or rising temperatures. We can select seeds from those trees to replant forests that are better adapted for future climate.

"All this information allows us to better understand our native trees, manage them better and at less cost, and help protect them against future shocks."

Dr Brown says it is vital that Australia takes a systematic approach to nationwide phenocams. "If we're going to set up 100s or thousands of cameras at sites across Australia, we need a standardised approach that will yield photos everyone can interpret and use. We can then quickly identify any patterns or changes, and better protect our native trees and wildlife."

The Australian Centre for Ecological Analysis and Synthesis (ACEAS), a Facility of the Terrestrial Ecosystem Research Network (TERN) is the

nation's leading facility for collecting and analysing ecological data to help managers design better environmental conservation policies at local, regional and continental scales.

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