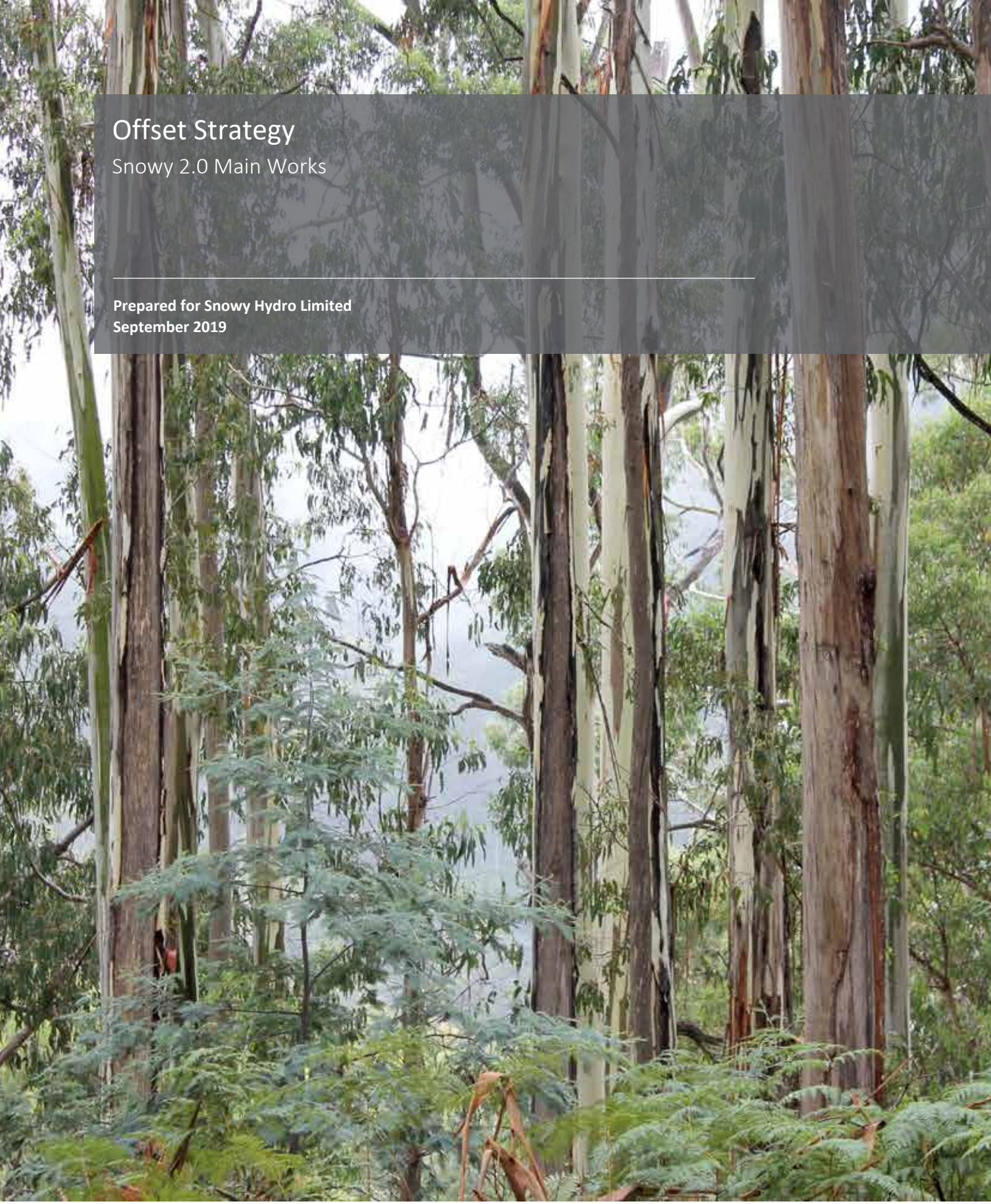
APPENDIX M.3

OFFSET STRATEGIES

Offset Strategy

Snowy 2.0 Main Works

Prepared for Snowy Hydro Limited
September 2019



EMM
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Offset Strategy

Snowy 2.0 Main Works

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Prepared by	**Approved by**
	
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13 September 2019	13 September

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1 Introduction

The Secretary's Environmental Assessment Requirements (SEARs) for the EIS, issued by the NSW Department of Planning, Industry and Environment (DPIE) on 31 July 2019, require '*a strategy to offset the residual impacts of the project on these ecosystems, focussing on enhancing the biodiversity values of the Kosciuszko National Park in the medium to long term (and) a strategy to offset the impacts of the project on users of the Kosciuszko National Park.*'

1.1 Biodiversity offset principles

1.1.1 Principles

Significant and extensive consultation has been undertaken with DPIE, NSW National Parks and Wildlife Service (NPWS) and the Commonwealth Department of Environment and Energy (DEE) regarding the biodiversity offsets for the Snowy 2.0 project, including for Exploratory Works and Main Works. Throughout this consultation process, the objective of the offset strategy has been to ensure any offsets achieve a positive outcome for the species and communities impacted by the project. This is also reflected in the Secretary's Environmental Assessment Requirements (SEARs) issued for the Snowy 2.0 Main Works.

Through these discussions a number of guiding principles were developed for the preparation of an offset strategy for Snowy 2.0 Main Works which would add value over and above existing mechanisms and programs for Kosciuszko National Park (KNP). These include:

- management measures/actions will seek to provide a net improvement in the biodiversity values of KNP over time;
- management measures/actions adopted should, where feasible, target threatened species, ecological communities or protected matters being impacted by the project;
- management measures/actions adopted should, where feasible, provide a measurable conservation gain for the threatened species, ecological communities or protected matters being impacted by the project;
- in some cases, a better conservation outcome may be achieved through management measures/actions directed at broader management of the KNP than management measures/actions which target specific species;
- management measures/actions adopted will seek to provide a whole of catchment benefit, providing measurable conservation gains for biodiversity in KNP;
- management measures/actions will be informed by scientific advice and evidence, and will be transparent, effective and efficient;
- management measures/actions that achieve a direct conservation outcome within KNP are preferred over out of park conservation or payment into the NSW Biodiversity Conservation Fund (BCF) established under the NSW *Biodiversity Conservation Act 2016* (BC Act); and
- payment of any offsets by Snowy Hydro is to be made once and will be proportional to the residual impacts after all measures to avoid, minimise and mitigate impacts have been considered.

1.1.2 Guidelines

Snowy 2.0 is the largest committed renewable energy project in Australia. By expanding the current Snowy Scheme's renewable energy capacity by almost 50%, the National Energy Market (NEM) will be served with an additional 2,000 MW generating capacity. In light of the unique location of Snowy 2.0 within KNP and the project's critical significance to the State of NSW and broader NEM, a number of mechanisms have been considered for the delivery of biodiversity offsets for Snowy 2.0, in consultation with DPIE, NPWS and DEE. Following ongoing consultation, it has been determined that a set of guidelines will be developed for the provision of Snowy 2.0 Main Works offsets.

For Snowy 2.0, biodiversity offsets will be delivered via like-for-like offsets where feasible. However, many of the species and communities impacted by the project are unique to KNP, and like-for-like offsets are not achievable. Where like-for-like offsets cannot be achieved, or are not feasible, conservation actions will be undertaken in KNP to benefit the species and communities impacted. Conservation actions will:

- be delivered preferentially in the catchment(s) in which the impact is occurring. Actions that improve catchment health across KNP will also be considered;
- be delivered in the same interim biogeographic regionalisation of Australia (IBRA) subregion(s) or adjacent subregion(s); and
- benefit the threatened species or ecological communities impacted by Snowy 2.0 Main Works; and
- provide direct and measurable conservation outcomes for matters of national environmental significance (MNES), providing direct offsets in line with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Environmental Offsets Policy (DSEWPaC 2012).

In consultation with DPIE, NPWS and DEE, it has been determined that the best way to ensure conservation actions benefit the threatened species or ecological communities impacted by Snowy 2.0 is to develop a set of management actions which:

- identifies the threatened species associated with the plant community types (PCTs) impacted by Snowy 2.0 Main Works;
- identifies Savings Our Species (SOS) actions and/or recovery plan actions that would benefit these threatened species;
- where SOS projects or activities and recovery plan actions have not been identified for threatened species, identify management actions for each threatened species; and
- considers projects that provide a cumulative benefit to key conservation actions across the catchments of KNP.

This process has been used to develop the proposed offset package outlined below.

1.2 Offsets for impacts to matters of national environmental significance

Any impacts on MNES listed under the EPBC Act arising from the project, including threatened species and ecological communities, will need to be offset with consideration of the EPBC Act Environmental Offsets Policy (DSEWPaC 2012). This document sets out the DEE's approach to provision of offsets under the EPBC Act.

Offsets are only required for significant residual impacts to MNES, once all measures to avoid, minimise and mitigate impacts have been considered. This means that, if a significant impact to MNES can be avoided or minimised to the extent that a significant impact can be avoided, offsets are not required. The burden to demonstrate a non-significant impact lies with the proponent.

Section 7.2 of the Environmental Offsets Policy requires that direct offsets form a minimum of 90% of the total offset requirement. Direct offsets are actions which '*provide a measurable conservation gain for an impacted protected matter*' (p.8) and may include actions such as pest species management where pest species are having a significant impact on the viability of the species and increasing threats to the species' long term survival.

Deviation from this rule is permitted where:

- it can be demonstrated that a greater benefit to the protected matter can be achieved through increasing the proportion of other compensatory measures; or
- scientific uncertainty is so high that it is not possible to determine a direct offset that is likely to benefit the protected matter.

When considering offsets for threatened species and communities protected under the EPBC Act, it is important to consider this requirement for direct offsets. This is particularly the case when considering any of the offset options under the BC Act, other than like-for-like offsets.

It is proposed that offsets for MNES meet the requirements of the EPBC Act through ensuring:

- management actions proposed provide a measurable conservation gain for an impacted protected matter wherever possible;
- demonstrating that a greater benefit to the protected matter can be achieved through increasing the proportion of other compensatory measures; or
- demonstrating that scientific uncertainty is so high that it is not possible to determine a direct offset that is likely to benefit the protected matter.

Given many of the species and communities listed under the EPBC Act that will be affected by Snowy 2.0 Main Works do not occur outside of KNP, it is likely that management actions in KNP will provide a greater benefit to these entities, or that determining a traditional 'like-for-like' offset is not available.

2 Offset strategy

2.1 Terrestrial biodiversity

A total of 32,118 ecosystem credits and 44,100 species credits are required to offset residual impacts arising from Snowy 2.0 Main Works, as outlined in the biodiversity development assessment report (EMM 2019) appended to the EIS.

2.1.1 Proposed conservation actions

In the development of the conservation actions proposed in this Biodiversity Offset Strategy (BOS), extensive consultation has been undertaken and key documents have been reviewed to ensure alignment with conservation works and priorities being undertaken by the NSW Government, including DPIE and NPWS, in KNP. A summary of this review is provided below.

To ensure conservation outcomes undertaken as a part of this BOS provide a benefit for the threatened species or ecological communities impacted, a list of threatened species aligned with the PCTs being impacted by Snowy 2.0 Main Works was developed. Where available, SOS actions and/or management actions outlined for each species were documented. The SOS program is an established program managed by DPIE to address impacts to threatened species and communities, providing targeted conservation projects and actions required to save specific plants and animals. The management actions for each species have been developed to address threats and causes of ongoing decline for threatened species. These actions have been developed by species experts and accountable officers in DPIE.

The Kosciuszko National Park Plan of Management 2006 (KNP PoM, DEC 2006) provides:

> a framework of objectives, principles and policies to guide the long-term management of the broad range of values contained in the park ... (and) contains a suite of actions to be undertaken by the National Parks and Wildlife Service and other organisations to protect and conserve the values of the park.

Given the importance of this document to the ongoing management and conservation of KNP, the management objectives in the PoM were reviewed and all conservation actions proposed have been aligned with the relevant management objective(s).

Caring for our Australian Alps Catchments (Worboys and Good 2011) was commissioned by the Australian Alps Liaison Committee as a technical report to the Commonwealth Government to:

- evaluate the natural condition of Australia's high mountain catchments ...;
- to identify significant current and future threats to those catchments associated with climate change and to assess priority adaptation responses."

This document provided a number of policy recommendations to protect the natural values of the Alps, including recommendations for catchment based management at the whole-of-Alps scale to protect water yield. This document was reviewed to ensure conservation actions proposed in this BOS were aligned with the recommendations from Worboys and Good (2011), where applicable to KNP.

The list of conservation actions, developed using the process outlined above, was reviewed in consultation with DPIE to define a set of conservation actions that would be carried forward to inform the BOS. Conservation actions have been assigned to KNP PoM management objectives and aligned with elements of Worboys and Good (2011)

to demonstrate how they will achieve key outcomes across the catchments of KNP, providing an overall conservation benefit.

i Ecosystem credits

Proposed conservation actions to offset impacts to ecosystem credits include implementation of broad management and conservation actions that can be implemented over large areas, designed to have an impact to a broad range of communities and species impacted by Snowy 2.0 Main Works. These proposed conservation actions align with key management actions in the documents listed above.

Key conservation actions that could be included to offset impacts to ecosystem credits include the following:

- Establish a program to restore and regenerate dry open eucalypt forest and woodland within KNP, improving connectivity and water yield.
- Undertake an expanded weed control program across KNP to improve vegetation condition and habitat for threatened species.
- Develop and implement a program to improve watercourses within KNP, restoring Alpine watercourses, recovering habitat for threatened species and improving water yield.
- Establish a program to reduce the distribution and abundance of feral predators across KNP.

Specific details for the scope and implementation of these proposed conservation actions will be developed further and agreed in consultation with key stakeholders, including DPIE, NPWS and DEE.

ii Species credits

In developing the offset strategy for EPBC Act listed communities and species credit species impacted by Snowy 2.0 Main Works a review of background information was undertaken, including the following:

- key threats as documented in Bionet;
- any Savings our Species (SoS) actions for each species; and
- management actions outlined in a species recovery plan.

This information was then summarised, and a list of proposed management actions outlined for each species. A summary of these, for some of the key species impacted by Snowy 2.0 Main Works, is provided in Table 2.1.

Table 2.1 Potential conservation actions for EPBC Act listed communities and species credit species

Species	Potential conservation measures
Alpine Sphagnum Bogs and Associated Fens	• a comprehensive groundwater study of the Alpine Bogs and Fens, looking at interconnectedness of the community with regional groundwater systems, inputs and outputs. Include an assessment of the differences between Sphagnum Bogs and Fens; • use of information collected in the comprehensive groundwater study to inform the conceptual model looking at impacts arising from climate change; • establishment of a program to monitor and quantify the impacts of feral Horses on Alpine Bogs and Fens, including fencing of some currently impacted Alpine Bogs and Fens to monitor assisted and un-assisted recovery;

Table 2.1 Potential conservation actions for EPBC Act listed communities and species credit species

Species	Potential conservation measures
	• regional surveys to identify bogs and fens where feral Horses and weeds are having a significant impact, and monitor impacts over time in relation to control of these issues; and • establishment of SOS sites at key areas of the community, and management of impacts determined in the actions above, to ensure improvement in the condition of the community and associated threatened species at these sites.
Clover Glycine	• annual systematic surveys of suitable habitat to determine the area and extent of populations, the number, size and structure of populations in KNP: – initial surveys to focus on understanding the extent of populations in Blanket Plain, Boggy Plain and along Nungar Creek; • establishment or extension of a SOS site at Gulf Plain, including: – collect floristic and environmental information relevant to community ecology and condition; – identify and survey potential habitat, using ecological and bioclimatic information that may indicate habitat preference; – intensive control of impacts from pest plants and animals, particularly Ox-eye Daisy and feral Horses; – work to identify optimal fire regimes to maintain habitat; – measurement of population trends and responses against recovery actions; and • collection of seed to add to a local seedbank.
Smoky Mouse	• a systematic camera survey across KNP and surrounding National Parks and State Forests to document the distribution of the species, including: – initial surveys undertaken at a broad scale, in suitable habitat areas (as identified through regional mapping), followed by more detailed surveys in following years based on annual results; – collection of vegetation and habitat characteristics at all sites monitored; – look at using this data to develop a species distribution model for the species in KNP; • establishment of a SOS in the Marica/Lobs Hole/Deadmans Firetrail areas, including: – annual field surveys for Smoky Mouse, including collection of genetic data; – habitat mapping, including analysis of floristic and habitat characteristics to further inform our understanding of species habitat requirements; – annual predator surveys to document an estimate of the distribution and abundance of predators in this site; – development and implementation of a predator control strategy based on annual surveys; – conduct experimental ecological burning at limited subset of locations, including monitoring of vegetation response and Smoky Mouse abundance in burnt versus unburnt sites; • analysis of genetic material to estimate levels of genetic partitioning between the biogeographical regions and measure levels of heterozygosity within and between biogeographical regions – moderate; and • capture of Smoky Mouse from the Marica/Lobs Hole/Deadmans Firetrail population in KNP to supplement the captive breeding program (subject to results of genetic analysis above).
Alpine Tree Frog	• systematic surveys through waterways within the species historical range to identify key populations and sample individuals to test for chytrid infection; • fencing of habitat and key populations to prevent access to breeding habitat by feral pests, in conjunction with a monitoring program looking at habitat characteristics, fecundity and breeding success in managed and unmanaged sites; and • implementation of a broad monitoring program in combination with local microclimate variables, particularly moisture, to better understand the likely impacts of climate change on populations and identify potential climate change refugia.

Table 2.1 Potential conservation actions for EPBC Act listed communities and species credit species

Species	Potential conservation measures
Booroolong Frog	• systematic surveys through waterways in the locality that may provide suitable habitat, including (but not limited to) the upper Yarrangobilly River, the Tumut River, Buddong Creek and Gilmore Creek, to identify key populations and sample individuals to test for chytrid infection; • collecting genetic samples for surveyed populations to provide information of taxonomic status/genetic subdivision of northern and southern populations; • establishment of a SOS site on the Yarrangobilly River, including: – testing of the population for Chytrid fungus; – weed control along the banks of the River, particularly Blackberry, using appropriate control methods; – monitor target weed density using appropriate methodologies; – quantitative assessment of pest animal abundance/density/activity using appropriate methodology or qualitative estimate; – monitor for evidence of direct disturbance on the species at the sites; – spotlights surveys to determine occupancy of breeding habitat by males. Map distribution of rocky habitats, determining the abundance of rock crevices in rocky habitat, determining the distribution and proximity to rocky habitat of significant weeds (particularly invasive willow and blackberry); – revegetation of all areas within 50 m of top of bank, to limit potential for erosion (particularly mobilisation of large amounts of sediment); and – establishment of a monitoring program to look at the species' response to revegetation works. • establishment of additional SOS sites as appropriate.
Alpine She-oak Skink	• systematic surveys throughout KNP, initially targeting areas of subalpine dry grasslands and other associated communities. Expansion of this survey program to include surveys of vegetation communities adjacent to preferred habitats; • establishment of a SOS site in northern KNP, including: – surveys of preferred and adjacent habitats to understand habitat preferences, and use of non-preferred habitats; – radiotracking surveys (if feasible) to understand the movement patterns of the species year-round; – quantitative assessment of pest animal abundance/density/activity using appropriate methodology or qualitative estimate; – monitor for evidence of direct disturbance on the species at the sites; and – establishment of large feral Horse exclusion areas, and implementation of a monitoring program, to understand the impacts of feral Horses on the species habitat.

Specific details for the scope and implementation of the suite of proposed conservation measures will be developed further and agreed in consultation with key stakeholders, including NPWS, OEH, DPIE and DEE.

2.2 Aquatic ecology

Comprehensive aquatic surveys have been undertaken throughout the Snowy 2.0 Main Works area and have established a baseline for understanding the existing values and the potential impacts of Snowy 2.0 Main Works. While this has been underway, consultation has been ongoing with the NSW Department of Primary Industries (Fisheries), DPIE and the local fishing community (in particular the Monaro Acclimatisation Society) who utilise Tantangara Reservoir. As a result of the comprehensive technical investigations and stakeholder engagement, a good understanding of the potential residual impacts on local aquatic ecology and recreational fishery has been established.

Through the design process, significant effort has been put into addressing the identified issues and mitigating potential impacts where practical. Where impacts cannot be avoided or mitigated, offsets may be required and implemented proportionate with the residual impacts.

Offset principles that apply to aquatic ecology align strongly with the biodiversity principles (refer to Chapter 1.1) and include:

- management measures/actions will seek to provide a net improvement in the fishery values over time;
- management measures/actions adopted should target matters being directly impacted by the project;
- management measures/actions will be informed by scientific advice and evidence, and will be transparent, effective and efficient;
- management measures/actions that achieve a direct (conservation or recreation) outcome within the local / regional fishery are preferred; and
- payment of any offsets by Snowy Hydro is to be made once and will be proportional to the residual impacts after all measures to avoid, minimise and mitigate impacts have been considered.

The potential impacts on aquatic ecology arising from Snowy 2.0 Main Works include:

- potential impacts on Murray Crayfish in Talbingo Reservoir during intake construction and excavated material placement;
- potential impacts on recreational fishing in Tantangara Reservoir due to possible transfer of pest fish species between Talbingo and Tantangara reservoirs. Note that transfer of pest fish species through operation of Snowy 2.0 is not considered certain, nor can it be excluded; and
- if fish transfer occurs and is not contained within Tantangara Reservoir, then there may be potential impacts to threatened species upstream and downstream.

Substantial effort has been directed to assessing the potential for transfer of pest fish species as well as the available reasonable and feasible controls to prevent and mitigate this. This strategy and the actions below in Table 2.2, will offset the residual impacts once these controls have been implemented.

Table 2.2 Potential actions for residual impacts to aquatic ecology

Species	Potential measures
Murray crayfish	• Monitoring and surveillance of Talbingo Reservoir population.

Table 2.2 Potential actions for residual impacts to aquatic ecology

Species	Potential measures
	• Contribute to research into habitat usage, population structure and habitat utilisation.
Macquarie perch	• Surveillance and sampling of Tantangara Reservoir, Murrumbidgee River and Tantangara Creek. • Contribute to local / regional insurance population program.
Stocky galaxias	• Surveillance and population monitoring. • Habitat enhancement (fencing) in Tantangara Creek. • Contribute to translocation program and establishment of insurance population.
Recreational fishing in Tantangara	• With stakeholders (in particular Monaro Acclimatisation Society) develop a program for stocking of large fish (rainbow trout) in Tantangara Reservoir. • Improve boat launching access at Talbingo and Tantangara reservoirs.

The proposed actions will be developed and implemented further in consultation with key stakeholders, including DPIE, DPI Fisheries and the local fishing community through the Monaro Acclimatisation Society.

2.3 Recreational users

An understanding of the recreational uses and values within and around the Snowy 2.0 Main Works area has been established through collection of qualitative and quantitative data since April 2018. This has involved 295 'face to face' surveys of recreational users, 33 completed e-mail surveys and visitor counts at key locations to establish user preferences and visitation numbers. At the same time consultation has been ongoing with the NPWS, fishing and bush user groups and operators. Together this provides a thorough understanding of the potential impacts to recreational users and facilities, as well as the needs of the asset managers.

A substantial proportion of the impact on recreational values will occur during only the construction phase of Snowy 2.0 Main Works. For example, much of Ravine / Lobs Hole and areas around the Tantangara Reservoir foreshore will be rehabilitated and re-established as recreation areas through the rehabilitation process.

Substantial effort has been directed to mitigate potential impacts through design and iteration processes. Offsets may be required where direct permanent impacts of Snowy 2.0 Main Works cannot be avoided or mitigated.

Offset principles for recreation include:

- measures/actions that achieve a direct recreation outcome within the Snowy 2.0 Main Works area are preferred;
- management measures/actions will seek to improve recreation values over time;
- management measures/actions adopted should target matters being directly impacted by Snowy 2.0 Main Works;
- management measures/actions will be informed by objective evidence of the impacts to facilities and users, and will be transparent, effective and efficient; and,
- payment of any offsets by Snowy Hydro is to be made once and will be proportional to the residual impacts after all measures to avoid, minimise and mitigate impacts have been considered.

The potential residual impacts on recreational facilities and users arising from Snowy 2.0 Main Works include:

- potential loss of Trout as a target recreation species in the event that Redfin establish in Tantangara Reservoir;
- potential loss of amenity of bushwalking, camping and horse riding from permanent infrastructure; and
- potential loss of amenity and available areas of lake / reservoir use, due to safety restrictions.

This strategy and the actions below in Table 2.3, will offset the residual impacts once all the mitigation measures and controls contained in the Snowy 2.0 Main Works EIS have been implemented.

Table 2.3 Potential actions for residual impacts to recreational uses and facilities

Recreational user group	Potential measures
Recreational fishing	• With stakeholders, develop a program for stocking of large fish (rainbow trout) in Tantangara Reservoir.
Bushwalking, camping and horse riding	• Upgrade camping facilities on the Tantangara Reservoir foreshore and Lobs Hole and integrate with the new assets. • Upgrade/ refurbish facilities that have been directly impacted as a consequence of Snowy 2.0.
Lake based recreation	• With NPWS, Maritime and stakeholders, improve boat launching access at Talbingo and Tantangara reservoirs.

2.4 Governance arrangements

Once agreed, this Offset Strategy will be implemented to fulfil Snowy Hydro's obligations to offset the impacts of the Project, including as required under the BC Act and the EPBC Act.

This Offset Strategy is proposed to be binding and form a condition of approval. The final agreed management actions for terrestrial biodiversity, aquatic ecology, and recreational users will be measured, monitored and audited by DPIE as part of its compliance and park management functions.

3 Conclusion

Following extensive consultation with Commonwealth and NSW government agencies and primary stakeholders, the proposed actions in this Offset Strategy will be used to offset:

- residual impacts of Snowy 2.0 Main Works on ecosystems, focussing on biodiversity values of KNP; and
- residual impacts on recreational users.

Focussing on biodiversity values of KNP is in line with the key objectives identified in a number of plans, particularly the KNP PoM (DEC 2006), Worboys and Good (2011) and Pittock et al. (2018). A set of principles have been developed to guide the development of this Offset Strategy. In line with these principles a list of conservation actions has been developed; these conservation actions will be implemented by NPWS and OEH.

Similarly, should residual impacts to aquatic ecology occur, Snowy Hydro will implement actions and controls focussing on these aquatic values of KNP. Snowy Hydro will continue to engage with DPI Fisheries and DPIE regarding these controls should they be required.

Recreational user disruption will be at its greatest during the construction phase of Snowy 2.0 Main Works, as several sites within KNP will be closed or restricted in access for an extended period. Once these works are completed, most of these areas will be rehabilitated with the remainder retained for Snowy Hydro's operational purposes. Notwithstanding, Snowy Hydro will offset residual impacts on identified recreational user groups once all appropriate mitigation measures and controls contained in the Snowy 2.0 Main Works EIS have been implemented.

This offset strategy has been developed with implementation of a number of guiding principles to identify appropriate actions targeting improved biodiversity outcomes for KNP and its recreational users. Snowy Hydro will continue to engage with Commonwealth and NSW government agencies and identified recreational user groups regarding the implementation of these actions as part of carrying out Snowy 2.0 Main Works.

4 References

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