NSW NATIONAL PARKS & WILDLIFE SERVICE

Nungatta Feral Predator–Free Area

Review of environmental factors

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Cover photo: Nungatta, South East Forest National Park

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Shortened forms

Term	Definition
ACHAR	Aboriginal cultural heritage assessment report
BC Act	*Biodiversity Conservation Act 2016* (NSW)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (C'th)
FAFT	fire access and fire trail
FFA	*Flora and fauna assessment* (Narla Environmental 2022)
FM Act	*Fisheries Management Act 1994* (NSW)
FPFA	Feral predator–free area
ha	hectares
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NPWS	NSW National Parks and Wildlife Service
REF	review of environmental factors
RF Act	*Rural Fires Act 1997* (NSW)
RoLEM	Reintroduction of Locally Extinct Mammals
SEFNP	South East Forest National Park
TfNSW	Transport for NSW

Summary

Introduction

This review of environmental factors (REF) and supporting documents have been prepared by the NSW National Parks and Wildlife Service (NPWS) and consultants to assess and mitigate potential impacts associated with establishing a feral predator–free area (FPFA) in Nungatta, within South East Forest National Park (SEFNP) in the far south-east of NSW.

The activity

The activity involves the construction and operation of conservation fencing and associated infrastructure within SEFNP, followed by the eradication of feral predators and herbivores (to the greatest extent practicable) and the reintroduction of locally extinct species within the established Nungatta FPFA (the 'activity'). The activity would include:

- establishment of a 2,084.4 ha Nungatta FPFA, comprised of:
    - an initial release area of 246.9 ha (Stage 1)
    - a small site compound of 0.3 ha (Stage 1)
    - a larger feral predator free area of 1,837.2 ha (Stage 2)
- construction of 28.2 km of predator exclusion fencing:
    - 23.9 km of perimeter fencing around the Nungatta FPFA
    - 4.3 km of internal fencing to separate the Stage 1 and Stage 2 areas
- establishment of a 15 m wide cleared corridor along the conservation fences (8 m outside and 7 m inside of the fences), achieved by widening of existing and dormant road and trail corridors and new clearing
- construction and maintenance of 15.3 km of new fire trails
- upgrading and re-alignment, and maintenance of 6.37 km of existing fire trails
- reprofiling on current alignment, and maintenance of 7.17 km existing fire trails
- construction and maintenance of 16.3 km of new management trails
- construction of 17 new culverts and 2 new bridges
- upgrade of 5 existing culverts and 2 existing bridges
- construction of 20 instream large debris traps, associated access tracks and maintenance pads
- construction of a 0.3 ha site compound in the south-western corner of the activity area
- eradication of foxes, cats, deer, pigs and rabbits inside the Nungatta FPFA. If rabbits cannot be eradicated, they will be reduced to a level where they will have a negligible impact
- a long-term monitoring program to observe trends in:
    - reintroduced and extant native species
    - ecosystem function and ecological processes
    - threats.

In this REF, the term 'activity area' generally refers to the whole Nungatta FPFA of 2,084.4 ha. The construction footprint area of 48.56 ha refers to the surveyed corridors construction footprint area (i.e. the surveyed corridor for fence alignment and cleared corridor, new fire trails and management trails, instream large debris traps, and the site compound, as described in Section 7.2.2). The term 'Nungatta Feral Predator–Free Area'

refers to the area enclosed by the conservation fence. A later stage of the activity will include the introduction / reintroduction / translocation of locally extinct animal species into the Nungatta FPFA; however, this is not specifically assessed in this REF as it will be subject to further assessments via future translocation activities.

Proposal objectives

The objectives of the proposed activity are to:

- create and maintain a large FPFA area by constructing fencing and eradicating feral animals within the fenced area
- establish and maintain viable populations of reintroduced species in the new FPFA. Locally extinct species considered for reintroduction include (but are not limited to):
    - *Bettongia gaimardi* (eastern bettong)
    - *Pseudomys fumeus* (smoky mouse)
    - *Dasyurus viverrinus* (eastern quoll)
    - *Potorous longipes* (long-footed potoroo)
- maintain or improve the trajectory for extant resident animals (including threatened species) within the Nungatta FPFA
- improve the environmental health and ecosystem function within the FPFA.

In addition, the Nungatta FPFA would have an important role in increasing the awareness and understanding of threatened species, ecological communities, threatening processes and their management.

Options considered

At a statewide scale, the Eden–Bombala region has been identified as a priority for the establishment of an FPFA by the NSW Government, and the Department of Planning and Environment (the department) Biodiversity, Conservation and Science Division, based on the number of priority species occurring in the region.

Consideration has been given to reasonably feasible alternative sites within the Eden–Bombala region of NSW, alternative designs and management options that may also achieve the activity objectives.

Sites within the Eden–Bombala region were considered based on:

- the number of species (both reintroduced and extant) that will benefit
- practicality and feasibility of establishing and maintaining infrastructure associated with the FPFA
- environmental, social and cultural impacts associated with site establishment works
- the extent of ecosystem restoration achievable.

The preferred location of the Nungatta site was identified through an assessment by an expert working group against broad criteria, requiring judgements based on available science, experience and an overall, holistic assessment.

Statutory and planning framework

This REF and supporting documents have been prepared in accordance with the requirements of section (s) 5.5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) specifying a ‘duty to consider environmental impact to the fullest’ extent before carrying out or approving works that are not subject to development consent under Part 4 of the EP&A Act.

The REF considers the environmental factors listed in s 171 of the Environmental Planning and Assessment Regulation 2021, including all additional environmental factors that are relevant to this activity.

The assessment has taken into account the provisions of the NSW *Biodiversity Conservation Act 2016* (BC Act), the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and other relevant legislation.

Community and stakeholder consultation

Consultation with the relevant neighbours, community groups, government agencies and Registered Aboriginal Parties has been conducted as detailed in this REF.

This REF will be publicly exhibited to the wider community for a period of 30 days. Members of the public are invited to provide feedback on the proposed activity. Issues raised in submissions will be considered and, where appropriate, addressed before determination of this REF.

Once determined, the final version of the REF and the decision statement listing the conditions of determination will be published.

Environmental impacts

Impact category	Extent of impact	Nature of impact
Physical and chemical	Construction – low; negative Operation – low; negative	Soil disturbance during construction will increase the risk of erosion and sedimentation-related issues, particularly with granitic soils in the activity area, which are highly erodible. During construction, the activity has the potential to have a negative impact on water quality, hydrology and aquatic fauna, including: • erosion and sedimentation of local aquatic habitats and waterways • pollution of local water quality from machinery and construction materials and spills and dewatering • a variety of dispersible liquid materials would be used that pose a potential pollutant threat to local water quality. These liquids include but are not limited to diesel, unleaded petrol, machinery oils and lubricants • possible introduction of aquatic pathogens. The proposed fence line includes 5 Class 2, Type 1 Key Fish Habitat watercourses that will be crossed (Reef Creek, Surveyor's Gully, Sandy Creek, Donald Liang's Creek and an unnamed creek). With the implementation of appropriate design and mitigation measures (see Section 10), it is expected the activity is not likely to have a significant impact on soil quality or land stability. The activity has been designed to avoid impacts by utilising the existing trail / road network, abandoned logging tracks and previously disturbed areas at crossings and on ridgelines, where possible. The activity avoids side cuts on steep slopes and running parallel with waterways. During the detailed design phase, the activity will be optimised further to avoid or minimise these impacts, where

Impact category	Extent of impact	Nature of impact
		possible (i.e. the alignment of the fence line may be adjusted within the survey corridor to avoid sediment trapping). The activity will apply design standards and construction methods that meet or exceed specifications in the Rural Fire Service (RFS) fire trail design manual and NSW *Managing Urban Stormwater* Blue Book (NSW Government 2004).
Biodiversity Vegetation, including ecological communities and plant community types	Construction – medium; negative Operation – medium; positive	The native vegetation clearing required for the activity involves 31.67 ha for the following: • predator exclusion fence management corridor (29.90 ha) • debris traps and maintenance pads (0.4 ha) • site compound (0.14 ha) • new management trails (1.23 ha). None of the vegetation identified within the activity area is listed as a threatened ecological community (TEC) under the BC Act or EPBC Act. As such, no TECs will be impacted by the activity. The freshwater aquatic vegetation (submerged), and trailing bank vegetation (ferns and sedges) present has the potential to be impacted. The activity would likely result in minor impacts to threatened biodiversity; however, the activity has been designed to avoid impacts by utilising the existing trail / road network, abandoned logging tracks and other previously disturbed areas, where possible. For the purposes of the assessment the alignment of the fence line, the ancillary supporting infrastructure and the corresponding disturbance footprint have been defined to assess the impact to threatened species and hollow bearing trees. During the detailed design phase, the activity will be optimised to further avoid or minimise these impacts, where possible (e.g. small adjustments made to the alignment of the fence line within the survey corridor).
Biodiversity Threatened species and key threatening processes (KTPs)	Construction – medium; negative Operation – medium; positive	Tests of significance (5-part test; BC Act) and assessments of significant impact criteria (EPBC Act) were undertaken for the following species, which have been recorded or are likely to occur within the subject area: • *Pultenaea parrisiae* (Parris' bush-pea) • *Callocephalon fimbriatum* (gang-gang cockatoo) • *Calyptorhynchus lathami* (glossy black cockatoo) • *Cercartetus nanus* (eastern pygmy-possum) • *Dasyurus maculatus* (spotted-tailed quoll) • *Falsistrellus tasmaniensis* (eastern false pipistrelle) • *Myotis macropus* (southern myotis) • *Ninox strenua* (powerful owl) • *Petauroides volans* (greater glider) • *Petaurus australis* (yellow-bellied glider) • *Scoteanax rueppellii* (greater broad-nosed bat) • *Tyto novaehollandiae* (masked owl) • *Tyto tenebricosa* (sooty owl) • *Myotis macropus* (southern myotis) • *Sminthopsis leucopus* (white-footed dunnart).

Impact category	Extent of impact	Nature of impact
		The activity is likely to have low-level short-term impacts to potential foraging habitat and negligible impacts to potential breeding habitat for potentially occurring migratory species, given their migratory nature. Considering the proposed eradication of feral predators within the Nungatta FPFA, the activity is likely to improve habitat for threatened species. The predator exclusion fencing will be a permanent barrier to the movement of medium and large non-volant (i.e. non-flying or gliding) mammal species and large reptiles. Therefore, populations of some species inside the fence may be subject to the following indirect impacts: • entrapment • funnelling • barriers • genetic fragmentation • altered ecosystem functioning. The activity is not expected to significantly impact threatened species known or potentially occurring within the construction footprint due to the extent of vegetation to be retained, the fact that potential local populations of the subject species would extend well beyond the Nungatta FPFA, and the proposed safeguards recommended in the assessment. The activity would contribute to the following KTPs: • bushrock removal • clearing of native vegetation • loss of hollow bearing trees • infection of frogs by amphibian chytrid causing the disease *chytridiomycosis* • infection of native plants by *Phytophthora cinnamomi* • removal of dead wood and dead trees. It is not anticipated that any of the KTPs will significantly impact on any threatened species, populations and ecological communities that occur or have the potential to occur within the activity area. The removal of hollow bearing trees was considered necessary to establish a robust and resilient predator exclusion fence that can be readily maintained. Although the activity would increase the risk of pathogen spreading, this risk can be effectively mitigated through proper hygiene protocols. During operation, the activity's explicit aims are to remove cats, foxes, dogs, rabbits, deer and pigs and reintroduce locally extinct animals, thus improving the target species' likelihood of reproduction and restoring ecosystem processes, which are also of benefit to other threatened species found in the area; this would constitute a positive impact. Therefore, the activity is likely to have a positive contribution to minimising the effects of the following KTPs listed under the BC Act: • competition and grazing by the feral European rabbit (*Oryctolagus cuniculus*) • competition and habitat degradation by feral goats (*Capra hircus*) • predation by the European red fox (*Vulpes vulpes*)

Impact category	Extent of impact	Nature of impact
		• predation by the feral cat (*Felis catus*) • predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*). Overall impact of the activity on KTPs is likely to be positive and threatened species benefit from the overall reduction in impacts from KTPs.
Aboriginal cultural heritage	Construction – low; negative Operation – medium; positive	An Aboriginal cultural heritage assessment report (ACHAR; GML Heritage 2022a) was completed to accompany the REF. As a result of the field inspections and consultation with Registered Aboriginal Parties, the assessment report concluded: • A total of 66 new Aboriginal cultural heritage sites were identified during site surveys. Of these, 35 sites were recorded in close proximity to the proposed conservation fence line route; 31 sites were recorded along the internal and external management trails. • The majority of these comprised fewer than 5 artefacts, and only 4 were considered to have subsurface archaeological potential. Three uncommon artefacts were identified, including a hand axe / hammer, a blade, and a possible micro-scraper. Overall, these sites are representative of a highly active and mobile cultural landscape in which artefacts were dropped or discarded as people moved through Country. • The majority of the sites are located outside of the impact area. Thirteen sites are located within the 30 m wide survey corridor of the fence line or 6 m wide corridor of the management trails. The activity footprint was altered to avoid impacts to the identified sites. An Aboriginal Heritage Impact Permit (AHIP) should be sought for direct impacts to 14 identified sites and potential accidental impact to a number of additional sites. Part of the Bundian Way (State Heritage Register 01906) is located within the proposed Nungatta FPFA. The proposed works would result in the clearance of vegetation, formalisation of an extant dormant logging track, and construction of fence line along 7.0 km of the total length of the Bundian Way. A Statement of Heritage Impact (GML Heritage 2022b; Attachment F) has assessed the potential impacts to the identified heritage values of the Bundian Way, noting that the listing is currently under review for its potential misrepresentation of some Aboriginal groups, and a number of the heritage criteria it has been assessed as meeting are not demonstrated by the portion that passes through the proposed Nungatta FPFA. Overall, the works would have a neutral to moderate positive impact on the Bundian Way citation. The infrastructure would be constructed along previously disturbed footprints (i.e. existing trail corridors) and would not reroute the extant tracks that are representative of the Bundian Way. Moreover, the rehabilitation of the area to promote thriving native faunal and floral populations of disappearing species would enhance the current disturbed and diminished landscape.

Justification and conclusion

There is strong scientific support for the establishment of FPFAs using conservation fencing as an essential component of any overall strategy to prevent further extinctions and promote the recovery of our most susceptible species (Ringma et al. 2017; Legge et al. 2018; Legge et al. 2019). A network of FPFAs is necessary to complement the conventional reserve system and is required in the short to medium term to prevent extinction of predator-susceptible threatened mammal species (Legge et al. 2019).

Establishment of an FPFA within SEFNP is a critical step in restoring the ecosystem functions (e.g. turning over soil, spreading native seed and fungal spores, native predators) provided by the targeted locally extinct species. It will enable reintroduction of native species previously lost locally and/or more broadly from NSW including:

- re-establishment of eastern bettong (*Bettongia gaimardi*) currently listed as extinct in NSW
- establishment of new populations of species that are locally extinct or declining such as eastern quoll (*Dasyurus viverrinus*), long-footed potoroo (*Potorous longipes*) and smoky mouse (*Pseudomys fumeus*). Other locally threatened or extinct species may be included subject to approved translocation plans like broad-toothed rat (*Mastacomys fuscus*), New Holland mouse (*Pseudomys novaehollandiae*), Hastings River mouse (*Pseudomys oralis),* eastern chestnut mouse (*Pseudomys gracilicaudatus),* Tasmanian pademelon (*Thylogale billardierii*) and red-legged pademelon (*Thylogale stigmatica*).

It will also provide direct and indirect conservation benefits for populations of existing threatened native species, enabling them to recover, including:

- species that are expected to benefit directly from feral exclusion, such as eastern pygmy-possum (*Cercartetus nanus*), long-nosed potoroo (*Potorous tridactylus*), southern brown bandicoot (eastern) (*Isoodon obesulus*), spotted-tailed quoll (*Dasyurus maculatus*), white footed dunnart (*Sminthopsis leucopus*), and Parris' bush-pea (*Pultenaea parrisiae*)
- species that are expected to benefit from feral exclusion in combination with management interventions such as ecological fire management, habitat augmentation and overall improvements in ecosystem health, including yellow-bellied glider (*Petaurus australis*), giant burrowing frog (*Heleioporus australiacus*), flame robin (*Petroica phoenicea*), hooded robin (south-eastern form) (*Melanodryas cucullata*), scarlet robin (*Petroica boodang*) and large forest owls.

This REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration of impacts on cultural values (including Aboriginal and non-Aboriginal heritage), socio-economic values (including potential impacts on the community resulting from construction works) and threatened species, populations and ecological communities and their habitats. It has also considered potential impacts to threatened species and matters of national environmental significance listed under the Commonwealth EPBC Act.

1. Introduction

1.1 Background

Australia has the worst mammal extinction in the world. At least 34 Australian mammal species have become extinct since European settlement, with feral cats and foxes the main drivers for at least two-thirds of these losses (Legge et al. 2018; Radford et al. 2018; Woinarski et al. 2015). The range and abundance of surviving mammals continues to decline significantly across Australia.

Feral cats and foxes also negatively impact on bird (Garnett et al. 2011; Woinarski et al. 2017), reptile (Woinarski et al. 2018; Chapple et al. 2019), and amphibian species (Woinarski et al. 2020).

Feral cats are found throughout mainland Australia and are estimated to kill 1.5 billion native mammals, birds, reptiles and amphibians every year. In NSW, cats are thought to impact 117 threatened species, more than any other feral animal species (Coutts-Smith et al. 2007).

A network of FPFAs is an essential part of the NPWS strategy to protect and restore our most vulnerable native species.

The NPWS FPFA program represents one of the most significant threatened fauna restoration activities in NSW history. The activity builds on the successful Reintroduction of Locally Extinct Mammals (RoLEM) program, which has established 3 feral-free areas in western NSW and has reintroduced to the state 8 species that were previously extinct. The establishment of 4 large feral cat and fox-free areas at various locations across NSW (including the Nungatta site) will deliver a measurable conservation benefit for at least 50 threatened animal species, including:

- re-establishment of 13 not seen in their natural habitat for over 100 years
- establishment of new populations of threatened and protected species which are locally extinct – priority species at Nungatta will include the critically endangered long-footed potoroo, the eastern quoll and bushfire-affected species such as the smoky mouse
- improvement in the trajectory, or reduction in extinction risk, for other threatened extant animal species
- a significant conservation benefit for an additional 20 or more extant threatened animal species.

The initiative will, in turn, improve, enhance and restore essential ecosystem function and processes.

The program is partly funded by the NSW Environmental Trust with most of these funds expected to be expended in the first 4 years of each activity. NPWS will cover other costs, including ongoing costs. The initiative will be independently evaluated in its 10th year.

Reflecting the central role of national parks in securing our biodiversity, the activity will deliver an exceptional ecological return and position NPWS as a world-leader in rewilding, restoration ecology and feral predator control.

1.1.1 Nungatta site selection

On 18 December 2020, the former Minister for Energy and Environment announced plans to establish 4 new FPFAs to enable the reintroduction of locally extinct species, improve protection of extant species, and restoration of ecosystem health and functioning of selected reserves. One site in particular would be on NPWS land between Eden and Bombala. This site was to be at least 2,000 ha and be suitable for the reintroduction of long-footed potoroo, *Potorous longipes.*

The Eden–Bombala region has been identified as a priority for the establishment of an FPFA by the Australian Government and the department's Biodiversity, Conservation and Science Division to protect and restore extinct and extant populations of threatened mammals.

A 4-step site selection process was used involving:

Step 1: Identification of priority species, populations and communities that are now extinct in NSW or threatened by predation from feral animals

Step 2: Strategic state-level assessment of priority locations using spatial, multi-criteria analysis to identify areas that maximise conservation outcomes and benefit the greatest diversity of priority species

Step 3: Detailed regional assessments of potential sites involving an analysis of planning, ecological, cultural, social, operational and economic considerations

Step 4: On-ground feasibility assessments and other operational and resourcing considerations.

Communication and engagement with key stakeholders was undertaken throughout the process.

Operational feasibility assessment

A comparative assessment of the operational feasibility of 36 sites in NSW South Coast national parks was undertaken during 2020–21. A detailed investigation of risks to the building and operating of an FPFA was conducted. A comparative assessment of the 11 most likely candidate sites, including 6 in SEFNP, was then undertaken. The comparative assessment considered:

- number of native species that could benefit including:
  - the number of locally extinct species to be reintroduced (and the likely population size of each, based on the area and suitability of habitat at each site)
  - extant fauna that will benefit from feral animal removal
- establishment and maintenance costs of a 2,000 ha FPFA, (including perimeter length and shape, site ruggedness and management risks such as fire, vandalism, number and nature of stream crossings and the timeframe for completion)
- permissibility under the Wildness Act and constraints for other tenures in or beside the sites (like council road reserves, travelling stock reserves and state forests)
- potential for conflict with current customary use, both in and beside the sites (like fishing and other recreational pursuits, intensive agriculture, urban and peri-urban developments and timber plantations)
- scale and quality of the visitor experience including the location, natural setting and accessibility, together with the cost of implementing visitor programs
- environmental, cultural and social impacts associated with construction of predator proof fencing and supporting ancillary infrastructure including impacts on existing plant and animal species, ecological communities, connectivity and refugia, Aboriginal and historic heritage values, and recreational use
- anticipated extent of broader ecosystem restoration based on current condition and the benefits associated with the exclusion of feral animals, focused management and reintroductions
- the NSW Fire and the Environment report (DPIE 2020b), which provides an outline of the impacts from the 2019–20 bushfires and notes that over 60% of the South East Corner Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion was affected by fire and many species are likely to have endured severe impacts. This also supports the need for increased conservation effort in the region.

Ecological feasibility assessment

An expert panel workshop, held on 25 June 2021, found the Nungatta site suitable pending an assessment of the availability of food resources and the impact of the soil-borne pathogen *Phytophthora cinnamomi* at the site. It was recommended that baseline surveys of the abundance and diversity in all seasons of hypogeal (underground) fungi and forage plants also be undertaken. Sporocarps of hypogeal fungi are small truffle-like balls found in the soil. They are the primary food source of native mycophagous mammals such as the long-footed potoroo *Potorous longipes.*

Subsequent plant surveys indicated widespread infection of phytophthora in the past (Miles 2021; Attachment E). Recent soil survey found *Phytophthora cinnamomi* across most of the north and central areas of the Nungatta site, as well as the site's south-west. However, recent surveys also found that the diversity and biomass of hypogeal sporocarps at Nungatta is substantial (Davoodian 2022; Attachment D).

Expert review of plant surveys and hypogeal surveys suggests the site appears to be a promising location for reintroduction of native mycophagous mammals.

The risk of *Phytophthora cinnamomi* to establishing self-sustaining and resilient populations of reintroduced threatened animals will be assessed in their translocation plans (DPIE 2019).

Stakeholder and community consultations

A detailed communication and engagement plan listing stakeholders has been completed and key stakeholders engaged. Those consulted include:

- Aboriginal community and traditional owners
- NPWS South Coast Regional Advisory Committee
- Snowy Monaro Regional Council, Bega Valley Shire Council
- Far South Coast Bushfire Management Committee
- Snowy Mountains Bushfire Management Committee
- Forestry Corporation of NSW
- South East Local Land Services
- NSW Fisheries
- Transport for NSW (TfNSW)
- Far South Coast Wild Dog Group
- immediate neighbours and landowners in Nungatta Valley
- National Parks Association
- other conservation groups and interested individuals.

NPWS has also engaged with Australian Wildlife Conservation, Worldwide Fund for Nature, NSW and Victorian Royal Botanical Gardens, ACT Government Mulligans Flat Feral Free Area and the Commonwealth Government Department of the Environment. Aboriginal cultural heritage assessment and amendments to the plan of management for SEFNP further enhanced outreach to community groups and individuals about the Nungatta FPFA proposal. All stakeholder comments are being considered in each planning and design phase.

Finalising preferred locations for fence lines and corridors

Once Nungatta was chosen as the preferred location, extensive assessment of ridgelines, stream crossing points, and current and dormant trails was undertaken to identify where the fence could be located to minimise impact to extant flora, fauna and ecosystem values without unduly compromising the potential of an FPFA. Where possible, the perimeter was located on or beside existing or dormant trails, crossed streams where damage to riparian and floodplain terraces could be minimised, avoided old and mature forest stands, wetlands, rocky outcrops, and threatened plant species. The perimeter is mostly located on flat ground, spurs or ridges. It avoids steep slopes and side cuts where it would be unfeasible to maintain a feral predator proof fence in tall forest.

Both a preferred and alternative 2,000 ha area was identified. This allowed for the possibility of NPWS not getting approval to close the council road reserve that is partially aligned with Laings Road. Both were surveyed for the ACHAR in January 2022 but only the preferred site was surveyed for the REF in May 2022 because by then both Bega Valley Shire Council and Snowy Monaro Regional Council had agreed to pursue legal approval to restrict public access along the council road reserve.

2. Brief description of the proposed activity

Proposal name	Nungatta Feral Predator-Free Area (referred to hereafter as the activity) The establishment of the activity will involve: • construction of conservation fencing designed to exclude foxes, feral cats, dogs, rabbits, deer, goats, cattle, horses and pigs • an eradication program to eliminate or reduce the feral species populations to a level where they have a negligible impact on the activity • reintroduction of locally extinct animal species • monitoring, evaluation and reporting on species response, threats and ecosystem health • construction of ancillary infrastructure (including management trails, culverts and bridges, and large debris traps and site compound) to support the establishment and ongoing operation of the activity • construction of visitor facilities like parking areas, walking tracks, information shelters, and other visitor infrastructure.
Location of activity	The activity is generally located between White Rock River and Nungatta Creek Road, on the southern side of Imlay Road and is within the South East Forest National Park. The activity is approximately 40 minutes' drive south of Bombala and 60 minutes from Eden (refer to Figure 1 and Figure 2).
Name of NPWS park or reserve	South East Forest National Park
Description of any unreserved land	The activity area includes Laings Road, a council road reserve. NPWS has, with the support of the Snowy Monaro Regional Council and Bega Valley Shire Council, applied for the temporary closure of the council road reserve for 5 years under s 116, NSW *Roads Act 1993*. TfNSW has agreed to approve this request after this REF is determined.
NPWS Area	Sapphire Area
Councils	Bega Valley Shire Council and Snowy Monaro Regional Council
NSW state electorates	Bega and Monaro electorates
Estimated capital cost of activity*	$3,500,000
Estimated duration of activity	Ongoing
Proposed commencement date	Construction of Stage 1 (246 ha, soft release area) to commence in November 2022 with Stage 2 (1,837 ha, hard release area) commencing soon afterwards, subject to relevant approvals.
Proposed completion date	September 2023 (begin reintroduction of locally extinct or declining threatened species after eradication of feral predators inside fenced areas); reintroductions and management will be ongoing.

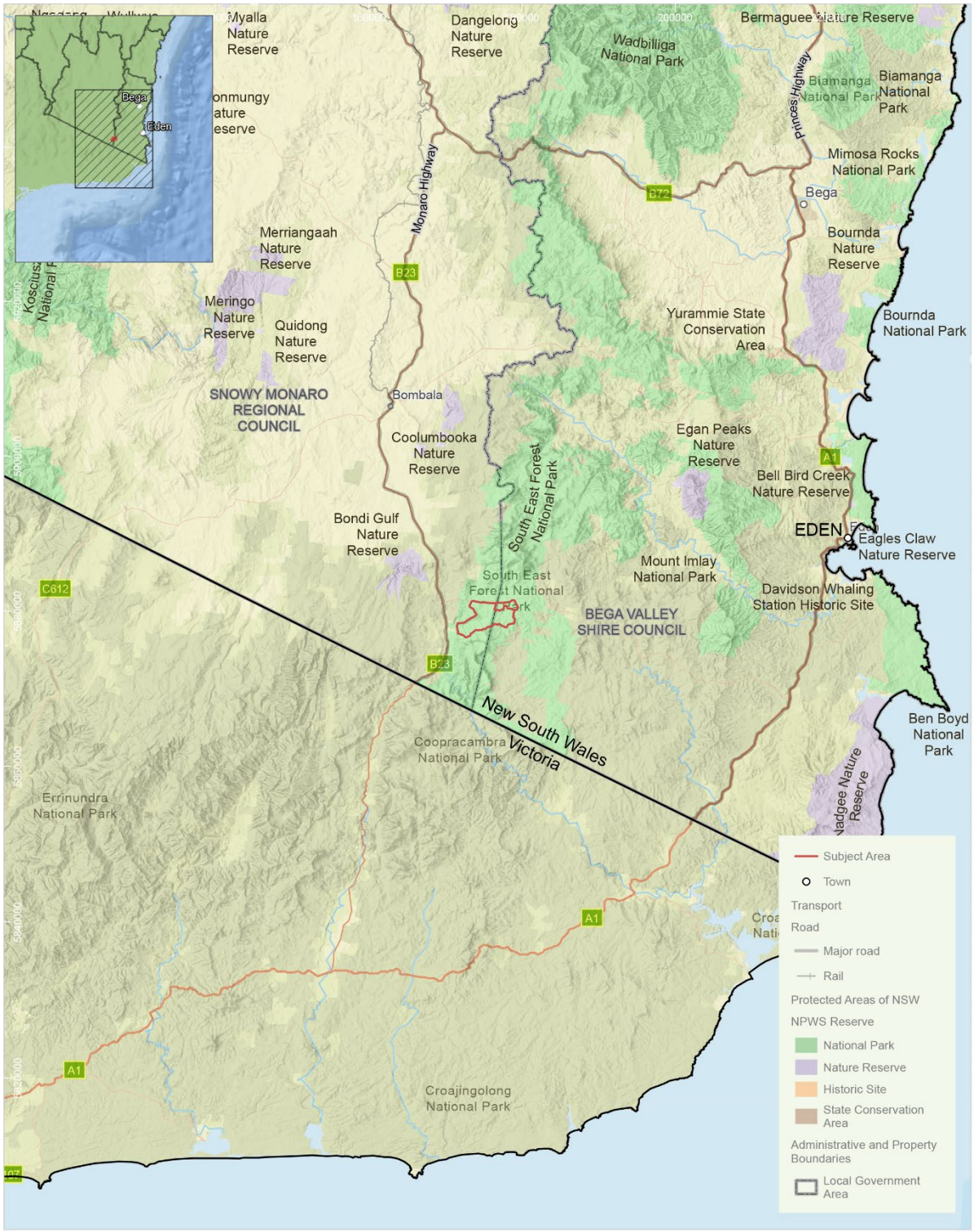

Figure 1 Locality plan overview

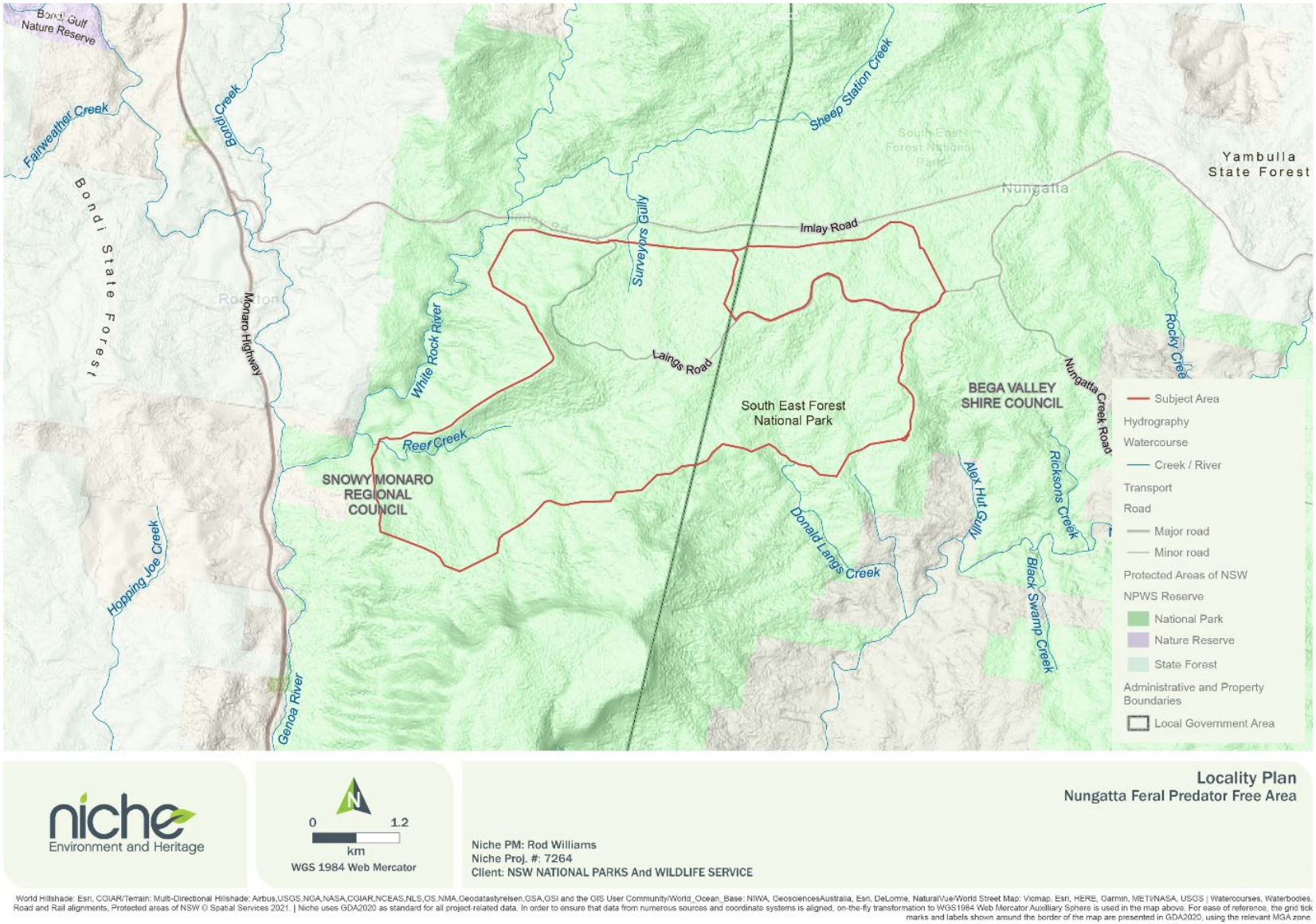

Figure 2 Locality plan

3. Proponent's details

Contact name	Peter (Max) Beukers
Position	Senior Project Officer – Nungatta Feral Predator-Free Area
Street address	NSW National Parks and Wildlife Service Cnr Merimbula and Sapphire Coast Drives Merimbula NSW 2549
Postal address	NSW National Parks and Wildlife Service (part of NSW Department of Planning, Industry and Environment) Locked Bag 5022, Parramatta 2124

NPWS/EHG proponents

Area Manager or Unit Manager	Andrew Wall Manager, Sapphire Area South Coast Branch NSW National Parks and Wildlife Service

4. Permissibility and assessment pathway

4.1 Permissibility under NSW legislation

4.1.1 *National Parks and Wildlife Act 1974*

Objects of the National Parks and Wildlife Act (s 2A)

The activity is consistent with the following objects of the *National Parks and Wildlife Act 1974* (NPW Act):

- **conservation of habitat, ecosystems and ecosystem processes** (s 2A(1)(a)(i)) – the activity will remove feral predators and herbivores and reintroduce locally extinct species that will lead to the restoration of ecosystem processes and function including predicted increased levels of seed and spore dispersal and soil engineering
- **conservation of biological diversity at the community, species and genetic levels** (s 2A(1)(a)(ii)) – through reintroduction of locally extinct species, and restoration of TECs
- **fostering public appreciation, understanding and enjoyment of nature and its conservation** (s 2A(1)l) – the activity will increase awareness and understanding of threatened species, communities, threats and their management, including the incorporation of scientific research.

Adverse effects to the values for which the land has been acquired for SEFNP under the NPW Act [consistent with s 2A(3)(b) of the NPW Act] have been minimised through careful design, and the incorporation of best practice methods for construction of conservation fencing and associated infrastructure, removal of feral animals and reintroduction of locally extinct species.

The principles of ecologically sustainable development [as required under s 2A(2) of the NPW Act] have been considered in the following aspects of the activity:

- Careful evaluation of the potential for serious or irreversible damage to the existing environmental values of SEFNP and the risk-weighted consequences of various options with the aim of avoiding those impacts (precautionary principle) has been undertaken as part of the REF.
- The desired outcome of the activity is to maintain or enhance the health, diversity and productivity of part of the Great Eastern Escarpment and the Eden region for the benefit of future generations (intergenerational equity).
- The fundamental goal of the activity is the enhancement of native biodiversity and ecological integrity [conservation of biological diversity].

Management principles

The activity is consistent with the following management principles for national parks under s 30E of the NPW Act, in particular:

- the conservation of biodiversity, the maintenance of ecosystem function, the protection of geological and geomorphological features and natural phenomena and the maintenance of natural landscapes (s 30E(2)(a))
- the protection of the ecological integrity of one or more ecosystems for present and future generations (s 30E(2)(c))

- provision for appropriate research and monitoring (s 30E(2)(g)).

It is considered that the activity meets these management objectives as it is intended to remove feral species from the activity area, increase species biodiversity through the reinduction of locally extinct species, provide infrastructure for visitors to the activity area, and includes research and monitoring components.

Consistency with the plan of management

The South East Forest National Park and Egan Peaks Nature Reserve Plan of Management (plan of management) guides the conservation of biodiversity, rehabilitation of landscapes and the protection of natural and cultural heritage in SEFNP. It also includes management principles for use of the park by Aboriginal people for cultural purposes, sustainable visitor or tourist use, natural resource management and land management practices.

The management of SEFNP and Egan Peaks Nature Reserve is subject to the following specific objectives:

- 'Protection as part of a system of contiguous conservation reserves along the Great Eastern Escarpment and in the Eden region.
- Contribution to protection of natural and cultural heritage and the landscape values of the Eden region.
- Protection and enhancement of scientific reference values to provide information, and if necessary a species source, for nearby areas subject to intensive human use.
- Maintenance of east–west vegetation links between the escarpment and the coast.
- Maintenance, and where necessary recovery, of populations of threatened species found in the south-east forests, with highest priority to endemic plant species and endangered forest-dependent fauna species such as the long-footed potoroo and smoky mouse.
- Conservation of endangered ecological communities and rare forest ecosystems which are solely or largely contained within the park.
- Increasing the proportion of old growth forest ecosystems.
- Recovery from the impacts of past logging operations, including ongoing rationalisation of the road network and restoration of natural forest values.
- Encouragement of community education and appreciation of the diversity and high conservation values of the south-east forests.
- Contribution to regional tourism and recreation opportunities and provision of social and economic benefits to the region.'

The activity will contribute to achieving the management objectives as described in the plan of management, specifically the reintroduction of the long-footed potoroo and smoky mouse. The activity is therefore permissible in accordance with s 81 of the NPW Act.

The plan of management was amended to allow this activity in August 2022 by the NSW Minister for Environment and Heritage. The amendment allows the construction and operation of an FPFA for the return of threatened and declining species, and the subsequent improvement of ecosystem health.

Leasing, licensing and easement provisions

Not applicable – NPWS is the proponent and the activity is not subject to a lease or licence.

NPWS/EHG management powers and responsibilities (s 8 and s 12)

The activity is consistent with the functions of the Secretary of the department and NPWS as outlined in the following sections of the NPW Act:

- **carrying out of works and scientific research considered by the Secretary to be necessary for the preservation, protection management and use of the national park** (ss 8(3)(a)–(c) and s 7(c)) – this activity includes the construction and operation of conservation fencing and associated infrastructure, removal of feral predators and herbivores, reintroduction of locally extinct species and monitoring, evaluation and reporting
- **the conservation and protection of wildlife (including threatened species, populations and ecological communities, and their habitats)** (s 12(b)) – this activity includes the establishment of the Nungatta FPFA, control of feral predators and reintroduction of locally extinct species
- **the conduct of research or monitoring and public education related to reserves and wildlife** (ss 12(h),(i)) – this activity includes the proposed research, monitoring, evaluation and reporting of the activity, including education and communication.

4.1.2 *Wilderness Act 1987*

The Wilderness Act is not relevant to the activity. Although there are declared wilderness areas within the South East Forests National Park, the activity would not be located within these areas.

4.1.3 *Biodiversity Conservation Act 2016*

The activity is consistent with the biodiversity conservation objectives of the BC Act. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest wellbeing of the community, now and into the future, consistent with the principles of ecologically sustainable development.

The activity upholds the conservation purpose of the BC Act and will maintain a healthy, productive and resilient environment by conserving biodiversity, maintaining ecosystems, supporting conservation and reducing threats.

A test of significance for threatened species as listed under the BC Act is presented in the *Flora and fauna assessment* (FFA; Narla Environmental 2022 at Attachment B). With the implementation of the avoid and minimise principles, along with a number of mitigation measures, it is anticipated the activity is unlikely to significantly impact any threatened species or communities listed under the BC Act.

Statewide biodiversity conservation programs

Strategies for the recovery of threatened species, populations and ecological communities have been set out in a statewide Biodiversity Conservation Program (formerly known as the Threatened Species Priorities Action Statement). These actions are currently prioritised and implemented through the Saving our Species program, which aims to maximise the number of threatened species that can be secured in the wild in NSW for 100 years. The *National Parks and Wildlife Service Threatened Species Framework* (DPIE 2021) outlines a series of actions designed to secure and restore threatened species populations on the national park estate, including establishing a network of FPFAs (see Section 8.1.1).

Individual recovery plans may need to be prepared for threatened species listed under the EPBC Act and BC Act. Individual recovery plans are prepared for nationally listed threatened species and some recovery plans were previously prepared for some species listed in NSW to consider management needs in more detail. To date, recovery plans have been prepared for the long-footed potoroo, southern brown bandicoot, smoky mouse, spotted-tailed quoll, large forest owls and several other threatened species.

The activity will contribute towards achieving the objectives of the statewide Biodiversity Conservation Program and relevant actions in individual recovery plans. The target species for the activity are the long-footed potoroo (*Potorous longipes*), smoky mouse (*Pseudomys fumeus*), eastern quoll (*Dasyurus viverrinus*) and eastern bettong (*Bettongia gaimardi*). The activity will also provide direct and indirect benefits to other species both within the activity area and general region.

4.1.4 *Rural Fires Act 1997*

The objectives of the *Rural Fires Act 1997* (RF Act) relate to the prevention, mitigation and suppression of bush and other fires in order to protect life, property, infrastructure and the environment from the impacts of fire. The Snowy Monaro Bushfire Management Committee and the Far South Coast Bushfire Management Committee have both approved amendments to the list of fire assets and fire trails to accommodate the Nungatta FPFA (Far South Coast BFMC 2022; Snowy Monaro BFMC 2022).

Fire management for the area of the activity is currently outlined in the *Fire Management Strategy South East Forest National Park (including Egan Peaks Nature Reserve, Mount Imlay National Park & Yurammie State Conservation Area)* (NPWS 2010). This identifies that the activity is located in a Land Management Zone. The objective of the land management zoning is to conserve biodiversity and protect cultural and historic heritage, along with management of fire consistent with the fire thresholds.

The fire management strategy will be updated to agree with the amendments to the fire management zoning and fire trail network as approved by the bushfire management committees (see Figure 3–5).

The activity will involve a 15 m cleared corridor with the predator proof fence situated approximately in the centre of this corridor. A 6 m fuel free zone will be maintained from the fence as per s 76 of the RF Act. This fence will prevent arson attacks, which frequently occur on site. The addition of boundary fire trails will facilitate fire management activities and assist in containing any fires within the park and prevent fires originating off site affecting the activity.

The activity, through the construction of trails and the management of fuel loads, contributes towards NPWS meeting the objectives described in the RF Act, and the fire management strategy for the park.

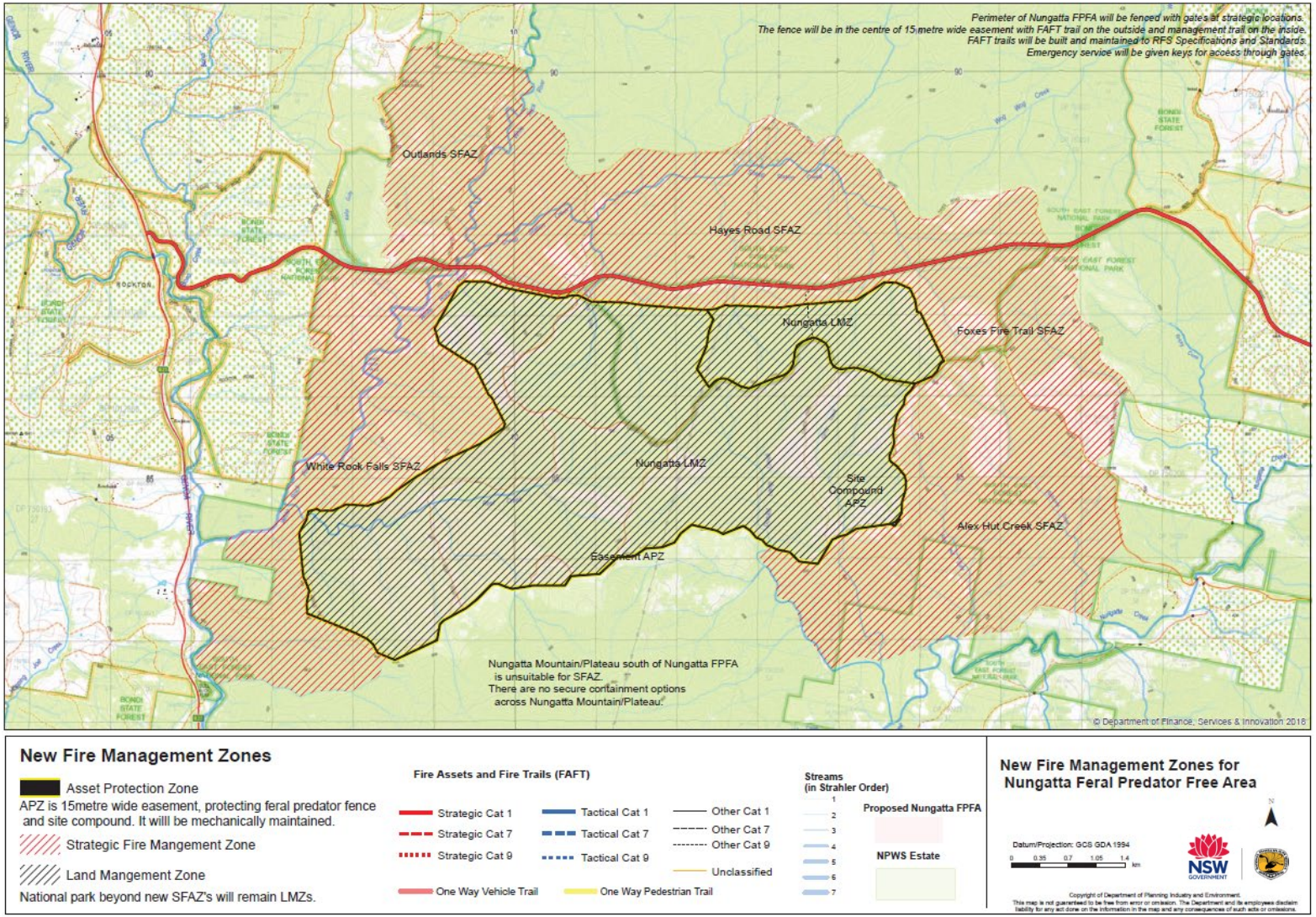

Figure 3 Fire Management Zones following amendments approved by bushfire management committees 2022

Source: NPWS submissions to Snowy Monaro Bushfire Management Committee and Far South Coast Bushfire Management Committee, May to August 2022.

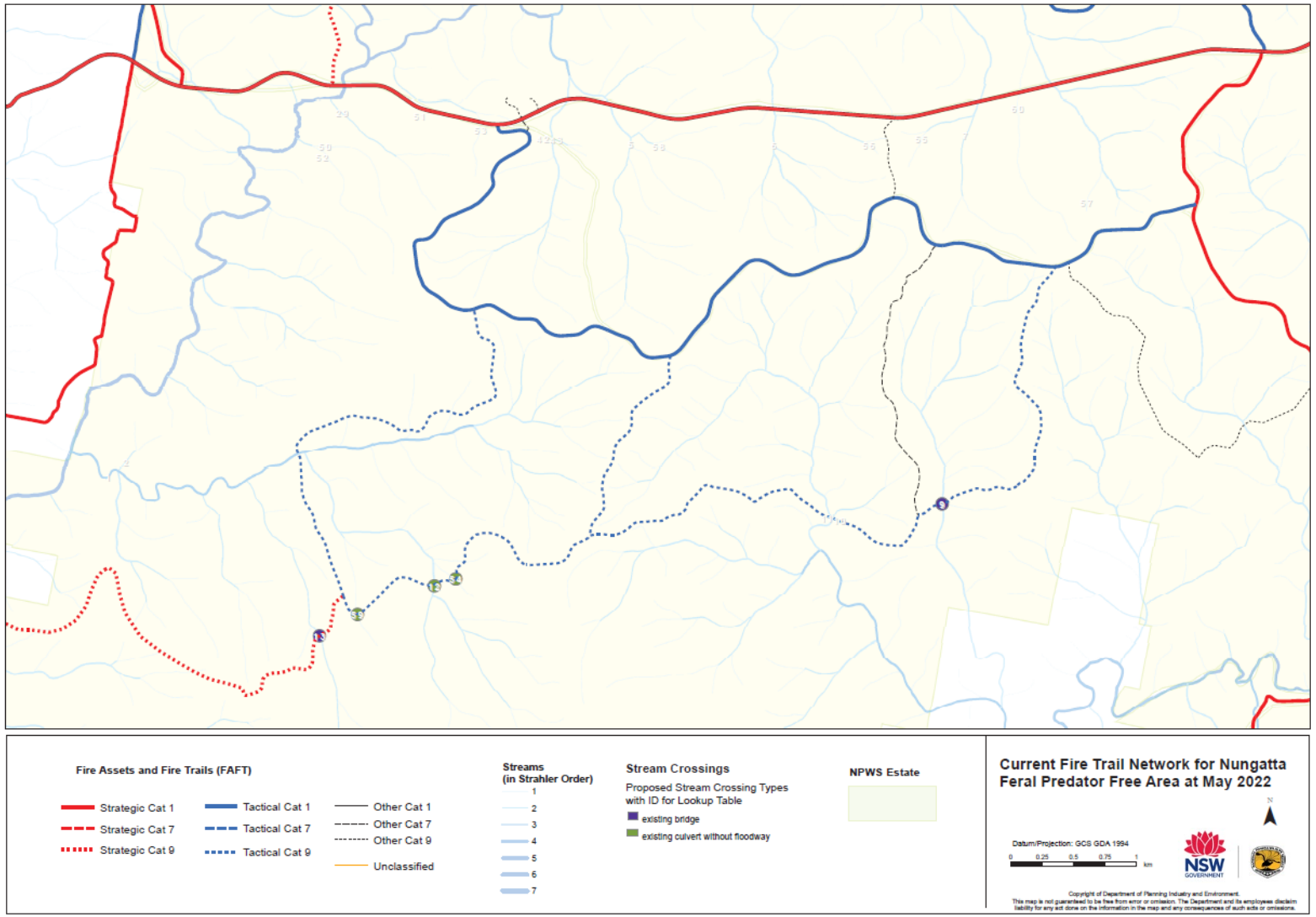

Figure 4 **Current fire trail network on the fire trail register**

Source: NPWS submissions to Snowy Monaro Bushfire Management Committee and Far South Coast Bushfire Management Committee, May to August 2022.

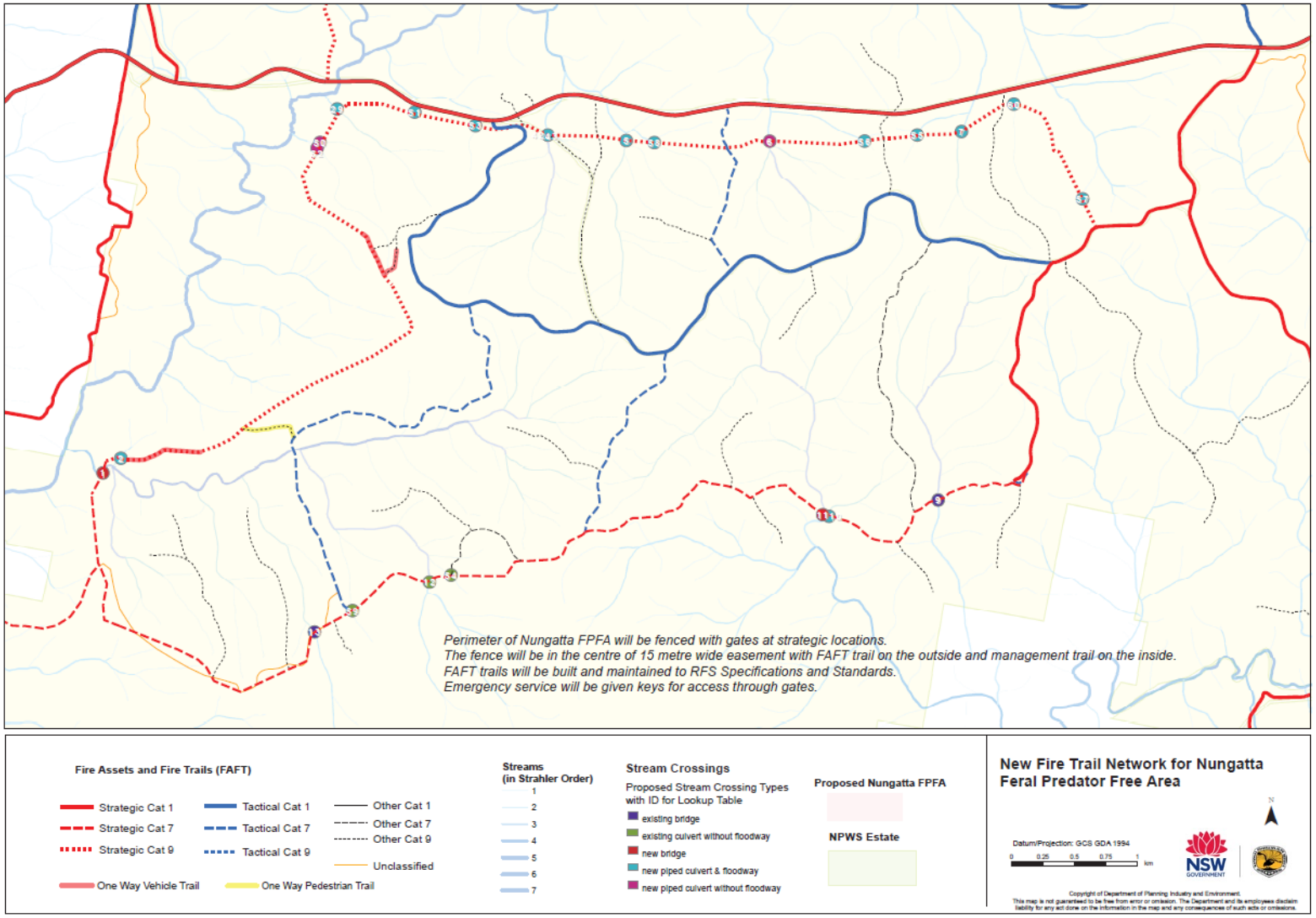

Figure 5 Updated fire trails network approved by the RFS, August 2022

Source: NPWS submissions to Snowy Monaro Bushfire Management Committee and Far South Coast Bushfire Management Committee, May to August 2022.

4.2 *Environmental Planning and Assessment Act 1979*

4.2.1 Confirmation of assessment pathway

The activity may be undertaken without development consent under the provisions of s 2.73(1)(a) of the *State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021* as it is:

- on land reserved under the NPW Act or acquired under Part 11 of the NPW Act
- for a use authorised under the NPW Act.

The activity is not designated development under Schedule 3 of the Environmental Planning and Assessment Regulation 2021.

The activity is not State Significant Infrastructure under Schedule 3(7) of the *SEPP (Planning Systems) 2021* and is not of a similar kind to such an activity.

The activity is not designated development under the *SEPP (Resilience and Hazards) 2021* as it is not on land mapped as littoral rainforest or coastal wetland.

The activity is not declared to be exempt development under an environmental planning instrument or fails to fully meet the requirements for exempt development.

It is noted that, while conservation fencing may be considered exempt development in some situations, the height of the proposed fencing and the scale of the associated ground disturbance and clearing means it does not meet the standards of exempt development (under Schedule 1 of the *SEPP (Transport and Infrastructure) 2021* and the definition of 'minor impact' (under s 1.6 of the EP&A Act)).

As the activity is considered a 'use of land' as defined in s 5.1 of the EP&A Act, the determining authority in its consideration of the activity is to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity as per s 5.5 of the EP&A Act.

The small section of the activity that is being carried out on the council road reserve can also be undertaken without development consent as the zoning is also C1.

4.2.2 Consistency with strategic plans

The relevant strategic plans prepared under Division 3.1 of the EP&A Act are:

- South East and Tableland Regional Plan (2017)
- Snowy Monaro Local Strategic Planning Statement (2020)
- Bega Valley Shire Local Strategic Planning Statement 2040 (2020).

This proposal is consistent with the regional plan and planning statements. It aims to restore and enhance high biodiversity habitat and supports tourism and recreation opportunities.

This proposal avoids compromising future upgrades of Imlay Road as a strategic link for heavy freight and tourism between the Snowy Mountains and the Port of Eden.

4.3 Other NSW legislation

4.3.1 Coal Mine Subsidence Compensation Act 2017

The *Coal Mine Subsidence Compensation Act 2017* does not apply as the activity is not located within a Mine Subsidence District.

4.3.2 *Fisheries Management Act 1994*

The activity may affect fish, fish habitat or marine vegetation, including threatened species and involve the excavation of or deposition in 'water land' including land that is only intermittently submerged by water. NPWS is exempt from the requirement for a permit for dredging and reclamation works within 'water land' under s 200(1) of the FM Act because it is a public authority; however, under s 199, a public authority must give the Fisheries Minister written notice of any proposed dredging or reclamation work in 'water land'. NPWS has provided formal notification to DPI Fisheries, (part of the NSW Department of Primary Industries) in accordance with s 199 of the FM Act.

DPI Fisheries has further advised NPWS that a permit under s 219 of the *Fisheries Management Act 1994* (FM Act) will be required to build barriers across some streams as this will block fish passage.

4.3.3 *Heritage Act 1977*

The activity is on land that contains an item listed on the State Heritage Register (SHR).

Part of the Bundian Way (State Heritage Register 01906) is located within the proposed activity area. The proposed activity would result in the clearance of vegetation, formalisation of an extant dormant logging track, and construction of fence line along 7.0 km of the total length of the Bundian Way.

A Statement of Heritage Impact (SoHI) (GML Heritage 2022b) was prepared for the proposed activity, and is provided at Attachment F.

Overall, the activity is likely to have a neutral to moderate positive impact on the Bundian Way citation.

4.3.4 *Marine Estate Management Act 2014*

The Marine Estate Management Act does not apply as the activity is not likely to affect nor does it directly adjoin a marine park or aquatic reserve, and works are not likely to affect plants or animals within the marine park or aquatic reserve.

4.4 Commonwealth legislation

4.4.1 *Environment Protection and Biodiversity Conservation Act 1999*

The primary objective of the EPBC Act is to '*provide for the protection of the environment, especially those aspects of the environment that are Matters of National Environmental Significance'* (MNES).

Actions that may significantly affect MNES require assessment and/or approval from the Commonwealth under the EPBC Act. The EPBC Act lists the MNES that must be addressed when assessing the environmental impacts of an activity.

The activity is on land that contains the following, or the activity may affect nationally listed threatened species and ecological communities or listed migratory species.

An EPBC Act Protected Matters Report (see Appendix L of the FFA at Attachment B) found:

- 3 TECs listed under the EPBC Act occur within the activity area
- 52 listed threatened species or species habitat are known / likely / may occur within the activity area

- 11 listed migratory wetland, terrestrial and marine species or species habitat are known/ likely / may occur within the activity area.

These are described in Section 9.5 of this REF and in the biodiversity assessment (Narla Environmental 2022 at Attachment B). Assessments of the significance of impacts on MNES are included in Attachment B as per Significant Impact Guidelines and summarised in Section 10.7.

These assessments confirm that the activity is unlikely to cause significant impact to any species, populations or communities listed under the EPBC Act and therefore, referral under the Act is not required.

4.5 Consistency with National Parks and Wildlife Service policy

Table 1 identifies the relevant NPWS policies for the activity and how the activity is consistent with and/or contributes to NPWS achieving each policy's principles.

Table 1 Relevant NPWS policies

Policy name	How activity is consistent
Boundary Fencing Policy	The activity is consistent with the policy in the level of clearing (up to 6 m on from the fence line – principle 14) and environmental assessment (principles 16–18). The predator proof fence is not on a boundary. Due to this, and the special needs of the activity, the proposed fencing is not of a type that would typically be suitable for installation on a park boundary. As such, NPWS would be fully responsible for the fence's installation and maintenance costs.
DPIE Translocation Operational Policy	As required by the policy, single species and multi-species translocation plans will be prepared for each proposed reintroduced species in accordance with the BC Act and Translocation Operational Policy (DPIE 2019). All translocation activities will be prepared in consultation with species experts. This includes consultation with relevant Recovery Teams to advise on likely requirements for founder individuals for translocations. Translocation activities will be subject to peer review by a minimum of 2 scientists, including one departmental scientist and one external independent scientist. Relevant animal ethics committee approvals will be required under the *Animal Research Act 1985*. The translocation activities will include an assessment of the risks associated with genetic diversity and how this will be estimated and increased/maintained.
NPWS Law Enforcement and Compliance Manual 2022 and NPWS Guidelines on use of passive infrared cameras for the purpose of wildlife monitoring	NPWS will install signs that advise public, staff and contractors of why wildlife, gate and fence monitoring cameras are being used. NPWS storage and use of the images captured will comply with the NPWS Law Enforcement and Compliance Manual 2022.
Tree Risk Management Policy	When managing hazardous trees, NPWS prioritises the protection of life, consistent as far as possible with protecting the natural, cultural and social values of parks. The protection of property, including park infrastructure, is also an important consideration but is secondary to the protection of life.

Policy name	How activity is consistent
Vehicle Access Policy	The activity is consistent with the policy in that the new roads or trails are required for park management purposes, such as fire management (principle 3). Vehicle access to the area will also be restricted to protect conservation value of the activity (principle 28).
Visitor Safety Policy	NPWS has a duty of care to park visitors. The policy outlines how NPWS addresses safety issues and reduces risk to park visitors while maintaining park values. Visitor access to the activity area will be managed in accordance with this policy.
Walking Tracks Policy	The walking tracks are identified in the plan of management (principle 1). The construction, grading and signage will be undertaken as detailed in the policy (principles 2–15).
Wild Dog Policy	The activity involves the removal of feral predators (i.e. wild dogs) from within the fenced area and controlling feral predator numbers outside the fenced area. The activity will contribute to NPWS meeting its obligations to control wild dogs under the General Biosecurity Duty of the *Biosecurity Act 2015* and NSW Wild Dog Strategy. The activity is therefore consistent with the Wild Dog Policy.

4.6 Summary of licences and approvals

4.6.1 Approval under the National Parks and Wildlife Act

Internal NPWS approval or authorisation, including expenditure, is required for the proposed activity.

An ACHAR has been completed for the Nungatta FPFA. The ACHAR requires this activity to have an AHIP under s 90 of the NPW Act and this is being sought.

4.6.2 Other approvals

A permit will be required under the FM Act to block fish passage.

A SoHI has been completed but no approval is required under the Heritage Act.

4.6.3 Publication triggers

The REF's publication is triggered if the activity requires an approval or permit identified in section 171(4) of the EP&A Regulation before it may be carried out. These triggers are summarised below in relation to the proposed activity.

Table 2 Triggers for publication of the REF

Permit or approval	Applicable?
Fisheries Management Act, sections 144, 201, 205 or 219	Yes (s 219 only)
Heritage Act, section 57 (commonly known as a section 60)	No
National Parks and Wildlife Act, section 90 (AHIP)	Yes
Protection of the Environment Operations Act 1997, sections 47–49 or 122	No

The REF will therefore require publication following determination.

5. Consultation – general

The NSW Government has 3 operational FPFAs and has successfully reintroduced 10 locally extinct mammals. The proposed activity is one of 4 new FPFAs announced by the NSW Government in December 2020 and further expands the Government's rewilding efforts to reintroduce native animal species that were once abundant in each area. This brings the current commitment by the NSW Government to 7 FPFAs.

A communication and engagement plan has been developed to guide community engagement and consultation throughout the project. This has involved initial consultation with direct neighbours of the reserve, and key government and external stakeholders. The plan provides for continued consultation at identified stages of the project.

Consultation has been held with internal and external stakeholders in the site identification and site selection process during 2020–21.

Stakeholders included in the consultation process were direct neighbours, Forestry Corporation of NSW, the surrounding community, community groups, service providers and Aboriginal groups, relevant government agencies and Bega Valley Shire Council and Snowy Monaro Regional Council. The key aims of the consultation process were to inform stakeholders about the proposed activity and identify any issues of concern or interest to be investigated and addressed. Ninety-one of the individuals, groups or organisations that had expressed interest or concern were notified when the draft REF went on public exhibition.

5.1 Consultation required under Transport and Infrastructure State Environmental Planning Policy

5.1.1 Local council (ss 2.10, 2.11, 2.12, 2.13 and 2.14)

The activity would be located on land that contains local council infrastructure or services (such as roads).

NPWS has received approval for the gating of Laings Road from Snowy Monaro Regional Council and Bega Valley Shire Council. As a result NPWS has submitted to TfNSW, an application to approve the temporary closure of the council road reserve that is partially aligned with Laings Road, for 5 years, under s 116 of the NSW Roads Act. Further consultations with TfNSW are detailed below.

5.1.2 National park or other C1-zoned land (s 2.15(2)(a) & s 2.15(2)(b))

The activity is a development on land zoned C1 (formerly E1) or is on or adjacent to land reserved or acquired under the NPW Act.

The activity is supported by the NSW Minister for Environment and Heritage, NPWS Deputy Secretary, National Parks and Wildlife Advisory Council, Animal Ethics Committee and the Regional Advisory Committee. It is subject to the outcomes of this REF.

5.1.3 Transport for NSW (s 2.122 and Schedule 3)

The current daily level of traffic generation associated with NPWS management of this section of the SEFNP ranges between nil and 10 vehicles per day. NPWS management of the activity is not expected to increase the current traffic levels.

Additional traffic numbers may be generated due to increased public interest and the inclusion of visitor facilities/infrastructure with the activity. The current level of visitor trips to SEFNP is low (pers. comm. M Beukers, 10 May 2022).

As the activity is located more than 3 hours away from Canberra, the nearest major population centre, the level of visitor generated traffic is expected to remain at a level similar to that currently experienced. It is also noted that the Port of Eden has seen a significant increase in cruise ship visitation since 2014. However, cruise ship passengers are unlikely to visit will the site because it is over an hour from the Port of Eden. Visitors from Bombala are more likely because it is only a 40-minute drive from there.

The building of permanent visitor and research facilities will be staged to reduce the risk of damage to the environment until the need for the facilities is clearly established. The construction of some permanent visitor and research facilities will not occur until after translocated threatened species have establishing populations. Till then, temporary accommodation at the site compound may be provided for the safety of researchers. And only visitor signage sufficient to explain the purpose of fences around the Nungatta FPFA may be installed.

Overall, the level of traffic associated with the activity is expected to be low and generally be within the current daily level of traffic generation for this section of SEFNP (i.e. nil and 10 vehicles per day). Given the activity's low levels of traffic generation, consultation with TfNSW has not been triggered.

5.1.4 Marine park or aquatic reserve (s 2.15(2)(b))

Not applicable – the proposed activity is not on or adjacent to a marine park or aquatic reserve.

5.1.5 Siding Spring Observatory (s 2.15(2)(d))

Not applicable – the proposed activity will not increase the amount of artificial light in the dark night sky within 200 km of the Siding Spring Observatory.

5.1.6 Defence communications facility buffer (s 2.15(e))

Not applicable – the proposed activity is not located in the buffer area surrounding the facility near Morundah.

5.1.7 Mine subsidence area (s 2.15(2)(f))

Not applicable – the proposed activity is not on land in a mine subsidence district within the meaning of the *Coal Mine Subsidence Compensation Act 2017*.

5.2 Consultation required under other legislation

5.2.1 Fisheries Management Act

On 29 March 2022, DPI Fisheries was provided with formal notification of works under s 199 of the FM Act.

DPI Fisheries provided comments on the proposed waterway crossing types associated with the Nungatta FPFA. These comments relate to new crossings proposed over key fish habitat waterways. Key fish habitat waterways include Strahler 3rd order and above waterways. DPI Fisheries will be provided with a copy of the REF for further comment. The following recommendations from DPI Fisheries will be implemented for the proposed activity:

- New bridge over Reef Creek (4th order stream, crossing ID1) – DPI Fisheries is supportive of the proposed bridge in this location. Under DPI policy, bridges are the preferred waterway crossing type in this Class 2 moderate key fish habitat type.
- New bridge over Donald Laings Creek (3rd order stream, crossing ID 11) – DPI Fisheries is supportive of the proposed bridge in this location. Under DPI policy, bridges are the preferred waterway crossing type in this Class 2 moderate key fish habitat type.
- Two new culverts across Surveyors Gully and unnamed tributary of Sheep-station Creek (3rd order streams, crossing IDs 6 and 42) – Under DPI policy these locations would be considered Class 2 moderate to Class 3 minimal key fish habitat types. The sites are located toward the upper catchment parts of Strahler 3rd order streams. Upstream key fish habitat values are also limited by sloping topography, and reductions in Strahler order.
- DPI Fisheries has no objections to the proposed crossings over Strahler 2nd and 1st order streams. These waterways are not considered to be key fish habitat.

During consultations DPI Fisheries considered the overall aim and intention of the Nungatta FPFA. DPI Fisheries recommends:

- the REF include information on proposed construction methodologies
- a survey and assessment be done of aquatic animals in 3rd and 4th order streams
- operational measures to minimise impacts to fish passage, such as the regular cleaning of the nets and clearing of the debris traps upstream of the waterway crossings, be documented in the REF.

NPWS accepts all DPI Fisheries' recommendations, including that:

- the activity uses best practice erosion and sediment control measures according to the 'Blue Book', *Managing Urban Stormwater: Soils and Construction* (NSW Government 2004)
- DPI Fisheries be provided with formal notification of intent by providing plans and construction methodologies for new stream crossings in a draft of Review of Environmental Factors for the Nungatta FPFA.

NPWS has provided DPI Fisheries with a copy of the Nungatta South East Forest National Park FPFA Aquatic Fauna Surveys (Austral Research and Consulting 2022; Attachment C). The surveys found no threatened aquatic species.

5.2.2 Roads Act

As NPWS is seeking the temporary closure of the council road reserve (partially aligned with Laings Road) for 5 years under s 116 of the Roads Act, more detailed consultation has occurred with TfNSW than is required under the Transport and Infrastructure SEPP. TfNSW will be provided with a copy of the REF before approving the closure.

5.3 Targeted consultation

5.3.1 Adjacent landowners

Consultation is ongoing between adjacent landowners and NPWS. A communication plan for the project listed all key stakeholders including immediate neighbours and residents of the Nungatta Valley to the south of the Nungatta FPFA. Consultation with neighbours and residents of the Nungatta Valley were commenced by phone calls in August 2021, with follow-up discussions and emails. A newsletter about progress on the Nungatta FPFA was sent to all neighbours and Nungatta Valley residents on 2 March 2022. Neighbours were also notified by email in June 2022 of planned amendments to the plan of management for

SEFNP to allow the Nungatta FPFA. Issues raised and addressed by adjacent landowners are listed in Table 3.

Table 3 Summary of key community and stakeholder issues – adjacent landowners

Name	Summary of issues	Where addressed in REF
Neighbours and residents of Nungatta Valley	Maintaining access to Imlay Road using Nungatta Creek Road and Merv's Fire Trail Disruption to activities they are undertaking on their land	Sections 5.3.1 and 0 – Build and operation of Nungatta FPFA will not disrupt traffic on Nungatta Creek Road or its maintenance and operation by Bega Valley Shire Council. NPWS will provide an access licence (under s 188c of the NPW Act along Merv's Fire Trail to provide alternative access for 2 western neighbours.
Forestry Corporation of NSW	Not interfere with Forestry operations/use of Imlay Road	Sections 5.3.2 and 8.2.2 – Build and operation of Nungatta FPFA will not disrupt traffic on Imlay Road, or its operation and maintenance by Forestry Corporation of NSW.
Snowy Mountains Regional Council, Bega Valley Shire Council and TfNSW	Restricting public access along the council road reserve that is partially aligned with Laings Road is not permitted under the NSW Roads Act	Sections 5.1.1 and 0 – A 5-year closure of the council road reserve that is partially aligned with Laings Road has been agreed with the councils and TfNSW. Councils have sent their approval to TfNSW. TfNSW will approve under s 116 NSW Roads Act on receipt of determined REF. Options for a permanent solution to be explored over the next 5 years. Temporary closure to be extended until a permanent solution is in place.
DPI Fisheries	Nungatta FPFA requires fox and cat proof barriers across streams that will restrict fish passage that is not permitted under the FM Act	Sections 4.3.2 and 5.2.1 – DPI Fisheries is supportive of the Nungatta FPFA. NPWS will adopt DPI Fisheries' recommendations. NPWS will apply for a permit to build barriers across streams under s 219 of the FM Act.

5.3.2 Wider community consultation and/or notification of works

Imlay Road and its easement are owned, operated and maintained by Forestry Corporation of NSW. The easement is 30 m wide and Imlay Road is generally located within the centre of the easement. The easement's tenure is Bondi State Forest. Forestry Corporation of NSW has advised that it will not permit NPWS to build any structure within this easement or to impact their existing drainage infrastructure that rests within the easement.

Table 4 Summary of key community and stakeholder issues – Imlay Road

Name	Summary of issues	Where addressed in REF
Forestry Corporation of NSW	Not interfere with Forestry operations/use of Imlay Road	Nungatta FPFA design and alignment is offset by 40–300 m from southern edge of Imlay Road corridor. These alignments will contain new fire trails and crossings. The new fire trails and crossings will negate the need to use Imlay Road to operate and maintain the FPFA.

5.3.3 Interest groups and/or notification

The draft REF was exhibited between 31 August 2022 and 2 October 2022. During the public exhibition of the draft REF, submissions were invited from 91 interest groups, organisations or individuals including the following:

- 6 neighbours in the vicinity of the Nungatta Feral Predator Free Area
- Far South Coast Birdwatchers
- NSW National Parks Association
- World Wide Fund for Nature
- Australian Wildlife Conservancy
- Australian National University (ANU)
- Forestry Corporation of NSW
- Bega Valley Shire Council
- Snowy Monaro Regional Council.

Two supportive submissions were received. One submission raised no issues. The other submissions raised 10 points that have been considered under 4 themes:

- securing long-term funding for operations
- clearing and the loss of hollow bearing trees
- delaying permanent visitor and research infrastructure until translocations are successful
- future operational procedures.

Prior to public exhibition, targeted consultation was carried out with NSW Government agencies, Forestry Corporation NSW, neighbours, local government and the Aboriginal community, including native title claimants and various community groups (see section 5.3.1 and 5.3.2).

After review of submissions, the following key changes will be made to the project:

- The loss of hollow bearing trees and feed trees may be mitigated using new artificial hollows and transplanting feed trees.
- The type and scheduling of new visitor and research infrastructure will be reconsidered.
- Key stakeholders will continue to be advised on new operational procedures as they are developed.

6. Consultation – Aboriginal communities

6.1 Native title notification requirements

A search of the National Native Title Tribunal (NNTT) 'Native Title Vision' was undertaken on 4 November 2021 to identify any native title claims or determinations in the area. Results indicated that no claims or determinations are present within the study area.

NPWS has sent a notification letter to NTSCorp on 24 May 2022 (as there are no current native title holders or claimants), in accordance with Subdivision J of the *Native Title Act 1993* (to the extent that it applies), and provided them with an opportunity to comment on the proposed works, within 28 days of receipt of the letter. NPWS has received no response.

6.2 Other consultation with Aboriginal communities

In accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010), the Aboriginal community were consulted as part of the ACHAR (GML Heritage 2022a) for the proposed activity. Consultation included advertising for registered Aboriginal parties, notification to the interested parties providing information on the proposal and seeking cultural advice.

Due to the culturally sensitive material it contains, the ACHAR is confidential. Access is restricted to Registered Aboriginal Parties, and it is not available for public exhibition.

7. Proposed activity (or activities)

7.1 Location of activity

Park name	South East Forest National Park
Description of location	The activity is situated on the coastal range in the headwaters of the Genoa River catchment. It is located within the South East Forest National Park, approximately a 40-minute drive south of Bombala and 60 minutes west of Eden (refer to Figure 1). The proposed Nungatta FPFA is generally bounded by White Rock River to the west, Nungatta Creek Road to the east, Imlay Road to the north and Merv and Reef Road to the south (refer to Figure 2).
Site commonly known as	Nungatta
Lot/DP	NA
Street address	NA
Site reference	Easting – 178449 Northing – 5881843 MGA zone – 56

7.2 Description of the proposed activity

The proposed activity involves the establishment of a 2,084.4 ha FPFA. This consists of an initial release area of 246.9 ha, a larger FPFA of 1,837.2 ha and a small site compound (0.3 ha). The smaller release area is for initial, intensive monitoring of translocated animals, while the larger breeding area will support the translocated animals and the development of resilient populations. Each area will be surrounded by a cleared corridor that contains a predator proof fence, vehicle access along both sides of the fence and predator proof crossings of streams.

The key operational components associated with the activity are as follows:

- **Conservation fencing** – Total length of conservation fencing is 28.2 km. The 8.4 km perimeter of the initial soft release area will be fenced first. Another 19.77 km of fencing will complete the hard release area. The conservation fence is nominally 1.8 m high with floppy top, mesh size/gauge specifically designed to exclude foxes, feral cats, rabbits, deer, goats and pigs, 2 mid-height electric wires, and a skirt lying flat on the ground to prevent burrowing (see Figure 6 for an example of such a fence). A ‘back to base’ text messaging system may be incorporated into the electric fence to alert NPWS operations of any change in electric conductivity, and possible breaches. This system identifies the sections breached. Specially designed gates will be placed at strategic locations for management, emergencies and public access. Specially designed gates will also be placed to allow wombat passage but not pigs, foxes, cats or other feral animals. All stream crossings will be fitted with mesh barriers to prevent ingress by feral predators. The fence, gates and all instream crossings will be checked for damage or breaches 3 times per week. Main gates and other weak points in the perimeter may have surveillance cameras. The operation of surveillance cameras will be compliant with relevant NPWS surveillance and privacy policies. Figure 7 shows an example of the corridor, conservation fence, and internal and external road trails arrangement.

- **Corridor** (vegetation clearance) / **fence line tracks** (internal and external) – The conservation fence would require the construction of a 15 m wide cleared corridor (up to 8 m on the outside and 7 m on the inside of the fence). The corridor would be cleared to a standard that allows for ongoing maintenance using slashers and the movement of 4WD vehicles / all terrain vehicles, or similar.
- **Fire access and fire trails** (FAFTs) – A network of strategic and tactical FAFTs would be constructed within the cleared corridor. The strategic FAFT (RFS Categories 1, 7 and 9) would generally be located around the perimeter of the activity area, while the tactical FAFTs are located on a section of Reef Road that links Merv's Fire Trail West and Laings Road. The FAFT would be constructed and drained using the RFS *Fire Trail Design, Construction and Maintenance Manual* (Soil Conservation Service 2017). New fire trails may be surfaced with crushed rock material, consistent with the existing fire trails where the natural earth surface is unsuitable (Figure 5).
- **Management trail** – A total of 16.34 km of management trails will be constructed. Most of the management trails are located inside the conservation fence. All are located within the activity area. The management trails will be used for predator eradication and ecological monitoring. New management trails may be surfaced with crushed rock material, consistent with the existing fire trails, where the natural earth surface is unsuitable.
- **Culverts** – Installation of 17 new culverts and modification of 5 existing culverts.
- **Bridges** – Installation of 2 new bridges and repair and modification of 2 existing bridges. All bridges would be standard NPWS concrete slab bridges. Repairs or replacements to existing damaged bridges would be undertaken within the location and footprint of the existing bridges and 15 m corridor.
- **Large debris traps with maintenance pad** – 20 large debris traps and associated access tracks and maintenance pads will be constructed. A further 4 creek crossing locations will however only require a maintenance access pad located in the 15 m cleared corridor. The large debris traps will be located upstream of the crossing. The traps would consist of several lengths of heavy steel cabling spanning the stream and fixed to trees or posts on either side and within the stream. The maintenance pads would by up to 10 m x 10 m and allow for an excavator to reach above the debris trap to remove snagged logs after flooding.
- **Site compound** – A site compound is located in the south-eastern corner of the activity area (i.e. the intersection of Merv's Fire Trail East and Alex Hut Trail). The compound will contain a temporary workshop, shelter, hard standing for materials and remote water and power supply. It may also include temporary overnight accommodation and a toilet for management and research purposes only.
- **Visitor infrastructure sites** – Visitor infrastructure (e.g. signs, shelter, carpark, observation points) are proposed at 7 locations around the perimeter.
- **Ancillary infrastructure** – Construction of ancillary infrastructure (e.g. parking, signage, bollards, drainage, remote cameras, telemetry) to support the establishment and ongoing operation of the activity.

The general arrangement for these key operational components can be seen in Figure 7.

NPWS proposes to prioritise the work phases. Phase 1 has 2 stages: Stage 1 is building the site compound and smaller soft release area, Stage 2 is building the hard release area. Stage 2 is likely to start before Stage 1 is completed. The phasing associated with establishing each release area is outlined below:

Phase 1: Establish the site compound, clear the corridor and install the fence, culverts, bridges, visitor sites and ancillary infrastructure.

Phase 2: Eradicate or reduce the feral species populations within the release area to a level where they have a negligible impact (i.e. supports the reintroduction locally extinct species).

Phase 3: Reintroduce locally extinct target species (e.g. long-footed potoroo, smoky mouse, eastern bettongs and eastern quolls).

Phase 4: Ongoing monitoring, evaluation and reporting on species response, threats and ecosystem health.

Phase 5: Review monitoring results and implement adaptive management in response to monitoring results and observations.

Phase 6: Ongoing management and maintenance of the activity area including the removal of feral animals and other interventions such as dedicated fire management, habitat restoration, weed control, fence and track maintenance, debris removal and hazardous tree management.

The prioritisation of the initial release area provides the following advantages:

- allows for the fast tracking of phases 2 and 3 (feral eradication and threatened species reintroduction) within the initial release area
- given the smaller size of the initial release area the effort and timeframe for eradication of feral species is anticipated to be less than that required for the larger breeding area
- locally extinct threatened species can be reintroduced sooner
- the effort and time associated with monitoring the reintroduced species is anticipated to be less than that required for the larger breeding area
- learnings from the eradication, reintroductions and monitoring can be applied to the larger breeding area.

Figure 6 Predator proof fence in Mallee Cliffs National Park
(Source: Wayne Lawler/Australian Wildlife Conservancy)

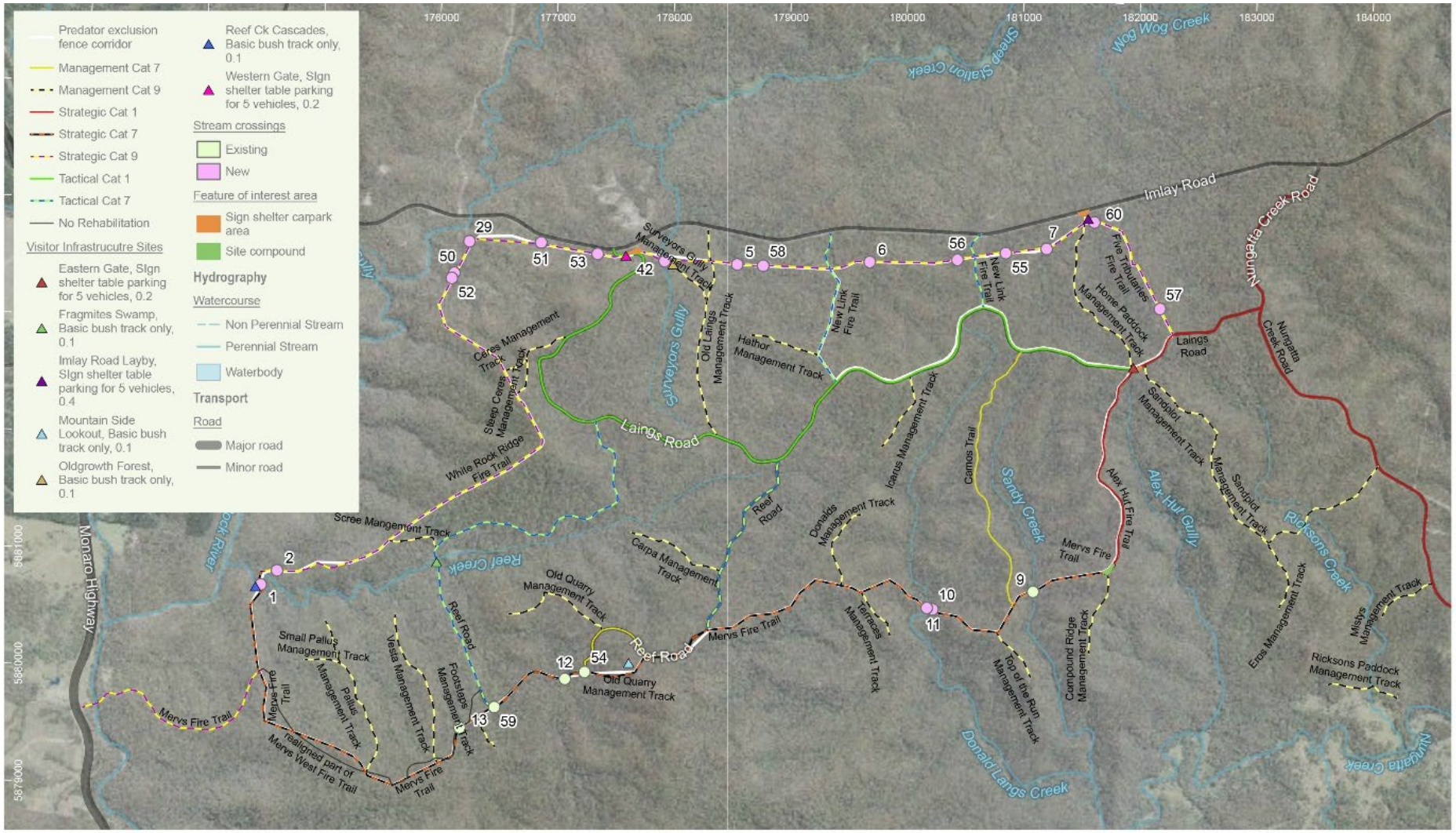

Figure 7 General arrangement of proposed operational components within Nungatta FPFA

7.2.1 The proposed activity: pre-construction, construction, operation and remediation

Pre-construction

Subject to a determination to progress with the activity, NPWS will:

- undertake detailed design of the activity to further avoid or minimise impacts, where possible (i.e. the alignment of the fence line may be adjusted within the survey corridor). The environmental assessments for the activity surveyed a nominal 25 m wide corridor; however, the corridor is only 15 m wide and forms the basis of the impact assessment. This approach has resulted in a larger than necessary survey area, that provides for greater flexibility in the detailed design phase. It allows for minor alterations to the location of the infrastructure to further minimise impact on significant ecological features like hollow bearing trees, and Aboriginal artifact sites. This means the severity of impacts predicted in this report are not likely to be realised, because further refinement is expected during the detailed design phase
- undertake a hazardous tree risk assessment to identify any trees within a 30 m management zone either side of the corridor. This assessment will be done before the fence is erected. Hazardous trees are those with an inward lean or defects that affect their structural integrity, and are likely to fall onto the fence within the next 5 years. Ideally these works would be undertaken as part of the clearing of the corridor. Any subsequent approval associated with the removal of hazardous trees will be subject to assessment and determination prior to undertaking any works
- mark out the disturbance footprint (e.g. corridor, management trails, site compound)
- install erosion and sediment controls prior to ground disturbance
- notify internal and external stakeholders.

Construction

The construction of the activity involves:

- undertaking a rigorous pre-clearing survey, relocating fauna prior to clearing where possible, and implementing sensitive felling practices for hollow bearing trees
- clearing will be a 15 m wide corridor for the feral predator proof fence and fire trails or clearing will be a 3 m wide corridor for the management trails
- vegetation will be cleared using heavy drum mulching machines, excavators with falling heads, bulldozers and associated trucks and heavy plant. Larger logs will be placed on the edge of the corridor for horizontal habitat for fauna. Tree heads, small or juvenile trees, shrubs and large ferns will be chipped by moving them into large chippers or mulched in-situ using large drum mulchers. Preference is to leave the root ball in the topsoil where practical. A layer of mulch will be left on the ground. This layer of mulch acts to minimise surface erosion, which protects and/or rehabilitates soils. Drainage along contours will be installed after clearing to reduce erosion inside the corridor
- formation and earthworks associated with draining the corridor, and building fire trails and management trails
- construction of the site compound, fence, culverts and bridges, large debris traps, visitor infrastructure and ancillary infrastructure.

Operation

The operational tasks associated with the activity include:

- removal of feral predators and feral herbivores (to the greatest extent practicable)
- reintroduction of locally extinct, threatened and declining animal species

- routine patrols (at least 3 times per week) of the fence line and crossings to check for breaches and entanglements. Weekly reporting of nature and species involved in breaches and entanglement
- additional patrols where a scale-up of resources and response times is required after forecast rain, wind and fire events that increase the risk of breaches and entanglements
- monitoring, evaluation and reporting on species, threats and ecological health
- ongoing maintenance and park management including:
  - slashing and/or the removal of vegetation in the corridors to reduce fire hazard beside the fence line
  - hazard reduction burning, with ecological and cultural burning to reduce fire hazard or improve ecosystem health
  - clearing debris against the fence, in large debris traps and in stream barriers.

7.2.2 The disturbance footprint (size of the area of impact)

The proposed activity occupies an area of 2,084.4 ha. The surveyed area was 48.56 ha and includes cleared areas. The disturbance footprint is 37.67 ha of uncleared forest (refer to Table 5 for a full breakdown):

- the surveyed area contains 395 hollow bearing trees containing 206 small, 116 medium and 73 large hollows that may provide breeding habitat for a number of threatened fauna species
- the removal of less than 279 hollow bearing trees identified within the disturbance footprint. These include 26 stags and 176 small, 149 medium and 54 large hollow bearing trees.

Table 5 Summary of disturbance footprint associated with the proposed activity

Activity component	Native vegetation clearing (ha)	Non-native and other areas (including roads) (ha)	Total footprint (ha)
Predator exclusion fence including 15 m corridor (includes fire and management trails sharing the corridor)	29.90	12.66 (mostly active and dormant road corridors)	42.40
Fire and management trails (outside cleared exclusion fence corridor)	1.23	3.68 (mostly dormant road corridors)	4.91
Debris traps and maintenance pads (outside cleared exclusion fence corridor)	0.40	0.56	0.96
Site compound	0.14 included in predator exclusion fence	0.16 included in predator exclusion fence	0.30
Visitor and ancillary infrastructure	Included in predator exclusion fence	Included in predator exclusion fence	Included in predator exclusion fence footprint
Total	**31.67**	**16.90**	**48.56**

7.2.3 Proposed construction methods, materials and equipment

Vegetation management

The vegetation management will occur in accordance with the following specifications (Figure 8):

- A fence line corridor of 15 m (8 m outside and 7 m inside the fence) will be cleared of all vegetation.
- Vegetation removal will use a broadacre forestry mulcher followed by tree loppers, or an excavator with a mulching arm, to remove trees with a diameter at breast height (DBH) of less than 20–30 cm.
- Trees with DBH greater that 20 cm will be removed using a broadacre forestry mulcher, excavator (with or without forestry falling head) or dozer.
- The removal of hollow bearing trees will be avoided altogether where practical.
- Hollow bearing tees with DBH greater than 40 cm will be removed under the following guidelines:
    - Hollow bearing trees to be removed will be clearly marked and surrounding vegetation cleared at least one day before felling.
    - Hollow bearing trees will be shaken using an excavator/bulldozer for more than 30 seconds and left overnight before being felled the following day. This allows time for fauna in hollows to move on.
    - Hollow bearing trees may be shaken for another 30 seconds just before felling, in a last attempt to scare fauna from hollows.
    - After felling, hollows in the felled tree and the surrounding area are to be checked for trapped or injured fauna.
    - If the tree is being removed in stages, the hollow bearing branch should be the last to be removed.
    - Trees should be felled in a manner that avoids disturbance to surrounding vegetation and soil.
- All trees to be removed with a DBH of 40 cm or greater are to be retained within the activity area. They will be repurposed as coarse woody debris on the ground to provide habitat. This will be done in accordance with the following specifications:
    - Any native trees with a DBH greater than 40 cm will be identified and excluded from the mulching.
    - These native trees with a DBH greater than 40 cm (hereby referred to as target trees) will be felled leaving the root ball in place to prevent erosion.
    - The remaining stump will then be ground down using the forestry mulcher.
    - The felled target tree will be cut into sections 3–5 m in length, which will then be loaded into a tip truck using an excavator (or similar).
    - The truck will then relocate the debris to locations suitable for redistribution.
    - A smaller excavator will be waiting at this location to redistribute the coarse woody debris around the designated sites.
    - The coarse woody debris will be distributed in piles of 3–5 logs, with piles at least 15 m apart.
    - The head and limbs with a diameter less than 20 cm will be mulched where the tree was felled.
- Any native trees with a DBH less than 40 cm will either be mulched to ground level or pushed over, using an excavator or dozer with tree pusher. The stem and root ball can either be mulched where the tree was felled or moved in the same way as trees with DBH greater than 40 cm (above).

- Suitable sites for the redistribution of coarse woody debris include decommissioned trails and areas of relatively open vegetation that are low in coarse woody debris, in which access is possible with minimal vegetation disturbance.
- Dangerous or overhanging trees or branches within 20 m of the predator proof fence will be assessed, and potentially trimmed to avoid potential future impacts on fence integrity.
- All remaining vegetation within the fence corridor clearing envelope is to be mulched and spread across the corridor to reduce soil erosion potential.
- Stumps will be mulched to ground level or pulled out when trees DBH less than 20 cm are pushed over, rather than being ripped and removed
- There will be no windrows left along the fence line corridor.
- After construction, artificial hollows may be installed in stands where few hollow-bearing trees remain, including near corridor sections and areas that were previously logged.
- After construction, feed trees for threatened arboreal animals may be planted near corridor sections where few feed tree species remain or in previously logged coupes with very low density of feed tree species.

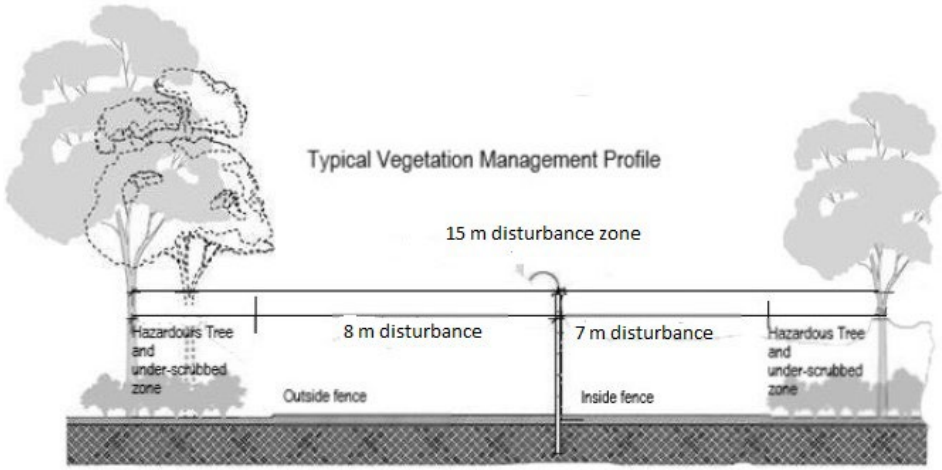

Figure 8 Typical fence line clearing profile

Construction of fire trails

The external 8 m of the corridor will contain an approved fire trail under the relevant BFMC FAFT plans. Fire trails are to be constructed in accordance with the NSW RFS *Fire Trail Design, Construction and Maintenance Manual* (Soil Conservation Service 2017) to either Category 1, Category 7 or Category 9 standard. Specifications of each category will be in accordance with the *NSW RFS Fire Trail Standards* (RFS 2016). The location of fire trails will be as mapped (Figure 5).

These trails are to be maintained to the standard required by the NSW RFS Fire Trail Standards (RFS 2016). All perimeter fire trails will be part of the perimeter fire trail network and included in the NSW fire trail register.

Fire trails will be built to enable access for the construction of bridges, culverts and erecting of the fence, ongoing management of the fence, and ongoing fire management. The fence will be slightly offset from the centre of the 15 m corridor, allowing 7 m on the inside of the fence and 8 m on the outside.

Construction of management trails

The inside trail will be an unformed management track inside the cleared corridor, without stream crossings.

Management tracks not located in the cleared 15 m corridor will be no more than 3 m wide and constructed using a forestry drum mulcher, Posi-Track or similar small plant with assistance from hand tools. No trees with DBH greater that 30 cm will be removed in constructing these management tracks. Soil disturbance will be avoided or kept to a minimum. These management trails will not cross mapped drainage lines. Mitre drains and roll overs as specified in the RFS Fire Trail Design, Construction and Maintenance Manual will be used where necessary to manage drainage and mitigate impacts of erosion.

Fence construction

The conservation fence is designed to prevent incursion of feral animals into the Nungatta FPFA. The proposed fence design is based on proven and successful activities in western NSW under the RoLEM activity.

The proposed fence would be 1.8 m high, with a floppy top and 2 hot (electric) wires. In addition, the fence has 2 'skirts' that lay flat on the ground on the inside and outside of the fence, extending 400 mm. These will be pinned into the ground to prevent incursions. The bulk of the fence is constructed from netting, with 30 mm aperture on the lower section and 40 mm on the upper section. The smaller holes on the lower section are designed to prevent small rabbits entering the fenced area (see diagram in Attachment B). The top 2 sections of netting that would be installed on the fence will overlap (as opposed to being 'butt-joined') to improve the strength across the join (see diagram in Attachment B). There would be a second overlapping section extending up from the base (the area most subject to macropod impact).

Vehicle and pedestrian gates will be included at strategic points to provide access and emergency exits from the feral-free fenced area.

Upon completion of the fence line clearing, strainer assemblies will be installed at corners. These will consist of posts and rails and be designed as bases for wire tensioning. A single plain wire will be installed at ground level to provide a sight line for the installation of pickets and intermediate posts.

Intermediate posts (1.8 m above ground level, 80 mm nominal bore) will be spaced every 400 m, or where extra strength or support is required. Intermediate posts will be concreted into the ground.

Steel pickets (1.8 m above ground level) will be spaced every 5 m. Pickets will be installed mechanically, using a post knocker that will ram them to a depth of 600 mm. Following installation of posts and pickets, 6 horizontal plain support wires (2.5 mm diameter) will be strung, spanning the height of the fence (making a total of 7 horizontal plain wires, including the sighter wire). The plain wires will be tensioned back to the strainers and tied off to the pickets using tie-wire. Hot wire 'stand-offs' will then be installed. The stand-offs are 160 mm long rods that support the electric wires and keep them clear of the body of the fence to prevent shorting out. The stand-offs will be bolted to the pickets at 1,000 mm and 1,300 mm above ground level. Insulators will be fitted later in the construction process. Netting will then be installed.

Three rolls of netting are used:

- 1,800 mm wide roll for the upper vertical section, including the 600 mm floppy top (40 mm aperture)
- 1,200 mm wide roll for the lower vertical section and external skirt (30 mm aperture)
- 900 mm wide roll for the lower section and internal skirt (30 mm aperture)
- all netting will be 1.4 mm gauge.

Netting is connected to the plain support wires using 'C-clips' that are installed using pneumatic guns. At this point, lengths of 3.15 mm plain wire will be threaded in the netting that forms the floppy top to help hold its shape so that it is effective in excluding any feral animals that climb the fence. These will be installed at every picket, and 2 between pickets.

Electric wires will then be installed, threaded through insulators on the stand-offs, and connected to a solar-powered electric fence energiser. Two energisers will be installed at diagonally opposite sections of the fence to ensure consistent voltage is maintained around the perimeter.

The final items for installation will be gates at strategic locations on the fence perimeter to enable vehicle and pedestrian access. The proposed vehicle gates are sliding gates that will roll on tracks set into a concrete plinth (see Attachment B). The vehicle gates will have a fixed-angle top to prevent feral incursions. All gates will be padlocked (keyed alike). Pedestrian gates will involve a double gate system illustrated in Attachment B and will be located with vehicle gates.

There will be minor variations in the fence design through construction to accommodate local variances in terrain (such as distance between posts and pickets).

A diagram illustrating the design for the fence is provided in Attachment B.

Culverts and bridges

Crossings for mapped streams have been designed by a suitably qualified civil engineer. Smaller piped culverts are designed to withstand a 1:20 year flood event. Bridges and larger piped culverts are designed to withstand a 1:50 year flood event. All crossings and their approaches will be part of the perimeter fire trail network and included in the NSW RFS FAFT register. All crossings and their approaches will be in the 8 m cleared corridor on the outside of the feral predator proof fence.

Construction will comply with the *Rural Fire Service Fire Trail Design, Construction and Maintenance Manual* (Soil Conservation Science 2017) and the *Managing Urban Stormwater* Blue Book (NSW Government 2004).

Bridges will use precast concrete decks over steel girders that rest on concrete abutments poured on site. Piped culverts will use precast reinforced concrete pipe and headwalls. Rock armouring and geotextiles may be used to reinforce drains and abutments.

The design will ensure that in times of flood no adverse impacts on neighbouring properties are experienced.

Ancillary facilities to support construction and operation

The activity involves the establishment of ancillary facilities to support the construction and operation, including temporary onsite storage of materials used in construction and maintenance, installation of surveillance, monitoring equipment in the reserve and outside the feral-free area.

Temporary onsite storage will be established within the south-eastern area of the activity. It is located on an existing modified area.

Visitor facilities consist of a shelter, signs, parking and bollards that are located around the perimeter of the activity. These shelters will be constructed in accordance with the department's *Construction Assessment Procedures* and the *NPWS Facilities Manual* and associated policies and be of a colour that is sympathetic to the natural setting.

The anticipated plant/machinery associated with the construction of the activity are outlined in Table 6.

Table 6 Construction plant and machinery

Plant / machinery	Activity	Sound power level (dbA)
11–30 tonne excavators, loader	Vegetation clearing / earthworks/culverts/bridge	104
D4–D7 dozer, grader, roller	Vegetation clearing / earthworks	116
Large drum mulcher, truck mounted large chipper	Vegetation clearing	116
Backhoe, post knocker, small excavator, loader	Fencing	111
1 x truck, skid-steer, Posi-Track	All	111
Light vehicles	All	106
Chainsaw	All	110

7.2.4 Eradication of feral predators and herbivores from proposed feral-free fenced area

The eradication of feral predators and herbivores (to the greatest extent practicable) within the proposed fenced area will be delivered through intensive eradication programs informed by a comprehensive monitoring program. These works will be summarised in a feral animal eradication and incursion plan for the activity. The feral animals known to be in the area that could be subject to eradication are cats, foxes, wild dogs, goats, pigs, deer, rabbits and hares. Other species may be included in the plan if identified as posing significant risk. All feral animal eradication will be conducted in accordance with: standard operating procedures (SOPs) developed by the Invasive Animal CRC; the NSW Vertebrate Pest Control Manual; and NPWS Pesticide SOPs and the Firearms Management Manual. The plan will specify the use of a range of conventional techniques, including trapping, shooting and baiting, in accordance with relevant codes of practice (including animal welfare requirements) and the EPA / Australian Pesticides and Veterinary Medicines Authority (APVMA) permits. Experimental and emerging techniques will be considered and deployed if appropriate.

Stage 1

A monitoring program will be implemented, consisting of remote camera traps deployed in an array throughout the proposed fenced area, spotlighting patrols and sand plots on tracks. Eradication effort and impact will be recorded and, together with the data from the monitoring program, the results will be used to refine the eradication program. Monitoring will be carried out prior to and ongoing throughout the Stage 2 control program.

Stage 2

Once the fenced area is at ‘lock-up’ stage, intensive control of feral predators and herbivores will be conducted. The tactical deployment of eradication effort and tools will be modified in response to the information generated by the monitoring program. Typically, the eradication tools will include:

- use of poison baits and bait delivery devices
- ground shooting, including for euthanasia of trapped feral animals
- cage and soft jaw trapping
- lures and attractants or fodder points may be used in association with control techniques for feral predators and herbivores.

Shooting will be conducted under shoot plans approved by NPWS and carried out by authorised personnel. Feral animal eradication programs will be consistent with policy and legislation (as outlined above). Additional separate risk management documents are required for some techniques, including an Authorised Control Officer Risk Assessment for poison baiting.

Verification of feral predator-free status

The proposed fenced area will be monitored using remote camera arrays, sand plots, scat sampling, scent-detection dogs and spotlighting. Verification of feral predator-free status will be determined through assessing activity of feral animals over time. Where there has been no activity detected on camera or on sand plots for 1–2 months, an 'interim feral-free status' will be declared. To ensure all feral predators have been removed, intensive monitoring will continue for a further 2 months post 'interim feral-free status', after which the area will be declared 'feral predator-free'. Once declared feral predator-free, regular monitoring for the presence of feral predators and herbivores will continue inside the fence (using remote camera traps and sand plots on tracks) to ensure any incursions are detected. Routine patrols of the fence line will identify any damage to the fence allowing incursions, resulting in immediate repair. Any incursions will be responded to as per the feral animal eradication and incursion plan.

7.2.5 Control of large macropods in the fenced area

Over-abundance of large macropods (i.e. kangaroos and wallabies), wombats, and potentially emus, within the Nungatta FPFA is a potential risk to both fence integrity and ecological function. Released from predation pressure, macropods inside the predator proof fence are likely to increase unsustainably and lead to overgrazing on native grasses. This impact on vegetation could also reduce the prospect of success for reintroduced species. NPWS will monitor this macropod and wombat pressure and adopt an adaptive management approach. Any intervention to the extant macropod and wombat population is outside the scope of this REF. If macropod and wombat control or relocation is required NPWS will develop a macropod and wombat management plan to assess options and inform preferred options to manage populations inside the fenced area (see Section 7.2.10 for an example).

7.2.6 Reintroduction of locally extinct species

Once the eradication of feral predators and herbivores from within the fenced area has been confirmed, the reintroduction of locally extinct animals will commence. The reintroduction is planned for November 2023 with the reintroduction of candidate species expected to occur over several years. Details relating to the timeline for reintroduction of each species, the number of individuals of each species to be released, the source populations and a range of other relevant issues will be identified as part of science-based planning for the translocation, including the preparation of formal translocation plans. Single species and multi-species translocation plans will be prepared for each proposed reintroduced species in accordance with the BC Act and Translocation Operational Policy (DPIE 2019) for approval by the department.

7.2.7 Asset protection and strategic fire management to protect infrastructure

The protection of life and property, including community assets, from the adverse impacts of fire is a legislative requirement and the primary fire management objective of the NPWS.

The relevant bushfire risk management plan and reserve fire management strategies will be prepared to adequately identify built and natural assets and prioritise strategies for their protection.

NPWS proposes the establishment of an Asset Protection Zone (APZ) that coincides with the 15 m cleared corridor to protect threatened species inside the fenced area by protecting the integrity of the predator proof fence. Fuel reduction within the APZ will aim to reduce the overall fuel hazard to below the rating of 'high' (the target for an APZ) with the intention of reducing the risk of fire within the zone and to assist with suppression of fires in this zone. This will be largely achieved by regular and ongoing mechanical works. The finalisation of these APZs is subject to the approval of the reserve fire management strategy.

NPWS proposes the establishment of Strategic Fire Management Zones (SFMZs) on the western, northern, eastern and south-eastern sides of the Nungatta FPFA. An SFMZ is not practical for the southern side because of the lack of natural or built fire containment options on the large and rugged Nungatta Plateau. Reduction of fuels within the SFMZs will be achieved using both hazard reduction burning, and the mechanical removal of ground debris, shrubs and sub-canopy trees.

A program of burns will be carried out within the fenced area prior to, during and following reintroductions. These burns will be planned to optimise outcomes from an ecological, cultural and safety perspective. Where possible, these will be designed to achieve mutual outcomes for community safety and biodiversity. The strategy will be based on tolerable fire intervals for species and ecological communities, with a number of over-arching principles to ensure a diversity of age classes/life stages of vegetation communities are present across the reserve.

7.2.8 Monitoring, evaluation and reporting

NPWS will monitor, evaluate and report performance against the activity objectives, outputs and outcomes identified for the Nungatta FPFA over the short, medium and long term. This monitoring will also provide for continuous improvement and adaptive management to ensure the best available evidence (including lessons learned from successes and failures) continues to inform the program.

Indicators are selected to monitor trends in:

- reintroduced and extant native species
- ecosystem function and ecological processes
- threats.

7.2.9 Construction timetable and staging and hours of operation

Clearing of corridors is predicted to start in November 2022, subject to relevant approvals. Construction of the trails, roads, crossings and fencing will immediately follow these works and completion is fundamental to commencing the eradication of feral species, which is anticipated to begin by February 2023.

Construction activities that are audible at any residential or other sensitive receiver will be limited to between 7 am and 6 pm Monday to Friday, and 8 am to 1 pm Saturdays.

Works that may be undertaken outside of these hours include:

- any works that do not cause construction noise emissions to be audible at any nearby sensitive noise receiver
- delivery of material as requested by Police or other authorities for safety reasons
- emergency works to avoid the loss of life, property and/or prevent actual or potential environmental harm
- any other works as agreed through negotiation between NPWS and potentially affected noise receivers.

7.2.10 Ensuring the integrity of the fence against wombats

General

Wombats (*Vombatus ursinus*) have a widespread distribution across south-eastern Australia and are considered reasonably common in the coastal forests of the Nungatta area of SEFNP.

Their diet consists of a variety of grasses, sedges, forbs, roots and bulbs, based on availability, where they may graze large areas of suitable habitat from late afternoon to early morning (depending on the season).

Wombats live in burrows that can be up to 30 m long and they may share these with other wombats, although they are very territorial with their feeding grounds.

Impact of the activity on wombats

- The activity may act as a barrier and restrict movement and dispersal of wombats.
- The activity may impact on a number of existing wombat burrows within the construction footprint.

Impact of wombats on the fence infrastructure

- Wombats follow set trails to preferred feeding areas. They are known to bulldoze their way through obstacles, including fences.
- Wombats frequently dig holes in the sandy soil under the apron of predator exclusion fences, necessitating regular maintenance.

Proposed mitigating measures

- NPWS will adopt an adaptive management approach to minimising the impact of the activity on wombats, and minimising damage from wombats on fence infrastructure.
- Wombats are highly territorial and removal of animals from within the fenced area may result in another animal replacing its territory and burrow. Wombats will be relocated if there are continued issues in identified areas of the fence.
- Wombat burrows within the construction footprint will be marked on ground (and mapped) and then closed, ensuring animals have left but cannot return.
- Long and Robley (2004) recommend the installation of ‘wombat gates’, increased apron width, and/or low electric wires to minimise the impact of wombats on conservation fences.
- The success of wombat gates is variable between sites. It is recommended these be constructed on known pathways where possible and monitored to determine their success. Wombat gates will be designed using pipes or other surfaces or structures that are avoided by other species (Coates 2013; Driessen et al. 2018).
- Lighter gauge wire netting may be used in areas where wombats frequently damage fences. Again, this will be monitored and installed as required.
- Marks (1998) has shown the conditioned avoidance by wombats of electric fences. This will be trialled in affected areas to determine its probability of success.
- The adopted fence design is considered to be best practice and has been proven to be effective. It has a skirt / apron that lies flat on the ground surface or is pinned where there are uneven surfaces. Consideration will be given to increasing the width of the fence apron in selected areas only after other listed options have proved unsuccessful.
- InfraBuild and Waratah fencing have advised that in some situations (wet soils, acid sulphate soils) the burial of wire netting may lead to increased corrosion and shorter life expectancy of their products. For this reason, the fence apron will not be buried.

8. Reasons for the activity and consideration of alternatives

8.1 Objectives and reasons for the activity

The primary objectives of the NSW FPFAs project are common to all of the 4 sites, including the Nungatta site. These are:

- establish and maintain viable new populations of locally extinct species within the FPFA
- maintain or improve the trajectory (as measured by population size, abundance, occupancy or extent) of extant resident fauna (including threatened species) within the FPFA
- improve ecological health / ecosystem function within the FPFA
- eliminate (or reduce to ecologically insignificant levels) threats to reintroduced and extant resident fauna and their habitat.

In addition, the Nungatta site has an important role in increasing the awareness and understanding of threatened species, communities, threatening processes and their management. This will be achieved through the development of visitor experiences, but this aspect is outside the scope of this REF.

The FPFAs will operate as anchors (foundations) supporting broader landscape-scale conservation by:

- preventing the extinction of highly threatened species that will not survive in the presence of feral cats and/or foxes
- providing secure long-term protection and increasing the wild population of species that are suppressed by cats and/or foxes
- restoring ecological processes through the return of digging mammals, etc.
- enabling targeted interventions beyond feral animal control, as required
- through research and innovation, generating knowledge that can be applied to mitigate the impact of feral predators and other threats across the landscape (i.e. improve conservation outcomes ‘beyond the fence’)
- establishing insurance populations of threatened species until effective landscape control of cats and foxes is developed
- providing source populations for the restoration of species, when feasible, across the landscape
- promoting public awareness of, and appreciation for, the value of native wildlife.

8.1.1 Reasons for the feral predator-free program

Scientific publications have established:

- Australia has the highest number of mammal extinctions in the world (Burbidge and McKenzie 1989; McKenzie et al. 2007).
- Over 30 mammal species are now extinct (>13% of all Australian terrestrial mammals) and another 60 listed as threatened (Woinarski et al. 2015; Legge et al. 2018).
- In NSW, 26 mammal species have become extinct since European settlement, and around 50–60% of surviving mammals are threatened with extinction.

- Predation by the introduced red fox and feral cat is the key driver in almost all of these extinctions, and in the ongoing decline of many extant species (Short and Smith 1994; Abbott 2011; Woinarski et al. 2015; Radford et al. 2018). Feral cats and/or foxes have been shown to have a significant impact on some bird species (Garnett et al. 2011; Woinarski et al. 2017), reptiles (Woinarski et al. 2018; Chapple et al. 2019), and amphibian species (Woinarski et al. 2020).
- The number of species considered at risk of extinction continues to rise (EPA 2018).
- Some monitoring programs indicate population reductions of >90% in multiple species over the last 2 decades, even in large conservation reserves (Woinarski et al. 2015). Most conservation reserves under current management will fail to conserve and recover such predator-susceptible species (Woinarski et al. 2018).
- The effective control of feral predators is essential for the recovery of many of our most threatened species, especially mammals and ground-dwelling birds.
- Despite current conservation efforts, there is no effective strategy for landscape-scale control of feral cats, and landscape-scale fox control has mixed results (Radford et al. 2018).
- A number of species with a high to extreme susceptibility to predation are dependent on permanent and intensive predator control, and in some cases entirely dependent on feral predator-free safe havens (Legge et al. 2018; Radford et al. 2018).
- There is strong scientific support for the establishment of FPFAs using conservation fencing as an essential component of any overall strategy to prevent further extinctions and promote the recovery of our most susceptible species (Ringma et al. 2017; Legge et al. 2018; Legge et al. 2019). A network of these so-called ‘exclosures’ is necessary to complement the conventional reserve system and is required in the short to medium term to prevent extinction of predator-susceptible threatened mammal species (Legge et al. 2019).

Australian small to medium-sized terrestrial mammals have been in significant decline since European settlement some 200 years ago (Woinarski et al. 2015). The ecological importance of these mammals and the function they provide cannot be understated (Haouchar et al. 2016). The eastern bettong for instance, is believed to have been mycophagous (having a diet based on fungi), a conclusion based on studies of its extant Tasmanian population (Rose 1986). This species is now considered completely extinct from the Australian mainland. Prolific digging in search of fungi results in high levels of bioturbation. This bioturbation provides essential ecosystem functioning by improving soil quality and seed germination success, resulting in a greater biomass (Haouchar et al. 2016; Dundas et al. 2018).

Predator-free areas have been identified as a key component in the conservation of mammals in Australia (Ringma et al. 2018a; Ringma et al. 2018b). With pressures from feral predators increasing (Woinarski et al. 2017), creating a network of predator-free safe havens is the most effective and achievable tactic in the medium term (NESP 2018). Raising awareness of the importance of these networks and their achievability is a critical outcome of this proposed activity.

8.2 Consideration of alternatives

8.2.1 Alternative sites

Eleven sites were investigated as part of the site selection/prefeasibility process (described further in Section 1.1.1). Multiple factors were considered in the site selection/prefeasibility process including land tenure, permissibility, available hectares, topography including drainage lines, access, management operations, facilities and constraints, risk of catastrophic events such as fire and flooding, environmental, cultural and social values and

impacts, habitat suitability and condition for selected species proposed for reintroduction, presence of easements, roads and utilities, and level of support from adjacent landholders and the broader community.

Following ecological and operational feasibility assessments, the Genoa section of SEFNP has been identified as the preferred location for the establishment of an FPFA to support the reintroduction of locally extinct and declining native animal species and to better protect existing native animals from feral predators.

8.2.2 Alternative fence line alignments and areas

The placement of linear infrastructure such as roads and fences has some flexibility. The alignment of such is mainly constrained by topography and the corresponding implications on the quantum of construction earthworks and operational aspects (i.e. maintenance and operational costs) associated with vegetation debris build-up that occurs with conservation fencing, and the risk that debris build-up and falling trees pose to the continued integrity of the fence line.

The placement of fence lines has also considered the condition of vegetation in which they are likely to be located. The proposed alignment has been located adjacent to the existing trail network and in areas that have been subject to previous disturbance, where possible.

Alternative fence line alignments that involved both larger and smaller fenced areas were investigated in the general location of the activity:

- A fence alignment adjacent to the Imlay Road corridor boundary was considered. This alignment was not supported by Forestry Corporation of NSW and presented a higher safety risk to NPWS staff during operation and maintenance (i.e. NPWS staff stopping and working next to an active road). The fence line was moved southwards to avoid these impacts. This resulted in a reduction in the size of the fenced area.
- Extensive artefact scatters with subsurface potential were encountered on the proposed route on the White Rock Sector and Imlay Sector 04. The alignment was altered to avoid this impact, which resulted in a reduction in the size of the fenced area.
- A smaller fenced area was also considered. This option was rejected as it did not meet the minimum area required to meet the objectives of the project. The project objective is to support viable self-sustaining populations of reintroduced and extant species and so reverse the trend of species extinctions and biodiversity decline by improving ecological health through removing feral predators and herbivores (to the greatest extent practicable), and restoring ecosystem processes such as digging and predation.

Consideration of these aspects, along with further refinements to the proposed activity during the detailed design phase, has and will further contribute to a reduction in the overall impact of the activity on the ecological features of the activity, by way of avoiding or minimising potential impacts. These refinements were introduced progressively during the activity planning and design and in response to field survey results and preliminary impact assessments. The final activity design incorporates all of the identified refinements and it is this final design that has been assessed by this REF.

8.2.3 Alternative construction and management options

Maintaining the integrity of the fence is one of the key primary management measures to mitigate the impact of feral predators. One of the key risks to the integrity of the fence is from falling trees and/or large branches. The option of clearing a wider corridor, nominally 80 m, was considered. This option was rejected as it resulted in a higher ratio of vegetation being cleared to vegetation fenced and the risk of falling trees and/or large branches to the fence can be partially mitigated through a hazardous tree inspection program, with lopping as necessary as well as routine and weather responsive fence line inspection programs.

8.2.4 Alternative of not proceeding

The location is currently used for broad-scale conservation. The ‘do nothing’ option would allow for the continued use of the location for broad-scale conservation. While the ‘do nothing’ option would allow the location’s continued use for broad-scale conservation, it would also forego the benefits of the activity listed in Section 8.1, namely:

- the establishment of an FPFA on a site ideally suited to the reintroduction of locally extinct species
- direct and indirect benefits to the other species both inside and outside the Nungatta FPFA
- knowledge gained from establishing an FPFA, which can be applied elsewhere
- providing source populations for the restoration of species across the landscape
- promoting public awareness of, and appreciation for, the value of native wildlife, including through such measures as interpretive signs and interpretive walking tracks.

The ‘do nothing’ option would result in a lost opportunity for the development of a large-scale fenced conservation area on an ideally located site (within SEFNP) with limited significant environmental constraints.

The ‘do nothing’ option would avoid the potential environmental impacts associated with the construction and operation of the activity, which include construction noise, traffic and visual impacts, as well as impacts to biodiversity and heritage.

However, through the implementation of the management and mitigation measures described in Section 10, these potential impacts would not result in any significant impacts to the environment.

8.3 Justification for the preferred option

The identification of suitable sites has been guided by a large body of scientific literature and by lessons learned from earlier rewilding initiatives. A key driver of selection is past and present distribution of target species. NPWS aims to maximise the number of species that will benefit from feral animal exclusion – including reintroduced species and extant species currently suppressed by feral predation. Species most at risk, and those not already protected in a predator-free area, have been prioritised.

A statewide analysis identified 4 bioregions across NSW – north-east, western Sydney, south-east and central NSW – as areas with a significant number of potential rewilding species.

Within the south-east bioregion, a range of sites across NPWS reserves were reviewed to assess their suitability. Factors used to assess potential locations included ecological, cultural, operational, social and economic considerations. Initial feasibility assessments identified the Nungatta area as a potential site. A number of fence line configurations were considered with that shown in Figure 8 being the preferred configuration.

This location was chosen for the establishment of a feral predator-free enclosure as it:

- meets the minimum area required of >2,000 ha
- has a climate and habitat that is suitable for the locally extinct species targeted for reintroduction: long-footed potoroo, smoky mouse, eastern bettong and eastern quoll
- has the best combination of relatively gentle terrain and small stream crossings, with a large network of old dormant forestry trails for monitoring of the locations considered
- minimises the environmental impact from the activity.

The proposed FPFA will:

- restore the ecosystem processes such as turning over the soil and spreading native seed and fungal spores. This function has largely been lost from the landscape resulting in likely decline in forest health and native species diversity
- enable the reintroduction of eastern bettong and possibly the Tasmanian pademelon listed as extinct in NSW
- enable the reintroduction of other locally extinct or threatened animals including long-footed potoroo, smoky mouse and eastern quoll and possibly the chestnut mouse, Hastings River mouse, broad-toothed rat and red-necked pademelon
- provide secure long-term protection for the abovementioned threatened species
- through research and innovation, generate knowledge that can be applied to mitigate the impact of feral predators and other threats across the landscape (i.e. improve conservation outcomes beyond the fence)
- establish insurance populations of threatened species until effective landscape control of cats and foxes is developed
- provide source populations for the restoration of species, when feasible, across the landscape
- promote public awareness of, and appreciation for, the value of native wildlife.

9. Description of the existing environment

The activity is located near Bombala at the south-eastern extremity of NSW. The area is predominantly rural, with many townships, villages and holiday areas. Land is used for conservation and timber production (national park and state forest), agriculture, particularly dairy farming, with fishing, oyster harvesting, tourism and retail also being important industries.

The activity is located entirely within SEFNP, which is surrounded by state forests to the north (Cathcart State Forest), south (Nungatta State Forest), east (Towamba State Forest) and west (Nalbaugh and Coolangubra state forests).

9.1 Natural values

9.1.1 Location

The Nungatta FPFA is located in the South East Corner IBRA Bioregion, which extends from southern NSW into Victoria. It comprises approximately 2,084 ha (including a smaller fenced soft-release area of 247 ha) within SEFNP. SEFNP has a total area of 115,499 ha, covering escarpment and hinterland hills west of Bega and Eden. It forms part of a system of conservation reserves that stretch over 600 km along the Great Escarpment from NSW to Victoria.

The Nungatta FPFA is located between the escarpment and the coast and straddles the boundary between the Bega Valley and Snowy Monaro local government areas. It is situated approximately 30 km south-east of Bombala and 75 km west of Eden. It lies just south of Imlay Road, which connects the Monaro and Princes highways south of Eden and Bombala. The FPFA is irregularly shaped, but roughly 7 km east to west and 3 km north to south.

The Nungatta FPFA sits within a large contiguously forested landscape. Most of the area has been logged 25–50 years ago. It contains narrow stands of older lightly unlogged forest along gullies, streams and in steep isolated slopes. The FPFA is fully contained within, and surrounded by, SEFNP. Its boundary lies within an area bound by Imlay Road to the north, Nungatta Creek Road to the east, other parts of SEFNP including the footslopes of the Nungatta Plateau to the south, and White Rock River to the west (Figure 1).

SEFNP was formed in 1997 as an amalgamation of several pre-existing national parks and areas of state forest. The area in which the Nungatta FPFA is situated was formerly part of Nungatta State Forest and was subject to extensive logging. About half the FPFA was incorporated into the former Nungatta National Park, which was gazetted in 1973, but the other half continued to be managed as state forest until 1997 when it was incorporated along with Nungatta National Park and several other national parks into SEFNP.

A number of sealed roads (such as Imlay Road) and unsealed trails and tracks (such as Laings Road, Nungatta Creek Road, Alex Hut Trail, Cammos Fire Trail, and Merv's Fire Trail) were created through the area to support logging operations. These are still in existence, providing good access across the site (Figure 1).

There are no recreational facilities within the Nungatta FPFA; however, the White Rock River picnic area is located off Imlay Road, near its north-western boundary, and the existing tracks through the FPFA are used by landholders neighbouring SEFNP to access their properties, by occasional recreational users and probably by feral animal hunters (M Beukers, pers. comm.), although hunting is not permitted on national parks estate. It is also periodically accessed by NPWS staff and contractors to undertake activities such as track maintenance, feral animal and weed monitoring and control, prescribed burning, and threatened species surveys and monitoring.

9.1.2 Climate

The climate of the South East Corner IBRA Bioregion in NSW is mostly temperate, with warm summers and no dry season (DEC 2006). The mean annual maximum temperature is 17.8°C, with a mean summer high of 24.3°C. The mean annual minimum temperature is 5.1°C, with a mean winter low of 0.3°C. Mean annual rainfall is 595.7 mm. Rainfall is spread throughout the year but is highest in summer (mean 172.8 mm) and lowest in winter (mean 134.4 mm).

9.1.3 Geology, soils and topography

Most of the South East Corner IBRA Bioregion is underlain by folded and metamorphosed Ordovician to Devonian sedimentary rocks that have been intruded by several granite bodies (DEC 2006). Typical soils found across the bioregion are texture contrast profiles with properties that differ with rock type (DEC 2006). The soils are mapped as either kandosols or dermosols.

The Nungatta FPFA is between 420 and 708 m above sea level (ASL). Most of it is characterised by undulating terrain, from 500–620 m, off upper catchments that fall from a broad east–west ridge that follows Laings Road. There is a higher, 620–700 m, north–south ridgeline in the west of the FPFA.

Figure 9 shows the soil landscape within the activity area, which consists of yellow earths (YE) and more fertile yellow podzolic soils (YPm).

A search of the Environment Protection Authority (EPA) contaminated lands record (search criteria – Local Government area – Bega Valley Shire Council and Snowy Monaro Regional Council) did not indicate the presence of any contaminated land near the activity (EPA 2022).

Reference to the NSW Government's online Sharing and Enabling Environmental Data in NSW (SEED) resource, indicates that the activity is not expected to be underlain by acid sulfate soils (NSW Government 2022).

9.1.4 Watercourses, waterbodies and wetlands

The activity is located in the headwaters of the White Rock River and Genoa River, located to the west of the activity area. Figure 10 shows the activity area is drained by a series of sub-catchments (Reef Creek, Donald Langs Creek, Sandy Creek and multiple unnamed sub-catchments/drainage lines. The majority of the drainage lines are 1st and 2nd Strahler stream orders and are expected to provide an ephemeral water source. Parts of Reef Creek are 3rd and 4th Strahler stream orders and a section of Sand Creek is a 3rd Strahler stream order. These 3rd and 4th Strahler stream orders are expected to provide semi-permanent if not a permanent water source.

The proposed activity would involve the crossing of 24 (1st–4th order streams) recognised waterways including 4 3rd order streams and one 4th order stream. The establishment of the Nungatta FPFA will require barriers (i.e. grills, nets and fencing) to be constructed on the waterways and has the potential to impact the movement of native aquatic fauna. Therefore the waterways require assessment to identify aquatic fauna values that may be impacted as a result of the project.

The SEFNP plays an important role in catchment protection because of its high proportion of forested lands. Creeks and rivers emanating from the park have high water quality characterised by low salinity, turbidity, dissolved organic matter and phosphorous regimes. Further, they usually have high clarity and dissolved oxygen. Many towns and rural dwellings in the vicinity of the park are dependent for their water supplies on ground and surface water that has its origins in the park.

All or substantial areas of a large number of sub-catchments are protected in the park, particularly in the Genoa (in which the activity is located), Coolangubra and Tantawangalo sections. Significant natural catchments include Sheep Station Creek (located to the north of Imlay road) and the White Rock and Reef Creek catchments, which flow into the Genoa River located to the west of the activity site.

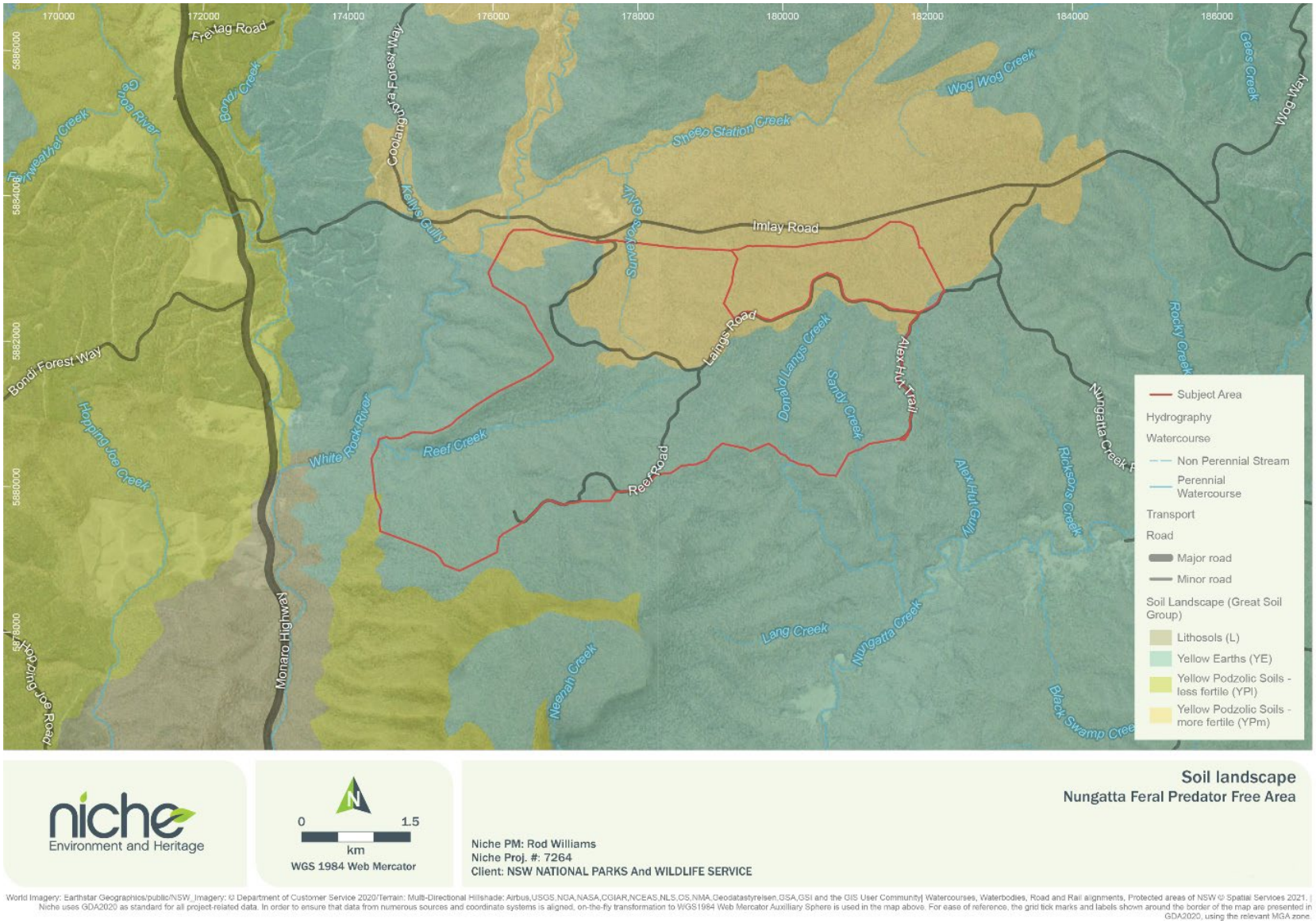

Figure 9 **Soil landscape of Nungatta FPFA**

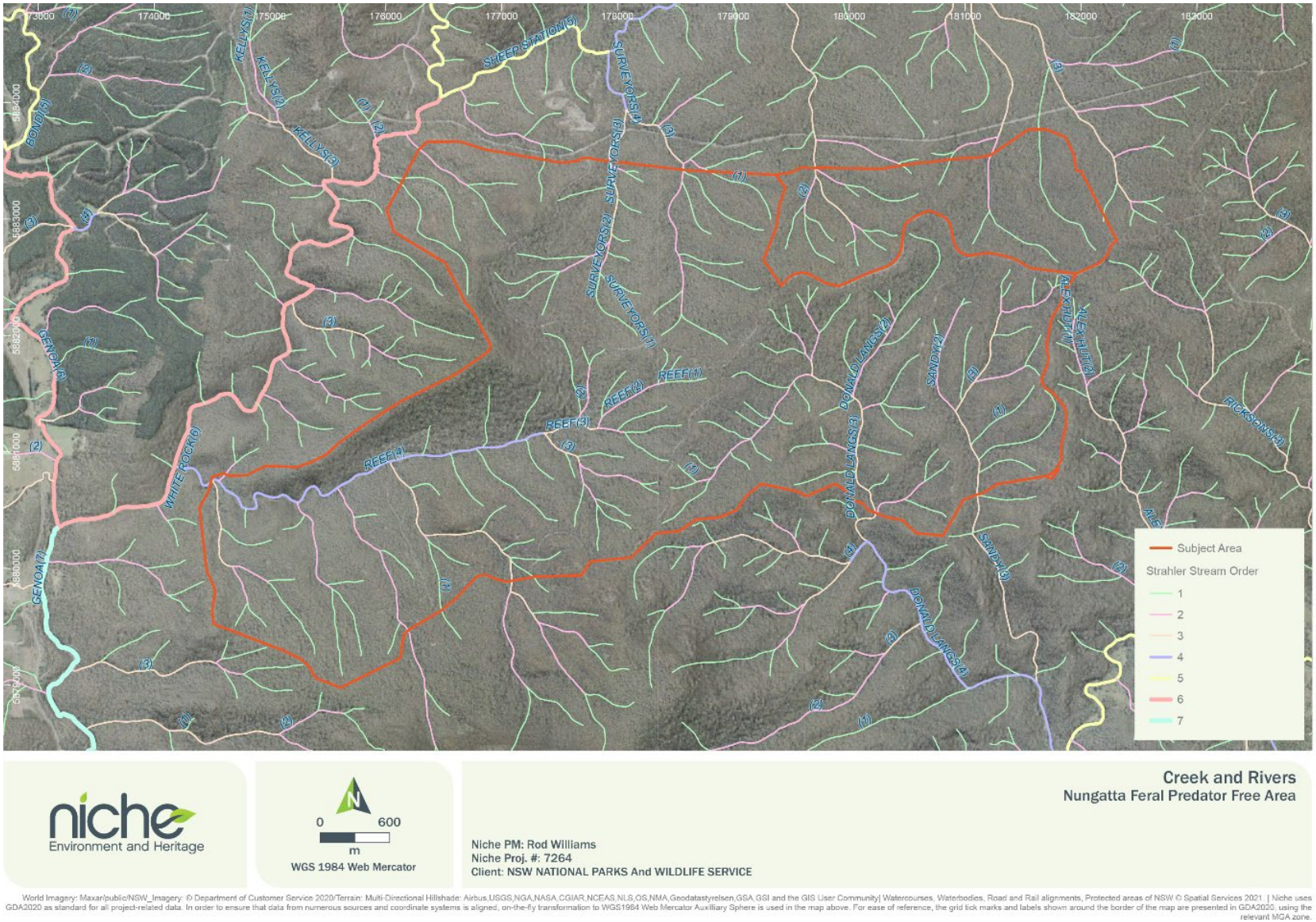

Figure 10 **Creeks and rivers in and around Nungatta FPFA**

9.2 Biodiversity

9.2.1 Overview of terrestrial and aquatic biodiversity

Vegetation

The field survey conducted by Narla Environmental identified the terrestrial vegetation within the disturbance area as best conforming to the plant community types (PCTs) listed in Table 7, which shows the proposed impact areas per PCT. These PCT allocations may change as more vegetation sampling is classified and the PCT map of the Nungatta FPFA is updated.

Table 7 PCTs and associated impact area

Plant community type	Extent within the terrestrial ecology survey area (ha)	Impact area (ha)
PCT 790: Crimson Bottlebrush – Scented Paperbark wet heath in the hinterland hills, southern South East Corner Bioregion	1.06	0.68
PCT 817: Dwarf She-oak closed heathland of escarpment ranges, South Eastern Highlands Bioregion	0.23	0.14
PCT 929: Messmate – Mountain Grey Gum moist open forest of granitic foothills, southern South East Corner	4.75	3.18
PCT 943: Mountain Grey Gum – Brown Barrel very tall moist forest on escarpment ranges, central and southern South East Corner Bioregion	0.16	0.13
PCT 1228: Swamp Gum – Ribbon Gum open forest on flats of the coastal and hinterland lowlands, southern South East Corner Bioregion	3.16	2.48
PCT 1320: White Stringybark – Maiden's Gum grassy open forest on granitic foothills, southern South East Corner Bioregion	28.31	19.25
PCT 1322: White Stringybark – Narrow-leaved Peppermint dry open forest on hinterland hills, far south of the South East Corner Bioregion	36.20	23.98
PCT 1340: Yertchuk – Silvertop Ash – Blue-leaved Stringybark shrubby open forest of the Wallagaraugh catchment, far southern South East Corner Bioregion	4.36	2.68
Total (ha)	**78.23**	**52.52**

Figure 6 of the FFA (Narla Environmental 2022; Attachment B) identifies the location of these PCTs within the subject area.

The aquatic ecology surveys undertaken by Austral (Attachment C) identified freshwater aquatic vegetation (submerged) and trailing bank vegetation (ferns and sedges).

Threatened ecological communities

The PCTs identified within the subject area can be generally aligned with TECs listed under the BC and EPBC Acts; however, these TECs have key diagnostic characteristics such as distribution, elevation, vegetation characteristics and indicative species.

Narla Environmental found no TECs in the disturbance or activity areas. They identified 3 PCTs that might occur in the activity area and could align with a TEC (Table 8); however, they found that key diagnostic characteristics identified during the field surveys did not identify any PCTs as conforming to a TEC.

Table 8 PCT alignments under the BC and EPBC Acts

PCT	BC Act	Characteristics met?	EPBC Act	Characteristics met?
943	Robertson Basalt Tall Open-forest in the Sydney Basin and South Eastern Highlands Bioregions (CEEC)	**No**, only occurs within Sydney Basin and South-eastern Highlands Bioregions.	–	NA
1228	River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and Southeast Corner bioregions (EEC)	**No**, generally occurs below 50 m elevation, but may occur on localised river flats up to 250 m ASL. Subject area is 440 m and 580 m ASL.	River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria (CEEC)	**No**, generally occurs below 50 m elevation, but may occur on localised river flats up to 250 m ASL. Subject area is 440 m and 580 m ASL.
1320	Lowland Grassy Woodland in the Southeast Corner Bioregion (EEC)	**No**, associated with rain shadow areas of the south coast and hinterland of NSW. Subject area not in rain shadow area.	Lowland Grassy Woodland in the Southeast Corner Bioregion (CEEC)	**No**, dominant and diagnosing species were not identified within the subject area.

EEC = endangered ecological community, CEEC = critically endangered ecological community

Environmental assets of intergenerational significance

No assets of intergenerational significance declarations made under s 153G of the NPW Act were identified within the subject area on the Map of NSW Assets of Intergenerational Significance (NPWS 2022b). Consistent with other FPFAs, the site will be declared an environmental asset of intergenerational significance following successful eradication of feral animals and reintroduction of locally extinct species.

Areas of outstanding biodiversity value or critical habitat

No areas of outstanding biodiversity value (AOBVs) listed under Part 3 of the Biodiversity Conservation Regulation 2017 occur within, or in the vicinity of the subject area. There is also no FM Act critical habitat listing within, or in the vicinity of the subject area.

Threatened species and populations

Threatened flora

Desktop analysis by Narla Environmental revealed 7 threatened flora species as occurring or having the potential to occur on or within the locality (areas adjacent) of the subject area; however, thorough targeted surveys did not identify any threatened flora within the subject area at the time of the survey (May and June 2022).

One BC Act and EPBC Act vulnerable species, *Pultenaea parrisiae* (Parris' bush-pea), was previously identified (Miles 2021) within and adjacent to the activity area; however, targeted surveys did not identify it during the May and June 2022 assessment, most likely because

this species is cryptic and challenging to identify when not in flower (flowers October and November). A BC Act 5-part Test of Significance for impacts to Parris' bush-pea is presented in Appendix A of the FFA (Narla Environmental 2022; Attachment B). An EPBC Act Assessment of Significant Impact Criteria for impacts to Parris' bush-pea is presented in Appendix E of the FFA (Narla Environmental 2022; Attachment B). Both these assessments determined that the proposed activity is unlikely to result in a significant impact to Parris' bush-pea.

The following locally occurring species were assessed for their potential to occur within the subject area (Table 9).

No threatened aquatic vegetation was identified (Austral Research and Consulting 2022).

Table 9 Assessment of likely occurrence of threatened flora species within the subject area

Species	BC Act	EPBC Act	Likelihood of occurrence	Further assessment required?
Acacia georgensis (Bega wattle)	V	V	Low	No
Amphibromus fluitans (river swamp wallaby-grass)	V	V	Low	No
Boronia deanei (Deane's boronia)	V	V	Low	No
Caladenia tessellata (thick-lipped spider-orchid)	E	V	Low	No
Callistemon forresterae (Forrester's bottlebrush)	–	V	Low	No
Calotis glandulosa (mauve burr-daisy)	V	V	Low	No
Correa lawrenceana var. *genoensis* (Genoa River correa)	E	E	Low	No
Cryptostylis hunteriana (leafless tongue-orchid)	V	V	Low	No
Dodonaea procumbens (trailing hop-bush)	V	V	Low	No
Glycine latrobeana (clover glycine)		V	Low	No
Grevillea acanthifolia subsp. *paludosa* (bog grevillea)	E	E	Low	No
Leionema ralstonii	V	V	Low	No
Lepidium hyssopifolium (basalt pepper-cress)	E	E	Low	No
Leucochrysum albicans subsp. *Tricolor* (hoary sunray)	–	E	Low	No
Nematolepis rhytidophylla (Nalbaugh nematolepis)	V	V	Low	No

Species	BC Act	EPBC Act	Likelihood of occurrence	Further assessment required?
Pomaderris cotoneaster (cotoneaster pomaderris)	E	E	Low	No
Pomaderris elachophylla (lacy pomaderris)	E	–	Low	No
Pomaderris parrisiae (Parris' pomaderris)	V	V	Low	No
Pomaderris sericea (bent pomaderris)	E	V	Low	No
Prasophyllum petilum (Tarengo leek orchid)	E	E	Low	No
Pultenaea parrisiae (Parris' bush-pea)	V	V	Present; at least 1,000 individuals of this species have been recently recorded	Yes (refer to the FFA (Narla Environmental 2022; Attachment B)
Thesium austral (austral toadflax)	V	V	Low	No
Xerochrysum palustre (swamp everlasting)	–	V	Low	No

CE = critically endangered, E = endangered, V = vulnerable, M = migratory. – = not listed.

Threatened and migratory fauna and habitat

The biodiversity assessment by Narla Environmental (Attachment B) included evaluations of terrestrial and migratory fauna habitat:

- There are numerous threatened species recorded in BioNet within 10 km of the proposed FPFA (shown in Table 10).
- The survey area contains the following potential threatened fauna habitat:
  - 11 small burrows and 7 wombat burrows (9 small burrows and 7 wombat burrows within the proposed predator exclusion fence corridor) (refer to Appendix L of Attachment B for figure)
  - 395 hollow bearing trees containing 206 small, 116 medium and 73 large hollows were identified that may provide breeding habitat for a number of threatened fauna species
  - 153 microhabitat logs
  - 1 rock outcrop
  - 5 culverts and 2 bridges provide shelter for microbats
  - a suite of *Eucalyptus* spp. provide intermittent nectar sources for nectivores such as the grey-headed flying-fox
  - *Banksia marginata, Callistemon citrinus, Hakea eriantha* and *Kunzea ericoides* were identified and provide intermittent nectar sources for small nectivores such as eastern pygmy possums and microbats
  - seed-bearing trees such as *Eucalyptus* spp. provide foraging habitat for gang-gang cockatoos
  - *Exocarpos strictus, Persoonia linearis* and *Polyscias sambucifolia* provide intermittent fruit sources for fructivores such as the grey-headed flying-fox

  - foraging and shelter resources for the southern brown bandicoot, long-nosed potoroo, and white-footed dunnart
  - a number of wetlands (PCT 970), soaks and streams are present.
- A fauna survey (refer to the FFA (Narla Environmental 2022; Attachment B)) found a total of 2 threatened fauna species within the subject area: *Callocephalon fimbriatum* (gang-gang cockatoo, BC Act: vulnerable, EPBC Act: endangered); and *Petroica boodang* (scarlet robin, BC Act: vulnerable) (see Narla Environmental (2022) for a map of the survey area). Several microchiropteran bats that were not identified to avoid disturbance may also have been threatened species.
- The following EPBC Act listed migratory fauna species were considered to occasionally use habitat within or around the subject area for foraging or passage (DCCEEW 2022):
  - *Hirundapus caudacutus* (white-throated needletail)
  - *Monarcha melanopsis* (black-faced monarch)
  - *Myiagra cyanoleuca* (satin flycatcher)
  - *Rhipidura rufifrons* (rufous fantail).

The aquatic biodiversity assessment by Austral Research and Consulting (Attachment C) included evaluations of aquatic fauna habitat:

- A review of the NSW Department of Primary Industries' *Fisheries NSW Spatial Data Portal* (DPI 2022) revealed that the freshwater fish community is considered generally 'poor' within the vicinity of the subject area. No threatened, listed freshwater species are modelled to occur within the subject area (DPI 2022); however, there are numerous threatened species recorded on BioNet in the Southern Rivers Catchment (DPE 2022a) (shown in Table 11).
- The 5 waterway crossings present within the construction footprint were assessed for their potential to support aquatic fauna and threatened aquatic species via environmental DNA (eDNA), electrofishing, bait traps, dip netting, site observations and in-situ water quality:
  - All sites were classified as Type 1 highly sensitive key fish habitat as they contained either boulder and bedrock features or extensive instream vegetation.
  - Surveys resulted in 5 native fish species being observed or detected (Table 11).
  - Platypus eDNA was present at 3 sites.
  - No turtle species are considered likely to occur based on the habitat available, the substrate type and low and ephemeral nature of many of the waterways surveyed.

Table 10 Assessment of likely occurrence of threatened fauna species within the subject area

Species	BC Act	EPBC Act	Likelihood of occurrence
Anthochaera phrygia (regent honeyeater)	CE	CE	Low – no records in proximity to the activity area
Artamus cyanopterus cyanopterus (dusky woodswallow)	V	–	Moderate – 13 records within proximity to the activity area
Botaurus poiciloptilus (Australasian bittern)	E	E	Low – no records in proximity to the activity area
Calidris ferruginea (curlew sandpiper)	E	CE	Nil – no suitable habitat in proximity to the activity area
Callocephalon fimbriatum (gang-gang cockatoo)	V	E	Present – this species was observed foraging on 5 occasions during the site assessment in May/June 2022

Species	BC Act	EPBC Act	Likelihood of occurrence
Calyptorhynchus lathami (glossy black cockatoo)	V	–	Moderate – 2 records in proximity to the activity area
Cercartetus nanus (eastern pygmy-possum)	V	–	Moderate – 6 records in proximity to the activity area
Daphoenositta chrysoptera (varied sittella)	V	–	Moderate – 6 records in proximity to the activity area
Dasyurus maculatus (Spotted-tailed Quoll)	V	E	Moderate – 14 records in proximity to the activity area
Falco hypoleucos (grey falcon)	E	V	Low/nil – no records in proximity to the activity area
Falsistrellus tasmaniensis (eastern false pipistrelle)	V	–	Moderate – 9 records in proximity to the activity area
Grantiella picta (painted honeyeater)	V	V	Low – no records in proximity to the activity area
Haliaeetus leucogaster (white-bellied sea-eagle)	V	–	Low – one record in proximity to the activity area
Heleioporus australiacus (giant burrowing frog)	V	V	Low – 2 old records in proximity to the activity area
Hirundapus caudacutus (white-throated needletail)	–	V	Low – 4 records in proximity to the activity area
Isoodon obesulus obesulus (southern brown bandicoot-eastern)	E	E	High – 65 records in proximity to the activity area
Lathamus discolor (swift parrot)	E	CE	Low – one record in proximity to the activity area
Litoria castanea (yellow-spotted tree frog)	CE	CE	Low – no records in proximity to the activity area
Litoria raniformis (growling grass frog)	E	V	Low – no records in proximity to the activity area
Litoria watsoni (Watson's tree frog)	–	E	Low – no records in proximity to the activity area
Mastacomys fuscus mordicus (broad-toothed rat)	V	V	Low – no records in proximity to the activity area
Miniopterus orianae oceanensis (large bent-winged bat)	V	–	Low – 2 records in proximity to the activity area
Mixophyes balbus (stuttering frog)	E	V	Low – one record in proximity to the activity area
Myotis Macropus (southern myotis)	V	–	Moderate – 2 records in proximity to the activity area
Ninox strenua (powerful owl)	V	–	High – 38 records within proximity to the activity area
Numenius madagascariensis (eastern curlew)	-	CE	Low – no records suitable habitat in proximity to the activity area

Species	BC Act	EPBC Act	Likelihood of occurrence
Pachycephala olivacea (olive whistler)	V	–	Moderate – 13 records in proximity to the activity area
Petauroides penici (greater glider)	–	V	High – 37 records in proximity to the activity area
Petaurus australis (yellow-bellied glider)	V	–	High – 152 records in proximity to the activity area
Petrogale penicillata (brush-tailed rock-wallaby)	E	V	Low – no records in proximity to the activity area
Petroica boodang (scarlet robin)	V	–	Present – this species was observed foraging on 6 occasions during the site assessment in May/June 2022
Petroica phoenicea (flame robin)	V	–	Moderate – 10 records in proximity to the activity area
Phascolarctos cinereus (koala)	V	V	Low – 15 records in proximity to the activity area
Potorous longipes (long-footed potoroo)	CE	E	Low/nil – 62 old records in proximity to the activity area
Potorous tridactylus (long-nosed potoroo)	V	V	Low – 3 old records in proximity to the activity area
Pseudomys fumeus (smoky mouse)	CE	E	Low/nil – 24 old records in proximity to the activity area
Pteropus poliocephalus (grey-headed flying-fox)	V	V	Low – no records in proximity to the activity area
Pycnoptilus floccosus (pilotbird)	–	V	Low – no records in proximity to the activity area
Rostratula australis (Australian painted snipe)	E	E	Low – no records in proximity to the activity area
Scoteanax rueppellii (greater broad-nosed bat)	V	–	Moderate – 6 records in proximity to the activity area
Sminthopsis leucopus (white-footed dunnart)	V	–	Present – 9 records in proximity to the activity area. Recorded within the proposed Nungatta FPFA (away from the disturbance footprint) by NPWS in May 2022 and in 2019
Tyto novaehollandiae (masked owl)	V	–	Moderate – 6 records in proximity to the activity area
Tyto tenebricosa (sooty owl)	V	–	Moderate – 8 records in proximity to the activity area
Hirundapus caudacutus (white-throated needletail)	–	M	Transient
Monarcha melanopsis (black-faced monarch)	–	M	Transient
Myiagra cyanoleuca (satin flycatcher)	–	M	Transient
Rhipidura rufifrons (rufous fantail)	–	M	Transient

CE = critically endangered, E = endangered, V = vulnerable, M = migratory. – = not listed.

Table 11 Aquatic fauna identified and/or likelihood of species to be present based on desktop assessments, field surveys, eDNA analysis and site inspections

Common name	Species name	Conservation listing	Likelihood of occurrence
Native fish species			
Australian bass	*Macquaria novemaculeata*	–	Unlikely
Australian grayling	*Prototroctes maraena*	EPBC Act (V)	Unlikely
Australian smelt	*Retropinna semoni*	–	Definite
Climbing galaxias	*Galaxias brevipinnis*	–	Definite
Common galaxias	*Galaxias maculatus*	–	Unlikely
Cox's gudgeon	*Gobiomorphus coxii*	–	Unlikely
Empire gudgeon	*Hypseleotris compressa*	–	Unlikely
Firetail gudgeon	*Hypseleotris galii*	–	Unlikely
Flathead gudgeon	*Philypnodon grandiceps*	–	Unlikely
Long-finned eel	*Anguilla reinhardtii*	–	Possible
Macquarie perch	*Macquaria australasica*	EPBC Act (E); FM Act (E)	Unlikely
Roundsnout galaxias	*Galaxias terenasus*	–	Definite
Short-finned eel	*Anguilla australis*	–	Definite
Striped gudgeon	*Gobiomorphus australis*		Unlikely
Reptiles			
Eastern snake-necked turtle	*Chelodina longicollis*	–	Unlikely
Macquarie river turtle	*Emydura macquarii macquarii*	–	Unlikely
Mammals			
Platypus	*Ornithorhynchus anatinus*	PL	Definite
Invertebrates			
Burrowing crayfish	*Engaus* sp.	–	Possible
Spiny crayfish	*Euastacus* sp.	–	Possible
Yabbie	*Cherax* sp.	–	Possible

Note: PL = DAWE (2020) provisional management list.

9.3 Cultural values

9.3.1 Aboriginal cultural heritage

A comprehensive ACHAR (GML Heritage 2022a) was undertaken in conjunction with the registered Aboriginal stakeholders, to identify and assess the nature and significance of the Aboriginal cultural heritage within the activity area.

The survey identified 66 new sites. The majority of these comprised fewer than 5 artefacts and only 4 were considered to have subsurface archaeological potential. Three uncommon

artefacts, being a hand axe/hammer, a blade and possible micro scraper, are representative of a highly active and mobile culture in which artefacts were dropped or discarded as people moved through Country.

The majority of the sites are not predicted to be impacted, 14 sites are however located within the survey corridor (30 m of fence line and 6 m of management trails) and for the purposes of impact assessment are subject to disturbance by the activity. Six of the proposed impacted sites consist of artefact scatter, only one of which contains more than 2 artefacts. A further 26 sites are located within 15 m of the survey corridors and are not expected to be impacted.

During the survey, 3 locations with extensive artefact scatters with subsurface potential were identified with the alignment of the fence altered to avoid this impact.

The assessment of significance of Aboriginal sites has 2 defined components: cultural significance, which is determined by the Aboriginal community, and archaeological/scientific significance, which is determined by an archaeologist based on the ability of the site to contribute to the scientific understanding of Aboriginal culture. These 2 components are not always interrelated, with sites potentially having different cultural and scientific values.

The significance of the Aboriginal heritage evidence has been assessed in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011). The Aboriginal community has also reviewed the findings and either endorsed or not contradicted the scientific finding. In overall terms:

- 89% of the sites are assessed as being of low significance
- 6% of the sites are assessed as being of moderate significance
- 5% of the sites are assessed as being of high significance.

An AHIP will be required for the total footprint of the activity. It will have direct impacts on the 14 identified sites.

A small section of the Bundian Way is located within the activity area generally adjacent to Laings Road, a traditional Aboriginal walking route. The Bundian Way marks the easiest path from the Monaro to the coastal plains and is traditionally open to many different tribal groups. The activity will provide pedestrian access along the Bundian Way.

9.3.2 Historic heritage values

Part of the Bundian Way (State Heritage Register 01906) is located within the proposed activity area. The proposed activity would result in the clearance of vegetation, formalisation of an extant dormant logging track, and construction of fence line along 7.0 km of the total length of the Bundian Way.

An SoHI (GML Heritage 2022b) was prepared for the proposed activity, and is attached at Attachment F.

Overall, the activity is likely to have a neutral to moderate positive impact on the Bundian Way citation. The infrastructure would be constructed along previously disturbed footprints (i.e. fire trails and dormant logging tracks) and would not reroute the extant tracks that are representative of the Bundian Way. Moreover, the rehabilitation of the area to promote thriving native faunal and floral populations of disappearing species would be an enhancement of the current disturbed and diminished landscape.

9.4 Social values

9.4.1 Recreation values

The are no visitor or recreation facilities at Nungatta. Recreation observed over the past 12 months includes entirely self-reliant walking, mountain biking, 4WD, rough camping (no campsite), bird watching and orchid watching using exiting fire trails. Illegal uses observed include hunting and firewood gathering.

9.4.2 Scenic and visually significant areas

The activity area is a relatively small area within SEFNP, surrounded by state forest with only a few rural, remote private holdings. The Nungatta FPFA will largely not be visible from public roads and trails, except for primary vehicle access points, long perimeter fire trails and through the trees on a few 0.1–0.3 km sections of Imlay Road, where the fence will be offset but will be visible from the road.

The Nungatta FPFA will not be visible from scenic lookouts, nor will it disturb sight lines or horizon views, with the possible exception of distant eastern horizon views off the Monaro Highway at Rockton.

9.4.3 Education and scientific values

The Nungatta FPFA has diverse and significant plant and animal communities, cultural features and a variety of management issues that provide numerous opportunities for research. The activity would ultimately enhance the education and scientific values of Nungatta.

9.4.4 Interests of external stakeholders

Section 5 identifies the various government agencies and community stakeholders consulted during the preparation of the REF, with their comments considered in the development of the preferred activity. Consultation with the wider community will be undertaken via the public exhibition of the REF. Any comments received will be considered and the activity refined, prior to determination of the activity.

9.5 Matters of national environmental significance

In accordance with the EPBC Act, an action will require approval from the Minister (Commonwealth) if the action will have, or is likely to have, a significant impact on a matter of national environmental significance. These matters include:

- World Heritage properties
- National Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

An EPBC Act Protected Matters Report (Appendix L of the FFA) found:

- 3 threatened ecological communities listed under the EPBC Act occur within the activity area
- 52 listed threatened species or species habitat are known / likely / may occur within the subject area
- 11 listed migratory wetland, terrestrial and marine species or species habitat are known / likely / may occur within the subject area.

As detailed in the FFA (Narla Environmental 2022; Attachment B), MNES applicable to the activity relate to threatened species and communities that were assessed as having a ‘moderate’ likelihood, ‘high’ likelihood or were ‘present’ within the activity area. These include 4 threatened species (gang-gang cockatoo, spotted-tailed quoll, greater glider and Parris’ bush-pea). As summarised in the significant impact criteria in the FFA (Narla Environmental 2022; Attachment B), the proposed action is unlikely to have a significant impact on an MNES and there is consequently no need for referral.

MNES assessments of significance under the EPBC Act determined the activity was unlikely to have significant impact on MNES.

10. Impact assessment

10.1 Physical and chemical impacts during all stages of the activity

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. impact on soil quality or land stability?	☒	Construction phase – low to medium; negative Operational phase – low; negative	Approximately 31.67 ha of native vegetation would be removed. During construction, there is potential for loss of soil quality and stability through the removal of vegetation and ground cover along the conservation fence line, fire trails, management trails and additional accommodation facility site. Once these areas have been disturbed, and the soil is exposed, the risk of erosion and sedimentation-related issues is increased, particularly with granitic soils in the activity area, which are highly erodible. This includes the generation of sediment-laden water and transportation of sediments into drainage/hydro-lines and/or creeks. Access track construction, realignment and maintenance of the conservation fence corridor may also compact ground surfaces, increasing runoff potential. These impacts will be limited to the 15 m disturbance corridor around the conservation fence line and other fire and management trails. With the implementation of appropriate design and mitigation measures, it is expected the activity is not likely to have a significant impact on soil quality or land stability.	A construction environmental management plan (CEMP) will be prepared to address: • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF issue-specific environmental management plans. Works will be conducted, and trails will be maintained in accordance with the following (where applicable): • *NSW Erosion and Sediment Control on Unsealed Roads – Field Guide* (OEH 2012) • *Managing Urban Stormwater* Blue Book (NSW Government 2004) • *Fire Trail Design, Construction and Maintenance Manual* (Soil Conservation Service 2017). During the operational phase, regular inspections will be conducted to monitor erosion and sedimentation, stockpiles and disturbance area rehabilitated.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
2. affect a waterbody, watercourse, wetland or natural drainage system – either physically or chemically (e.g. due to runoff or pollution)?	☒	Low; negative	The proposed fence alignment includes 24 waterway crossings. Five of these waterways are classified as 3rd or 4th Strahler order streams: Reef Creek, Surveyor's Gully, Sandy Creek, Donald Liang's Creek and an unnamed stream (all Class 2 waterway classes and Type 1 Key Fish Habitat). To maintain key fish habitat, crossings installed comply with NSW Fisheries policy and guidelines for fish habitat conservation and management (DPI 2013). During construction, the activity has potential negative impacts to water quality, hydrology and aquatic animals such as frogs, including: • erosion and sedimentation of local aquatic habitats and waterways • pollution of local water quality from machinery and construction materials and spills and dewatering. • a variety of dispersible liquid materials would be used that pose a potential pollutant threat to local water quality. These liquids include but are not limited to diesel, unleaded petrol, machinery oils and lubricants. The nature of these liquids and their ability to disperse away from the study area means they could have a negative impact on ground or surface water on or adjacent to the study area, especially during rain • introduction of aquatic pathogens. Overall, with the safeguards and mitigation measures described, significant negative impacts	Waterway crossings are designed to maintain key fish habitat as guided by NSW Fisheries policy and guidelines for fish habitat conservation and management (DPI 2013) including: • installing low-level bridges on class 4 and 5 streams and box culverts for class 2 and 3 streams • all crossings will have feral predator proof barriers with an aperture of at least 30 mm, which will allow passage of all known native fish species in the area • feral predator proof barriers across 4th and 3rd order streams will rise with water levels • feral predator proof fences across the top of crossings will have failure points on either side of crossings, and upstream debris catchers to reduce the likelihood of log jams and dam effects that may cause erosion and change stream geomorphology. Direct impacts on riparian and aquatic fauna during construction of crossings will be mitigated by: • construction of an exclusion fence around the worksite • construction of a sedimentation fence near watercourse crossings to prevent mobilised sediment entering the watercourses • surveying and removing animals from the worksite during construction. Animals removed will be relocated in suitable habitat upstream of the worksite. The storage and handling of fuels and chemicals would comply with the Australian Standard (AS1940). All chemicals must be kept in clearly marked bunded areas.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			to water quality or waterways from the proposal are not expected.	Vehicle wash downs and/or concrete truck washouts would be undertaken within a designated bunded area on an impervious surface or off site. Regularly inspect vehicles and mechanical plant for leakage of fuel or oil. Do not re-fuel, wash or maintain vehicles or plant within 20 m of a waterway. Refuelling, fuel decanting and vehicle maintenance work, if required, would take place in a designated sealed and bunded area within the construction compounds. At least 2 ‘spill kits’ would be kept on site at all times for potential chemical or fuel spills, one at each end of the proposal site. Construction contractors would be trained in the correct use of a spill kit. A toilet would be provided for site workers, which would be appropriately managed by a licensed contractor. No works would be undertaken in periods of heavy rain or flooding. Weather forecasts would be monitored daily. A facility for collecting, treating and disposing of any concrete wastes generated during construction would be installed on site. Stockpiles would be established at least 50 m from waterways where possible. Materials/equipment laydown and compound areas would be located in cleared or degraded areas to prevent any damage to the surrounding plants or habitat.
3. change flood or tidal regimes, or be affected by flooding?	☒	Low; negative	The installation of large debris traps in streams is not anticipated to change the flooding regime of those streams.	Large debris traps will snag trees and large limbs floating in floodwater before it reaches the crossings. This will reduce risk to feral predator proof fences,

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			Any change to stream profile cause by snagged debris during flooding is likely to be similar to the same large debris catching under or across the bridges and culverts immediately downstream, and the damage to infrastructure is likely to be much greater.	bridges and crossings. After flooding, debris will be cleared from traps using excavators and chainsaws. Debris requiring removal for the activity should be relocated within adjoining habitats in close proximity to the subject site.
4. affect coastal processes and coastal hazards, including those under climate change predictions (e.g. sea level rise)?	☐	NA		
5. involve the use, storage or transport of hazardous substances, or use or generate chemicals which may build up residues in the environment?	☐	NA		
6. involve the generation or disposal of gaseous, liquid or solid wastes or emissions?	☒	Low; negative	Waste materials, fuel spills and sediment have the potential to cause pollution to the environment; however, given the proposed safeguards listed, pollution to the environment is unlikely to occur.	Spoil generated would predominantly be used as fill material as per the *Fire Trail Design Construction and Maintenance Manual* (Soil Conservation Service 2017). Recycle and divert from landfill surplus soil, rock and other excavated or construction materials, wherever this is practical. Dispose of waste at a facility that can lawfully accept that type of waste. Should contaminated water or other harmful substances escape from the sites, immediately take steps to contain any discharge, minimise

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
				environmental damage, clean up the contamination and make good any damage. A contingency plan will be implemented in the event that contaminated soils are encountered during the works. Waste material, other than vegetation and tree mulch, is not to be left on site once the works have been completed. Rubbish and food scraps would be removed from the subject site so as not to encourage fauna into the work area during construction.
7. involve the emission of dust, odours, noise, vibration or radiation?	☒	Negligible; negative	Air quality may be affected by dust generation from earthworks associated with the construction of the proposal. Fumes, odours and other air pollution may occur from vehicles, equipment, machinery or other activities. The construction of the proposal has potential to generate noise and vibration from machinery. No sensitive receivers are located within 500 m of the construction footprint, and no negative impacts are expected on neighbouring properties. Local fauna may be negatively impacted by dust, fumes, odours, noise and vibration during construction of the proposal; however, no negative impacts are expected if the described safeguards are implemented.	Focus construction vehicle movements on daylight hours only, when fauna movements are low. Works should be limited to daylight hours for construction activities. Implement and enforce appropriate speed limits within the proposal boundary for all construction contractors' vehicles to minimise dust generation. Use a water cart or similar to spray unpaved access tracks during the construction phase where required. Apply dust suppressants or covers to soil stockpiles. Plant and machinery to be turned off when not in use as much as possible and to be fitted with emission control devices complying with Australian Standards.

10.2 Biodiversity impacts during all stages of the activity

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. affect any declared area of outstanding biodiversity value or critical habitat or environmental asset of intergenerational significance?	☐	NA	The ecological assessment by Narla Environmental (2022; Attachment B) determined the site does not contain any declared AOBVs.	NA
2. result in the clearing or modification of vegetation, including ecological communities and plant community types of conservation significance? ^	☒	Short-term; medium; negative	The native vegetation disturbance required for the activity involves 31.67 ha (1.52% of 2,084.4 ha fenced area) for the following: • predator exclusion fence management corridor (29.90 ha) • debris traps and maintenance pads (0.4 ha) • site compound (0.14 ha) • management and walking trails (1.23 ha). The vegetation identified within the subject area is not representative of any BC Act or EPBC Act listed TEC. As such, no TECs will be impacted by the activity. Further impacts to native vegetation involve the loss of up to 279 hollow bearing trees identified in the disturbance footprint. These hollow bearing trees may provide breeding habitat and shelter for a number of threatened fauna species. The various *Eucalypt* species located within the disturbance footprint have the potential to provide foraging habitat for the koala; however, the koala has not been recorded in the subject area for more than 15 years and there is low anticipated	**Construction phase** Clearing of native vegetation would not be more than required to permit the scope of works. If any minor changes to the fence alignment are required that place it outside the surveyed corridor, pre-clearing surveys will be undertaken to ensure there are no further impacts than outlined in this REF. The extent of the construction footprint will be clearly marked (e.g. via pegging/fencing/flagging) before clearing to prevent any inadvertent clearance beyond what is required and has been assessed and defined to avoid damage or encroachment into the root zone of retained trees. This fencing/marking is to remain until all clearing and construction is completed. Site induction is to specify that no clearing is to occur beyond the marked area. All vehicles, plant and equipment are only to be parked in designated areas. Clearing and earthworks is to avoid damage to root zones of the retained trees, where possible. Trees to be retained require an adequate Tree Protection Zone (TPZ) for the duration of works to ensure they survive. If the TPZ cannot be avoided during works, the Structural Root Zones (SRZs) of trees will be retained.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			impact to potential foraging and breeding habitat given the vast area of similar habitat connected to the subject area and within the greater SEFNP. The freshwater aquatic vegetation (submerged), and trailing bank vegetation (ferns and sedges) present has the potential to be impacted. The activity would likely result in minor impacts to threatened biodiversity; however, the activity has been designed to avoid impacts by utilising the existing trail / road network, abandoned logging tracks and previously disturbed areas, where possible. For the purposes of the assessment the alignment of the fence line, the ancillary supporting infrastructure and the corresponding disturbance footprint have been defined to enable assessment of the impact to hollow bearing trees and other potential threatened species habitat.	The SRZ of hollow bearing trees should be prioritised for protection. During the detailed design phase the clearing of hollow bearing trees will be avoided, where practicable, with micro-siting adjustments of the fence alignment. Vegetation removal will use a broadacre forestry mulcher followed by tree loppers, or an excavator with a mulching arm, to remove trees with a DBH of greater than 40 cm. Hollow bearing tees will be removed under the following guidelines: • Clearing of all habitat trees proposed for removal should be supervised by a suitably qualified person experienced in fauna capture and relocation and animal first aid. • Hollow bearing trees to be removed will be clearly marked prior to works. • Vegetation and non-hollow bearing trees will be removed at least 24 hours before falling of the hollow bearing tree. • Fauna should be removed passively (i.e. ushering) from the zone of disturbance. The tree will be shaken using an excavator/bulldozer for >30 seconds and left in-situ for one night to allow the fauna to move on prior to falling. • Immediately before falling, the tree will be shaken again for >30 seconds using an excavator to usher any remaining fauna out of the tree. • Following felling, hollows and the surrounding area are to be checked again to ensure no trapped or injured fauna are present. • If the tree is being removed in stages, the hollow bearing branch should be the last to be removed.

Repurposing trees

Where practical, trees with a DBH of 40 cm or greater, and those with hollows, should be retained and repurposed as coarse woody debris/ hollow bearing logs on the ground to provide habitat. This will be done in accordance with the following specifications:

- Any native trees with a DBH greater than 40 cm will be identified.
- These native trees with a DBH greater than 40 cm (hereafter referred to as target trees) will be felled either by pushing over to extract the root ball or leaving the root ball in place to prevent erosion.
- The remaining stump will then be ground down using the forestry mulcher.
- The felled target tree will then be cut into sections.
- These sections will then be relocated, either by loading onto a truck using an excavator (or similar) or directly by excavator only.
- Relocated debris will be placed in suitable predefined locations within 50 m of the edge of the cleared corridor using an excavator.
- The coarse woody debris will be distributed in piles of 3–5 logs, with piles at least 15 m apart. Windrows will be avoided.

After construction

- After construction artificial hollows may be installed near corridor sections where few alternate hollow bearing trees remain or in previously logged coupes with very low density of hollow bearing trees.
- After construction seeding feed trees for threatened arboreal animals may be planted near corridor sections where few feed tree species remain or in previously logged coupes with very low density of feed tree species.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
3. endanger, displace or disturb terrestrial or aquatic fauna, including fauna of conservation significance, or create a barrier to their movement? ^	☒	Short-term; low; negative Operation – high; positive	Direct impacts to threatened fauna habitats further to the vegetation loss described above include: • disturbance to 24 waterways that may provide habitat for several potentially occurring threatened amphibian species (low likelihood of occurrence). Impacts will involve the repair of existing bridges, removal of vegetation • 5 of the waterways (refer to Section 9.1.4) were classified as Type 1 highly sensitive key fish habitat as they contained either boulder and bedrock features or extensive instream vegetation supporting native fish species as well as platypus. • various areas containing course woody debris, burrows and rock outcrops were also identified within the subject area. The fence will be a permanent barrier to the movement of medium and large non-volant (i.e. non-flying or gliding) mammal species and large reptiles. Consequently, populations of some species inside the fence may be subject to the following indirect impacts: • Entrapment – some fauna may attempt to traverse the fence by climbing over, digging under or pushing through it, notably in times of stress caused by predation, drought, foraging pressures or fleeing wildfires and/or flood (Bradby et al. 2014, Jakes et al. 2018). According to the review conducted by Long and Robley (2004): 'Most fence managers indicated that native animals had been injured or killed in their exclusion fence. However, in all cases this occurred infrequently and is not	The following safeguards and mitigation measures have already been or will be implemented: **Ecological monitoring regime** • A detailed ecological monitoring regime has been outlined in the draft overarching ecological health monitoring framework (DPE 2022b), which sets out annual monitoring methods that will be used to document and describe changes to threatened species abundance and populations, plus detect new species that may visit or establish. Most medium-sized mammals are expected to benefit from removal of predation by feral cats and foxes inside the fenced area, resulting in a population increase. Nevertheless, populations may still be sufficiently small to be subject to loss of genetic diversity. In these cases, occasional manual dispersal through translocation (capture and release) across the fence will maintain connectivity between populations. The required rate of dispersal to maintain genetic diversity is likely to be low; a widely accepted number is one individual per generation from either side of the fence (depending on which side is the larger population). **Microbat inspection** • Existing culverts and bridges will be inspected for microbat roosts, prior to the commencement of works. If microbats are detected, NPWS will develop a Microbat Management Plan before commencing bridge and culvert works. If required, the Microbat Management Plan will outline the procedures to minimise and mitigate any potential impacts to microbats during the proposed works

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			considered to constitute a serious impact on resident fauna populations.' • Funnelling – fauna may follow the fence into a blind corner, or away from resources, without reaching a gap or opportunity to traverse, which may result in prey-trapping or resource pressure (Davies-Mostert et al. 2013). • Breach of Perimeter – causes include tree or limb fall, sabotage, human error, flooding, fire and animal diggings or other activities may compromise the fence's ability to exclude feral predators. Any breach of the feral proof fence increases risk of fox or cat incursion into the feral predator free area. Incursions by foxes and cats increase risk of predation on translocated threatened species. • Barrier – loss of connectivity via an open-space or fixed barrier may result in increased predation, loss of habitat resources, interruption of migration, dispersal, and seasonal movement patterns as well as access to breeding opportunities, resulting in direct mortality, genetic differentiation and potentially limiting the ability of species to shift distributions in relation to climate change (Krosby et al. 2010). • Genetic fragmentation – restriction of movement and dispersal, and therefore genetic exchange, is likely to increase the functional isolation of populations, with ramifications for genetic differentiation and species adaptability (e.g. Lacy 1997; Bradby et al. 2014; Ascensão et al. 2016). For those	and the proponent is to adhere to the outlined procedures. **Entrapment** • NPWS will monitor fence lines for trapped fauna. If significant entrapments are detected, NPWS will develop a fauna management plan. • NPWS will monitor for entrapment of platypus and long-necked turtles, and if significant entrapments are detected, a management plan will be developed for these species, which may include translocation or assisted movement of animals either side of the fence • Platypus should not be relocated during breeding season (October to March). A riparian animal trapping and relocation plan would need to be developed. **Funnelling** • To prevent fauna funnelling, the predator exclusion fence has been designed to avoid acute angles. **Breach of Perimeter** • The fence, gates and all instream crossings will be checked for damage or breaches three times per week. A "back to base" text messaging system may be incorporated with electric fence to alert NPWS operations of any change in electric conductivity, and possible breaches. This system will identify the sections breached. All stream crossings will be fitted with mesh barriers to prevent ingress by feral predators. Specially designed gates will be placed strategically for management, emergencies and public access. Main gates and other weak points in perimeter may have surveillance cameras The

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			species subject to the direct barrier impact, restricting dispersal among metapopulations may result in reduced genetic diversity and greater risk of extinction where isolated populations exist (e.g. Lacy 1997; Crawford et al. 2016). Test of Significance (5-part test; BC Act) and Assessments of Significant Impact Criteria (EPBC Act) (refer to Narla Environmental 2022; Attachment B) were undertaken for the following species that have been recorded or are likely to occur within the subject area: • *Callocephalon fimbriatum* (gang-gang cockatoo) • *Calyptorhynchus lathami* (glossy black cockatoo) • *Cercartetus nanus* (eastern pygmy-possum) • *Dasyurus maculatus* (spotted-tailed quoll) • *Falsistrellus tasmaniensis* (eastern false pipistrelle) • *Myotis macropus* (southern myotis) • *Ninox strenua* (powerful owl) • *Petauroides volans* (greater glider) • *Petaurus australis* (yellow-bellied glider) • *Scoteanax rueppellii* (greater broad-nosed bat) • *Tyto novaehollandiae* (masked owl) • *Tyto tenebricosa* (sooty owl) • *Heleioporus australiacus* (giant burrowing frog) • *Mixophyes balbus* (stuttering frog) • *Litoria castanea* (yellow-spotted tree frog) • *Litoria raniformis* (growling grass frog)	operation of surveillance cameras will be compliant with relevant NPWS policies. Specially designed gates may also be used to allow wombat passage but not pigs, foxes, cats or other feral animals. **Genetic fragmentation** • Single species and multi-species translocation plans will be prepared for each proposed reintroduced species in accordance with the BC Act and Translocation Operational Policy (DPIE 2019) for approval by the department. **Culvert design** • Culverts should be appropriately sized and potentially oversized to offset the risk of a culvert blocking. Hinges on the grills will allow for debris to be swept from the culvert as the water pressure behind the build-up becomes too great and the grill is lifted. This should allow for the debris to be swept away with the flow. Post-event inspections (immediately after the event when it is safe to inspect) and routine inspections and maintenance (3 times a week) of bridges and culverts are proposed. This inspection regime should minimise the risk of blockages of nets and grills with debris. **Habitat** • Existing hollow logs and bushrock requiring removal for the activity should be relocated within adjoining habitats close to the subject site. • Clearing of all habitat trees proposed for removal should be supervised by a suitably qualified person experienced in fauna capture and relocation and animal first aid.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			• *Litoria watsoni* (Watson's tree frog) • *Myotis macropus* (southern myotis) • *Sminthopsis leucopus* (white-footed dunnart). The activity will have low impacts to potential foraging habitat and negligible impacts to potential breeding habitat for potentially occurring migratory species given their migratory nature. The activity is not expected to significantly impact threatened species known or potentially occurring within the construction footprint due to the extent of vegetation to be retained, the fact that potential local populations of the subject species would extend well beyond the subject area, and the proposed safeguards recommended in the assessment.	• If any minor changes to the fence alignment are required, pre-clearing surveys should be undertaken to ensure there are no further impacts than outlined in this REF. **Wombat management** • NPWS will adopt an adaptive management approach to minimising the impact of the activity on wombats, and minimising damage from wombats on fence infrastructure. • Wombats are highly territorial and removal of animals from within the fenced area may result in another animal replacing its territory and burrow. Wombats will be relocated if there are continued issues in identified areas of the fence. • Wombat burrows within the construction footprint will be marked on ground (and mapped) and then closed, ensuring animals have left but cannot return. • Long and Robley (2004) recommend the installation of 'wombat gates', increased apron width, and/or low electric wires to minimise the impact of wombats on conservation fences. • The success of wombat gates is variable between sites. It is recommended these be constructed on known pathways where possible and monitored to determine their success. Wombat gates will be designed using pipes or other surfaces or structures that are avoided by other species (Coates 2013; Driessen et al. 2018). Lighter gauge wire netting may be used in areas where wombats frequently damage fences. Again, this will be monitored and installed as required.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
				• Marks (1998) has shown the conditioned avoidance by wombats of electric fences. This will be trialled in affected areas to determine its probability of success. • The adopted fence design is considered to be best practice and has been proven to be effective. It has a skirt / apron that lies flat on the ground surface or is pinned where there are uneven surfaces. Consideration will be given to increasing the width of the fence apron in selected areas only after other listed options have proved unsuccessful. • InfraBuild and Waratah fencing have advised that in some situations (wet soils, acid sulphate soils) the burial of wire netting may lead to increased corrosion and shorter life expectancy of their products. For this reason, the fence apron will not be buried. **Amphibian habitat impact minimisation** • Program work to ensure it takes place during low flow periods. • Ensure sediment and erosion controls are implemented during in-stream works to avoid impacts on water quality and fish passage. • Stockpiling of materials is to be conducted outside of the riparian zone, and appropriately cordoned off to prevent sediment entrainment in surface water runoff. • Ensure only natural materials are used in bed-level crossings. • Frog friendly mesh used at ground level (i.e. mesh with a large enough gauge to allow passage of frogs).

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4. result in the removal of protected flora or plants or fungi of conservation significance? ^	☒	Low; negative	One (1) BC Act and EPBC Act Vulnerable species, *Pultenaea parrisiae* (Parris' bush-pea), is known to occur within the activity area (Miles 2021). This species was not identified during surveys undertaken as part of this assessment, likely due to the cryptic nature of the species when not in flower, but records were mapped by Miles (2021). A Test of Significance (5-part test) was undertaken in accordance with s 7.3 of the BC Act to assess potential impacts from the activity on *Pultenaea parrisiae* as well as an Assessment of Significant Impact Criteria in accordance with the EPBC Act (refer to Narla Environmental 2022; Attachment B). The activity is not expected to significantly impact the threatened species.	The proposed predator exclusion fence has been aligned to avoid known sub-populations of *Pultenaea parrisiae,* as indicated in Miles (2021). Targeted surveys should be conducted prior to vegetation clearing to clearly mark and delineate any individuals within the works area. Works should aim to avoid any individuals if practical. Clearing of native vegetation should not be more than required to permit the scope of works. If any minor changes to the fence alignment are required, pre-clearing surveys should be undertaken to ensure there are no further impacts than outlined in this REF.
5. contribute to a key threatening process to biodiversity or ecological integrity?	☒	Medium; negative High; positive	**Infection of native plants by *Phytophthora cinnamomi*** The activity contributes to the following KTPs during construction and operations: • Infection of native plants by *Phytophthora cinnamomi*. The root-rot fungus, *Phytophthora cinnamomi*, is known to be present across the north, centre and south-west of the activity area. It is also highly likely to occur in other parts of the activity area based on observed absence or infection of susceptible plants. However, some hills and isolated slopes and gullies may not be infected based on the presence of highly susceptible plants like grass trees (*Xanthorea* spp.).	**Infection of native plants by *Phytophthora cinnamomi*** Fence and road alignments to avoid sub-populations of *Pultenaea parrisiae* and so reduce likelihood of infection from *Phytophthora cinnamomi.* A soil movement plan will be developed in accordance with department Hygiene Guidelines to mitigate risk of introducing *Phytophthora cinnamomi* (and spreading weeds) into uninfected areas during construction and ongoing operations. Actions suggested by Keith McDougal and Ed Lieu and the Hygiene Guidelines include: • implement a work-flow that minimises the risk of transporting soil from infected to un-infected parts of the activity area

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			Phytophthora cinnamomi spreads to uninfected areas through the soil in water. It is also moved in soil and plant material carried by animals, people, machinery, equipment and quarry material. Plants in the activity area known to be susceptible to infection by *Phytophthora cinnamomi* were listed for NPWS by J Miles & K McDougall. They found that the threatened plant, *Pultenaea parrisiae* is highly susceptible to *Phytophthora cinnamomi* infection. Davoodian (2022; Attachment D), found that the impact of *Phytophthora cinnamomi* on hypogeous fungal sporocarps (truffles) is currently low. Species experts consulted found the indirect impacts of *Phytophthora cinnamomi* on threatened native animals is currently speculative, but not known (pers. com. Claridge et al., 2022). The activity will have a low impact during construction and low impact during operation on spread of *Phytophthora cinnamomi* to uninfected areas **Infection of frogs by amphibian chytrid causing the disease chytridiomycosis** The activity may contribute to the following KTPs during construction and operations: • Infection of frogs by amphibian chytrid causing the disease chytridiomycosis. Chytrid fungus infects frogs. It may occur in the activity area. Un-infected sub-populations of frogs may also occur it the activity area. Contact with chytrid infected soil, water and skin may transport chytrid into uninfected area.	• clean vehicles, plant and equipment at work base before and after leaving the activity area • monitoring and reporting of changes in distribution and condition of susceptible plants • mark out *Pultenaea parrisiae* sub-populations in or near the disturbance corridor • avoid unnecessary foot access to/across known *P. parrisiae* sites unless for safety or conservation tasks. Exclude all vehicle access from these sites • ensure site inductions are carried out for all personnel (internal and external) working in the vicinity of, or with potential to access, *P. parrisiae* sites including the provision of maps of *P. parrisiae* sites and hygiene protocols • if accessing *P. parrisiae* sites is required ensure all gear, clothing and footwear is soil and weed seed free, brushed clean then sprayed with 70% methylated spirits before entering and after leaving the site • avoid and minimise access to low-lying swampy areas with potential *P. parrisiae* habitat • assess risks of *Phytophthora cinnamomi* in translocation plans for threatened fauna being introduced to the Nungatta FPFA. **Infection of frogs by amphibian chytrid causing the disease chytridiomycosis** • Adopt DPIE Hygiene Guidelines (2020a) and prepare and implement a frog hygiene protocol for areas within 40 m of waterways to reduce the risk of spread of chytrid fungus. This involves the removal of soil from plant/equipment and its disinfection with

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			The activity may have a low impact during construction and a low impact during operation on the spread of chytrid in uninfected frog communities. **Clearing of native vegetation** The activity may contribute to the following KTPs during construction only: • Clearing of native vegetation. In total, 31.67 ha of mostly regrowth and early mature eucalypt forest will be cleared for a 15 m corridor that will contain the predator proof fence and 16.34 km of 3 m wide new management trails. That represents 1.5% of the activity area and a fraction of the 111,673 ha in the SEFNP. Clearing, with routine patrols, is necessary to mitigate the impact of limb and tree strike, fire and other events that could breach the feral predator proof fence. The activity will have a medium impact during construction and no impact during operation on clearing of native vegetation. **Loss of hollow bearing trees** The activity contributes to the following KTPs during construction only: • Loss of hollow bearing trees. Impact on hollow bearing trees will occur as the 15 m feral predator proof fence corridor is cleared. For details on the impact on threatened fauna, flora and ecosystems, refer to assessment 3. above about endangering, displacing or disturbing terrestrial or aquatic fauna, including fauna of	cleaning products containing benzalkonium chloride before accessing the activity area. **Clearing of native vegetation** The area to be cleared has been minimised by incorporating existing cleared corridors in active and dormant roads, fire trails and tracks. This has reduced the amount of native vegetation to be cleared inside the 48.56 ha disturbance area by 16.89 ha. Mark out edges of corridors to be cleared. NPWS approve marked edges and supervise clearing **Loss of hollow bearing trees** To reduce the number of hollow bearing trees impacted the 15 m wide feral predator proof fence corridor has been aligned with active and dormant fire trails and tracks that pass through mostly regrowth and young forest stands. Where larger old trees are present (like stream crossings), the 15 m feral predator proof fence corridor is located to minimise older trees that need to be removed. To reduce the number of hollow bearing trees impacted by 3 m wide new management trails, no removal of any tree with DBH greater than 40 cm is allowed. For details on other safeguards and mitigation measures on threatened fauna, flora and ecosystems, refer to assessment 3. above about endangering, displacing or disturbing terrestrial or aquatic fauna, including fauna of conservation significance, or create a barrier to their movement. **Bushrock and removal of dead wood and trees** Fence alignment avoids rocky outcrops.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			conservation significance, or creating a barrier to their movement. Less than the 246 hollow bearing trees surveyed in the disturbance area (48.56 ha) will be lost during construction because after strategic alignment of the fence corridor and new management trails only 31.67 ha require clearing in an otherwise contiguously forested landscape. The activity will have a low impact during construction and no impact during operation on loss of hollow bearing trees. **Bushrock and removal of dead wood and trees** During construction and operation, the activity is not anticipated to contribute to KTPs listed below: • Bushrock removal • Removal of dead wood and dead trees. Impact on dead wood and trees will occur as the 15 m feral predator proof fence corridor is cleared and 3 m wide new management trails are created. Removing dead wood and trees from the 15 m cleared area is needed to mechanically maintain an APZ beside the fence to protect it from bushfires. Removing dead wood and trees from new management trails is necessary to enable feral predator eradication, and ongoing pest management and the ecological monitoring plan. Bushrock of the type identified as a KTP, is rare in the activity area. Its removal is only required to create an APZ beside the feral predator proof	Large hollow logs and dead trees and bushrock will be salvaged and placed beside cleared areas. **Competition or predation by feral animals** A feral animal eradication plan will be prepared. During operations feral animals will be removed by baiting, trapping and shooting. The proposed Nungatta FPFA is designed to drastically reduce competition and predation by feral animals.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			fence that can be mechanically maintained or to allow construction of fire trails beside the fence. The activity is likely to have a negligible impact during construction and no impact during operation on removal of dead wood, trees and bushrock. **Competition or predation by feral animals** During operation, the activity's explicit aims are to remove cats, foxes, rabbits, deer and pigs and reintroduce locally extinct animals, thus improving their chance of reproducing and restoring ecosystem processes, which are also of benefit to other threatened species found in the area. This outcome would constitute a positive impact by minimising the effects of the following KTPs listed under the BC Act: • Competition and grazing by the feral European rabbit (*Oryctolagus cuniculus*) • Competition and habitat degradation by feral goats (*Capra hircus*) • Predation by the European red fox (*Vulpes vulpes*) • Predation by the feral cat (*Felis catus*) • Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*). Overall impact of the activity on competition and predation by feral animals is likely to be positive and threatened species are likely to benefit.	
6. introduce weeds, pathogens, pest animals	☒	Low; negative	During construction, the introduction and/or spread of weeds and pathogens, including	A soil movement plan will be developed in accordance with department Hygiene Guidelines to mitigate risk of

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
or genetically modified organisms into an area?			*Phytophthora cinnamomi* could occur. Impact of *Phytophthora cinnamomi* is assessed in the section above. The eradication of feral animals, foxes, cats, deer and pigs is likely to have a beneficial impact on the flora. Pigs and *Phytophthora cinnamomi* are a particular threat to *Pultenaea parrisiae.* Pigs are likely to be significant spreaders of *Phytophthora* due to their digging activity. A possible negative impact could be large increases in populations of the larger native herbivores such as wallabies and wombats due to reduced predation of young animals, which could increase browsing pressure on the vegetation. There is also potential for infection of frogs by amphibian chytrid causing the disease chytridiomycosis. The activity is likely to have minimal significant environmental impacts if safeguards are followed.	introducing *Phytophthora cinnamomi* (and spreading weeds) into uninfected areas during construction and ongoing operations (as stated above). Vehicles and equipment working within the construction zone will be inspected daily with any identified weed seeds or segments removed and disposed of appropriately. The area of disturbance and immediate surrounds will be continually monitored during and after construction activities to identify and control any weed populations that have established as a result of works. Particular focus will be given to the eradication of any establishment of Weeds of National Significance (WoNS) in the disturbance footprint. All weed incursions will be monitored and controlled by a person experienced in weed management.

10.3 Community impacts during all stages of the activity

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. affect community services or infrastructure?	☒	Low; negligible	During construction, works would be occurring adjacent to, but not in the road corridors for Imlay Road and Nungatta Creek Road, Laings Road and all other fire trails between White Rock River and Nungatta Creek Road; however, impacts to public road users are considered unlikely and negligible. Laings Road would be used to transport materials to the project site; however, due to the low number of people that use Laings Road, impacts are considered to be unlikely and negligible. Other than the temporary closure of a road reserve, road closures are not anticipated for the activity.	Laings Road and all other managed NPWS fire trails and management tracks between White Rock River and Nungatta Creek Road, south of Imlay Road and north of Nungatta Plateau and the 'Head of the Run' in Nungatta Valley will be closed to the public during construction for the safety of the public.
2. affect sites important to the local or broader community for their recreational or other values or access to these sites?	☒	Low; negligible	Visitation is not a primary objective for the Nungatta area of SEFNP and visitation is considered low. The plan of management amendment to establish the Nungatta FPFA was distributed to neighbours, user groups and stakeholders for comment. No submissions referred to impacts on recreational use or access. Unauthorised public access will not be permitted within the proposed FPFA; however, restricted public access will be permitted following establishment. Community use through provision of educational and scientific opportunities is aligned with the objectives of a national park and will improve the overall experience for visitors. After construction visitor facilities are being considered at the Main Eastern Gate (signs,	During construction, signage around the reserve will indicate why it is closed, a brief summary of the program, and that future access will be possible in some form. Ongoing community consultation will be undertaken to ensure neighbours, park users and conservation groups are aware of and involved in the project.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			shelters, tables, parking), Fragmites Swamp (basic bush track only), Imlay Road Layby (signs, shelters, tables), Mountain Side Lookout (basic bush track only), Oldgrowth Forest (basic bush track only), Reef Ck Cascades (basic bush track only), and Main Western Gate (signs, shelters, tables, parking). Overall, there is expected to be little to no change in the level of public visitation within the reserve.	
3. affect economic factors, including employment, industry and property value?	☒	Low; positive	The activity area is currently of no commercial interest. There are no businesses reliant on the activity area. The FPFA program includes the creation of 4 roles within NPWS South Coast Area. Subject to relevant approvals, construction of the fence and associated infrastructure will be sub-contracted. It is estimated that construction will occur over a 12-month period at a value of over $3.5 million. A proportion of this will contribute to the local economy.	NA
4. have an impact on the safety of the community?	☒	Negligible	Restricted public access into the Nungatta FPFA may affect some community movement, particularly during bushfire and flood. The FPFA siting allows for alternative access around the reserve.	An emergency response plan will be developed in consultation with local emergency services that will address access and procedures for operation during emergencies, particularly bushfire and flood.
5. cause a bushfire risk?	☒	High; positive	The Nungatta FPFA is highly susceptible to bushfire impacts. Bushfires are expected to impact on the feral predator proof fence over time, compromising the exclusion of feral predators. The predator exclusion fence would be located within a 15 m cleared corridor and will be a	Bushfire risk will be managed in and around Nungatta FPFA with regular hazard reduction burning, fuel breaks, with small-sized mosaic-style burns, to allow movement of fauna within the reserve (Figure 3, Figure 4, Figure 5).

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			maintained and managed as an APZ. SFMZs will be managed to the north, south-east, east and west of the Nungatta FPFA. An SFMZ across Nungatta Mountain and plateau to the south and south-west of the Nungatta FPFA is not feasible because of lack of reliable natural or built containment lines. Growth of bushfire hazard within the Nungatta FPFA will be managed using a combination of ecological, cultural and hazard reduction burning. NPWS will instigate operating procedures that allocate sufficient resources to additional patrols after fire, wind and rain events to deal with potential breaches of the feral predator proof fence.	The SEFNP reserve fire management strategy will be updated to include a new fire management strategy for the Nungatta FPFA. The fire management strategy will use fire trails and fire management zones approved by the NSW RFS (Far South Coast BFMC 2022; Snowy Monaro BFMC 2022).
6. affect the visual or scenic landscape? ^	☒	Low; negative	The activity will largely not be visible from public roads and trails, except for primary vehicle access points, long perimeter fire trails and through the trees on a few 0.1–0.3 km sections of Imlay Road, where the fence will be offset but will be visible from the road. The activity area is surrounded by national park. The national park in this location is surrounded by state forest and only a few rural, remote private holdings. The Nungatta FPFA will not be visible from scenic lookouts, nor will it disturb sight lines or horizon views, with the possible exception of distant eastern horizon views off the Monaro Highway at Rockton.	The building of visitor facilities and installing of signage will be staged to compliment visitation numbers. The construction of some permanent visitor and research facilities will not occur until after translocated threatened species have establishing populations. Until then, temporary accommodation at site compound may be provided for the safety of researchers, contractors, volunteers and staff. Visitor signage sufficient to explain the purpose of fences around the Nungatta FPFA may be installed. This signage will communicate the purpose of the fence, detailing why the design is necessary and the benefits it brings.

10.4 Natural resource impacts during all stages of the activity

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. result in the degradation of the park or any other area reserved for conservation purposes?	☒	Construction – low; negative Operation – high; positive	Vegetation impacts assessed in Section 1.1. In total, this disturbance corridor will protect approximately 2084.4 ha within SEFNP, where vegetation impacts from feral and over-abundant herbivores will be reduced and predation from feral predators eliminated. There will be no other use or degradation of natural resources (water, air or extractive materials) as part of the activity.	The impact has been reduced by constructing the conservation fence adjacent to existing access tracks, which have previously been cleared. Overall, the project activities are specifically aimed at improving the conservation value, ecological function and status of threatened species in a large area of SEFNP.
2. affect the use of, or the community's ability to use, natural resources?	☐	NA	The activity would not impact on the use of, or the community's ability to use, natural resources, including water, air and minerals.	
3. involve the use, wastage, destruction or depletion of natural resources including water, fuels, timber or extractive materials? ^	☐	NA	There are limited opportunities to use recycled materials (e.g. timber) or accredited alternatives (e.g. timber from certified sustainable sources). Fence materials have been selected based on their effectiveness, durability, and maintenance requirements.	
4. provide for the sustainable and efficient use of water and energy? †	☐	NA	There are limited opportunities to incorporate sustainability outcomes such as water and energy efficiency into the activity. Opportunities for the use of renewable energy (e.g. photovoltaics), may be suitable at some sites.	

10.5 Aboriginal cultural heritage impacts during all stages of the activity

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. disturb the ground surface or any culturally modified trees?	☒	Low; negative	An ACHAR (GML Heritage 2022a) was completed to accompany the REF. As a result of the field inspections and consultation with Registered Aboriginal Parties, the assessment report concluded: • A total of 66 new Aboriginal cultural heritage sites were identified during site surveys. Of these, 35 sites were recorded in close proximity to the proposed conservation fence line route; 31 sites were recorded along the internal and external management trails. • The majority of these comprised fewer than 5 artefacts, and only 4 were considered to have subsurface archaeological potential. Three uncommon artefacts were identified, including a hand axe / hammer, a blade, and a possible micro-scraper. Overall, these sites are representative of a highly active and mobile cultural landscape in which artefacts were dropped or discarded as people moved through Country. • Most of the sites are outside the impact area. Thirteen sites are located within the 30 m wide survey corridor of the fence line or 6 m wide corridor of the management trails. The activity footprint was altered to avoid impacts to the identified sites. No culturally modified trees were detected during site surveys.	**Avoidance – alteration of activity footprint** A survey corridor used for the fence alignment (i.e. 30 m) was double the width of the actual corridor that would be cleared for the construction works (i.e. 15 m). This was intended to allow for shifting of the works to avoid impact to archaeological sites. Whilst 14 sites have been identified within the survey corridor, not all of these sites would necessarily be within the final 15 m wide impact area. Further refinements can be made to the final 15 m wide fence line construction corridor to reduce additional impacts to individual sites. During the survey, 3 extensive artefact scatters with subsurface potential were encountered on the proposed route. The relevant fence line sector was altered to avoid impact to these sites. If during detailed design the proposed fence line route must be altered outside of the surveyed area or an additional management trail established, the new footprint should be subject to a pre-works survey and the ACHAR updated with the results. **Heritage induction** Personnel involved in the proposed works should participate in an Aboriginal Cultural Heritage Induction prior to the commencement of the works. This induction should be prepared and delivered either by the Registered Aboriginal Parties or the Local Aboriginal Land Council.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			An AHIP should be sought for direct impacts to 13 identified sites and potential accidental impact to a number of additional sites. Surface and subsurface artefact sites would not be affected by impacts to surface conditions from vibration, noise, or changes to the visual setting. Changes to erosion and sedimentation rates from construction activities near watercourses may have the potential to indirectly affect sites further downstream; however, this can be mitigated and managed through the implementation of NSW Government standard erosion and sediment controls during construction.	**AHIP application** An AHIP should be sought for the proposed works, should sites need to be relocated or should accidental impact occur. Community collection of artefacts is recommended for sites that would be impacted by the works. Acknowledging the low ground surface visibility experienced during the survey, the AHIP should also account for impact to previously unrecorded sites that may be encountered during the works. **Community collection and artefact relocation** Following approval of the AHIP and prior to any works commencing, the Registered Aboriginal Parties and a NPWS Site ID trained staff member should attend each of the recorded GPS locations for the sites that would be impacted by the proposed works. This would provide the opportunity for: • confirmation of the recorded location, noting the likelihood for a GPS error margin • reidentification of the artefact and its relocation away from the impact area. The final location of the artefact/s should be agreed upon by all Registered Aboriginal Parties present and may consider being downslope from the works, increasing the likelihood that any further movement of the artefact/s would be away from the works; and/or − being up to 100 m away from the works The final location of the artefact should be recorded by GPS, photographed, and submitted as an amendment to the relevant AHIMS record.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
				Site avoidance All sites outside the approved AHIP corridor should be protected for the duration of the works. Due to the number of sites located in proximity to the impact area, the impact area footprint should be visually defined prior to construction and serve as a buffer where sites are located in proximity to the works. This impact area footprint should be established and clearly marked on site using high visibility methods. No personnel should be permitted to undertake activities outside of the impact area footprint throughout the course of the works. **Unexpected finds procedure** Implement an unexpected finds procedure.
2. affect or occur near known Aboriginal objects, Aboriginal places or an Aboriginal cultural asset of intergenerational significance? If so, can impacts be avoided? How?	☐	NA	Part of the Bundian Way (State Heritage Register 01906) is located within the subject area. This is addressed in the section below.	As above
3. affect areas: • within 200 m of waters • within a sand dune system • on a ridge top, ridge line or headland	☒	Low; negative	The construction footprint crosses creek lines. An ACHAR (GML Heritage 2022a) was completed to accompany the REF. The assessment did not identify any issues relating to the listed areas.	As above

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
• within 200 m below or above a cliff face • in or within 20 m of a cave, rock shelter or a cave mouth? If so, can impacts be avoided? How?				
4. affect wild resources which are used or valued by the Aboriginal community or affect access to these resources?	☐	NA	Not applicable; the Aboriginal community has not recently been using wild resources in the activity area.	
5. affect access to culturally important locations?	☒	Construction – low; negative	As discussed in the section below, part of the culturally significant Bundian Way is located within the Nungatta FPFA The infrastructure would be constructed along previously disturbed footprints (i.e. fire trails and dormant logging tracks) and would not reroute the extant tracks.	Construction works should be timed to ensure public access to the portion of the Bundian Way that passes through the Nungatta FPFA is disrupted for a minimal time.

10.6 Other cultural heritage impacts during all stages of the activity

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. affect or occur near places, buildings or landscapes of heritage significance? ^	☒	Low; negative	An SoHI (GML Heritage 2022b) was prepared for the proposal, and is attached at Attachment F. Part of the Bundian Way (State Heritage Register 01906) is within the subject area. The proposed activity would result in the clearance of vegetation, formalisation of an extant dormant logging track, and construction of fence line along 7.0 km of the total length of the Bundian Way. Overall, the activity would have a neutral to moderate positive impact on the Bundian Way citation. The infrastructure would be constructed along previously disturbed footprints (i.e. fire trails and dormant logging tracks) and would not reroute the extant tracks that are representative of the Bundian Way. Moreover, the rehabilitation of the area to promote thriving native faunal and floral populations of disappearing species would be an enhancement of the current disturbed and diminished landscape.	The following recommendations are made pending the outcomes of the ongoing review of the heritage citation: Access disruption – construction works should be timed to ensure public access to the portion of the Bundian Way that passes through the Nungatta FPFA is disrupted for a minimal time. Wayfinding and interpretative signage – signage should be installed for visitors to the FPFA. This signage should provide both guidance on the route of the Bundian Way and its cultural significance. Detailed recommendations for signage associated with the Bundian Way has been presented previously in the Interpretation Strategy (2015). Signage in the Nungatta FPFA may be coordinated with other existing Bundian Way infrastructure or the standard NPWS style. A conservation management plan should be prepared for the Bundian Way to assist in the management of its heritage values and works proposed within or in close proximity to its curtilage.
2. impact on relics or moveable heritage items, or an area with a high likelihood of containing relics? ^	☒	Low; negative	Within the Nungatta FPFA, 4 Aboriginal archaeological sites have been identified along the Bundian Way. These sites comprise isolated artefacts characteristic of transient movement, rather than focused occupation sites. Each site has been identified as having low significance. One site (FPFA 30, AHIMS 63-2-0197) may be accidentally impacted by the proposed activity; however, the other 3 sites are located outside of the impact area.	The AHIMS site (FPFA 30, AHIMS 63-2-0197) should be avoided if practicable. If the site is to be impacted, it would be managed in accordance with an AHIP.

Is the proposed activity likely to…	Applicable?	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			The activity has the potential to have a minor adverse heritage impact.	
3. impact on vegetation of cultural landscape value (e.g. gardens and settings, introduced exotic species, or evidence of broader remnant land uses)?	☐	NA	NA	

10.7 Impacts on matters of national environmental significance under the Environmental Protection & Biodiversity Conservation Act during all stages of the activity

Is the activity likely to affect MNES, including:	Applicable?	Likely impact (negligible, low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. listed threatened species or ecological communities)?	☒	Construction – low; negative Operation – high; positive Operation – low; negative	As detailed in the FFA (Narla Environmental 2022; Attachment B), MNES applicable to the activity relate to threatened species and communities that were assessed as having a 'moderate' likelihood, 'high' likelihood or were 'present' within the activity area. These include 4 threatened species (gang-gang cockatoo, spotted-tailed quoll, greater glider and Parris' bush-pea). As summarised in the significant impact criteria in the FFA (Narla Environmental 2022; Attachment B), the proposed action is unlikely to have a significant impact on an MNES and there is consequently no need for referral.	In addition to those safeguards detailed in sections above, the following safeguards and mitigation measures have already been implemented. Consideration was given to site selection to minimise habitat disturbance for threatened species; this included utilisation of existing cleared tracks and conservation fence lines in preference to disturbing new areas.

Is the activity likely to affect MNES, including:	Applicable?	Likely impact (negligible, low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			MNES assessments of significance under the EPBC Act determined the activity was unlikely to have a significant impact on MNES. During construction, up to 31.67 ha will be disturbed. This vegetation removal, along with impacts to habitats such as streams, hollow bearing trees, foraging resources, etc. may result in some localised negative impact for threatened species; however, these impacts are anticipated to be minimal due to the 2,084 ha of available habitat with increased level of protection and management within the fenced area, and the removal of feral animals that are considered predators of these species and implicated in the decline of many threatened species. During operation, the activity's explicit aims are to reintroduce locally extinct animals, thus improving their plight and restoring ecosystem processes that are also of benefit to other threatened species found in the area. The activity's proposed actions are closely aligned with the measures to reduce the impacts of KTPs listed under the EPBC Act. These include providing safe havens from feral predators and reducing total grazing pressure, and thus are expected to benefit most, if not all threatened species that have been identified from the Nungatta FPFA. The conservation fence may also have some minor negative impacts to ground-dwelling species, by limiting home range, dispersal capability, gene transfer and resources associated with the construction of the conservation fence. The extent of the impact of this is difficult to predict at this point, and the drivers of impact may differ to other situations; however, observations from similar activities in similar environments may help to reduce the potential for negative impacts. Overall, the activity will have low short-term negative impact to some threatened species, countered by the high long-term positive effects.	The Protected Matters Search Tool, literature sources and government databases were used in combination with on-ground survey data to determine the species occurring or potentially occurring at the subject area. Impact assessments (Narla Environmental 2022; Attachment B) using the MNES criteria were performed for all identified species and communities, and these were assessed as not likely to cause significant impacts. A detailed ecological monitoring regime has been outlined in the draft overarching ecological health monitoring framework (DPE 2022b), which sets out annual monitoring methods that will be used to document and describe changes to threatened species abundance and populations, plus detect new species that may visit or establish.

Is the activity likely to affect MNES, including:	Applicable?	Likely impact (negligible, low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment & proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			No threatened ecological communities listed under the EPBC Act were recorded within the construction footprint.	
2. listed migratory species?	☒	Construction – low; negative	The construction will have low impacts to potential foraging habitat and negligible impacts to potential breeding habitat for potentially occurring migratory species given their migratory nature. In the unlikely event that migratory threatened species forage within the subject area, the proposed removal of vegetation will have low impacts to foraging habitat given the large areas of suitable foraging habitat in the surrounding area and in their migratory range. No anticipated net loss of breeding habitat is expected as these species do not breed within or in close proximity to the subject area. The activity is unlikely to significantly impact these species; therefore, a Referral to Commonwealth pursuant to the EPBC Act is not required.	NA
3. the ecology of Ramsar wetlands?	☐	NA	NA	NA
4. world heritage values of World Heritage properties?	☐	NA	NA	NA
5. the national heritage values of national heritage places?	☐	NA	NA	NA

10.8 Cumulative impacts during all stages of the activity

There are no other proposed or approved developments in proximity to the site or elsewhere in SEFNP that may add to the impacts described above.

11. Summary of impacts and conclusions

Category of impact	Significance of impacts		
	Extent of impact	Nature of impact	Environmentally sensitive features
Physical and chemical	Construction – low; negative Operation – low; negative	Soil disturbance during construction will increase the risk of erosion and sedimentation-related issues, particularly with granitic soils in the activity area, which are highly erodible. During construction, the activity has the potential to have a negative impact on water quality, hydrology and aquatic fauna, including: • erosion and sedimentation of local aquatic habitats and waterways • pollution of local water quality from machinery and construction materials and spills and dewatering • a variety of dispersible liquid materials would be used that pose a potential pollutant threat to local water quality. These liquids include but are not limited to diesel, unleaded petrol, machinery oils and lubricants • possible introduction of aquatic pathogens.	Reef Creek, Surveyor's Gully, Sandy Creek, Donald Liang's Creek
Biological	Construction – medium; negative Operation – medium; positive	The native vegetation clearing required for the activity involves 31.67 ha. None of the vegetation identified within the activity area is listed as a TEC under the BC Act or EPBC Act. As such, no TECs will be impacted by the activity. The freshwater aquatic vegetation (submerged), and trailing bank vegetation (ferns and sedges) present has the potential to be impacted. The activity would likely result in minor impacts to threatened biodiversity; however, the activity has been designed to avoid impacts by utilising the existing trail / road network, abandoned logging tracks and other previously disturbed areas, where possible. For the purposes of the assessment the alignment of the fence line, the ancillary supporting infrastructure and the corresponding disturbance footprint have been defined to assess the impact to threatened species and hollow bearing trees. The activity is likely to have low-level short-term impacts to potential foraging habitat and negligible impacts to potential breeding habitat for potentially occurring migratory species given their migratory nature. Considering the proposed eradication of feral predators within the Nungatta FPFA, the activity is likely to improve habitat for threatened species.	No TECs Threatened species (refer to Section 10.2)
Natural resources	Low	Apart from vegetation management there will be no other use or degradation of natural resources (water, fuels or extractive materials) as part of the activity.	Nil

Category of impact	Significance of impacts		
	Extent of impact	Nature of impact	Environmentally sensitive features
Community	Low	Unauthorised public access will not be permitted within the proposed FPFA. Restricted public access will be permitted and improve following establishment with appropriate community use through provision of educational and scientific opportunities. Visitation is not a primary objective for the Nungatta site and visitation is considered low.	Nil
Cultural heritage	Construction - low; negative Operation – medium; positive	An ACHAR (GML Heritage 2022a) was completed to accompany the REF. As a result of the field inspections and consultation with Registered Aboriginal Parties, the assessment report concluded: • A total of 66 new Aboriginal cultural heritage sites were identified during site surveys. Of these, 35 sites were recorded in close proximity to the proposed conservation fence line route; 31 sites were recorded along the internal and external management trails. • The majority of these comprised fewer than 5 artefacts, and only 4 were considered to have subsurface archaeological potential. Three uncommon artefacts were identified, including a hand axe / hammer, a blade, and a possible micro-scraper. Overall, these sites are representative of a highly active and mobile cultural landscape in which artefacts were dropped or discarded as people moved through Country. • The majority of the sites are located outside of the impact area. Thirteen sites are located within the 30 m wide survey corridor of the fence line or 6 m wide corridor of the management trails. The activity footprint was altered to avoid impacts to the identified sites. Part of the Bundian Way (State Heritage Register 01906) is located within the proposed Nungatta FPFA. The proposed works would result in the clearance of vegetation, formalisation of an extant dormant logging track, and construction of fence line along 7.0 km of the total length of the Bundian Way. An SoHI (GML Heritage 2022b) has assessed the potential impacts to the identified heritage values of the Bundian Way, noting that the listing is currently under review for its potential misrepresentation of some Aboriginal groups, and a number of the heritage criteria it has been assessed as meeting are not demonstrated by the portion that passes through the proposed Nungatta FPFA.	Aboriginal cultural heritage sites Bundian Way State Heritage Listing

A consideration of each of the factors required to be considered under the REF is given in Table 12.

Table 12 Environmental factors in section 171 of the EP&A Regulation

Environmental factor	Consideration	Significance of impact*
(a) the environmental impact on the community	Social, economic and cultural impacts as described in sections 10.3, 10.5 and 10.6	Not significant
(b) the transformation of the locality	Human and non-human environment as described in sections 10.1, 10.2 and 10.4	Not significant
(c) the environmental impact on the ecosystems of the locality	Amount of clearing, loss of ecological integrity, habitat connectivity/ fragmentation and changes to hydrology (both surface and groundwater) as described in sections 10.1, 10.2 and 10.4 and, for nationally listed threatened ecological communities, in section 10.7.	Not significant
(d) reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	Visual, recreational, scientific and other impacts as described in section 10.3.	Not significant
(e) the effects on any locality, place or building that has— (i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or (ii) other special value for present or future generations	Impacts to Aboriginal and historic heritage associated with a locality (including intangible cultural significance), architectural heritage, social/community values and identity, scenic values and others, as described in sections 10.3, 10.5 and 10.6 and (for MNES heritage places) section 10.7.	Not significant
(f) the impact on the habitat of protected animals, within the meaning of the Biodiversity Conservation Act	Impacts to all native terrestrial species, including but not limited to threatened species, and their habitat requirements, as described in section 10.2.	Not significant
(g) the endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air	Impacts to all listed terrestrial and aquatic species, and whether the proposal increases the impact of key threatening processes, as described in section 10.2	Not significant
(h) long-term effects on the environment	Long-term residual impacts to ecological, social and economic values as described in all parts of section 10.	Not significant
(i) degradation of the quality of the environment	Ongoing residual impacts to ecological, social and economic as described in section 10.4.	Not significant
(j) risk to the safety of the environment	Impacts to public and work health and safety, from contamination, bushfires, sea level rise, flood, storm surge, wind speeds, extreme heat, rockfall and landslip, and other risks likely to increase due to climate change as described in sections 10.1, 10.3 and 10.4.	Not significant
(k) reduction in the range of beneficial uses of the environment	Impacts to natural resources, community resources and existing uses as described in sections 10.3 and 10.4.	Not significant
(l) pollution of the environment	Impacts due to air pollution (including odours and greenhouse gases); water pollution (water quality	Not significant

Environmental factor	Consideration	Significance of impact*
	health); soil contamination; noise and vibration (including consideration of sensitive receptors); or light pollution, as described in sections 10.1 and 10.3.	
(m) environmental problems associated with the disposal of waste	Transportation, disposal and contamination impacts as described in section 10.3.	Not significant
(n) increased demands on natural or other resources that are, or are likely to become, in short supply	Impacts to land, soil, water, gravel, minerals and energy supply as described in section 10.4.	Not significant
(o) the cumulative environmental effect with other existing or likely future activities	The negative synergisms with existing development or future activities as considered in section 10.8.	Not significant
(p) the impact on coastal processes and coastal hazards, including those under projected climate change conditions	Impacts arising from the proposed activity on coastal processes, and impacts on the proposed activity from those coastal processes and hazards, both current and future, as considered in section 10.1.	Not significant
(q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1	Inconsistency with the objectives, policies and actions identified in local, district and regional plans, as considered in section 3.2.2.	Not significant
(r) other relevant environmental factors.	Any other factors relevant in assessing impacts on the environment to the fullest extent, such as native title.	Not significant

- In conclusion:
- There is **not** likely to be a significant effect on the environment, so an environmental impact statement is not required.

  This REF has examined and taken into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the proposed activity. The REF has concluded that the proposed activity is not likely to be a significant effect on the environment and an environmental impact statement is not required.
- There is **not** likely to be a significant effect on threatened species, populations, ecological communities or their habitats and a species impact statement is required
- The activity is **not** likely to have a significant impact on matters of national environmental significance listed under the Environment Protection and Biodiversity Conservation Act (Cth)

  Formal assessments of significance, tests of significance under s 7.3 of the BC Act, have been conducted as part of the ecological assessment (Attachment B) to determine whether the proposal will have a significant impact on threatened biodiversity.

  Formal assessments concluded that TECs and threatened fauna and flora species are unlikely to be significantly affected by the proposal.

  Formal assessments of significance, under the EPBC Act's significant impact criteria, have been conducted as part of the ecological assessment (Attachment B).

  Formal assessments concluded that TECs and threatened fauna species are unlikely to be significantly affected by the proposal.
- The activity will **not** require certification to the Building Code of Australia, Disability (Access to Premises – Buildings) Standards 2010 or Australian Standards in accordance with the NPWS Construction Assessment Procedures (NPWS 2011)

12. Supporting documentation

Please provide details of documentation included with this application.

Attachment	Document title	Author	Date
A	*Threatened species tests of significance summary*		
B	*Flora and fauna assessment*	Narla Environmental	2022
C	*Aquatic ecology assessment*	Austral Research and Consulting	2022
D	*Hypogeous fungi and Phytophthora survey, Nungatta FPFA*	N Davoodian	2022
E	*Flora Survey for the Nungatta Feral Predator-Free Area*	J Miles	2021
F	*Statement of Heritage Impact*	GML Heritage	2022b

13. Declarations

As the person responsible for the preparation of the REF, I certify that, to the best of my knowledge, this REF is in accordance with the EP&A Act, the EP&A Regs and the Guidelines approved under section 170 of the EP&A Regs, and the information it contains is neither false nor misleading.

Signature

Name (printed)

Position

Date

By endorsing the REF, the proponent confirms that the information in the REF is accurate and adequate to ensure that all potential impacts of the activity can be identified.

Signature

Name (printed)

Position

Date

14. References

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DECCW (Department of Environment, Climate Change and Water) (2010) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, NSW Department of Environment, Climate Change and Water, Sydney.

DPE (Department of Planning and Environment NSW) (2022a) 'NSW BioNet', NSW Department of Planning and Environment, Parramatta, www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet

DPE (2022b) 'Ecological health and monitoring framework' [draft in prep.], National Parks and Wildlife Service, Coffs Harbour.

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Attachment A: Threatened species tests of significance

Scientific name	Common name	NSW status	EPBC status	Likelihood of occurrence	Potential impacts	Cross-ref. to test of significance in FFA
Pultenaea parrisiae	Parris' bush-pea	V	V	High	The activity has the potential to impact individuals of this species that occur within the subject area; however, the bulk of the local population occurs outside of the activity area and will not be impacted by the activity. Moreover, only a small amount of suitable habitat (0.58 ha) is likely to be impacted. Therefore, the proposed activity will not result in a significant impact to this species.	Appendices A and E
Callocephalon fimbriatum	Gang-gang cockatoo	V	E	Present. This species was observed foraging on 5 occasions	Low anticipated impact to potential foraging habitat given clearing occurring outside breeding season and the large area of similar foraging habitat connected to the activity area and within the greater SEFNP. Low impact to potential breeding habitat as a number of suitable hollow bearing trees are likely to be impacted by the activity.	Appendices B and F
Calyptorhynchus lathami	Glossy black cockatoo	V	–	Moderate	Low anticipated impact to foraging habitat given the mobility of this species, clearing outside of breeding season, and large area of similar foraging habitat connected to the activity area and within the greater SEFNP. Low impact to potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	Appendix B
Cercartetus nanus	Eastern pygmy-possum	V	–	Moderate	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity	Appendix B

Scientific name	Common name	NSW status	EPBC status	Likelihood of occurrence	Potential impacts	Cross-ref. to test of significance in FFA
					area and within the greater SEFNP. Low impact to potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	
Dasyurus maculatus	Spotted-tailed quoll	V	E	Moderate	Nil to low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Potential positive impact from removal of feral predators.	Appendices B and F
Falsistrellus tasmaniensis	Eastern false pipistrelle	V	–	Moderate	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Low impact to potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	Appendix B
Myotis macropus	Southern myotis	V	–	Moderate	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Moderate impact to potential breeding habitat as bridges and a number of hollow bearing trees are likely to be impacted by the activity.	Appendix B
Ninox strenua	Powerful owl	V	–	Moderate	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Low impact to potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	Appendix B

Scientific name	Common name	NSW status	EPBC status	Likelihood of occurrence	Potential impacts	Cross-ref. to test of significance in FFA
Petaurus australis	Yellow-bellied glider	V	–	High	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Moderate impact to potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	Appendix B
Scoteanax rueppellii	Greater broad-nosed bat	V	–	Moderate	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Moderate impact to potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	Appendix B
Sminthopsis leucopus	White-footed dunnart	V	–	High	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Low impact to potential breeding habitat as hollow bearing logs are likely to be impacted by the activity.	Appendix C
Tyto novaehollandiae	Masked owl	V	–	Low	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Moderate impact to potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	Appendix B
Tyto tenebricosa	Sooty owl	V	–	Low	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Moderate impact to	Appendix B

Scientific name	Common name	NSW status	EPBC status	Likelihood of occurrence	Potential impacts	Cross-ref. to test of significance in FFA
					potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	
Heleioporus australiacus	Giant burrowing frog	V	V	Low	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Low anticipated impact to potential breeding habitat given only small areas of works are proposed within waterways; however, feral pest access prevention measures may reduce the ease of access to breeding areas.	Appendices D and H
Mixophyes balbus	Stuttering frog	E	V	Low	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Low anticipated impact to potential breeding habitat given only small areas of works are proposed within waterways; however, feral pest access prevention measures may reduce the ease of access to breeding areas.	Appendices D and H
Litoria raniformis	Growling grass frog	E	V	Low	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Low anticipated impact to potential breeding habitat given only small areas of works are proposed within waterways; however, feral pest access prevention measures may reduce the ease of access to breeding areas.	Appendices D and H

Scientific name	Common name	NSW status	EPBC status	Likelihood of occurrence	Potential impacts	Cross-ref. to test of significance in FFA
Litoria castanea	Yellow-spotted tree frog	CE	CE	Low	Nil anticipated impact to potential foraging habitat given *Litoria castanea* is only know from around Yass, approximately 200 km for Nungatta, the vast area of similar habitat connected to the activity area and within the greater SEFNP. Nil anticipated impact to potential breeding habitat given Nungatta is well outside of know distribution for the species, only small areas of works are proposed within waterways, and apertures of barriers are large enough to allow passage of frogs and tadpoles. Positive impact likely with removal of feral pests.	Appendices D and H
Litoria watsoni	Watson's tree frog	–	E	Low	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Low anticipated impact to potential breeding habitat given only small areas of works are proposed within waterways and the ability of *Litoria watsoni* to climb fences. Likely positive impact with the removal of feral pests.	Appendix H
Petauroides volans	Greater glider	–	V	High	Low anticipated impact to potential foraging habitat given the vast area of similar habitat connected to the activity area and within the greater SEFNP. Moderate impact to potential breeding habitat as a number of hollow bearing trees are likely to be impacted by the activity.	Appendix G

Attachments B to F

Attachment B: Flora and fauna assessment report (PDF 28MB)

Attachment C: Aquatic fauna surveys (PDF 1.5MB)

Attachment D: Hypogeous fungi and Phytophthora survey report (PDF 887KB)

Attachment E: Flora survey (PDF 364KB)

Attachment F: Statement of heritage impacts (PDF 3.5MB)

South East Forest National Park and Egan Peak Nature Reserve amendment to the plan of management