SAVING OUR SPECIES

Solanum celatum

2020-2021 annual report card

Overall status*

- Populations at all sites are known to be on track.
- Threat management is known to be on track at all sites, and population status is unknown at one or more sites.
- Threat management is known to be off track at one or more sites, and population status is unknown at one or more sites.
- **Populations at one or more sites are known to be off track.**

* For SoS priority management sites (may not include all locations where the species occurs in NSW)

Summary

Management sites	Bungonia National Park; Byrnes Run, Curramore; Kangaroo Valley; Macquarie Pass National Park; Mount Brown area
Action implementation	7 (of 7) management actions were fully or partially implemented as planned for the financial year.
Total expenditure	$80,158 ($20,000 cash; $60,158 in-kind)
Partners	Environment, Energy and Science; Participating landholders; Wollongong City Council

Photo: Marie-Claire Demers

Scientific name:
Solanum celatum

NSW status:
Endangered

Commonwealth status:
Not listed

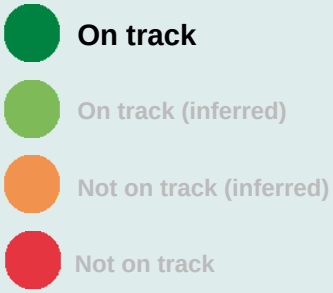
Management stream:
Site-managed species

Priority management site: Bungonia National Park

Local government area:
Goulburn Mulwaree; Shoalhaven

Partners:
Environment, Energy and Science

Population outcome



Monitoring

Species population monitoring by one or more methods indicates response to management over time and provides an outcome measure.

Monitoring metric	Species abundance
Annual target	Maintain or exceed a population count of 91 individuals (rolling average 2016—19) within 6 monitoring quadrats.
Long term target	In 5 years, the monitored population is stable or increasing from the 2016—17 baseline of 128 plants.
Monitoring result	One hundred and twenty-two plants were recorded across all monitoring plots with a further 14 plants located outside of plots bringing the site total to 136 plants.
Scientific rigour of monitoring method	High
Conducted by	Environment, Energy and Science

Investment

Participant	Cash	In-kind
Environment, Energy and Science	$0	$16,708

Management actions

The following actions are those identified as being required in financial year 2020-2021 to secure the species in the wild.

Threat	Management action	Implemented as planned?
Grazing by pest animals, most notably goats.	Aerial shooting of goats annually.	Yes

Threat outcome

Assessment on the status of critical threats at this site.

Threat	Annual target	Threat status
Grazing by pest animals, most notably goats.	No significant impact from pest animals.	On track
Inappropriate fire regimes, particularly frequent fire.	No direct impact from increased frequency or intensity of fire.	Not assessed
Habitat degradation, primarily by invasion of *Lantana camara*.	No direct impact from weed incursion.	On track

Site summary

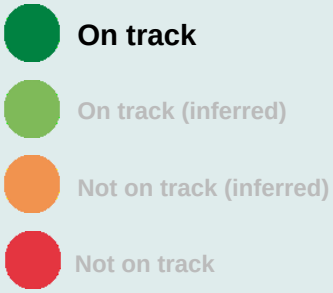
One hundred and twenty-two plants were recorded across all monitoring plots with an additional 14 plants located across the landscape, increasing the site total to 136 plants. This is an increase of 31 plants from the rolling average of 91 within the Bungonia monitoring plots. The monitoring methods are the same and due to favourable rainfall, this is the highest population count since 2018. The population's extent remains the same with plants persisting in all previously recorded areas. Low weed cover (<5%) was recorded within all monitoring plots. Aerial shooting, for goats predominantly, will be undertaken by National Parks and Wildlife Service using post-fire pest-reduction funding in July 2021. Multiple seed collections were undertaken across the population in February 2021 and are now stored in PlantBank at the Australia Botanical Gardens, Mt Annan.

Priority management site: Byrnes Run, Curramore

Local government area:
Kiama; Shellharbour

Partners:
Environment, Energy and Science; Participating landholders

Population outcome



Monitoring

Species population monitoring by one or more methods indicates response to management over time and provides an outcome measure.

Monitoring metric	Species abundance
Annual target	Maintain or exceed a population count of 7 individuals (rolling average 2016—19) across the monitoring quadrats.
Long term target	In 5 years, the monitored population is stable or increasing from the 2016—17 baseline of one plant.
Monitoring result	Sixteen plants were recorded across the monitoring plots.
Scientific rigour of monitoring method	High
Conducted by	Environment, Energy and Science

Investment

Participant	Cash	In-kind
Environment, Energy and Science	$4,000	$2,450
Participating landholders	$0	$2,100

Management actions

The following actions are those identified as being required in financial year 2020-2021 to secure the species in the wild.

Threat	Management action	Implemented as planned?
Habitat degradation, primarily by invasion of *Lantana camara*.	Implement weed control in the vicinity of the target species.	Yes
Habitat loss due to clearing for urban development.	Assess the condition of the species/species' habitat and evidence of the effects of degrading land use practices. Consult and educate landholders if land management actions are having negative effects on *S. celatum*	Yes

Threat outcome

Assessment on the status of critical threats at this site.

Threat	Annual target	Threat status
Habitat degradation, primarily by invasion of *Lantana camara*.	No significant impact from weed incursion.	On track
Habitat loss due to clearing for urban development.	No significant impact from degrading land use practices.	On track

Site summary

Sixteen plants recorded within the monitoring plots. One hundred and two plants were found across all the known areas of the site outside the four monitoring plots resulting in the highest recorded total of 118 plants. This is due to effective weed work, land management and landholder engagement, providing an increasing trend of total plant numbers from one recorded in 2017, to 118 in 2021. The *Solanum celatum* populations have expanded into new, adjacent management areas that have undergone weed control and slashing at this site. An area of 2.1 ha received primary and secondary weed control in 2020—21. Weeds were sprayed, hand-pulled and removed with a tractor. The weed removal targeted key weed species including cobbler pegs, fleabane, stinking roger, blackberry nightshade, moth vine, cape ivy, lantana, wild tobacco, turkey rhubarb, Madeira winter cherry, ink weed, soft chickweed and red-flowered mallow. The reduction of competition and soil disturbance stimulated multiple germination events, increasing the population. Interested landholders have increased their awareness of the species and weed reduction activities around the expanding populations, boosting the longevity of the plants. Many plants were flowering in August 2020 and seed collection was undertaken in January 2021 and has been stored at the Australian Botanic Gardens, Mt Annan.

Priority management site: Kangaroo Valley

Local government area:
Not specified

Partners:
Environment, Energy and Science; Participating landholders

Population outcome

Monitoring

Species population monitoring by one or more methods indicates response to management over time and provides an outcome measure.

Monitoring metric	Species abundance
Annual target	To monitor the effect of weeding on the species in a treatment and control plot. Maintain or exceed a population count of 54 individuals (rolling average 2017—19) within the monitoring quadrats and search the area for more individuals outside the quadrats.
Long term target	In 5 years, the species abundance is stable or increasing from the baseline of 40 individuals recorded in 2017—18.
Monitoring result	Thirty-one plants were recorded within the two monitoring plots.
Scientific rigour of monitoring method	High
Conducted by	Environment, Energy and Science

Investment

Participant	Cash	In-kind
Environment, Energy and Science	$4,000	$2,450
Participating landholders	$0	$6,300

Management actions

The following actions are those identified as being required in financial year 2020-2021 to secure the species in the wild.

Threat	Management action	Implemented as planned?
Habitat degradation, primarily by invasion of *Lantana camara*.	Primary removal of weeds using physical removal (not chemical) at site, within the treatment quadrat and the general population.	Yes

Threat outcome

Assessment on the status of critical threats at this site.

Threat	Annual target	Threat status
Habitat degradation, primarily by invasion of *Lantana camara*.	No significant impact from weed incursion.	On track

Site summary

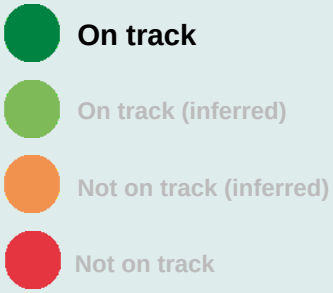
In 2020—21, the monitored population count fell by 63 plants. This was due to competition with weed species and the natural thinning of seedlings after the 2019—20 germination event. Seed collection was undertaken in February 2021 and stored in the PlantBank at The Australian Botanic Garden Mt Annan. Seasonal weeds could shade out seedlings; therefore, contracted weed removal is coordinated with annual weed growth cycles. This effort maximises seedlings' ability to rise above the seasonal weeds and establish a seed set. Ninety-two hours of primary and secondary weed work were spread out over the 2020—21 period. The core area of 2200 m² received comprehensive secondary weeding of predominantly annual weeds. A buffer of a further 500 m² received primary weeding along with the forest interface. Key weeds include cobblers pegs, fleabane, spear thistle, panic grass, moth vine, Madeira winter cherry, cape ivy and tobacco bush. Out of the 31 plants, 15 were seedlings, all of which were observed in the weeding treatment plot. Ongoing weeding is necessary to break the annual weed seed bank in this area. Landholders have been included in the species monitoring to increase the ease of identifying the plant and incorporate sensitive weeding around the species into their bushcare team activities.

Priority management site: Macquarie Pass National Park

Local government area:
Shellharbour

Partners:
Environment, Energy and Science

Population outcome



Monitoring

Species population monitoring by one or more methods indicates response to management over time and provides an outcome measure.

Monitoring metric	Species abundance
Annual target	Maintain or exceed a population count of 132 individual plants (rolling average 2016—19) within the monitoring quadrats.
Long term target	In 5 years the species abundance at Macquarie Pass National Park is stable or increasing from 84 plants recorded in 2016—17.
Monitoring result	One-hundred and fifty-six plants were recorded within the monitoring plots.
Scientific rigour of monitoring method	High
Conducted by	Environment, Energy and Science

Investment

Participant	Cash	In-kind
Environment, Energy and Science	$8,000	$6,650

Management actions

The following actions are those identified as being required in financial year 2020-2021 to secure the species in the wild.

Threat	Management action	Implemented as planned?
Habitat degradation, primarily by invasion of *Lantana camara*.	Primary and secondary weed control at Macquarie Pass easement site and Clover Hill in the vicinity of *Solanum celatum* plants.	Yes

Threat outcome

Assessment on the status of critical threats at this site.

Threat	Annual target	Threat status
Habitat degradation, primarily by invasion of *Lantana camara*.	No significant impact from weed incursion.	On track
Accidental disturbance during road and track maintenance activities.	No significant impact from slashing.	On track
Accidental disturbance during road and track maintenance activities.	No significant impact from road side maintenance.	On track

Site summary

This survey season recorded the second-highest numbers of *Solanum celatum* in 5 years both within the monitoring quadrats (156) and overall at the site (342). Compared to the rolling average for the site (132), the plants within the quadrats have increased by 24 plants. The extent of the population has remained the same since 2017 with increased density in treatment areas. Comprehensive weed control has been undertaken at this site since 2017 and weed numbers have shown a declining trend in the treatment plots. All slashing and weeding treatments were actioned, there is no significant correlation between the treatments and increasing numbers of the species. Observationally, flooding, reduced competition and soil disturbance have stimulated germination events. One hundred and seventy-nine hours of primary and secondary weeding were undertaken in 2020—21 across the three management areas at this site. The main weeds targeted are lantana, tobacco bush, senna, arsenic bush, crofton weed, mistflower, blackberry, tobacco bush, fleabane, farmers friends and spear thistle. Over 2 ha of land has undergone weed removal during this treatment period with steady recruitment and survival of the species observed. *Solanum celatum* seed was successfully collected in February 2021 and stored in the PlantBank at The Australian Botanic Garden Mt Annan..

Priority management site: Mount Brown area

Local government area:
Wollongong

Partners:
Environment, Energy and Science; Wollongong City Council

Population outcome

Monitoring

Species population monitoring by one or more methods indicates response to management over time and provides an outcome measure.

Monitoring metric	Species abundance
Annual target	Maintain or exceed a population count of 356 individuals (rolling average 2016—19) within the monitoring quadrats.
Long term target	Monitored population abundance is stable or increasing in 5 years from 389 plants recorded in 2016—17.
Monitoring result	One hundred and thirty-seven plants were recorded within the six monitoring plots during the 2020—21 species monitoring.
Scientific rigour of monitoring method	High
Conducted by	Environment, Energy and Science

Investment

Participant	Cash	In-kind
Environment, Energy and Science	$4,000	$2,450
Wollongong City Council	$0	$21,050

Management actions

The following actions are those identified as being required in financial year 2020-2021 to secure the species in the wild.

Threat	Management action	Implemented as planned?
Habitat degradation, primarily by invasion of *Lantana camara*.	Implement physical and chemical control of *Lantana* and other weeds in the vicinity of *Solanum celatum*.	Yes
Little is known about the species' area of occupancy.	Survey across the site and map all identified individuals.	Yes

Threat outcome

Assessment on the status of critical threats at this site.

Threat	Annual target	Threat status
Habitat degradation, primarily by invasion of *Lantana camara*.	No significant impact from weed incursion.	On track
Grazing, browsing or trampling by domestic stock causing physical damage to plants.	No significant impact from grazing.	On track
Little is known about the species' area of occupancy.	Survey the 0.8 ha surrounding the known population to detect expansion or new populations.	On track

Site summary

One hundred and thirty-seven plants were recorded within the monitoring plots during the 2020—21 species monitoring. A further 96 plants were recorded outside of the plots in a survey of the population extent, bringing the total site population to 233 plants within the 0.5 ha searched in February 2021. Site numbers were calculated by a total count of the searched population area. The 2021 survey season recorded a significant decrease of 219 plants (more than 20%) from the rolling average of 356. This could be due to competition with annual weeds that have boomed within the cattle exclusion plots. There was no significant difference (change more than 20%) between the 2020—21 cattle exclusion treatment and control (grazed) population counts. There is no trend to support cattle exclusion as a population regulator. Weed control is an effective action to increase germination rates and persistence of *Solanum celatum* in the ecosystem whilst reducing weeds in the dry rainforest environment. This is supported by the decreasing trend of weeds present at this site and the presence of germination events post weeding treatments. It also has multi-species benefits with the regeneration of other native dry rainforest species observed in the treatment area. Manual weed control continued during the 2020—21 period with 72 hours of labour, contributing to 6000 m^2 of secondary/maintenance and 1500 m^2 of primary weed control. Between the 2019—20 and 2020—21 monitoring sessions, ground layer weeds increased by 15% within the weeding treatment plot. Fifteen per cent fewer weeds were recorded in the ground layer treatment versus the control plot during 2020—21. No significant impact from weed incursion was detected. The main weeds targeted are lantana, white passionflower, moth vine, cape ivy, spear thistle and turkey rhubarb. Wollongong Council contributes substantial in-kind funding for extended weed removal at Mt Brown Reserve, this extends the reach and quality of the project, increasing the area of potential habitat for *Solanum celatum*.

Saving our Species 2020-2021 annual report card for Solanum celatum. For more information refer to the specific strategy in the Saving our Species program.