



NSW National Parks and Wildlife Service

Kosciuszko offset action plan – leafy anchor plant

Kosciuszko Offset Project



Acknowledgement of Country

Department of Climate Change, Energy, the Environment and Water acknowledges the Traditional Custodians of the lands where we work and live.

We pay our respects to Elders past, present and emerging.

This resource may contain images or names of deceased persons in photographs or historical content.

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Artist and designer Nikita Ridgeway from Aboriginal design agency – Boss Lady Creative Designs, created the People and Community symbol.

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Objective

This plan sets out management actions that, when implemented and measured, will deliver biodiversity gains for the leafy anchor plant (*Discaria nitida*) within Kosciuszko National Park.

The Kosciuszko Offset Strategy 2023 sets out a framework for the development of offset action plans and is based on a clear objective – to deliver a biodiversity gain in the park equivalent to 120% of the biodiversity loss identified in the Snowy 2.0 environmental assessments.

In the Snowy 2.0 environmental assessments for Main Works, up to 45 individual leafy anchor plants were identified as being impacted. (Assessments for the Snowy 2.0 Exploratory Works and Transmission Connection projects did not identify any impacts to leafy anchor plant.)

To deliver the 120% biodiversity gain identified under the Kosciuszko Offset Strategy, the objective of this action plan is to **increase the population of leafy anchor plants in Kosciuszko National Park by 54 individuals.**

As this is not a Commonwealth-listed species, this action plan has been approved only by the Deputy Secretary, NSW National Parks and Wildlife Service.

Species overview and key threatening processes

The leafy anchor plant is listed as **vulnerable** under the NSW *Biodiversity Conservation Act 2016*. It is not a listed species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Table 1 provides a species summary for leafy anchor plant, including a description of the species, its habitat and its distribution within Kosciuszko National Park.

Table 1 Species summary – leafy anchor plant

Category	Summary
Description	The leafy anchor plant is an erect deciduous shrub generally 1 m to 3 m high, but occasionally growing to 5.5 m. Plants often have a few main erect stems branching from near ground level. Leaves are narrow and blunt, mostly 1 cm to 1.5 cm long (but can be up to 2.5 cm long) and 6 mm wide. Plants are light green and glossy when young, darkening as the season progresses. The flowers are white and tiny, forming clusters of up to 9 flowers arising from beneath the base of the spines.
Habitat	Leafy anchor plants generally occur on or close to stream banks and on rocky areas near small waterfalls. The species occurs in woodland with heathy riparian vegetation and on treeless grassy subalpine plains. Most populations survive in sites that appear to be rarely burnt (fire refugia). The species is known to be highly fire sensitive. Most plants that have been burnt, even lightly, have died with very little post-fire recruitment.
Distribution and population	The leafy anchor plant population is confined to the far south of the Southern Tablelands of NSW and the north-east highlands of Victoria. In NSW the leafy anchor plant grows mostly within Kosciuszko National Park, south from the Blue Waterholes and Yarrangobilly Caves area to south-west of Jindabyne, at altitudes above 900 m. In NSW, 18 sites are known with a total population of about 2,800 plants. In Victoria the species is extremely rare with a total of only 31 plants known from 2 populations.

Source: Saving our Species and personal communication NSW Department of Climate Change, Energy, the Environment and Water, Biodiversity Conservation Division

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Table 2 provides a list of key threatening processes to leafy anchor plants within Kosciuszko National Park that will be addressed via cost-effective management actions (see Section 3).

Table 2 Key threatening processes to leafy anchor plants in Kosciuszko National Park

Threat	Description
Inappropriate fire regimes	Fire is a threat to the species as plants are generally killed even by low intensity fires. Post-fire recruitment has been observed to be very low.
Flooding	Major flooding events since 2010 have caused significant stream bank erosion and the consequent loss of numerous plants at some sites.
Feral herbivores	Feral horses and feral deer have been observed at sites that support leafy anchor plants. At these sites, browsing damage has been observed, including breakage of major stems.
Weeds	Competition from weeds, especially woody weeds such as blackberry, briar rose and willows.
Anthropogenic climate change	Loss of local populations due to climate change effects such as increasing temperature and more frequent flood events.

Source: Saving our Species and personal communication NSW Department of Climate Change, Energy, the Environment and Water, Biodiversity Conservation Division

Kosciuszko Offset Strategy: metrics-based approach

The Kosciuszko Offset Strategy requires expenditure of Snowy 2.0 offset funds to deliver biodiversity gains for Kosciuszko National Park equivalent to 120% of the loss for threatened species, threatened ecological communities, and ecosystems impacted by the Snowy 2.0 project. A benchmark of 120% has been set because this is considered achievable over the life of this action plan and it can be demonstrated as a biodiversity gain.

In setting an objective to exceed the statutory requirements, the strategy recognised the difficulties in measuring biodiversity gains and the inherent fluctuations in biodiversity over time. This benchmark provides a margin that will increase confidence that the minimum statutory requirements are being met. The strategy takes a metrics-based approach that will be applied to the delivery of biodiversity offsets by the National Parks and Wildlife Service. This will be achieved by following a 3-step process:

Step 1: quantifying the impacts and benefits that must be delivered

Step 2: implementing actions to deliver the required offset

Step 3: measuring and reporting on the biodiversity benefit.

Step 1: quantifying the impacts on leafy anchor plants and benefits that must be delivered

It is estimated that 45 leafy anchor plants will be impacted by Snowy 2.0 Main Works. The benefit that must be delivered is the successful and sustainable establishment of an additional 54 leafy anchor plants in Kosciuszko National Park (being 120% of the impact).

Step 1 limitations, assumptions and notes

- To the best of National Parks and Wildlife Service knowledge, transplanting of leafy anchor plants has not been done before, therefore survivorship is unknown.
- It is unknown how effective and sustainable planting efforts will be, hence plantings should not be limited to 54 individuals. An overcompensation of seed scarification and stratification should be applied to account for potential seed strike failure.
- All seeds with successful strikes will be transplanted into Kosciuszko National Park and monitored.

Step 2: implementing the management actions for leafy anchor plants to deliver the required offset

Delivering an offset of at least 54 additional leafy anchor plants in Kosciuszko National Park will involve the following management interventions:

- identifying an area (or areas) suitable for delivery of the offset (see actions 1 and 2 in Table 3)
- collecting seed from plants located at designated leafy anchor plant offset areas and growing an overcompensated number of plants at the Australian Botanic Garden Mount Annan (see actions 3 and 4 in Table 3)
- increasing and maintaining the number of leafy anchor plants by transplantation at Racecourse Creek and Gooandra Creek through a targeted series of offset actions including installing protective wire guards and regular watering (see actions 5, 6 and 7 in Table 3).

Leafy anchor plants are included in the NSW Saving our Species program, which has identified 4 priority management sites, and conservation actions such as population monitoring, seed collection and feral herbivore control, to manage the critical threats and conserve the species. These sites are Peppercorn Creek, Boggy Plain, Racecourse Creek and Little Thredbo River.

To concentrate conservation efforts, this action plan focuses on Racecourse Creek and Gooandra Creek (a new site additional to Saving our Species sites) as offset sites (Figure 1). Both sites are in northern Kosciuszko National Park and have populations of leafy anchor plants. Racecourse Creek was fire damaged in 2020 and provides an opportunity for replanting of leafy anchor plants along the creek bank and, following management actions in Table 3, potential regeneration of the species.

Goandra Creek was selected as a new site to help ensure the genetic viability of the species in the park. Seed will be collected and propagated as required.

While the proposed offset site at Racecourse Creek is within a Saving our Species leafy anchor plant site, actions under this offset plan will go above and beyond those identified under the Saving our Species program. For example, actions under Saving our Species at Racecourse Creek focus on:

- monitoring of established and tagged naturally occurring leafy anchor plants
- seed collection from these established plants in case of further catastrophic fire events or other emergency situations in the park
- threat abatement such as control of blackberry and deer management.

The propagation and transplanting of leafy anchor plants into the park under this offset action plan is unique to the Kosciuszko Offset Project and is the first time this has occurred in Kosciuszko National Park. This approach has the support of the Saving our Species program.

These sites are expected to support the objective of an additional 54 plants, remain accessible all year round and all can be monitored on the same day. Additionally, using 2 sites instead of one spreads the risk for population survival. Leafy anchor plants are highly susceptible to fire and often killed by low intensity fires.

Enhancement planting (seedlings grown in a nursery and then planted into the field) is recommended for the leafy anchor plant as seedling recruitment (seeds germinating

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naturally) in the field is rare. The most efficient way to increase plant numbers is by replanting into the existing population. This will initially involve seed already collected from Racecourse Creek under Saving our Species. Seed will also be collected from both offset sites, from as many plants as possible to ensure genetic diversity of the populations is captured. Once the seed is transported and sown at the Australian Botanic Garden Mount Annan nursery (which has appropriate facilities, hygiene protocols and monitoring capabilities), it will take a minimum of 6 months for the seeds to germinate.

Once at least 54 plants (plus additional plants to account for possible transplantation failure) have reached a sustainable growth level (that is, a size suitable for planting), they will be planted and wire protective guards will be placed around individual plants. After planting, the individual plants will be checked once a day for a week, and then once a week for a month. The plants will need to be checked at least monthly from October to April for the first year or until deemed established.

The proposed offset areas in Figure 1 include burnt and unburnt sites, and some sites are now also identified under the Assets of Intergenerational Significance (AIS) program. Actions under this action plan may, where appropriate, occur within AIS sites where offset funds are used to benefit the species, and actions go above and beyond those identified under the AIS program.

Table 3 lists the actions needed to deliver the required biodiversity gains. These include identifying suitable habitat areas, measuring their current condition, and addressing the identified key threatening processes (Table 2).

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Table 3 Management actions for leafy anchor plants to deliver the required offset in Kosciuszko National Park

Action number	Action	Threat addressed	Location	When	Who	Total cost (preliminary estimate)	Comment
1	Conduct site visits to confirm condition and suitability of Racecourse Creek and Gooandra Creek as proposed offset areas	–	Areas shaded in yellow (Figure 1)	2023 to 2024	NSW National Parks and Wildlife Service (NPWS)	\$0	Completed. Collaborated with Saving our Species to conduct site suitability assessments in November and December 2023. The condition and suitability assessments included size of the sites, accessibility, and confirmed presence of leafy anchor plant populations.
2	Undertake desktop mapping to amend leafy anchor plant offset sites, if required, to show areas where offset actions will be delivered	–	Areas shaded in yellow (Figure 1)	2023 to 2024	NPWS	\$0	Completed. Based on the results of action 1. As replanting has not taken place for this species before, it is unknown if there is an ideal spacing between each plant. It is however estimated that a 5 m spacing between individuals will be adequate. The total offset areas for leafy anchor plants will be calculated on this assumption.
3	If deemed suitable in action 1, undertake seed collection at Racecourse Creek and Gooandra Creek areas or other areas with leafy anchor plant populations, as required	–	Designated leafy anchor plant offset areas	2023 to 2024	NPWS	\$0	Underway. Seed collection will initially be focused on Racecourse Creek and then Gooandra Creek to ensure that the seed possesses suitable adaptations to the environment to reach sustainable establishment. If no seeds, or an inadequate number of seeds, are found at either of these areas then seed will be collected from other areas with known populations.
4	Grow plants from seed	–	Australian Botanic Garden Mount	2023 to 2027	NPWS and ABGMA	\$4,000	Ongoing. Sixty seeds (from existing seed stock from Saving our Species) were grown by ABGMA. The cost estimate accounts for 2 separate growth processes in case the initial strike rate is lower than the required offset. If

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Action number	Action	Threat addressed	Location	When	Who	Total cost (preliminary estimate)	Comment
			Annan (ABGMA)				a second batch of seed is not required to be grown, funds will be redirected towards the transplanting and maintenance of plants.
5	Transplanting leafy anchor plants will commence when plants are deemed by ABGMA botanists to have reached a sustainable level of maturity to survive transplantation	–	Designated leafy anchor plant offset areas	2024 to 2027	NPWS	\$3,000	Underway. Plants will be collected from ABGMA and initially relocated to the NPWS Yarrangobilly nursery for hardening off prior to in-ground transplantation. Once planted, each individual plant will be checked once a day for the first week, then once a week for a month. They will then be checked at least monthly from October to April for the first year or until established. Growth rates will be tracked to support future works. It is assumed that sustainable establishment will be met around the 10-year mark. Three plants were transplanted into the park at Racecourse Creek in April 2024 as a trial.
6	Install and maintain wire protective guards around each individual plant	Feral herbivores	Designated leafy anchor plant offset areas	2024 to 2044	NPWS	Up to \$1,000 over a minimum of 20 years	Underway. To protect plants from feral herbivores, wire guards will be installed and maintained until plants are deemed to have reached a sustainable level of maturity (guards will be in place for at least 5 years and will be reviewed after this time to see if they can be removed). Wire guards have been installed for the 3 trial plants planted in April 2024.
7	Water plants as required		Designated leafy anchor plant offset areas	2024 to 2044	NPWS	\$1,000	Underway. Plants will be watered during routine checking of plants within the first year and as required (see action 5) to help ensure survivorship.
Total cost						\$9,000	

Step 2 limitations, assumptions and notes

- As this species has not been replanted before, the ideal spacing between plants is unknown. It is, however, estimated that a 5 m spacing between individuals will be adequate. Total offset areas for leafy anchor plants will be calculated on this assumption.
- The proposed monitoring frequency once transplanting has taken place will need to be reviewed and possibly revised depending on the progress of growth demonstrated by the plants.
- Plant growth strategies, threat control strategies and actions will continue to evolve throughout the life of this action plan. The plan will be updated accordingly as new information, knowledge and management techniques become available.
- Costs identified above will be revised as required, taking into account the relative cost effectiveness of different measures.
- Actions under this plan will not apply to sites directly impacted by Snowy 2.0 construction activities. Snowy Hydro Limited is required under planning approvals to undertake habitat rehabilitation at these sites.

Step 3: measuring and reporting on the biodiversity benefit to leafy anchor plants

The Kosciuszko Offset Strategy states that each action plan must describe how the required biodiversity benefit (offset) will be measured. This involves setting out the attributes to be measured and the methodology, timing and other details relevant to monitoring.

The biodiversity benefit to be delivered for leafy anchor plants will be measured by the sustainable transplantation and maturity of plants. Sustainable plant maturity will be used as the sole indicator for the designated offset areas (as defined in action 5 of Table 3) where transplanting of leafy anchor plants will commence when plants are deemed by an Australian Botanic Garden Mount Annan botanist to have reached a sustainable level of maturity to survive transplantation.

Once planted, each individual plant will be checked once a day for a week, then once a week for a month. Plants will need to be checked at least monthly from October to April for the first year or until established. If this transplantation and monitoring design is not working, then methodologies will be reconsidered. Any changes to metrics or methodologies over time will be updated in the action plan and reported on as part of the adaptive management approach under the Kosciuszko Offset Strategy.

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Table 4 Measuring biodiversity benefits to leafy anchor plants

Attribute to be measured	Metric	Location	Methodology	Monitoring design	Timing	Cost	Frequency of measurement
Number of leafy anchor plants to reach established maturity	Number of individual leafy anchor plants	Designated leafy anchor plant offset areas	Site visits – individual plant counts	Survivorship, growth rates and fruiting (reproductively mature) will be tracked to support future works. It is anticipated that sustainable establishment will be met at the 10-year mark	During the active months (spring to autumn)	Up to \$2,000 over 20 years for ongoing population monitoring	From transplantation, individuals will be checked once a day for a week, then once a week for a month. They will then be checked at least monthly from October to April for the first year or until established, and then checked annually for the life of this project.

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Step 3 limitations, assumptions and notes

- This action plan will be updated after the seedling strike rate has been recorded to determine if an additional seed collection is required.
- Propagation and direct seeding will be explored if the seed strike rate fails to yield the required number of individuals, however there is currently no evidence to support these approaches for this species and these works would be experimental.

Governance

Reporting

As required under Snowy 2.0 approvals, the NSW National Parks and Wildlife Service must monitor, evaluate and publicly report on progress of the implementation program and the effectiveness of the specific projects and actions. They will prepare an annual report on the Snowy 2.0 biodiversity offset program for Kosciuszko National Park and its implementation, including progress with achieving the required increase in the number of leafy anchor plants. The report will be provided to the Commonwealth Department of Climate Change, Energy, the Environment and Water, and published on the National Parks and Wildlife Service website within 3 months of the end of each financial year.

The annual report will:

- detail the expenditure from the biodiversity offset fund on agreed actions under the Kosciuszko offset action plans
- outline any interest earned and reinvested into the offset program
- provide details about the conservation actions carried out for each approved threatened species, threatened ecological community and threatened ecosystem action plan such as:
 - the type of conservation action implemented – for example, feral animal control, habitat restoration
 - the geographic extent and location of the conservation actions
 - the proportion of the proposed conservation actions achieved, and proportion yet to be achieved
 - an analysis and summary of monitoring data
 - future conservation actions, with key timeframes including intended completion
- include details on progress towards each action plan objective that has been delivered
- document where adaptive management principles have been applied to each action plan to improve their effectiveness.

Adaptive management

Measuring the biodiversity benefit for leafy anchor plants focuses on the increased number of individual plants as an indicator rather than improvement to the health and functionality of the species community as a whole. Together with the influence of natural variability, it is anticipated there will be a level of uncertainty in relation to the actual biodiversity benefit additional plants will bring to the overall population. This uncertainty will be addressed by applying an adaptive approach, including reviewing and updating monitoring and condition improvement methodologies and strategies as new information, data or technology becomes available. At a minimum, action plans will be reviewed every 5 years.

Approvals

Date/approval	
Date prepared	September 2024
Date approved – NSW National Parks and Wildlife Service	26 September 2024
Approved by	Atticus Fleming, Deputy Secretary National Parks and Wildlife Service
Date for review	September 2029

Kosciuszko offset action plan – leafy anchor plant



Figure 1 Proposed leafy anchor plant offset areas – Kosciuszko National Park

More information

- [Assets of Intergenerational Significance](#)