NSW National Parks and Wildlife Service

Kosciuszko offset action plan – white-bellied sea-eagle

Kosciuszko Offset Project

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This resource may contain images or names of deceased persons in photographs or historical content.

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 white-bellied sea-eagle (*Haliaeetus leucogaster*) within Kosciuszko National Park.

The Kosciuszko Offset Strategy 2023 sets out a framework for the development of offset action plans. It 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 assessment for Main Works, up to 23 hectares of white-bellied sea-eagle habitat was identified as being impacted. (Assessments for the Snowy 2.0 Exploratory Works and Transmission Connection projects did not identify any impacts to the white-bellied sea-eagle.) At an estimated 0.4 individuals per hectare (see Step 1), the impact of the Snowy 2.0 project on the white-bellied sea-eagle is estimated to be a reduction of the population by 10 individuals.

To deliver the 120% biodiversity gain identified under the Kosciuszko Offset Strategy, the objective of this action plan is to **increase the population of white-bellied sea-eagles in Kosciuszko National Park by 12 individuals**.

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

Species overview and key threatening processes

The white-bellied sea-eagle is listed as **vulnerable** under the NSW *Biodiversity Conservation Act 2016*. It is not a listed threatened species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (although it is a listed marine species under that Commonwealth legislation).

Table 1 provides a species summary for white-bellied sea-eagle, including a description of the species, its habitat, its preferred food sources and its distribution within Kosciuszko National Park.

Table 1 Species summary – white-bellied sea-eagle

Category	Summary
Description	The white-bellied sea-eagle is a large eagle that has long, broad wings and a short, wedge-shaped tail. It measures 75 cm to 85 cm in length and has a wingspan of 180 cm to 220 cm. Adults are predominantly white and grey. The head, breast and belly, and the feathering on the legs, are white. The back and upper surfaces of the wings are grey, and the undersides are greyish black with a smaller area of white along the leading edge. The tail is grey at the base and has a white tip. The large, hooked bill is grey with a darker tip, and the eye is dark brown. The legs and feet are cream-white, with long black talons. Both sexes are similar in appearance, but females are larger than the males. Juveniles are brown with lighter markings.
Habitat	White-bellied sea-eagle habitat is characterised by the presence of large areas of open water including larger rivers, swamps, lakes and the sea. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as guard roosts. Nests are large structures built from sticks and lined with leaves or grass.
Diet	Fish and freshwater turtles are key food sources for white-bellied sea-eagles, but they also feed on waterbirds, reptiles, mammals and carrion. They hunt prey from a perch or while in flight by circling slowly or by sailing along 10 m to 20 m above the shore. Prey is usually carried to a feeding platform or, if small, consumed in flight, but some items are eaten on the ground.
Distribution and population	White-bellied sea-eagles may be solitary or live in pairs or small family groups consisting of a pair of adults and dependent young. They typically lay 2 eggs between June and September, with young birds remaining in the nest for 65 days to 70 days.

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

Table 2 provides a list of key threatening processes to white-bellied sea-eagles within Kosciuszko National Park that will be addressed via cost-effective management actions (see Table 3).

Table 2 Key threatening processes to white-bellied sea-eagles in Kosciuszko National Park

Threat	Description
Disturbance	The white-bellied sea-eagle is sensitive to disturbance when nesting, especially during the early stages of the breeding season, and may desert nests and young if confronted by humans or exposed to human activity Off-road vehicles accessing remote areas, and various forms of recreation such as bushwalking, fishing and intrusive photography, have been implicated in the abandonment of white-bellied sea-eagle nests Land clearing reduces the amount of suitable habitat available, and this can force birds to nest in sub-optimal habitats where their breeding success is greatly reduced
Anthropogenic climate change	Increased wildfire and drought frequency and duration may result in inland areas being increasingly unsuitable for nesting

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. The 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 NSW National Parks and Wildlife Service (NPWS). 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 white-bellied sea-eagles and benefits that must be delivered

It is estimated that 10 white-bellied sea-eagles will be impacted by Snowy 2.0 Main Works. The benefit that must be delivered is therefore the successful and sustainable establishment of an additional 12 white-bellied sea-eagles in Kosciuszko National Park (being 120% of the impact). This calculation is based on impacts to 23 hectares of white-bellied sea-eagle habitat from Snowy 2.0 with an estimated population density of 0.4 individuals per hectare.

Step 1 limitations, assumptions and notes

- The methodology in the dot-points below is based on expert departmental species knowledge.
- The Snowy 2.0 environmental assessments for white-bellied sea-eagles in Kosciuszko National Park are considered to be of limited value for estimating population density for the park as no nests were confirmed as a part of this work.
- Instead, the estimate of 0.4 white-bellied sea-eagles per hectare is based on a distribution and abundance study completed by ecologists in 2011 in South Australia, which estimated an average nest separation of 16.9 km.
- In the absence of robust baseline information for white-bellied sea-eagles in Kosciuszko National Park, the South Australian study has been used to estimate the population density for potential designated offset areas in the park. Departmental species experts consider this population density estimate to be ecologically applicable to Kosciuszko National Park based on the similarities in high-quality habitat and the presence of large waterbodies.

Step 2: implementing the management actions for white-bellied sea-eagles to deliver the required offset

Delivering an offset of at least 12 additional white-bellied sea-eagles in Kosciuszko National Park will involve the following management interventions:

- identifying an area (or areas) of suitable habitat for delivery of the offset (see action 1 in Table 3)
- counting the number of nests present and identifying the target density at that location and thus the required area across which the offset actions are to be delivered (see action 2 in Table 3)
- increasing the density (or other suitable metric) of white-bellied sea-eagles at that location through a targeted series of offset actions above and beyond core management (see actions 3, 4, 5 and 6 in Table 3).

White-bellied sea-eagle abundance and distribution surveys have typically focused on recording and monitoring nest sites within areas of preferred habitat (for example, within 1 km of waterbodies). Over the course of 3 years of monitoring in South Australia, 72 territories – that is, the space around a nest that is defended against other white-bellied sea-eagles and other species during the breeding season – were identified and monitored.

The mean distance between nearest neighbour nest sites was calculated based on the 72 known territories and mean home range of 2.2 km to 155 km. A home range is the extended area around the core territory and includes favoured hunting and loafing areas sometimes shared with neighbouring white-bellied sea-eagles.

The South Australian study also included monitoring on Kangaroo Island. On Kangaroo Island, 19 territories were found to have nests with a mean separation of 16.9 km (with a range from 3.9 km to 55.7 km). This was considerably denser than other areas.

As the variability between territory size is high, it is difficult to estimate the number of territories that may be present within Kosciuszko National Park and therefore difficult to identify potential designated offset areas. All large waterbodies in the park have the potential to offer high-quality habitat as they have access to suitable nesting trees, perches and fish.

Site visits and behaviour monitoring to determine the location of nests will be crucial in determining territory size and number. In the absence of baseline data, a precautionary value of 16.9 km between nests has been adopted. This gives an estimate of 5 breeding pairs (10 individuals) being potentially impacted by the Snowy 2.0 Main Works.

This action plan focuses on the protection and monitoring of nest sites as mortality rates in young birds is high because nests and young are abandoned when breeding sites are disturbed. Disturbance can occur when humans are present within 2 km of nest sites, so habitat buffers are critical to the species' successful breeding cycle.

Undisturbed nests are multigenerational and have been found to support populations for up to 50 years. Accordingly, nest protection from human activity is a priority in this action plan. As a precautionary measure, action 4 in Table 3 of this plan includes the construction of an artificial nest. This measure will be implemented if required, taking into account the results of action 3 in Table 3 (behaviour monitoring), including the confirmation of successful breeding events and any reductions or additional disturbance to breeding and foraging habitat.

The preliminary offset areas in Figure 1 include burnt and unburnt sites, and sites 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. In all cases, monitoring and management actions provided for in this action plan are additional to those which are part of the AIS program.

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

Table 3 Management actions for white-bellied sea-eagles to deliver the required offset in Kosciuszko National Park

Action number	Action	Threat addressed	Location	When	Who	Total cost (preliminary estimates)	Comment
1	Conduct site check to determine suitable habitat and presence of white-bellied sea-eagle	–	Areas shaded in red (Figure 1)	2022 to 2023	NPWS	$3,500	Completed. NPWS identified suitable habitat areas as part of generating baseline information.
2	Undertake a desktop assessment to determine the required area across which the offset actions are to be delivered	–	Area marked in red (Figure 1), plus any additional sites determined by NPWS	2023	NPWS	$0	Completed. Based on the results of action 1. Part of generating baseline information.
3	Conduct behaviour monitoring of white-bellied sea-eagles prior to and post breeding season	–	Designated white-bellied sea-eagle offset areas	2024 onwards	NPWS	Up to $10,000 over a minimum of 20 years	Due to the large size of potential habitat for nests within the park, it is critical that white-bellied sea-eagles are watched for their behaviour pre- and post-breeding season. This will provide an indication of nest location and information on any successful breeding and fledging events.
4	Construct an artificial nest in a designated white-bellied sea-eagle offset area	Disturbance	Designated white-bellied sea-eagle offset areas	2025 to 2045	NPWS	Up to $25,000 over a minimum of 20 years	White-bellied sea-eagle nests are multigenerational so building artificial nests could, if successful, support population increases throughout generations. This will positively impact the presence and prevalence of the species in the park.
5	Once located, protect nests from human interruptions by closing	Disturbance	Designated white-bellied	2025 to 2045	NPWS	Up to $5,000 over a	The white-bellied sea-eagle can see people coming from about 2 km away. If they are disturbed during breeding

Action number	Action	Threat addressed	Location	When	Who	Total cost (preliminary estimates)	Comment
	nearby walking tracks, putting up signage, conducting area checks and notifying nearby staff to avoid sites during breeding seasons		sea-eagle offset areas			minimum of 20 years	seasons, they may abandon the nest and not return. White-bellied sea-eagle nests are multigenerational so any disturbance could mean the nest would not pass onto the next generation for use, hence impacting the presence and prevalence of the species in the park.
6	Undertake tree planting to create a visual buffer between any nearby people and nests (designated white-bellied sea-eagle offset areas)	Disturbance	Designated white-bellied sea-eagle offset areas	2025 to 2045	NPWS	Up to $20,000 over a minimum of 20 years	This action will depend on the condition of the sites assessed in action 1. If the vegetative buffer is deemed to be adequate then no plantings will be needed. This action should, however, remain in this plan in case fire impacts known breeding sites in the future.
					Total cost	**$63,500**	

Step 2 limitations, assumptions and notes

- Very little monitoring of white-bellied sea-eagles has occurred in Kosciuszko National Park to date, limiting the current understanding of species distribution in potential designated offset areas.
- Nest monitoring and related breeding activity is critical to understanding and estimating population density.
- 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.
- The success of nest monitoring to track population density will continue to be evaluated through the project and an alternative approach to measuring density may be implemented if limited success is observed.
- 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 white-bellied sea-eagles

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. A hierarchical approach is being taken to measure the biodiversity benefit.

1. The population density of a species is the desirable measurement attribute.
2. If this is not feasible due to difficulty in detecting populations due to low numbers then other metrics (such as occupancy) combined with modelling will be considered instead.
3. If the attribute and monitoring design in (1) or (2) above is not working, then the attribute being measured will be revisited and another metric considered.

Any changes to metrics over time will be updated in the action plan and reported on as part of the adaptive management approach under the Kosciuszko Offset Strategy.

Table 4 Measuring biodiversity benefits to white-bellied sea-eagles

Attribute to be measured	Metric	Location	Methodology	Monitoring design	Timing	Cost	Frequency of measurement
Population	Density (spatial estimates of density based on the number of individuals utilising a territory)	Designated white-bellied sea-eagle offset areas	Observational surveys	Survey behaviour during breeding seasons to determine successful breeding events and to assist in nest location for better survey success. When nests (artificial or natural) are determined to be active, surveys for breeding events and re-use of nests will occur	During the active months (winter to summer)	Up to $60,000 over a minimum of 20 years	Annually

Step 3 limitations, assumptions and notes

- Once located, nest monitoring plays a critical role in measuring population density as nests are multigenerational. This means that they can be used by offspring when they reach sexual maturity at approximately 6 years of age.
- The known area of occupancy for the species is estimated to be greater than 11,500 square kilometres, and nest monitoring is therefore the only feasible option for population monitoring.
- Consistent with past methods for species monitoring (used with reasonable confidence), the presence of breeding pairs, checked annually, is considered to be an increase in the population.

Governance

Reporting

As required under Snowy 2.0 approvals, NPWS 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 population of the white-bellied sea-eagle. The report will be provided to the Commonwealth Department of Climate Change, Energy, the Environment and Water, and published on the environment.nsw.gov.au 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
- document where adaptive management principles have been applied to each action plan to improve their effectiveness.

Adaptive management

Quantifying and measuring the biodiversity benefit for white-bellied sea-eagles may present significant technical challenges. Together with the influence of natural variability, it is anticipated there will be a level of uncertainty to both measuring and interpreting biodiversity benefits relevant to the species. This uncertainty will be addressed by applying an adaptive approach, including reviewing and updating density numbers, monitoring, methodologies and strategies as new information, data or technology become available. At a minimum, action plans will be reviewed every 5 years.

Approvals

Date/approval	
Date prepared	February 2025
Date approved	April 2025
Approved by	Naomi Stephens, Acting Deputy Secretary, NSW National Parks and Wildlife Service
Date for review	February 2030

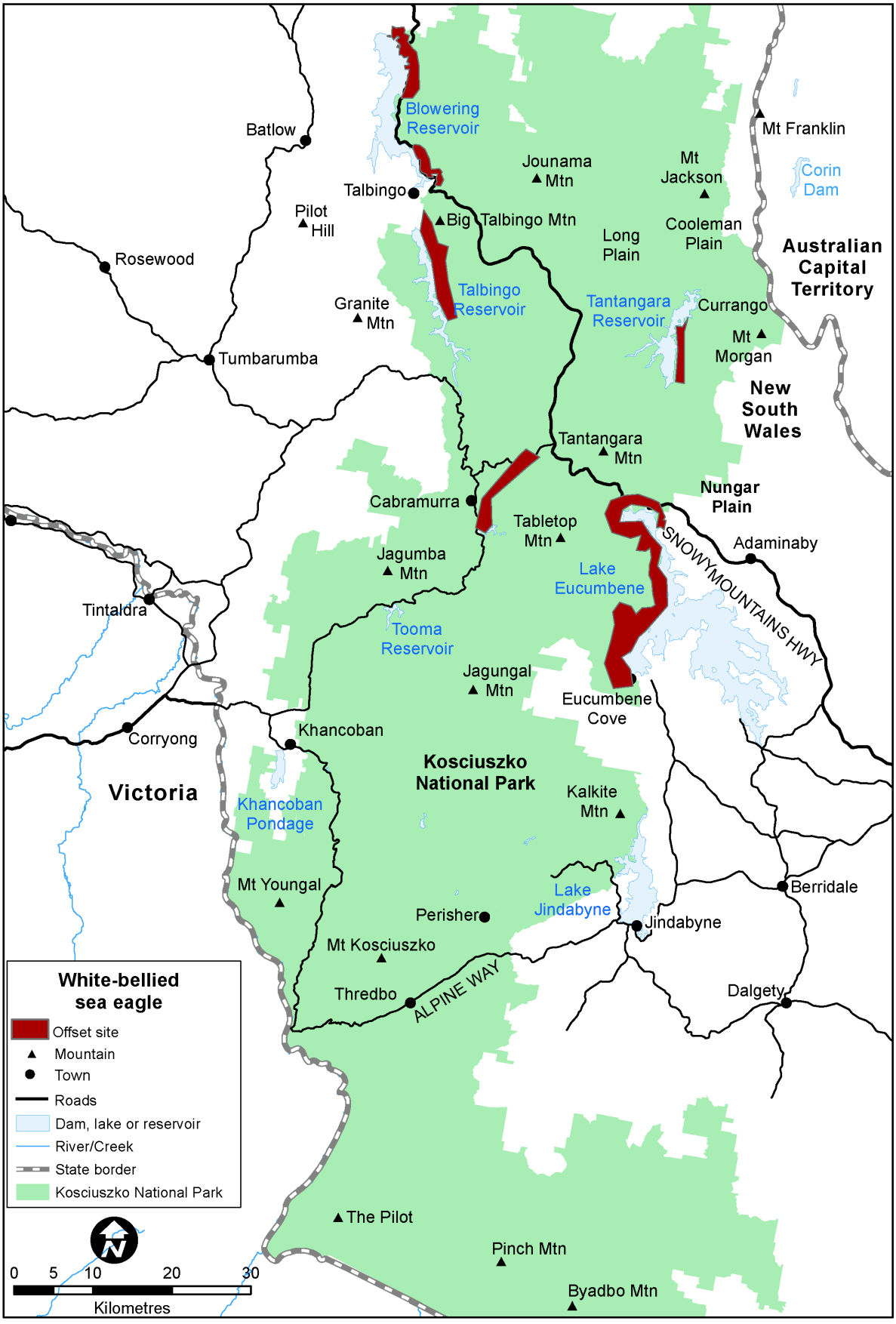

Figure 1 **Proposed white-bellied sea-eagle offset areas – Kosciuszko National Park**

More information

- Assets of Intergenerational Significance