



SAVING OUR SPECIES

Post-fire recovery of Mount Canobolas' unique threatened species

2018–19 annual report card

Summary

Action implementation	7 out of 9 research actions were fully or partially implemented as planned for the financial year
Total expenditure	\$26,620 grant + \$7972 in kind
Partners	National Parks & Wildlife Service, University of New England



Project name:

Post-fire recovery of Mount Canobolas' unique threatened species

Funding stream:

Science and research

Fire impacted *Eucalyptus canobolensis*. Photo: Heidi Zimmer

Post-fire recovery of Mount Canobolas' unique threatened species

Project description

Mount Canobolas is one of the highest peaks (1392 m) between the Blue Mountains and the Indian Ocean. Approximately 70% of the Mount Canobolas State Conservation Area was burnt in February 2018 wildfires. The large area of remnant vegetation (1672 ha) of this eroded shield volcano has considerable topographic relief. Not surprising it contains a suite of rare habitats and unique threatened species, including the only population of the Critically Endangered *Prostanthera gilesii*, which was entirely burnt in the fire. Many of the species and communities endemic to Mount Canobolas are poorly known and were extensively affected by the fire; for example, the *Xanthoparmelia* lichen community (XLC) (an endangered ecological community, includes three lichen species described since 2014; McCarthy and Elix 2014, 2016) and the Endangered *Eucalyptus canobolensis*.

This project aims to:

- determine the extent to which *Prostanthera gilesii* and *Eucalyptus canobolensis* resprout or seed
- monitor the fire responses of *Prostanthera gilesii* and *Eucalyptus canobolensis*
- assess the impact of fire on XLC
- make recommendations for management in this crucial post-fire period.

In addition, this project aims to inform management of Mount Canobolas' endemic threatened species into the future. This project will monitor the recovery of the natural population of *Prostanthera gilesii*, as well as gathering information to support establishment of a new *P. gilesii* population(s). Establishment of new populations using translocation is one way to reduce extinction risk from a single catastrophic event (e.g. fire or disease) in species limited to a single location, such as *P. gilesii*.

This project will also partner with University of New England (UNE) in a genetic analysis project to define the morphological characteristics and geographic distribution of *Eucalyptus canobolensis* (compare with closely related *E. rubida*) – current uncertainty in which has the potential to cause management inefficiencies. This work is timely because the February 2018 fire has triggered resprouting, providing abundant coppice material, which is key to identification of *E. canobolensis*.

Target threatened species, communities, and threats

Target threatened species and communities are:

- *Prostanthera gilesii*
- *Eucalyptus canobolensis*
- Mt Canobolas *Xanthoparmelia* lichen community

Outcomes or major successes

Prostanthera gilesii

We have permanently tagged the 158 resprouting *P. gilesii* individuals and are monitoring their growth and survival. Already we have seen the emergence of new plants and growth of additional stems, as well as plant losses – many due to movement of soil downslope in the site (attributed to rainfall events and possibly wombats).

We are also monitoring blackberries, which increased at the site over the warmer months, but have decreased going to winter. We are excited to see the 158 putative *P. gilesii* individuals (whether plants are true individuals or not will be revealed by genetic analysis), where initially we were concerned the species had been locally extirpated. Samples of a subset of wild *P. gilesii* were taken for genetic analysis, along with *ex situ* plants.

Tracking down *ex situ* collections has also been an important part of this project, with plants as far afield as in Tasmania. We are hopeful that at least one of the *ex situ* collections will be representative of the smaller *P. gilesii* subpopulation which has not recovered from the fire. The samples were sent to DArTseq (a genotyping-by-sequencing platform) for analysis in early May. Once we have the results from the genetic analyses, we will be able to move forward with translocation if this is deemed the best course of action.

Xanthoparmelia lichen community

We have established a system of permanent quadrats to monitor the lichen community on the summit of Mount Canobolas. Quadrats are 50 cm x 50 cm and marked with a bolt inserted into the rock. The quadrats span four treatments: i. rock; ii. gravel habitat reference sites; iii. burnt sites; and iv. sites affected by PhosChek fire retardant.

Considerable time was spent attempting to identify individual lichen species, without much success, as it requires a microscope and chemical reactions, as well as experienced eye. Retired Professor Jack Elix, who described the lichens of Mount Canobolas, was very helpful with identification when specimens were brought to him at Australian National Botanic Gardens in Canberra, but it is infeasible to rely on Jack for all species identifications.

We have decided to proceed with measuring the changes in abundance of morphotypes and individuals using image analysis software, which can identify morphotypes using small changes in colour.

Eucalyptus canobolensis

A system of permanent plots has been established based on the existing system of plant survey quadrats. In addition, we have used data collected for the Saving our Species (SoS) site managed species project for *E. canobolensis*. Analysis has revealed correlations between fire severity, tree size and resprouting.

Research communication and engagement

We have completed a report on fire response of Mount Canobolas threatened plants (*Prostanthera gilesii*, *Eucalyptus canobolensis* and *Xanthoparmelia* spp.).

Scientific manuscripts on *P. gilesii*, *E. canobolensis* and the *Xanthoparmelia* community will be developed in the coming financial year (although they may not be published within the coming financial year).

Investment

Participant	Cash	In-kind
Department of Planning, Industry and Environment	\$26,620	\$7,972

Research actions

Research action	Implemented as planned?
Monitoring of <i>P. gilesii</i> (including data management and update to National Parks and Wildlife Service)	<i>P. gilesii</i> site was monitored October 2018, February 2019 and June 2019 with results reported to stakeholders
Field work for sampling <i>P. gilesii</i> for genetic analysis	Genetic sampling is complete
DArT genetic analysis of <i>P. gilesii</i>	Samples are with the DArT team and are queued for analysis – results due mid-July
Results of DArT analysis of <i>P. gilesii</i>	Samples are with the DArT team and are queued for analysis – results due mid-July
Soil sampling for <i>Phytophthora</i> at potential <i>P. gilesii</i> recipient sites	It was decided we should wait until warmer conditions to maximise chance of <i>Phytophthora</i> detection (as well as giving additional time hone translocation site selection)
Report on genetic diversity of <i>P. gilesii</i> , recipient sites and implications for translocations; translocation proposal	We are awaiting the results of genetic analysis. The urgency for translocation of <i>P.gilesii</i> has been reduced due to the wild population resprouting. Development of a translocation proposal remains an important aim of this project and it will be completed by Spring 2019, allowing for inclusion of genetic data and results of <i>Phytophthora</i> sampling
Xanthoparmelia lichen EEC tasks Fieldwork for XLEC (survey new area for unburnt XLEC; establish permanent quadrats; identify lichen species in laboratory; manage and report data)	Quadrats have been established. Community is being monitored using permanent photo points to identify morphotypes. Fine-scale changes in abundance will be measured using image analysis software
<i>Eucalyptus canobolensis</i> tasks Establishment of <i>E. canobolensis</i> permanent plots (including data management)	Plots have been established and initial analyses have been undertaken
General Report writing and analysis on fire response and management recommendations for Mount Canobolas threatened species (<i>E. canobolensis</i> , <i>P. gilesii</i> and XLEC)	The report on the first year of results will be submitted by end July 2019

Saving our Species 2018–19 annual report card for ‘Post-fire recovery of Mount Canobolas’ unique threatened species’. For more information, refer to the specific strategy in the *Saving our Species* program.