

FEASIBILITY ASSESSMENT OF A CAT BARRIER FENCE ON BRUNY ISLAND



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Respect and Reconciliation

The Aboriginal Tasmanians are the First People of Tasmania and Traditional Owners of lutruwita (Tasmania). Bruny Island, including all its connected waters and surrounding lands, have sustained unique Aboriginal/palawa cultures since time immemorial. NRM South acknowledges Aboriginal rights, interests, cultural connections and obligations for Bruny Island and we support shared decision making, leadership, and engagement. Aboriginal peoples' spiritual, social, cultural and economic practices come from Country – land, sea and sky – and culture heritage, economy, languages and laws continue to be important, and are maintained.

Executive Summary

Predation by cats on Bruny Island impacts a range of taxa, including threatened eastern quolls and hooded plovers. Through an Australian Government funded cat control on Bruny Island (*“Priority actions for eastern quolls on Bruny Island”*), NRM South worked with partners to reduce feral cat numbers on north Bruny a range of control methods. Over the course of this project, the population was reduced by 95%. However, the potential remains for feral cats to re-populate north Bruny from uncontrolled populations on the southern part of the island.

During a NRM South hosted workshop in early 2022, experts suggested installing a cat-barrier fence at the narrowest point on Bruny Island (an isthmus of land connecting the north and south of the island, referred to as the ‘Neck’) to limit cats moving between the south and north of the island. From 2023-2024, NRM South carried out a feasibility study to explore this proposal, funded through the Australian Government’s Supporting Communities to Manage Pest Animals and Weeds Program (PWP).

The feasibility assessment comprised three main elements aimed at exploring the issues associated with a cat-barrier fence on Bruny Island at two potential sites on the Neck and south of the Neck:

1. Technical considerations – including the fence design, practicalities, likely maintenance and costs
2. Ecological effects – assessing the likely effectiveness in preventing movement of cats and potential impact to native fauna in the vicinity of the fence, and
3. Stakeholder engagement – including consultation with relevant government departments, the Bruny Island community, experts and the Aboriginal community.

Technical considerations

Well-tested “cat-proof” fence designs already exist, and these designs can be adapted to the requirements on Bruny Island. However, construction costs have increased consistently over time and seaward terminating ends and the proximity of the marine environment may inflate the maintenance cost on Bruny Island. Any route across Bruny Island would require gaps at Bruny Island main road, therefore, cats could breach the fence at these places. Mitigation measures, such as deterrent broadcast at fence gaps may be required and monitoring infrastructure that includes cameras would be required to monitor cat incursions at fence gaps. This will impact on the construction and operational budget of a cat-barrier fence.

Expert advice noted that a cat-barrier fence across the Neck with seaward termination on both the east and west sides was not advisable, due to: destructive impacts on the fence arising from marine flotsam; environment and forces of waves/tides; and negative impacts of the fence on the intertidal characteristics of the mudflats.

The fence would require development approval from Kingborough Council. Any site will need to be assessed to determine that the development complies with codes governing impacts on the environment, Aboriginal and other cultural heritage, and any other code associated with its zoning under the Kingborough Council *Interim Planning Scheme 2015*. Depending on the site of the fence a Level 3 Reserve Activity Assessment (RAA) would be required by Tasmanian Parks and Wildlife Service.

Ecological Considerations

Experts noted that cat suppression in north Bruny will have benefits for a range of species. Although a cat-barrier fence could potentially contribute to slowing repopulation from the south, insufficient data was available to assess how effective a semi-permeable (i.e. “leaky”) fence might be. Therefore, monitoring of cat incursions and continued cat-control north of the Neck would potentially still be required.

A variety of threatened vegetation communities and wetlands could be impacted by fence construction and operations, which could be avoided by careful route selection. Birds were the main threatened taxa known to occur in the vicinity of the assessed fence routes, however, the endangered eastern quoll was also identified. The fence may impact native fauna through:

- Collisions with the fence
- Increase wildlife usage of the main road, resulting in mortality
- Removal of habitat
- Displacement from habitat
- Restriction of dispersal/migration

Expert ecologists advised that it was unlikely that the fence would appreciably impact the movement of native fauna, because it would have gaps, however, cautioned that ongoing monitoring of all potential impacts was advisable.

Stakeholder engagement

Stakeholder groups were generally positive about cat-control and open to additional measures, including a cat-barrier fence. Some key points/outcomes from consultation with each group were as follows.

Community – support for cat control was high, including for the cat-barrier fence, due to the perception of benefits for native fauna. The main concern, even from positive respondents was the potential impact of a barrier on native fauna. There were also some strong opinions against cat control, therefore, continued community engagement is necessary to maintain support.

Expert – experienced experts cited that a fence, including “leaky” fences, could make the effort of cat-control, overall, more feasible. Therefore, a fence would be best deployed within the context of a carefully planned cat-control and/or eradication program.

Government – A diverse group of Departments were consulted, resulting in a broad range of issues being considered, including:

- Ongoing funding: broad concern from state agencies regarding the longevity and magnitude of the funding commitment required for a cat-barrier fence, noting that alternatives should be given equal consideration (e.g. Drift nets and targeted control measures, Virtual fencing, and Ecological control).
- Roles and responsibilities: noting that there is a need for clear policy on the management of a fence for its full lifecycle, and clear responsibilities for the asset.
- Landscape and cultural values: noting the need for careful assessment of impacts on Aboriginal cultural values.
- Amenity and recreation: evaluating whether the fence is an impediment to free enjoyment of the Neck (including existing reserves).

Conclusions

A fence could potentially slow the migration of cats from southern to northern Bruny Island and therefore assist with the control of feral cat populations on Bruny Island. It is not a panacea, but could be one strategy amongst a range of methods to control cats. The role and operation of the fence would need to be clearly defined within a contemporary cat management plan for Bruny Island. To be feasible, the fence requires:

- An updated Cat Management Plan for the Island, which considers the objective of a cat control program, including whether the goal is suppression or eradication, and how this is best achieved (e.g. a fence as a tool within the broader goals and investments for cat control on Bruny Island)
- A thorough environmental impact assessment which considers site selection and evaluates potential impacts to:
 - Natural values
 - Aboriginal cultural values and heritage
 - Economic values, such as tourism

and identifies strategies to reduce impacts. If the impacts are deemed unacceptable, it might be determined that alternate approaches to managing the feral cat population be used.

- Appropriate and detailed engagement with key stakeholders, including the local community, landowners and managers, and Aboriginal community and groups.
- Ongoing and adequate funding for the design, construction (including approvals), monitoring, and maintenance of a fence.
- Identifying clear roles and responsibilities – and the identification of the organisation responsible for the fence, including its construction, monitoring, maintenance and decommissioning.

1. INTRODUCTION

In Australia, feral cats are implicated in two thirds of mammal extinctions that have occurred since European colonisation (DCCEEW, 2023). Predation is the main threat to native fauna from feral cats (DCCEEW, 2023), however, competition for prey (Cunningham *et al.*, 2019) and critical habitat features (DCCEEW, 2023) may also contribute to the impact of feral cats on native fauna.

Additionally, cats spread a range of zoonotic diseases, such as *Toxoplasma gondii* and *Sarcocystis spp.*, that affect native fauna (Medina *et al.*, 2014, Dubey *et al.*, 2021) and livestock (Legge *et al.*, 2020). The protection of threatened native mammals from feral cats is a priority under the Australian Government's Threatened Species Action Plan (2022 - 2032) where Bruny Island has been identified as a priority place due to its biodiversity. The Threatened species Action Plan states priority places' purpose is to support a landscape-scale approach to threatened species recovery. The plan recognises that some species share the same habitat. Place-based action can help more species and threatened ecological communities." Bruny Island is a biodiversity hotspot with 10 terrestrial-dependent mammal and bird species now listed as threatened and 12 of conservation significance.

Bruny Island was one of five islands identified by the Australian Government for progressing feral cat eradication. Feral cat densities on Bruny Island are some of the highest in Tasmania. The highest cat density occurs in the southern wet forests (Scomparin, 2022); however, high seasonal density and predation pressure is observed around the seabird nesting colonies at the Neck Game Reserve in the Island's north (Wabiko, 2016; Geale, 2017; "Priority actions for eastern quolls on north Bruny Island", project No. ERF-MU42-P1). A diverse range of avian and mammalian taxa have been recorded in the feral cat diet on Bruny Island (Nick Mooney project No. SHA-TSCDG-TAS-33 Diet Studies 2017 - 2019; Wabiko, 2016; Geale, 2017). Population viability analyses and susceptibility profiles have indicated that several iconic threatened and non-threatened species may be impacted, to varying degrees, from cat predation (Francis, 2018; DCCEEW, 2023) including:

- Forty-spotted pardalote (*Pardalotus quadragintus*) - Endangered
- Hooded plover (*Thinornis rubricollis*) - Vulnerable
- Little penguin (*Eudyptula minor*)
- Short-tailed shearwater (*Ardenna tenuirostris*).
- Eastern quoll (*Dasyurus viverrinus*) - Endangered
- Long-nosed potoroo (*Potorous tridactylus*)

A range of the mammalian taxa present on Bruny Island fall into the small to medium size range that are at the highest risk of predation by cats (Radford *et al.*, 2018). Of particular concern, the Endangered eastern quoll (*Dasyurus viverrinus*) (EPBC Act 1999) is rated as highly susceptible to cat predation in the Commonwealth's "Threat abatement plan for predation by feral cats" (DCCEEW, 2023). Once common across Australia, the eastern quoll was extinct on mainland Australia by 1963 (Peacock & Abbott, 2014), where its decline was attributed primarily to impacts from predation by feral cats and foxes (Peacock & Abbott, 2014). Diseases, most likely from domestic cats and dogs, may also have contributed its decline (Peacock & Abbott, 2014). The eastern quoll remained extant only in Tasmania, however, in recent decades this population has also experienced a rapid and continuing decline (Fancourt *et al.*, 2013). On Bruny Island, the eastern quoll is widespread, mostly in the drier northern part of the island. Protecting the Bruny Island eastern quolls from the potential threat of predation from a burgeoning feral cat population is a priority for the conservation of the species. Cat control remains a priority action for conservation on Bruny Island.

Background

The Australian Government funded “*Progressing feral cat eradication on Bruny Island – a Threatened Species Strategy Project*” (SHA-TSCDG-TAS-33, 2017 - 2019) began the process of developing a long-term Cat Management Strategy for Bruny Island and assessing the feasibility of cat eradication. Research activities developed a baseline understanding of feral cat distribution, behaviour and the potential impacts of feral cats on the island’s native fauna. Trapping methods were developed to target cats, with over a hundred stray and feral cats removed from Bruny Island over the project’s life. Extensive community engagement sought to understand community attitudes to cat control and identify barriers to, and solutions to advance, responsible cat ownership. The Bruny Island Cat By-Law was developed and enacted by Kingborough Council.

Following this project, NRM South was funded by the Australian Government to undertake cat control for four years in the north of the Island (“*Priority actions for eastern quolls on north Bruny Island*”, ERF-MU42-P1). The project focussed on all aspects of domestic, stray and feral cat management and was delivered in partnership with Biosecurity Tasmania, Kingborough Council (KCC), the South East Tasmanian Aboriginal Corporation (SETAC), the Ten Lives Cat Centre, and Bruny Farming. The project successfully removed 120 feral and stray cats from north Bruny Island and achieved 74% compliance of cat owners with the Bruny Island Cat By-Law, limiting the recruitment of stray cats to the feral population. Follow up camera surveys estimated that approximately 4-6 feral cats remained on north Bruny Island at the completion of the project. The Neck, a narrow isthmus of land connecting the north and south of the island, was identified as the key access point for cats moving from the southern parts of the island to the northern parts.

There is a large population of feral cats on south Bruny Island (Scomparin, 2022), where systematic control has not been undertaken, and there is concern that the gains achieved in the project *Priority actions for eastern quolls on north Bruny Island* would be lost as cats move from the southern part of Bruny to the northern parts. Early in 2022, NRM South held a workshop with cat eradication experts from around Australia, as part of the project. During this workshop, the installation of a cat-barrier fence across the Neck (or south of the Neck) was identified as a potential strategy to limit the movement of feral cats between the south and the north of Bruny Island. The goal of this fence would be to keep cat numbers low in the north and potentially allow for follow up cat control measures further south.

Why a fence?

Implementing effective cat control requires a range of interventions. Consecutive programs on Bruny Island have shown targeted trapping to be an effective measure for an immediate reduction of feral cat numbers within a defined area, but cats can become “trap-shy”. The addition of specialised grooming traps, such as the [Felixer](#), were successful and may be used to target “trap-shy” individuals. Shooting and baiting have been identified as less effective “mop-up” methods on Bruny Island.

Monitoring cat distribution was imperative to identifying where interventions could be most effective. Controlling feral cats at large scales is thus a complicated and resource intensive process. Constructing cat-barrier fences within a large management area such as Bruny Island reduces the size of the management units to a more manageable scale, and could potentially restrict cat movement. Control activities could then focus on one area at a time, without the need to control reinvasion from uncontrolled areas (Algar *et al.*, 2020). As fences can prevent or slow reinvasion of managed areas, they can reduce the long-term costs associated with on-going control.

This report

NRM South was funded by the Australian Government, under the Supporting Communities to Manage Pest Animals and Weeds Program (PWP), to undertake a feasibility assessment of a cat barrier fence on Bruny Island. This report assesses the feasibility of a cat barrier fence at the southern part of the “Neck” by considering three main components:

1. Technical considerations, including fence design, planning and other considerations, and potential costs to construct, maintain and monitor.
2. Ecological considerations, including the potential effectiveness of a barrier to reducing cat movements, and the potential impact to flora and native fauna in the vicinity of the fence.
3. Stakeholder engagement, including local and state government (identifying any related policies, and alignment with the government’s long-term priorities and policy objectives for Bruny Island), local resident views and feedback from the Tasmanian Aboriginal community.

For the purposes of the stakeholder consultation, two proposed sites and designs were presented as a concept to guide the engagement.

2. TECHNICAL CONSIDERATIONS

The feasibility assessment considered the following technical considerations for a cat-barrier fence on Bruny Island:

- Design
- Potential locations
- Constructability and constraints
- Operations and maintenance
- Alternatives
- Budget

The technical considerations were investigated by examining cat fence programs around Australia, particularly the Kangaroo Island program ([Kangaroo Island Feral Cat Eradication Program](#)), and by consulting with experts about specific issues pertaining to installing a cat barrier fence that would be relevant to Bruny Island.

Design

The purpose of a fence on Bruny Island would be to restrict the passage of cats across the isthmus between north and south Bruny Island. The fence design was informed by a design pioneered at Arid Recovery in South Australia that has already been implemented by several cat management programs (Figures 1 and 2). This design was used on Kangaroo Island, where a 3km long fence was installed to restrict feral cats entering specific areas (e.g. the Dudley Peninsula) and as a 'hard edge' for the feral cat eradication team to work towards as they systematically eradicate feral cats from the peninsula ([Kangaroo Island Feral Cat Eradication Program](#)). A similar design was used during the eradication of cats from Dirk Hartog Island (Algar *et al.*, 2020). The general design includes electrification at variable heights and purports to exclude foxes, cats, and rabbits.

A Bruny Island fence is likely to have similar issues to the Kangaroo Island fence, including:

- Allowing for native fauna passage
- Be of a similar length
- Having gaps for the road
- Having gates for human egress, and
- Extending into intertidal zones.

Therefore, this design was used as a representation for the current feasibility assessment. It is recognised, however, that previous reviews of fence programs caution that what works in one circumstance, does not necessarily translate to others (Long & Robley, 2004; de Tores & Marlow, 2011).

As well as the technical specifications of the fence, a Bruny Island barrier would need to consider options for supplying power to the fence (for electrification), and potentially for mounting cameras for monitoring the fence.

Using the Kangaroo Island fence as a reference, the basic design would comprise the following technical specifications (Kangaroo Island Feral Cat Management Fence, pers. comms.; Long and Robley 2004):

- 1.8-metre-high fence with 'floppy top' and 'skirt' to prevent cats climbing over and other animals burrowing under the fence
- Using two types of wire mesh:

- 50mm wire mesh, spans the entirety of the fence including the ‘floppy top’
- For the ‘skirt’, a 30mm mesh is used to prevent rabbit movement from digging around the fence. It would potentially cover 300mm vertically and 300mm horizontally (shallow burial). To minimise rusting, this material can either be galvanised, stainless steel or PVC coated mesh (presumably costs will differ)
- Electric wires at 1200 and 1500mm to minimise the likelihood of native animals being shocked but dissuading them from climbing the fence
- Posts every 5 metres to support the fence
- Up to 5.5 metre clearing either side of the fence used for maintenance, monitoring and as a fire buffer (Figure 2b)
- Non-gated openings required to allow movement of traffic (Figure 2c).

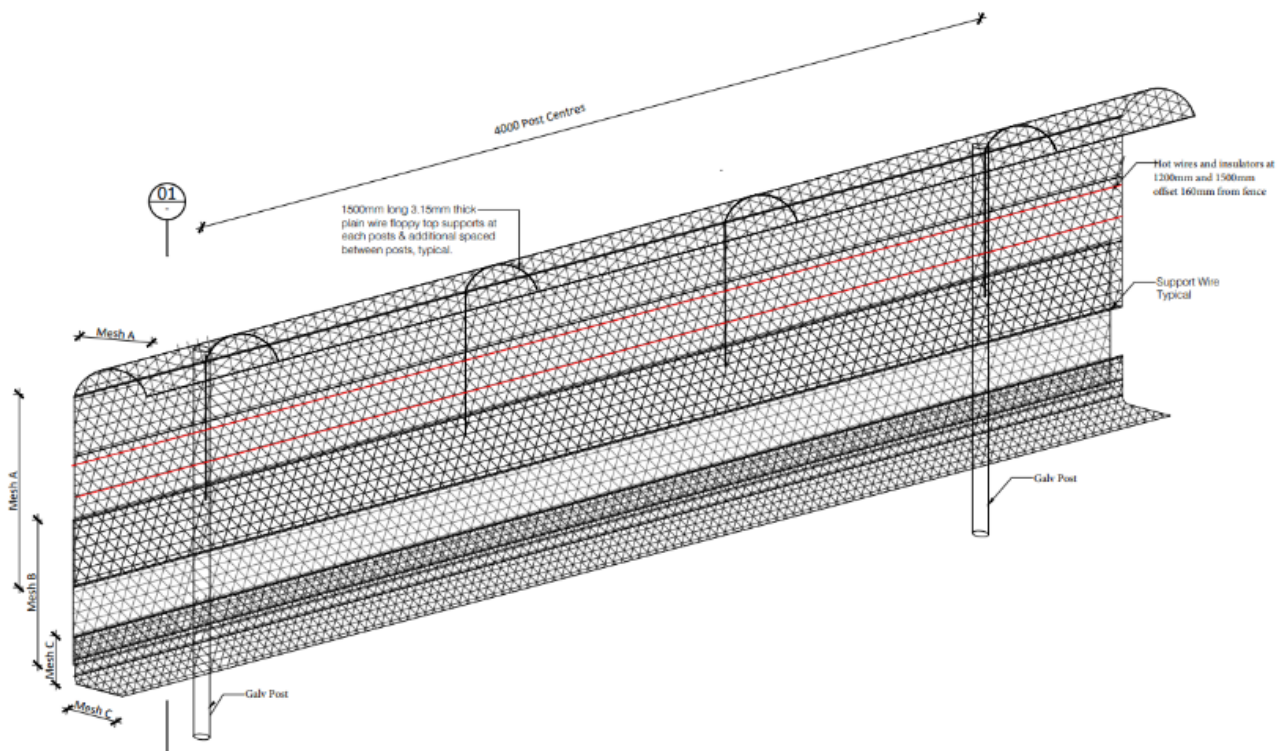


Figure 1. Schematic Drawing of the Fence Design

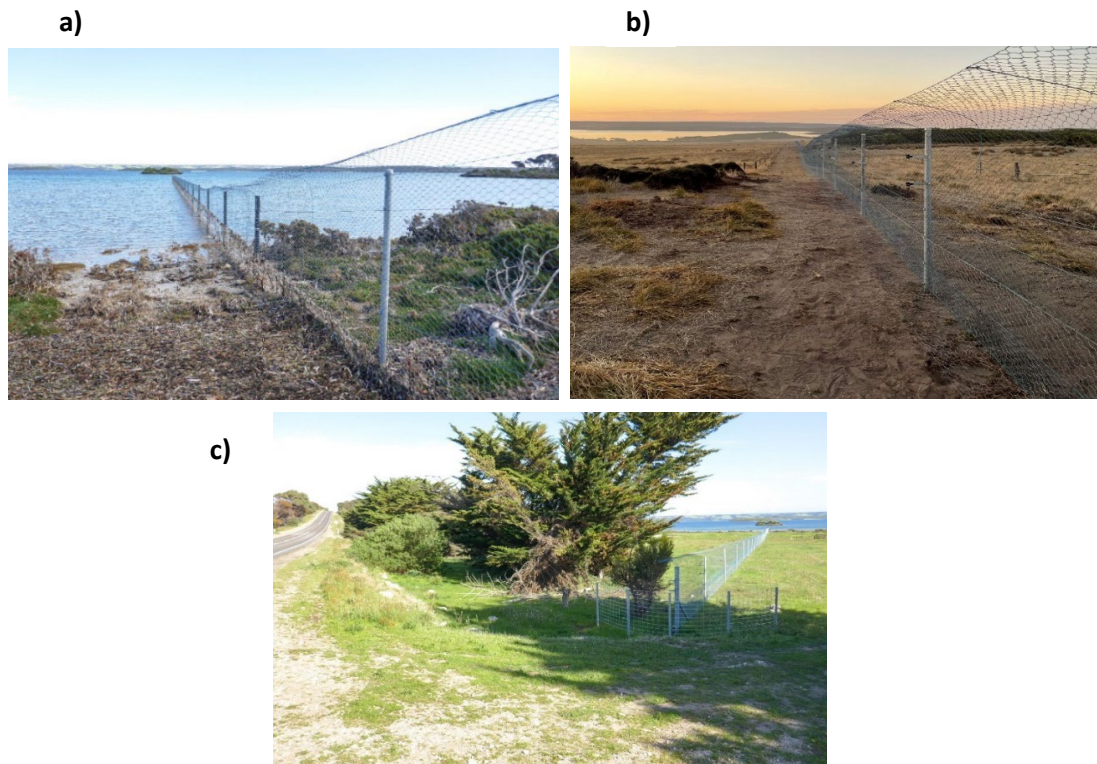


Figure 2. Example of a cat-barrier fence on Kangaroo Island. a) Northern end of Kangaroo Island cat barrier fence terminating beyond low tide mark; b) Extension of a fence across a beach with 5.5m buffer to facilitate monitoring and maintenance of fence line; and c) openings at roads in the Kangaroo Island cat barrier fence

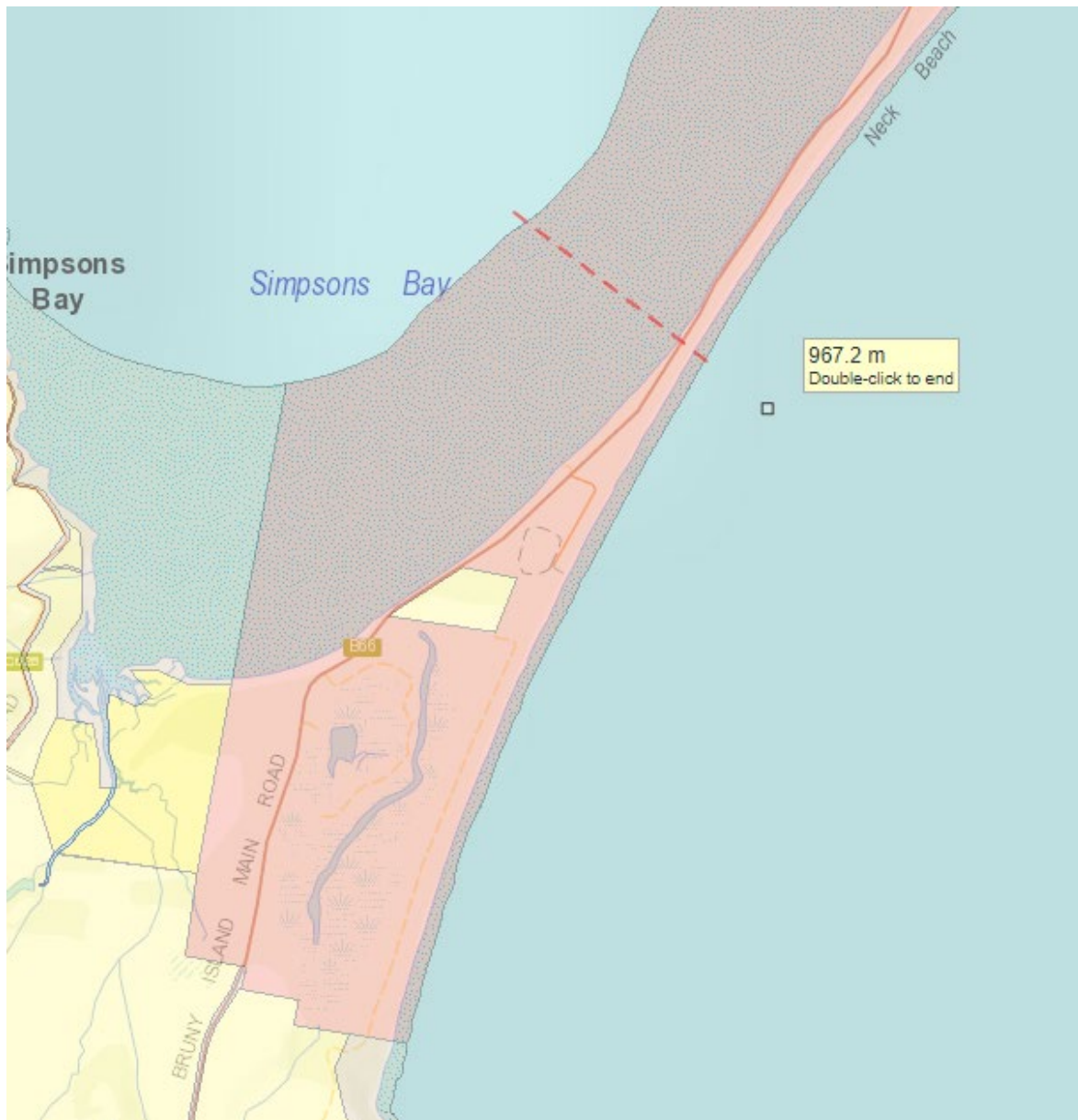
Potential locations

For the purposes of this feasibility assessment and stakeholder engagement, two sites were proposed for the cat barrier fence, identified in Figure 3 below. The rationale behind each of these two locations was as follows:

Site A - Narrowest section of the neck: (Figure 3 left panel), This site is located within the Bruny Island Neck Game Reserve (Parks and Wildlife Service managed land). The site was considered for two main reasons;

- Smallest footprint, with a total length on land of approximately 60m (excluding opening for road)
- Located south of the seabird colonies and existing penguin fence, therefore, it will not cross these colonies but could provide protection to them from feral cats.

Challenges with this site are that it must include openings in the fence to accommodate the Bruny Island Main Road. The Kangaroo Island fence incorporates such openings approximately 4 – 5m away from the road (Figure 2c) to allow passage away from the roadside. On Bruny Island, this configuration would limit the fence length on land at this site to approximately 45m, with most of the fence within the low tide water mark to inhibit cats crossing the beach zone.



Site B – Edge of the reserve: (Figure 3 right panel), This site was considered as a potential location as it would have less impact on the Neck Game Reserve (i.e. not require removal of vegetation). However, challenges include that the reserve abuts private land, including being bounded on one side by a reserve owned by the Tasmanian Land Conservancy and the fence may not be supported by landowners. Additional challenges include undertaking multiple landholder negotiations (four properties sit beside border of the reserve). The distance of the fence on land at this site would be approximately 2km, increasing construction costs and potentially maintenance costs. This site also has the challenge that a gap will be required at Bruny Island Main Road.

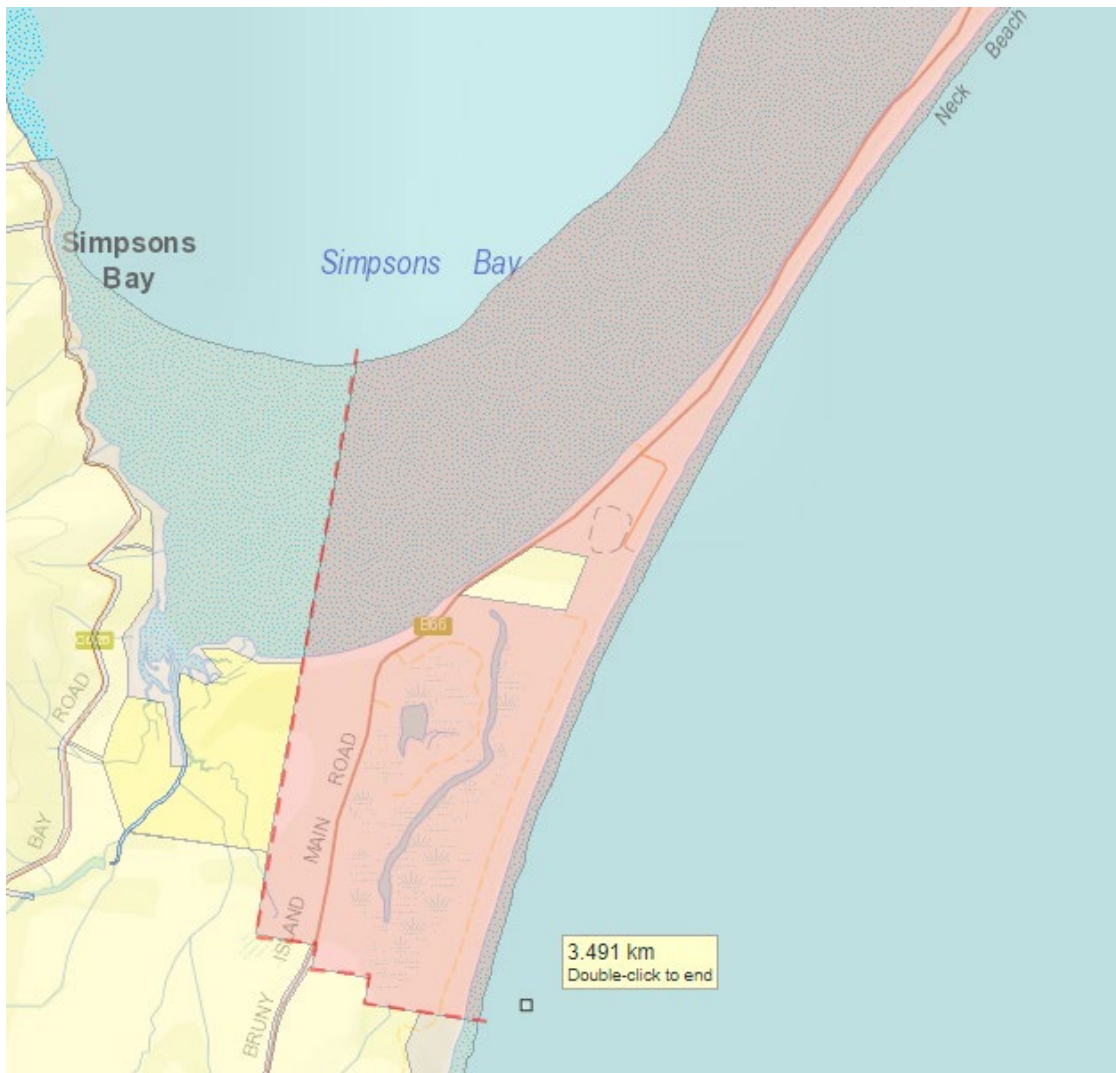


Figure 3. Generalised position of proposed fence locations (Site A – left and Site B – right) at the south end of the Neck.

Considerations

Although not formally discussed as part of this feasibility assessment, a cat-barrier fence on Bruny Island would presumably be a temporary structure to assist with the objective of permanently controlling feral cat populations. The construction of a fence in either location would need to adhere to any regulatory requirements.

Regulatory Requirements and Land Tenure

Construction of the fence would require:

- Landowner/manager approvals
- State regulatory approvals, dependent on values present at the site
- Local government approvals may be required.
- Commonwealth requirements, if it triggered the EPBC Act.

The approvals required at the state and/or local government level are guided primarily by how the land is zoned across the proposed fence routes under *the Land Use Planning and Approvals Act 1993* (LUPAA) and any applicable codes (standards) associated with the values/assets that are identified at

the sites. Bruny Island is in the Kingborough Council zone, which is therefore the responsible planning authority.

The land around the fence routes identified herein, is zoned Environmental Management (29.0) to the high-water mark under the Kingborough Council Interim Planning Scheme 2015. While there are exemptions for fences under 1.5m, these are not applicable for infrastructure that is within 30m of a watercourse. If the fence is to be in the more southerly position (Figure 3 Site B), potential impacts to wetlands, as well as the coast and tidal flats would need to be considered. There are also general exemptions in the planning scheme for water, sewer, and roads, but these tend to be for emergency use. The fence is an unconventional application and will almost certainly require planning permission from Council. Therefore, a development application would likely be required that would include an environmental impact assessment which assessed the presence of and potential impact to, some or all of the following:

- Vegetation (including any threatened ecological communities)
- Fauna and their habitats
- Cultural heritage
- Aboriginal cultural heritage
- Visual impacts
- Geomorphology

It would likely also require details about strategies to minimise adverse environmental impacts.

Assuming that planning permission is granted, a Reserve Activity Assessment (RAA) may also be required because the more northerly proposed location (Figure 3 Site A) of the fence is located on a designated game reserve, managed by the Tasmanian Parks and Wildlife Service. The RAA is an administrative process to assess risks and not a statutory instrument. The activity of constructing and operating the fence must be “not inconsistent” with the management objectives set out for “game reserves” in the *National Parks and Reserves Management Act*. It is likely that this would require a level 3 assessment because of the public interest and assessment may likely take 12-18 months (Stakeholder Engagement Report).

Depending on the route selected for a fence, negotiations with the landowners would be necessary.

Other agencies associated with the fence routes are likely to include:

- Other sections of NRE Tasmania (aside from PWS, including Crown Land property services)
- Marine and Safety Tasmania (MAST), for anything below the water line
- Department of State Growth, in relation to roads
- Environmental Protection Authority (EPA), in relation to environmental impact assessment

As part of the strategy to minimise environmental and other impacts, alternative routes could be explored (e.g. to minimise vegetation removal). However, during consultations, disparate advice was received from various government departments about the values that are likely to exist for example the Aboriginal cultural heritage present in the locations, therefore a thorough environmental impact assessment would be informative.

No concerns were identified about possible triggers of Matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999*. However, this may change once detailed investigations are completed, and if an MNES was identified that could be significantly impacted.

Geomorphological and other environmental constraints

Construction of a fence in the tidal zones, which are present at both proposed locations, is likely to be challenging to manage. Dr Chris Sharples, Senior Research Fellow at the University of Tasmania, was consulted for advice on geomorphology at the sites. His opinion was that neither of the proposed locations were feasible if the fences were built into the tidal zone, due to potential impacts on both the fence's integrity and the natural processes at the sites as follows:

- Permanent erosion from wind and sea level rises has undermined the mudflats on the western sides, which would impact the fence foundations
- Build-up of flotsam (debris, plastic, seaweed) at the fence could have significant implications for fence maintenance due to increase pressure on the fence, and significant impact on the movement and deposition of sediments within the tidal zone
- The foundations of the fence are likely to be impacted by the high energy surf on the eastern side of the proposed sites
- Waves will potentially push the fence out, especially if there is build-up of debris on the fence
- The actions of the surf are likely to increase as storm frequency and wave size are increasing over time (further input from Dr Mark Hemer, CSIRO)

Therefore, a significant period of monitoring prior to finalising a location will be required to determine the:

- Rate of flotsam build-up
- Changes to water flow, sediment deposition and erosion
- Frequency of storms and large surf.

The experience at other exclusion fences positioned in marine waters is that salt build-up on the wires reduces the voltage, and corrosion leads to frequent holes (Long & Robley, 2004). This increases the "leakiness" of the fence as predators can breach the fence regularly. Therefore, a seaward terminating fence is likely to incur a higher burden of maintenance. Alternatives to fixed steel fences could be utilised in the water-bound ends of fences to reduce some of the issues in these environments. For example, the water-bound ends of the predator exclusion fence across Heirisson Prong (Shark Bay Western Australia) utilises ends that are not electrified and constructed of combinations of plastic mesh and plastic-coated steel mesh (Robely *et al.*, 2003).

Operations and Maintenance

The fence

Ongoing monitoring and maintenance of a fence would be required to ensure it is in good repair to continue to achieve its objective. The maintenance schedule will be dependent on several issues that might affect the fence's integrity including,

- The quality of the fence materials
- Likelihood of corrosion: especially in the marine/tidal areas, but also on land in the fence "skirt" (pers. comms.: Arid Recovery)
- Level of salt build-up on wires and power points
- Extent of surrounding vegetation, i.e. the need for vegetation control to prevent damage to the fence
- Extent of debris build-up in the water zones
- Damage from inclement weather
- Vandalism, as portions are accessible to the public

It is likely that vehicle access along the full length of the fence would be required to facilitate maintenance and checks of the fence, as poor access is a major contributor to fences falling into disrepair (Long & Robley, 2004).

Managing breaches of the fence by cats

The fence would be inherently “leaky” due to gaps at the Bruny Island Main Road, therefore cats could potentially move across the fence line at this point. Strategies would have to be identified that prevent movement or identify when cats have crossed the barrier.

Methods such as broadcasts of dogs barking could be used to deter cats at the permanent openings. Alternatively, bends in the fence at gaps, or drift fences, can be used to direct cats back in the direction they came (as has been done on Kangaroo Island [KI Feral Cat Fence](#)). However, incursions are likely to occur and therefore dedicated monitoring would be required. On Kangaroo Island cat incursions are monitored using cameras with AI software that can track cats for up to 1km from the fence line, detector dog teams and public reports are submitted through the feral cat scan app ([KI Feral Cat Fence](#)). Cat control actions such as shooting can then be employed to remove the cat. Direct cat trapping, or the use of Felixers, could also be used in the vicinity of the gaps to manage these breaches.

The movement of native fauna could be affected by the fence (assessed in detail in Section 3), but cat monitoring at the gaps could also contribute to monitoring some species of native fauna. The type of monitoring would need to be considered in any management plans developed.

Budget

The budget required for a Bruny Island cat barrier fence will depend on the specifications of the fence, installation costs, its location, regulatory requirements (e.g. what site assessments and landowner negotiations required, and any other costs associated with approvals) and how the issues identified above are managed.

- Construction

Two fence locations are provided in this document, with the first being approximately 1km and the second approximately 3.5km in length.

- The fence design considered in the current assessment was estimated to cost (materials only) \$10,300 per kilometre, in 2004. Installation was estimated at an additional 50% (Long and Robley, 2004), equating to a total of \$15,450 in 2004 (which is approximately \$26,593 in 2024 terms). This compares to the total estimated cost to install a similar 13km fence on Dirk Hartog Island of \$28,000/km in 2013 (Bode *et al.*, 2013), and the 3km long Kangaroo Island fence which was reported to cost \$180,000 when constructed at the time in the media (unconfirmed). This results in potential minimum cost of \$26,593, but the cost is likely to be much higher, e.g. closer to \$100,000 based on the details above. Note that these estimates do not include how the fence would be electrified, and are only broadly indicative of the true likely cost.

- Maintenance

- The full cost of maintaining, monitoring and repairing the 80km cat-exclusion fencing at Arid Recovery (South Australia) is approximately \$75,000 per annum (pers. comm. Dr Katherine Tuft). Although the Bruny Island fence is likely to be much shorter, as with the Arid Recovery fence it is anticipated that a substantial proportion of the costs involved in maintenance would be associated with the employment of a maintenance person to check and repair the fence. The frequency of monitoring and repair is currently unknown but conceivably would be once a

week and presumably would take a few hours to a full day, depending on the extent of repairs required.

- Operations
 - Aside from monitoring the fence for breaches and other damage, monitoring the movement of cats and wildlife through the gaps in the fence would be required, e.g. at the road. Weeds and diseases that are identified should also be managed to limit impacts. These costs are also unknown but should be included in budgets as this monitoring will ensure the fence achieves its objective of reducing or preventing the movement of cats.

Stakeholders recognised that a substantial investment will be required to plan, construct, and operate a cat-barrier fence on Bruny Island. The Tasmanian Parks and Wildlife Services indicated that they do not currently have the capacity to undertake maintenance and monitoring of the fence. Hence, dedicated funding would be required for the management of the fence.

Alternatives to a fence

The amount of ongoing feral cat control required to keep north Bruny “free” from feral cats even with a fence in place is unknown. Considering the substantial costs involved in constructing a fence, and the potential concerns of some stakeholders, alternatives should be considered. Some alternatives suggested during stakeholder engagement were:

- Drift nets and targeted control measures

Drift netting could be used to direct the movements of cats that enter the isthmus from the south, towards cage traps, Felixers, baits stations or an area where shooters are active. Drift nets are commonly used in fauna surveys for directing wildlife to traps. However, the effectiveness of these to control the movements of predators like cats over larger areas is untested. Therefore, trials would need to be funded and implemented to examine the effectiveness of any these alternatives.

- Virtual fence

Virtual fences use deterrents that use flashes of intense light and/or sounds to discourage animals passing an area. Virtual fencing has been used to discourage wildlife from crossing roads (Fox *et al.*, 2018). At the Kangaroo Island cat-fence, barking dogs broadcasts were trialled to deter cats at fence gaps, however, the effect can decline over time as the cats habituate to them, and the novelty of such deterrents may need to be maintained. As in the alternative above, this virtual fence would also require a dedicated study to determine its effectiveness.

- Ecological control

Outside of the shore bird nesting season, cats may be feeding on abundant alternative prey, such as rabbits (Prof Chris Johnson, Prof Menna Jones, pers. comms.). Suppressing these prey populations could contribute to suppressing cat numbers on Bruny Island, thus reducing the predation pressure on native fauna (Cunningham *et al.*, 2019). Research would still be required to determine whether this method was a feasible strategy on Bruny Island.

3. ECOLOGICAL CONSIDERATIONS

This section addressed the:

- Likely effectiveness of a fence in preventing the movement of cats from the south to the north of the Island, and therefore in achieving the broader cat control objectives.
- Potential impacts to vegetation from constructing a fence.
- Potential impacts to native fauna in the vicinity of the fence and more broadly from restricted north-south passage - including identifying whether wildlife could become entangled and/or fatally wounded by an interaction with the fence (Long & Robley, 2004; de Tores & Marlow, 2011; pers. Comm. Dave Algar) and whether the fence could force native fauna onto the road and thereby increase collisions with vehicles.

The evaluation was conducted by conducting a desktop review of natural values identified in the Tasmanian Natural Values Atlas ([NVA](#)) and the Australian Government Protected Matters Tool ([Protected Matters](#)), and reference to the literature and expert elicitation (during stakeholder engagement).

Effectiveness of a cat-barrier fence in cat control

Previous projects have been highly successful in removing feral cats from north Bruny Island. Recent projects have primarily focussed on the northern part of the neck around shore-nesting bird colonies, where high cat density appears resource driven (Scomparin, 2022). Complementary trapping of stray cats in the south has also contributed to suppressing cat numbers in the north. However, it is likely that cats will rapidly repopulate north Bruny Island when control programs cease.

As discussed, the role of a proposed cat-barrier fence on Bruny Island is to reduce the movement of feral cats from the currently uncontrolled southern region to the cat controlled northern region, but the fence will be permeable (i.e. “leaky”) due to the necessity for gaps at roads. Breaches are likely to occur but as there are no data about the movement (e.g. number, routes, sources) of cats from the south to the north Bruny Island (Scomparin, 2022), it is impossible to estimate the effectiveness of a “leaky” fence in slowing cat incursions. The experiences of other such programs ([Kangaroo Island Feral Cat Eradication Program](#)) is that gaps require ongoing monitoring, e.g. with cameras and lethal controls to address the leaks.

Stakeholder engagement with experts identified that a fence could potentially control cat migration, as fences have done for cat control programs elsewhere. From an ecological perspective, if cats were semi-permanently suppressed in the north, this would reduce the predation pressure in the shore-nesting bird colonies and predation of the endangered eastern quoll. If cat incursions to the north of the island were controlled, it would allow a re-focussing of effort to the southern parts, which would have broader ecological benefits for Bruny Island.

Potential Impacts on Threatened Flora and Vegetation Communities

Desktop mapping of vegetation type within 1km of the proposed fence routes (see Figure 3) was undertaken using the TASVEG 4.0 vegetation community classifications (Figure 4) and the Tasmanian Threatened Native Vegetation Communities 2020 (Figure 5). Threatened flora was mapped within 5km around the proposed fence routes (see Figure 3) using the Tasmanian Natural Values Atlas ([NVA](#)), the Australian Government Protected Matters Tool ([Protected Matters](#)) and other local and expert sources (Table 1).

Table 1. Threatened flora potentially present within 5km of the potential cat-barrier fence sites, derived from a) the Commonwealth Protected Matters Tool and, b) the Natural Values Atlas of Tasmania.

Species	Common Name
a) Protected Matters Tool	
<i>Caladenia caudata</i>	Tailed Spider-orchid
<i>Epacris virgata</i>	Pretty heath, Dan Hill heath
<i>Prasophyllum apoxychilum</i>	Tapered leek-orchid
<i>Prasophyllum castaneum</i>	Chestnut leek-orchid
<i>Thelymitra jonesii</i>	Sky-blue sun-orchid
<i>Xerochrysum palustre</i>	Swamp everlasting, swamp paper daisy
b) NVA	
<i>Caladenia filamentosa</i>	Daddy longlegs
<i>Conospermum hookeri</i>	Tasmanian smokebush
<i>Lepidosperma viscidum</i>	Sticky sword-sedge
<i>Scleranthus fasciculatus</i>	Spreading knawel
<i>Thelymitra holmesii</i>	Bluestar sun-orchid

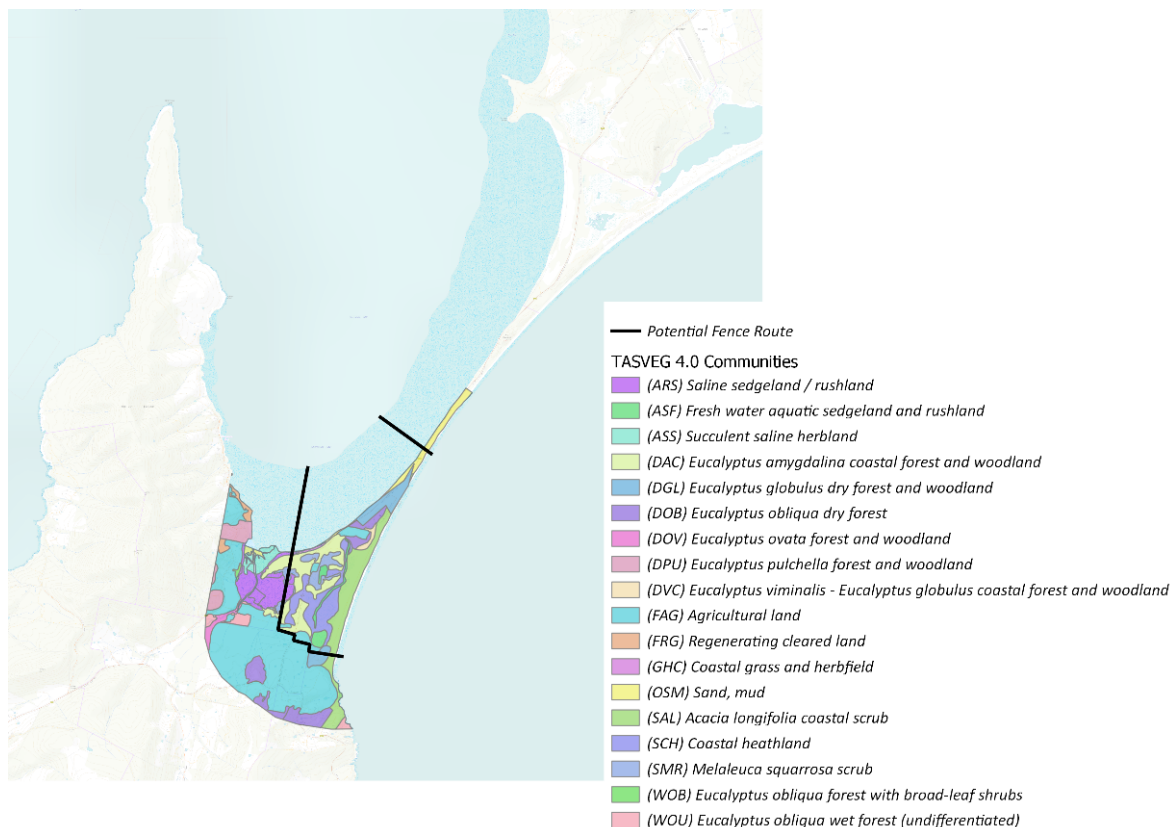


Figure 4. TASVEG 4.0 communities present within 1km of either of the assessed fence routes.

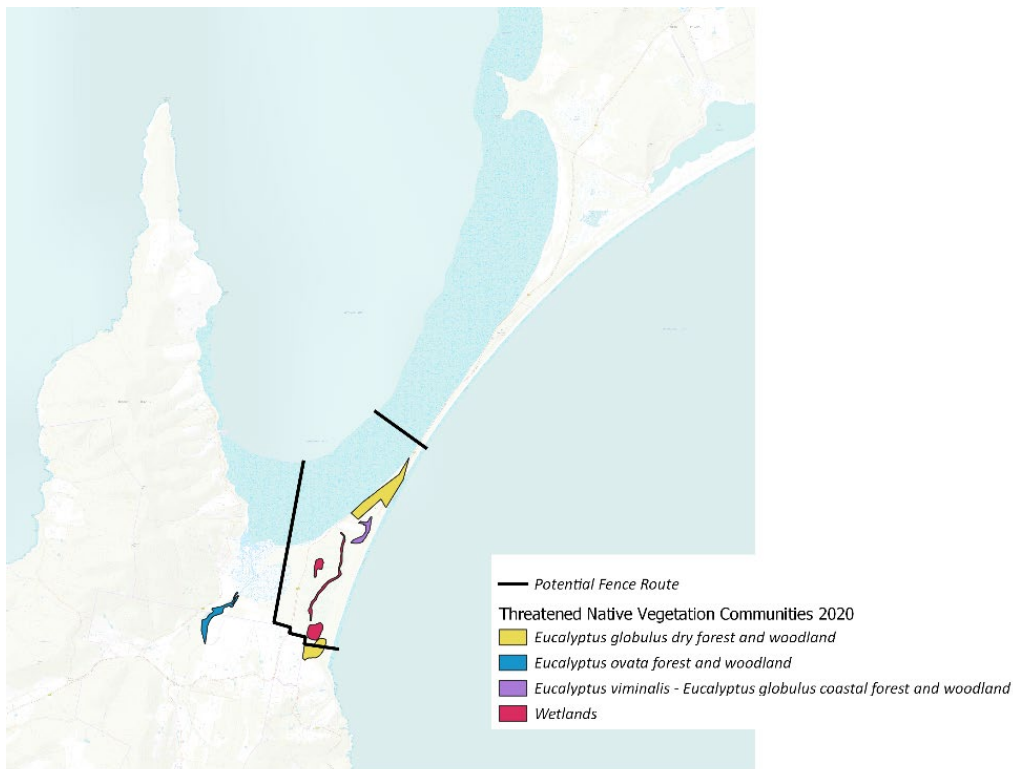


Figure 5. Threatened Native Vegetation Communities (2020) present within 1km of either of the potential fence routes.

Vegetation and threatened flora could be impacted by clearing required to install the fence and to allow access for monitoring. There may also be risks of fire associated with the electrified components. If the fence was to proceed field surveys should be undertaken to confirm/identify the location of threatened flora, and the route carefully selected to avoid them. It is possible that weeds could establish in cleared areas, hence best practice biosecurity management should be implemented.

Revegetation following removal of the fence would limit longer-term impacts of the structure.

Potential Impacts of a fence on Threatened Fauna

A desktop assessment was undertaken to identify threatened and important fauna within a 5km of the proposed fence routes (see Figure 3) using the Tasmanian Natural Values Atlas ([NVA](#)), the Australian Government Protected Matters Tool ([Protected Matters](#)) and local and expert sources (Table 2). Species that were unlikely to be present or impacted by a fence, e.g. pelagic seabirds, seabound species such as cetaceans were excluded from the assessment.

A fence could impact fauna by either displacing them or degrading or destroying their habitat. The majority of the identified threatened fauna at the proposed sites were birds, and some of these could be at risk of collision with the fence, as could bats (Long & Robley, 2004; de Tores & Marlow, 2011). Some species, however, may avoid linear infrastructure or altered habitats, and therefore, could experience a barrier effect (Ascensao *et al.*, 2019). Other potential impacts identified are an increased risk of predation and/or stress as fauna attempts to find a path through the fence (Jakes *et al.*, 2018). Wildlife may instead have to use the gaps at the Bruny Island main road, increasing the risk of vehicle associated mortalities.

Fences can fragment populations (Smith *et al.*, 2020), however a barrier on Bruny Island would not usually represent an insurmountable obstacle, due to the gaps and its height of 1.8m. The experts consulted for this assessment believed it would be permeable to most species on Bruny Island. However, as several species occur on both the north and south of Bruny Island, the Neck isthmus may be an important dispersal corridor that connects these populations. The only threatened species identified (see Table 2) that is unlikely to be able to navigate around the fence was the eastern quoll, but there may be other similar sized species that are affected.

The stakeholder engagement identified concerns about the potential impacts of a fence on local fauna. Therefore, if a fence was pursued, it would require assurances to the community that these concerns were adequately identified and impacts reduced as much as possible.

On-site surveys would be required to identify threatened fauna and evaluate if they could be impacted. Mitigation strategies may be needed to reduce impacts, for example, markers on the fence to highlight the fence and thereby reduce collisions. Ongoing monitoring might be required to identify any impacts and an adaptive management program instituted whereby management options are modified when an impact is identified. Identifying a route with the least likelihood of impacting or displacing wildlife would be a key strategy to limit the impact of the fence to fauna.

Table 2. Threatened fauna potentially present within 5km of either of the proposed fence locations derived from a) the EPBC Protected Matters Tool, and b) the Natural Values Atlas of Tasmania, and c) migratory species of significance.

Species	Common Name
a)	
<i>Aquila audax subsp. Fleayi</i>	Tasmanian wedge-tailed eagle
<i>Ardena grisea</i>	Sooty shearwater
<i>Botaurus poiciloptilus</i>	Australasian bittern
<i>Calidris acuminata</i>	Sharp-tailed sandpiper
<i>Calidris canutus</i>	Red knot
<i>Calidris ferruginea</i>	Curlew sandpiper
<i>Ceyx azureus diemenensis</i>	Tasmanian azure kingfisher
<i>Gallinago hardwickii</i>	Latham's snipe, Japanese snipe
<i>Hirundapus caudacutus</i>	White-throated needletail
<i>Lathamus discolor</i>	Swift parrot
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit
<i>Neophema chrysostoma</i>	Blue-winged parrot
<i>Numenius madagascariensis</i>	Eastern curlew
<i>Pachyptila turtur subantarctica</i>	Fairy prion (southern)
<i>Pardalotus quadragintus</i>	Forty-spotted pardalote
<i>Sterna nereis subsp. Nereis</i>	Fairy tern
<i>Thinornis cucullatus cucullatus</i> (also <i>rubricollis</i>)	Eastern hooded plover
<i>Tringa nebularia</i>	Common greenshank
<i>Tyto novaehollandiae castanops</i>	Masked owl (Tasmanian)
<i>Dasyurus viverrinus</i>	Eastern quoll
b)	
<i>Accipiter novaehollandiae</i>	Grey goshawk
<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle

c)	
<i>Ardenna tenuirostris</i>	Short-tailed shearwater
<i>Ardenna carneipes</i>	Flesh-footed shearwater
<i>Myiagra cyanoleuca</i>	Satin flycatcher

Expert Opinion

There was general opinion among experts consulted that a fence could be a useful tool for feral cat management, with positive outcomes for biodiversity on Bruny Island (Table 3). Cats are predating on a diverse range of native species, including eastern quolls, potoroo and shearwaters, therefore, limiting the migration of cats between south and north Bruny Island would benefit biodiversity. However, experts did point out that alternative measures exist to control predation pressure from cats (e.g. ecological controls) and that these should be explored as viable options, not simply as alternatives to a fence. The experts did not highlight any expected long-term ecological impacts of a fence. Experts indicated only minimal concern to the possibility of an animal becoming trapped in the fence and suggested that monitoring could mitigate this. The experts did not believe that any species was likely to become genetically isolated by the installation of a barrier fence in the short-term, especially as a “leaky” fence would allow movement of native species. Experts advised that ongoing monitoring would be essential to identify and manage any potential impacts on native biodiversity, arising from the barrier.

Table 3. Potential ecological issues raised in expert consultation

Issue raised	Likely risk
Potential impact on raptor flight/take off	Minimal
Potential impact on shearwater flight/take off	Unknown
Impact on native species migration e.g. quolls	Minimal. Fence is “leaky” so larger species can move through gaps. Smaller species such as juvenile quoll likely to pass through the fence.
Mortality rates of native species (e.g. increased road fatalities, fence collisions)	Unknown, but unlikely to have significant impact on native populations. Could be monitored.

4. STAKEHOLDER ENGAGEMENT

The objectives of stakeholder engagement were to:

- Engage with a range of stakeholder views to obtain their input about a barrier fence
- Inform stakeholders about the project
- Seek expert input on potential issues and ideas.

These ideas were utilised to help prepare the previous sections

How the assessment was conducted

Four categories of stakeholders were approached for this engagement:

- Local community (residents of Bruny Island),
- Government (State and Local government)
- Aboriginal representatives, and
- Subject matter experts (those with relevant experience to cat control, wildlife conservation, geomorphology, or animal welfare).

Consultation with the Government and community representatives was facilitated by external consultants, without the presence of NRM South, to promote an open dialogue. NRM South consulted directly with subject matter expert stakeholders and Aboriginal representative bodies.

Community engagement

Two approaches were used to consult with the community:

1. Conservation Management Pty Ltd was contracted to design a community survey to collect a range of viewpoints on whether a cat barrier fence should be installed at the neck on Bruny Island.
2. Community consultation session convened at Adventure Bay on Bruny Island on the 11th November 2023.

The survey, designed in Google Forms, proposed questions that elicited supportive or oppositional sentiments from the respondents about the cat exclusion fence. In addition, the survey collected demographic information on age, gender, whether respondents were Bruny Island residents, and whether the individual was engaged in cat management programs. The survey was available online and was promoted through various forums including social media, posters around the community, Bruny News and directly provided to community groups and organisations such as the Bruny Island Environment Network, Men's Shed, and Inala Nature Reserve. It was distributed in hardcopy with participants at the Community Consultation Day held on 11th November and the Bruny Island District School Fair on 4th November 2023.

Government engagement

Department of Natural Environment and Resources

- Invasive Species and Biosecurity Tasmania
- Tasmanian Parks and Wildlife Service (PWS)
- PWS Policy, Planning and Legislation
- Biosecurity TWWHA

Department of Premier and Cabinet

- Community Partnerships and Priorities, Aboriginal Heritage Tasmania

Department of State Growth

- Environment and Development Approvals Section
- Brand Tasmania

Kingborough Council

- Traffic Engineering
- Planning
- Environment

Aboriginal community

Utilising NRM South's strong working relationships with the primary Aboriginal representative bodies, the following groups were engaged with:

- Tasmanian Aboriginal Centre (TAC), and
- South East Tasmanian Aboriginal Corporation (SETAC) who have a strong involvement on Bruny Island and the weetaoona Aboriginal Corporation (wAC) who own the Murrayfield property on north Bruny Island.

Subject matter experts

Experts were consulted individually to capture a broad representation of the main concerns regarding the biological/ecological feasibility of a cat barrier fence. They were selected for their experience either on Bruny Island or with other feral predator fences across Australia. The following experts were consulted about the feasibility of a cat fence on Bruny Island:

- Gillian Basnett, Invasive Species Council
- Professor Menna Jones, University of Tasmania
- Professor of Wildlife Conservation, Christopher Johnson, University of Tasmania
- Conrad Daniels, Bruny Farming
- Dr Dave Algar, Principal Scientist, Department of Biodiversity, Conservation and Attractions
- Dr Chris Sharples, Geomorphologist, University of Tasmania
- Katherine Tuft, Arid Recovery
- Professor Sarah-Marie Legge, Australian National University and Principal Research Fellow with The University of Queensland
- Elise Jeffreys, Tasmanian Land Conservancy (TLC)

The key messages communicated to stakeholders were:

Key messages

- ❖ Bruny Island is a biodiversity hotspot with 10 terrestrial dependent mammal and bird species now listed as threatened and 12 of conservation significance.
- ❖ One of those mammals is the eastern native quoll and the population has been declining over recent decades with feral cats being a contributing factor to this loss.
- ❖ NRM South has been undertaking a cat control project on Bruny Island for the past 4 years, in partnership with Biosecurity Tasmania, Kingborough Council, Southeastern Tasmania Aboriginal Corporation (SETAC), Ten Lives Cat Centre, and Bruny Farming and funded by the Australian Government under the Regional Land Partnership program.
- ❖ The Australian Government is funding NRM South to undertake a feasibility assessment of installing a cat barrier fence on Bruny Island to prevent movement between the north and south islands.
- ❖ A cat barrier fence has been a key management tool used in other island eradication projects e.g. Kangaroo Island.
- ❖ This project is only to investigate the feasibility of installing a cat-barrier fence across the Neck isthmus (or south of the Neck), not to install a fence.
- ❖ Whilst there is no current commitment or proposal to install the cat-barrier fence, the initial feasibility is to assess the range of possible planning and policy issues if a fence was to be installed.
- ❖ The engagement for the feasibility assessment is limited to seeking both professional advice and input from relevant stakeholders but also general community sentiment.
- ❖ This advice will form part of the overall feasibility assessment being conducted, including investigations into the technical and biological feasibility for installing a cat-barrier fence.

Local and state government agencies were consulted to obtain comments, to identify any concerns associated with the concept of a fence, and to consider how the fence could align or challenge existing policies. Another objective was to ascertain how the fence would sit within the State and Local planning schemes and what would be required from a legislative perspective if the fence was to be pursued. It was explained that participants views will help NRM South evaluate the overall feasibility of a cat control barrier and that these discussions were all preliminary in nature.

The following key questions were used and adapted to suit the participants role and interests:

- ❖ What planning, land use management and related matters need to be considered?
- ❖ What policies are relevant to the consideration, impact assessment and approval process?
- ❖ Do you have any feedback on the two options being considered (maps were shared in the meeting)?
- ❖ Are there other government stakeholders that you think should be involved?

Results of Engagement

The engagement was highly valuable and feedback is categorised into the key groups.

Community consultation

The survey was open for 53 days from 30th September to 22nd November 2023 and received 36 responses from the community. A total of 63% of survey respondents were 55 years or older, while the remaining 36% were between the ages of 35 – 54. The respondents were predominantly full-time or part-time Bruny Island residents, with just 11% reporting to be visitors. General sentiment indicated support (64%), of which 47% strongly supported a cat exclusion fence, with just 30.6% strongly opposing the idea (Figure 6). The main reasons for support of the fence aligned with the concept's proposed objectives, i.e. protecting native wildlife, preserving the natural environment and concerns about impacts of feral cat.

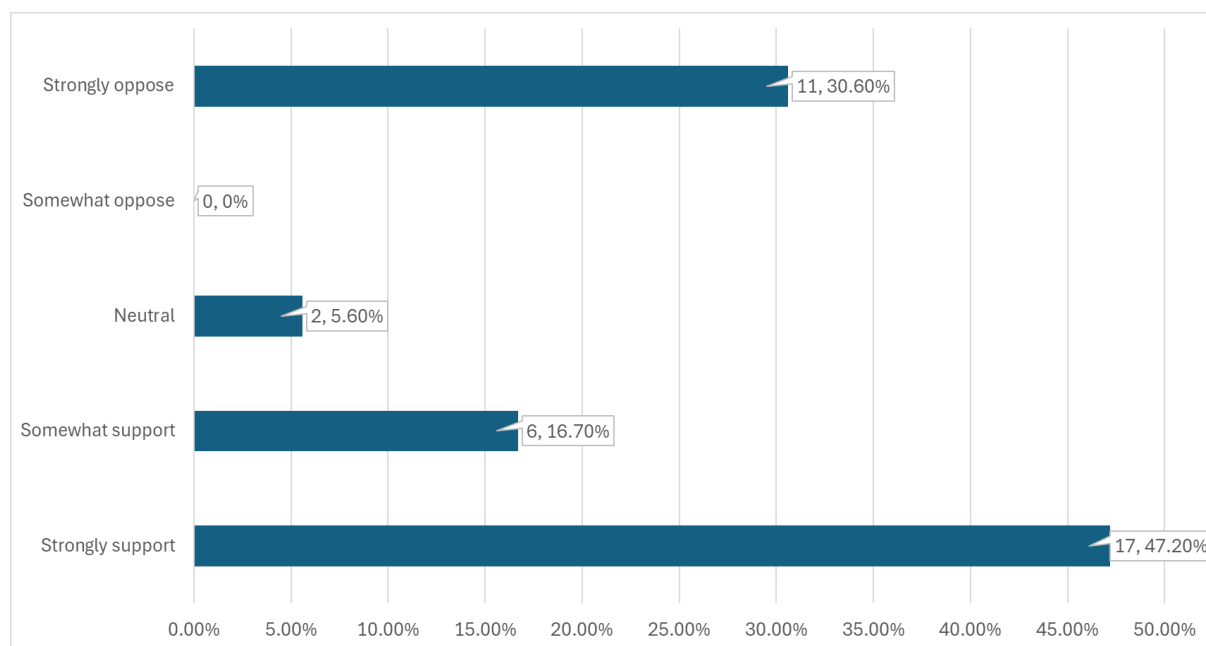


Figure 6. Community sentiment about cat barrier fence on Bruny Island

The community consultation session was attended by seven residents of Bruny Island and represented from the following groups:

- Bruny Island Men's Shed
- Community Association
- Bruny Island Environmental Network

Representation from these groups provided the facilitators a level of confidence that there was a broader representation of community concerns and interests associated with the concept of a fence. The attendees were very positive about cat control and saw the value of a fence as part of that. There was some additional discussion about the impact of a fence on residents and visitors use of the beach.

Government (State and Local) consultation

Some agencies approached responded that they did not consider they had any jurisdiction and therefore could not provide comments on the concept of a fence.

The key findings identified:

- A range of positive comments about the concept

- Identification of issues and challenges that would be involved with the construction and management of the fence, and
- Advice on the possible implications for future planning and approval process (see Table 4).

Table 4. Summary of government (state and local) consultation on cat barrier fence concept

Positive Aspects	Issues and Challenges	Possible implications
There was broad support for continued actions to reduce or eradicate feral cats on Bruny Island.	Substantial funding commitment required for ongoing management and maintenance	Accelerating climate change and an increasingly dynamic coast will need to be considered in the feasibility of the fence.
The project builds on the efforts undertaken by Kingborough Council, State government and community to reduce feral cats on Bruny Island over past decade. Council is supportive of the cat management program.	Alternatives* should be explored with similar weight	No known Aboriginal or European heritage sites or concerns with the proposed locations for the fence at this stage.
Support for government funding and resources to be directed towards actions to reduce or eradicate feral cats on Bruny Island.	The ability of a “leaky” fence to reduce migration of cats	No concerns raised about triggers of Matters of National Environmental Significance under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
Feasibility demonstrated in a different landscape with the construction of a barrier fence on Kangaroo Island to manage feral cats.	Questioned the asset life of the fence built into water	No concerns raised in terms of Bruny Island or Tasmania branding. Could be seen as part of Tasmania’s strong commitment to the environment and an interesting part of the conservation work on Bruny Island.
There is unlikely to be Aboriginal heritage sites at the two proposed locations for the permanent fence on the Neck.	Impact on movement of other native wildlife	
There is a high likelihood of ongoing community support for cat control interventions and positive messaging in terms of stories and brand.	Concern about potential implications for access along the beach	
	Visual impact of the fence to residents and visitor	
	Road safety; the fence is a new roadside structure that vehicles could collide with, and pedestrians will also potentially need to negotiate.	

* Suggested alternatives

- The use of drift fences combined with Felixers. Drift fences could be positioned to direct cats towards the Felixers. The high level of accuracy of the Felixer means that this has potential to provide a leaky barrier that nevertheless selectively removes cats while still allowing native species the freedom of north-south movement.
- Focus physical resources on protecting the shearwater colony on Cape Queen Elizabeth rather than locating the fence at the Neck.

Aboriginal community

Aboriginal Heritage Offices were consulted regarding the cultural significance of the two proposed sites on the Neck. They responded that the site for a proposed fence would need to be carefully considered to identify any potential impacts for the culturally significant shearwaters, or physical impact to Aboriginal heritage e.g. would there be impact to middens, stone tool sites, and/or human access to places. It is recommended that if a fence was pursued that a formal partnership arrangement with prescribed bodies to ensure they can apply their cultural knowledge, values and interests to shape, inform and be involved in implementing the potential project activities on Bruny Island.

The Tasmanian Aboriginal Centre raised several concerns regarding the feasibility of a cat barrier fence. They were concerned about the potential impact on native animals, including wallabies and mutton birds, which may be affected by the restrictive barrier as they move around the island. Additionally, there were concerns about the physical impact on Aboriginal heritage sites, such as middens and stone tool locations, and whether the fence would restrict human access to culturally significant areas. The cost versus benefit of the fence is also a point of contention, with doubts about its worth if it becomes a permanent, aesthetically displeasing structure that disrupts the sense of place. The TAC recommended that any proposal for the fence must undergo thorough cultural heritage assessments and community consultations, considering not only the physical impacts on tangible heritage objects but also broader social and aesthetic values. While there is support for cat management and the protection of natural and cultural values, the community is concerned about the broader impacts on the landscape and cultural heritage.

The weetaapona Aboriginal Corporation (Murrayfield) Board and SETAC were supportive of the concept of the fence.

Subject matter Expert consultation

Generally, experts who had experience with both exclusion and leaky fences were supportive of the proposed barrier fence for Bruny Island (see Table 5). Comments particularly highlighted that from experience, fences lower the cost of long-term cat management as it reduces the time to control and makes the effort i.e. cat management control, feasible. Modelling has concurred with this (Bode *et al.*, 2013).

Table 5. Summary of comments received from subject matter experts

Positive comments	Issues and Challenges	Possible implications
A fence is useful in defining management zones	Monitoring prior to installation and during essential to determine what is travelling along beach, flats and road.	Given the fence would extend onto the mudflats and into high energy waves on beach side, an alternative location to the neck may be more practical
Ongoing maintenance would be comparatively low (estimate 2 – 3 times per week to assess length of fence)	Important to have the time for successful community engagement	
In combination with a modest surveillance system, it would support effective trapping and removal activities	Important to have money upfront for the project and only one level of command i.e. 1 person responsible.	
Minimal impact on genetic isolation. Suggested that quolls would be the only animal that would see it as a barrier, and it is		

likely that young quolls could go through the fence.		
Cats move below sand dunes, so definitely worthwhile considering some efficient barrier at this location.		

Other comments received:

- Rabbit control could be a key tool to manage cats as rabbits are an alternative prey source that sustains cat population when shore nesting birds are absent
- Virtual/artificial fence could be a cheaper alternative.

5. CONCLUSIONS AND RECOMMENDATIONS

The findings from this study are summarised in the table below (Table 6).

Table 6. Summary of key findings

<i>Issue identified</i>	<i>Requirements and considerations</i>
<i>Technical</i>	
Funding	The project would need to be adequately funded, including construction, maintenance, monitoring, and decommissioning.
Objectives of feral cat management	Clearly identify the purpose or objective of the fence and the broader cat management program. Evaluate the pros and cons of a fence and alternate options to achieve the objective (i.e. is the fence a better option?)
Fence location	Confirm the best location, which should be informed by purpose, stakeholder input, impact on natural, cultural and economic values, construction issues, tenure, etc.
Design, including duration of deployment of a fence	Confirm the expected duration of the fence and what triggers would be in place to prompt its removal/continuation. Details of how to manage decommissioning.
Cost of construction and ongoing maintenance	Seek up to date quotes for the design, planning approvals, materials and construction, including ongoing maintenance costs and powering an electric fence, and cameras etc. Determine the cost of ongoing monitoring and maintenance of the fence. Determine which organisation would be responsible for this. This should also consider weed control.
Approvals	Confirm the approvals required. This could include Council, EPA, PWS (an RAA) and potential approvals required under the Threatened Species Protection Act, Nature Conservation Act, and/or EPBC Act. An environmental impact assessment would potentially be required, which would consider potential impacts to natural and cultural values, geomorphology, and ways to minimise impacts to these. A management plan may be required to addresses how any issues identified in an EIA would be managed.
Monitoring to determine any unacceptable impacts	Monitoring would be required for: <ul style="list-style-type: none"> • fauna around the fence and at the gaps in it to identify impacts • movement of cats through the gaps • Establishment of weeds or diseases along the fence.
<i>Ecological considerations for installing a fence</i>	
Vegetation	Conduct field surveys at the identified route and adjust route to avoid species of concern and significant vegetation
Fire risk	Caused by electric fence. Maintain a buffer between the electrified components and vegetation.
Native fauna	Conduct field surveys at identified route to identify species of concern. Protect fauna habitat wherever possible. Monitoring for impacts (roadkill, fence collisions, barrier-effect). Incorporate adaptive management into the project to address impacts when identified.

Biosecurity	Use best practice biosecurity approaches during construction and maintenance. Monitor for weeds and diseases and manage when identified.
Cat incursions at fence gaps	Monitoring (cameras). Management of cats either trapping, shooting, Felixers etc.
<i>Stakeholder engagement</i>	
Community	The majority of community respondents to this assessment were positive about the idea of a fence, a section of the community was undecided, and others objected outright. Concern for the impacts of a fence on native fauna was high and the community will likely seek assurances about it. Any proposal for a fence is likely to go to public comment as part of the planning approvals process, therefore, ongoing community support will remain important to it proceeding. Conduct further consultation with the Bruny Island community for any advancement of a cat-barrier fence constructed on the Island.
Government	Broad support. Ensure thorough assessment, adequate funding, etc. Establish which agency is responsible and ensure funding for the full lifecycle of the fence. The full cost of planning, constructing, maintaining, operating, and decommissioning the fence need to be costed. The agency managing the fence will need to be empowered to make decisions to ensure that the fence continues to serve its purpose. A management plan should include programs to monitor both cat incursions and any negative impacts on wildlife, with mitigation strategies clearly identified. A management plan will need to be adaptive, to enable actions to take place to improve fence operations where necessary, and potentially retire the fence where it is no longer functional.
Aboriginal community	Site assessment needs to carefully consider identifying any potential impacts for the culturally significant shearwaters, or physical impact to Aboriginal heritage e.g. would there be impact to middens, stone tool sites, and/or human access to places. It is recommended that if a fence was pursued that a formal partnership arrangement with prescribed bodies to ensure they can apply their cultural knowledge, values and interests to shape, inform and be involved in implementing the potential project activities on Bruny Island. Establish formal partnerships with identified Aboriginal groups To ensure that Aboriginal people can apply their cultural knowledge, values, and interests to shape, inform and be involved in implementing the potential project activities on Bruny Island.
Subject matter experts	Fences can be a good means of achieve cat management objectives and save costs as they reduce the management area. Have worked elsewhere Consider alternative locations in south Bruny Island that do not terminate on beaches or in marine waters. To avoid the degradative forces of dynamic water bodies on the east and west, the potential impact of the fence on tidal zone, impeding

	<p>human movement on the beach, visual disturbance to the beach and mudflats, the potential for cats to move around the fence at low tide. For example, a route even further south of the Neck that terminates on a rocky shelf, rather than in the sea/bay may be more feasible.</p> <p>Assess the range of available cat control actions and how they compare at effectively reducing cat migration across the Neck, and what the projected costs are.</p>
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This assessment has identified that a fence could contribute to the suite of measures to manage the feral cat issue on Bruny Island. However, it would require a commitment to significant amount of ongoing funding, and mitigation of key risks and concerns (e.g. natural, landscape, cultural, and amenity values, economic values, and construction challenges).

However, if some of the disadvantages (e.g. impacts relating social, cultural or natural factors) outweigh the benefits, it could be determined that other cat control measures are more suitable for controlling the movement of cats into the Neck and north Bruny Island. This includes continued management of domestic and stray cats, and other feral cat management options such as targeted control (cage trapping, shooting, Felixers), drift nets, virtual fencing and ecological control measures.

Most importantly, the feasibility of a fence is dependent on:

- An updated Cat Management Plan for the Island, which considers the objective of a cat control program, including whether the goal is suppression or eradication, and how this is best achieved (e.g. a fence as a tool within the broader goals and investments for cat control on Bruny Island)
- A thorough environmental impact assessment which considers site selection and evaluates potential impacts to:
 - Natural values
 - Aboriginal cultural values and heritage
 - Economic values, such as tourism

and identifies strategies to reduce impacts. If the impacts are deemed unacceptable, it might be determined that alternate approaches to managing the feral cat population be used.

- Appropriate and detailed engagement with key stakeholders, including the local community, landowners and managers, and Aboriginal community and groups.
- Ongoing and adequate funding for the design, construction (including approvals), monitoring, and maintenance of a fence.
- Identifying clear roles and responsibilities – and the identification of the organisation responsible for the fence, including its construction, monitoring, maintenance and decommissioning.
- Continued stakeholder engagement.

6. FREQUENTLY ASKED QUESTIONS

1. Why was this report done?

This report was part of the project “*Priority action for eastern quolls on Bruny Island - extension*”. This project was a one year extension of the original *Priority action for eastern quolls on Bruny Island* project delivered by NRM South, along with a suite of partners, from 2019-2023 focussed on reducing the impact of cats on species including the eastern quoll. There were two key components to the extension project, continuation of feral cat control at key sites using Felixer grooming traps, and the assessment of the feasibility of installing a cat barrier on Bruny Island as a potential means of managing feral cats.

The project *Priority action for eastern quolls on Bruny Island* was very successful in removing the majority of feral cat cats from north Bruny Island, but feral cats will repopulate the north from the uncontrolled populations in south of the island unless action is taken.

Cat experts identified a cat-barrier at the Neck as one option to control cat migration from south to north of the island, which prompted this assessment by NRM South. The report approached the assessment by identifying the range of issues that could affect the feasibility of a cat-barrier barrier on Bruny Island, and the appetite of relevant stakeholders.

2. Who funded the work?

The Australian Government, under the Regional Land Partnership program

3. When did the project run?

July 2023- 30 June 2024

4. Why was a barrier considered a way to manage feral cats?

Cat management requires a “toolkit” of control measures aimed to control and suppressing their numbers. A barrier is just one method that may be deployed to control the movement of cats.

Barriers have been used at sites including Kangaroo Island and Dirk Hartog Island cat eradication programs to keep feral predators away from threatened species. They can also help reduce the size of management units in large areas by physically separating controlled areas from uncontrolled areas. This can assist with reducing the costs of cat control.

5. How was the assessment approached?

The report considered the following three broad areas:

- 1) Technical issues, including:
 - a. Designs that are effective in preventing cat movements
 - b. Identifying any construction and maintenance issues
 - c. Estimating the cost of construction and maintenance
 - d. Determining site suitability and availability
 - e. Determining how to address necessary gaps in the barrier, such as the road and the seaward terminating ends
 - f. Identifying natural and cultural assessments and approvals that would be required.
- 2) Ecological issues, which considered:
 - a. Likely effectiveness in curbing cat movements

- b. Benefits to biodiversity
 - c. Potential impacts to biodiversity (flora and fauna) in the region of the barrier.
- 3) Stakeholder engagement to identify potential issues and to collate input from a range of stakeholders, including:
- a. Experts in cat management
 - b. State government departments (including NRE, particularly PWS, State growth, etc)
 - c. Kingborough Council
 - d. Bruny Island community
 - e. Aboriginal groups.

6. Which of the two routes did you decide the barrier should be built at?

There is no plan to build a barrier on Bruny Island at this time. The sites discussed in the report were used only for the purpose of providing examples for the stakeholder engagement. If a barrier was progressed, a thorough site selection process and assessment would be required.

7. I don't want a barrier on my land, how do I stop it?

There are no current plans for a barrier. If a barrier was progressed, it would not be built without the full consultation with and support from landowners or land managers, and all the necessary approvals.

8. Would the barrier be permanent?

While there are no current plans for a barrier, it would be hoped that a barrier would be a temporary structure in place while the feral cat issue was brought under control.

9. What did the report conclude?

The assessment identified a range of issues that need to be considered before installing a cat-barrier barrier on Bruny Island. The report determined that a cat-barrier barrier on Bruny Island would not stop cats, but could be an additional tool, alongside continued monitoring and trapping, that could contribute to feral cat-control and management.

Stakeholder engagement

It found there was strong support for continuing cat control on Bruny Island from both community, managers, government and experts.

In the community engagement, broad support for continuing cat control on Bruny Island including a barrier was found, but ongoing consultation would be needed before advancing the concept of a barrier due to concerns about impacts on native fauna.

Discussions amongst managers in the state Government identified a need for clarity on budget and who would be responsible for the "asset" (the barrier). They asked if it would be better if money and effort were spent on asset protection, that is, targeting physical resources to protect bird colonies than a barrier?

Amongst the experts, a cat-barrier barrier was recognised as potentially valuable for slowing repopulation of north Bruny by cats, however, the goal of cat control on Bruny Island needed clarification and alternative measures to a barrier be given equal consideration before advancing the idea of a cat barrier.

Amongst the Aboriginal community, concern about impacts on Aboriginal heritage site as well as the broader impacts on social and aesthetic values were identified.

Conclusion

A cat-barrier barrier is a major technical undertaking which would trigger multiple assessments and approvals, involving multiple agencies and ongoing commitment for the full lifecycle of the project. Initial and ongoing monitoring would be required to ensure a barrier was operating as intended and that any environmental impacts were managed.

Most importantly, for a cat barrier to be feasible it would require a clearly defined objectives supporting the broader goals of cat management on Bruny Island, which is best captured in a Cat Management Plan.

10. What is NRM South's position on a cat barrier?

NRM South is neutral on whether a barrier should be built. Our role was to identify the potential issues and what would need to be considered if a barrier was progressed.

11. When is a barrier on Bruny Island going to be built?

There is no plan to build a cat barrier on Bruny Island at this time. This assessment was an exercise to explore the types of issues that could arise, or need to be considered if a barrier was progressed on Bruny Island.

References

- Algar, D., Johnston, M., Tiller, C., Onus, M., Fletcher, J., Desmond, G., ... & Speldewinde, P. (2020). Feral cat eradication on Dirk Hartog Island, Western Australia. *Biological Invasions*, 22(3), 1037-1054.
- Ascensão, F., Kindel, A., Teixeira, F. Z., Barrientos, R., D'Amico, M., Borda-de-Água, L., & Pereira, H. M. (2019). Beware that the lack of wildlife mortality records can mask a serious impact of linear infrastructures. *Global Ecology and Conservation*, 19, e00661.
- Bode, M., Brennan, K. E., Helmstedt, K., Desmond, A., Smia, R., & Algar, D. (2013). Interior fences can reduce cost and uncertainty when eradicating invasive species from large islands. *Methods in Ecology and Evolution*, 4(9), 819-827.
- Cunningham, C. X., Johnson, C. N., & Jones, M. E. (2019). Harnessing the power of ecological interactions to reduce the impacts of feral cats. *Biodiversity*, 20(1), 43-47.
- DCCEE 2023, Threat abatement plan for predation by feral cats, Department of Climate Change, Energy, the Environment and Water, Canberra. CC BY 4.0.
- de Tores, P. J., & Marlow, N. (2011). The relative merits of predator-exclusion fencing and repeated fox baiting for protection of native fauna: five case studies from Western Australia. In *Fencing for conservation: restriction of evolutionary potential or a riposte to threatening processes?* (pp. 21-42). New York, NY: Springer New York.
- Dubey, J. P., Murata, F. H., Cerqueira-Cézar, C. K., Kwok, O. C., Su, C., & Grigg, M. E. (2021). Recent aspects on epidemiology, clinical disease, and genetic diversity of *Toxoplasma gondii* infections in Australasian marsupials. *Parasites & Vectors*, 14(1), 301.
- [Environment Protection and Biodiversity Conservation Act 1999 \(EPBC Act\)](#). *Federal Register of Legislation*, Australian Government, version update 15 December 2023, accessed 18 April 2024.
- Fancourt, B. A., Hawkins, C. E., & Nicol, S. C. (2013). Evidence of rapid population decline of the eastern quoll (*Dasyurus viverrinus*) in Tasmania. *Australian Mammalogy*, 35(2), 195-205.
- Fox, S., Potts, J. M., Pemberton, D., & Crosswell, D. (2018). Roadkill mitigation: trialing virtual fence devices on the west coast of Tasmania. *Australian Mammalogy*, 41(2), 205-211.
- Francis, L. (2018). Not all islands are equal. A conservation analysis of feral cat management on Bruny Island, and a rodent ecological interaction study (Honours Dissertation), University of Queensland.
- Geale, C. A. (2017). Activity and abundance of feral cats (*Felis catus*) at seabird colonies on Bruny Island (Honours Dissertation), University of Tasmania.
- Jakes, A. F., Jones, P. F., Paige, L. C., Seidler, R. G., & Huijser, M. P. (2018). A fence runs through it: A call for greater attention to the influence of fences on wildlife and ecosystems. *Biological Conservation*, 227, 310-318.
- Landscape South Australia Kangaroo Island. (2021). Dudley Peninsula Feral Cat Eradication Operations Plan: Summary, [KI-cat-eradication-dudley](#).
- Legge, S., Taggart, P. L., Dickman, C. R., Read, J. L., & Woinarski, J. C. (2020). Cat-dependent diseases cost Australia AU \$6 billion per year through impacts on human health and livestock production. *Wildlife Research*, 47(8), 731-746.

Long, K. & Robley, A. (2004) Cost Effective Feral Animal Exclusion Fencing for Areas of High Conservation Value in Australia, Commonwealth of Australia.

Medina, F. M., Bonnaud, E., Vidal, E., & Nogales, M. (2014). Underlying impacts of invasive cats on islands: not only a question of predation. *Biodiversity and Conservation*, 23, 327-342.

Peacock, D., & Abbott, I. (2014). When the 'native cat' would 'plague': historical hyperabundance in the quoll (Marsupialia: Dasyuridae) and an assessment of the role of disease, cats and foxes in its curtailment. *Australian Journal of Zoology*, 62(4), 294-344.

Radford, J. Q., Woinarski, J. C. Z., Legge, S., Baseler, M., Bentley, J., Burbidge, A. A., ... & Ringma, J. (2018). Degrees of population-level susceptibility of Australian mammal species to predation by the introduced red fox *Vulpes vulpes* and feral cat *Felis catus*. *Wildlife Research*, 45, 645-657.

Robley, A., Parkes, J., & Forsyth, D. (2003). Feasibility study for red fox eradication and a predator proof fence across the Yanakie isthmus, Wilson Promontory National Park. *Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Melbourne*.

Scomparin, C. (2022). Ecology and control of feral cats on a large island ecosystem (Doctoral Dissertation), University of Tasmania.

Smith, D., King, R., & Allen, B. L. (2020). Impacts of exclusion fencing on target and non-target fauna: a global review. *Biological Reviews*, 95(6), 1590-1606.

Wabiko, H. (2016). Monitoring predator activity in burrowing seabirds colony on Bruny Island (Honours Dissertation), University of Tasmania.