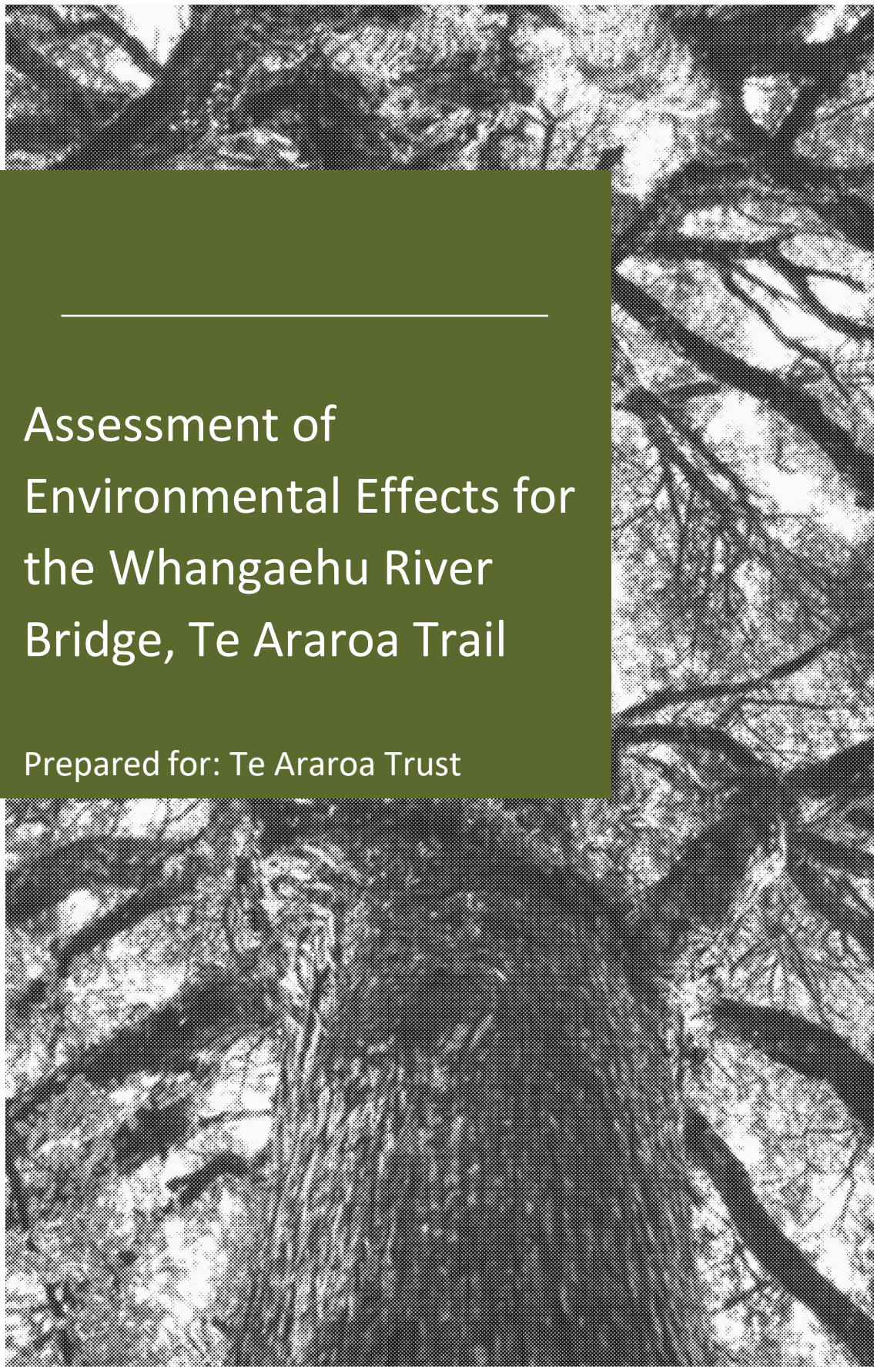

Assessment of Environmental Effects for the Whangaehu River Bridge, Te Araroa Trail

Prepared for: Te Araroa Trust

NSES Ltd report 22:2024/25

SINGERS
ECOLOGICAL

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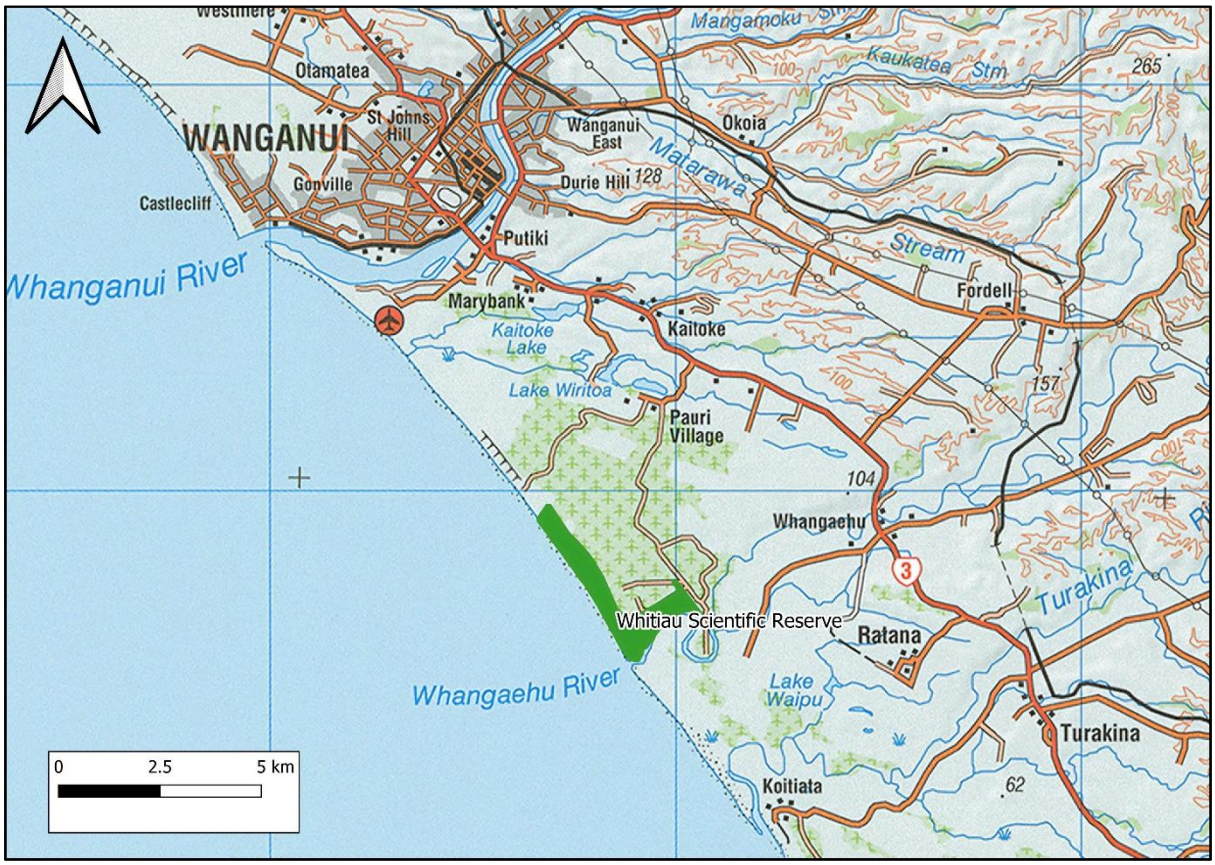
1. Introduction

The Te Araroa Trail is a continuous 3,000 km walking track from Cape Reinga to Bluff. From Whanganui the trail currently follows State Highway 3 to Turakina township requiring walkers to hike alongside a main highway.

This assessment of environmental effects (AEE) is part of a project to realign the trail along the west coast from near the Whanganui airport to Koitiata township, at the mouth of the Turakina River. This will require development of a bridge across the Whangaehu River and access through the Whitiau Scientific Reserve, located on the true right side of the river.

Whitiau Scientific Reserve is located on the north side of the Whangaehu River, approximately 12 km southeast of Whanganui and is managed by the Department of Conservation. The reserve is a nationally significant area of Holocene age coastal dunes and associated dune plains and wetlands.

Figure 1.1: Location of Whanganui and the Whitiau Scientific Reserve



1.1 The Proposal

The proposed trail route will enter the Whitiau Scientific Reserve from the beach at the mouth of the Whangaehu River and head inland for approximately 1.6 km along an existing 4WD track to the site of the proposed swing bridge. This track is already well developed and is used for management purposes and whitebait fishers.

The proposed Whangaehu River swing bridge is located approximately 5.3 km southwest of the current SH3 Whangaehu River Bridge. The proposal is to construct a 120 m long x 0.75 m wide cable suspended pedestrian swing bridge across the Whangaehu River.

Figure 1.2: Representation of the proposed swing bridge design

The bridge will be constructed for a 50 year timeframe using a combination of timber, stainless steel, concrete and reinforced polymer (FRP).

The treated wooden components include the bridge staircase and foundation piles, with the piles encased in concrete and a steel casing. The bridge staircases will be 6.5m–8m in height. The swing bridge platform will also be supported by wooden out riggers. All wooden structures will be cut to length offsite, though some minor trimming will be required on site. These towers and staircase will be supported by stainless steel wires located behind and perpendicular to the staircase and towers, which will be held with concrete deadman anchors. The bridge platform will be held by stainless steel wire cables and treated timber bracing. The bridge deck will be a fibre reinforced polymer decking. The bridge load capacity is for five people.

On the true right bank of the river the bridge is located within the Whitiau Scientific Reserve, whilst the true left bank of the river consists of private farmland. There are no ecological values on the farmland of significance. This AEE pertains only to the requirement for a resource consent for construction of the bridge and effects within Whitiau Scientific Reserve.

Effects associated with the walking track will be addressed through the Department of Conservation's concession process. This assessment has however considered the purpose of a scientific reserve and obligations of the manager.

Figure 1.3: Proposed works footprint within the Project Area

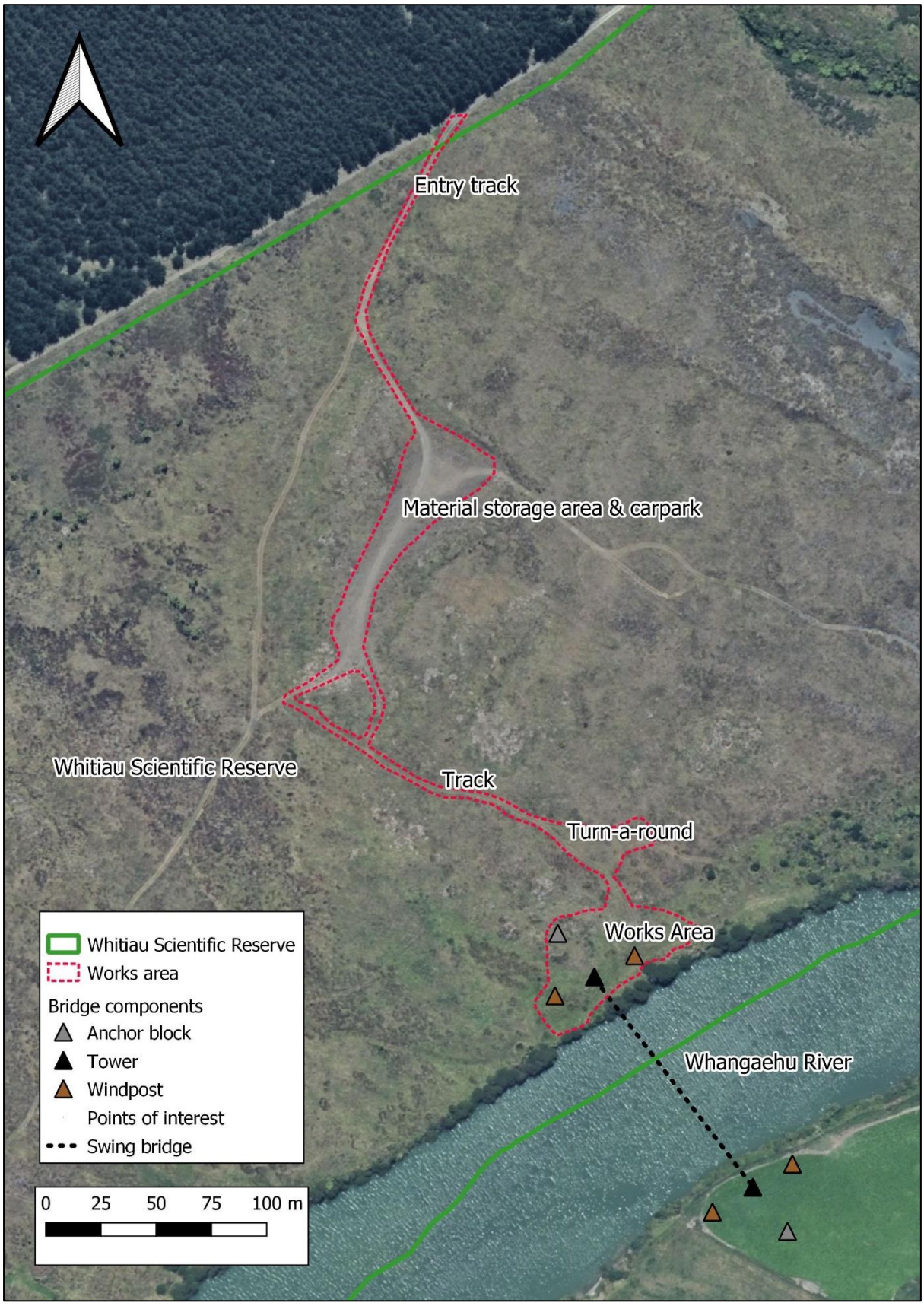


Figure 1.3 sets out the proposed works footprint. The proposal will involve small scale earthworks using a digger including preparation of tracks to bridge components and excavation of soil for foundations. The works footprint includes:

- Utilising existing formed tracks for vehicle access for trucks and a digger. It is proposed that concrete truck access is as close to the bridge foundations as possible.
- The area recommended for material storage and a carpark has a hardened gravel surface and is unvegetated. It will be used for offloading materials from trucks, carpark and all refuelling of the digger.
- From the material storage area, all bridge materials will be transported to where needed.
- The digger will be used to create a more uniform track surface to enable improved access, such as for a concrete truck. This will require using onsite soil material such as any raw sand from excavation of foundations.
- A digger will be used to clear vegetation required within the immediate works area such as for the bridge staircase, foundations and anchor footings. All indigenous vegetation will be excavated, will be stockpiled on the alluvial terrace near the harakeke flaxland. This will be later used for remediation of any areas of bare soil.
- The digger with an auger attachment will excavate 6 m holes for foundation piles and anchor blocks. To prevent soil slumping of the wet river silt, the foundation pile holes will be encased in a steel cylinder to the required depth. Excess water will be pumped from these holes into a temporary sediment retention pond, such as a small, excavated depression within the alluvial terrace.
- Excavated silt and soil from the foundations will be stockpiled and then later used for remediating disturbed ground following completion. This will be used to remediate areas where soil disturbance has occurred.

1.2 Statutory Framework

1.2.1 Reserves Act 1977

Scientific reserves are classified to protect and preserve (an area) in perpetuity (Section 21). The relevant legislation is included below.

(1) …reserves classified as scientific reserves, purpose of protecting and preserving in perpetuity for scientific study, research, education, and the benefit of the country, ecological associations, plant or animal communities, types of soil, geomorphological phenomena, and like matters of special interest.

(2) Every scientific reserve shall be so administered and maintained under the appropriate provisions of this Act that—

(a) …except where the Minister otherwise determines, the indigenous flora and fauna shall as far as possible be preserved.

(c) where scenic, historic, archaeological, biological, or natural features are present on the reserve, those features shall be managed and protected to the extent compatible with the principal or primary purpose of the reserve: provided that nothing in this paragraph shall authorise the doing of anything with respect to fauna that would contravene any provision of the Wildlife Act 1953

The concept of preservation in perpetuity is therefore fundamental to this AEE. Consequently, activities proposed within a scientific reserve need to be undertaken in such a way to preserve all features of significance, so this proposal is consistent with the Act.

Whilst this AEE is for a resource consent under the Resource Management Act 1991, this AEE has been undertaken, cognisant of the purpose of this reserve under the Reserves Act 1977.

1.2.2 Resource Management Act 1991, and associated subordinate plans

The Resource Management Act aims to sustainably manage resources and plan for the future of our environment. The Horizons Regional Council's One Plan provides direction for this. Of specific relevance to this Proposal is Schedule F — Rare and threatened habitats.

1.2.2.1 Schedule F: Indigenous Biological Diversity

Schedule F classifies habitat that is rare, threatened or at risk. A resource consent is required if a proposal occurs within an area which is rare, threatened or at risk habitat and meets criteria.

This proposal occurs within 'Stable duneland' which is a rare habitat. Whitiau Scientific Reserve additionally contains additional rare, threatened or at risk habitats including 'Active dunes' and 'Swamp and marsh wetland'. The 'Stable duneland' (within Whitiau Scientific Reserve) meets criteria because the area in question exceeds 0.05 hectares.

These designations and also because the area is legally protected, also classify the Whitiau Scientific Reserve as a Significant Natural Area under the Whanganui District Plan.

1.2.2.2 National Policy Statement for Indigenous Biodiversity

Whitiau Scientific Reserve qualifies as a significant natural area for its very high representativeness, diversity and pattern, rarity and distinctiveness and ecological context.

For this reason, relevant NPSIB policies include:

> Policy 1: Indigenous biodiversity is managed in a way that gives effect to the decision making principles and takes into account the principles of the Treaty of Waitangi.
>
> Policy 3: A precautionary approach is adopted when considering adverse effects on indigenous biodiversity.
>
> Policy 4: Indigenous biodiversity is managed to promote resilience to the effects of climate change.
>
> Policy 7: SNAs are protected by avoiding or managing adverse effects from new subdivision, use and development.
>
> Policy 10: Activities that contribute to New Zealand's social, economic, cultural, and environmental wellbeing are recognised and provided for as set out in this National Policy Statement.
>
> Policy 13: Restoration of indigenous biodiversity is promoted and provided for.

1.2.3 National Policy Statement for Freshwater 2020 (NPSFM) and National Environmental Standards for Freshwater 2020 (NES)

The NPSFM defines wetland habitat and provides policy direction for wetlands, with the objective of no loss of extent. The NES provides regulations for managing effects to natural inland wetland habitat from activities. Activities are permitted if located 10 m away from a natural inland wetland, or 100 m away if there is a hydrological connection been the activity and the natural inland wetland.

The Proposal is not located within a natural inland wetland habitat as defined by the NPSFM 2020. All components are greater than 10 m away from a natural inland wetland.

Two wetland areas occur within 100 m of the proposal. These include a narrow strip of riverine marsh associated with the rise and fall of the Whangaehu River. This marsh is dominated by crack willow (*Salix fragilis*), rautahi (*Carex geminata*) and harakeke (*Phormium tenax*). Dense harakeke flaxland habitat, which conforms to schedule F 'Swamp and marsh' is approximately >80 m upstream of the bridge staircase foundations and northern deadman. Similarly, this area has an intermittent hydrology associated with periodic flooding of the river

Whilst these structures are within the 100 m zone which under the NES requires consideration if there is a hydrological connection with the proposed activity. It is my opinion that there is no connection between this activity and the hydrology of these wetlands which are entirely dependent on the natural rise and fall of the Whangaehu River. This activity, primarily being excavation of soil to construct foundations and a deadman anchor will have no effect on this hydrology.

For these reasons it is my opinion that the NPSFM and NES are not relevant to this proposal.

2. The environmental impact assessment framework and methodology

2.1 EIANZ methodology

The ecological impact assessment follows the Environment Institute of Australia and New Zealand guidelines assessment of effects (EIANZ 2018). This method involves determining the study areas biological components, including reviewing existing information, assigning value or importance, assessing effects and magnitude from the activity, and measures for managing impacts. The magnitude of effect has used the area of stable duneland within Whitiau Scientific Reserve for the comparison of habitat loss.

A component of assigning value is identifying whether the Project Area is designated as a significant natural area under the Whanganui District Plan and the reasons or criteria which justify this designation.

When assigning value, significance criteria within National Policy Statement of Indigenous Biodiversity (NPSIB) significance criteria (representativeness, diversity and pattern, rarity and distinctiveness, ecological context) have been undertaken. These are identical to the EIANZ methodology.

2.2 Desktop and site assessment

The present assessment initially undertook a desktop assessment using QGIS. This involved the creation of a high resolution vegetation map using a combination of shapefiles created from the above work and what was discernible on more recent aerial imagery (Manawatu Whanganui 0.3m Rural Aerial Photos (2021-22). The 2021-22 imagery was taken in summer and shows a vegetation browning between dunes and alluvial soils. The location of the bridge structures were provided and imported into QGIS. Using this spatial information several maps showing the location of the bridge structures were made to inform fieldwork, which were exported as a georeferenced pdf to Avenzamap app.

A site visit was undertaken on the 17th of April 2024 with Jim Campbell (DOC Ranger), who has had over 35 years' experience managing the reserve.

During this visit, an Avenza map showing the location of bridge structures was used to navigate to the site. The area was assessed as to whether any wetland vegetation was present using Clarkson (2013), which determined that wetland is present adjacent to and associated with the margin of the Whangaehu River and approximately >80 m upstream. At the location of the bridge tower, data was collected of plant species presence and cover using the unbounded Recce method of Hurst and Allen (2022). Observations of fauna were recorded.

During the field visit drone images were taken at 120 m height and 80% overlap, using a DJI MavicPro with a 4K RGB camera. These images were then processed into an orthomosaic using WebOMB software. Using this layer, field notes and site photos a high resolution vegetation map was made using QGIS software.

On site ecological values of importance and potential effects associated with construction, including measures to avoid and minimise effects were discussed with Jim Campbell.

A plant species list for the Whangaehu—Turakina mouth dunes (Ogle & Campbell 1990) was reviewed. iNaturalistNZ and New Zealand Bird Atlas records were checked to assess what of other species of significance occur at the site.

3. Ecological Values

3.1 Whitiau Scientific Reserve

Whitiau Scientific Reserve is a nationally significant coastal reserve which protects ecosystems, habitats and species associated with Holocene dunes of the West Coast of the North Island. Despite its modified condition it is one of the most important dune reserves within the Foxton Ecological District, the largest dune system in New Zealand. Conservation, particularly of invasive weeds has maintained and improved native dominance within the reserve and allowed dune ecosystems to naturally develop.

The reserve includes active foredunes with populations of native sand binders, spinifex (*Spinifex serceus*) and pingao (*Ficinia spiralis*) (At Risk — declining species), characteristic dune shrubs including tauhinu (*Ozothamnus leptophyllus*), sand coprosma (*Coprosma acerosa*) and sand daphne (*Pimelea villosa*) (At Risk — declining species).

Behind the foredunes low lying dune slacks of bare moving sand occur with sand sedge (*Carex pumila*) which grades into dune plains of oioi (*Apadasmia similis*). Older dune plains are in a process of vegetation succession and are dominated by indigenous wetland plants such as harakeke (*Phormium tenax*), mingimingi (*Coprosma propinqua*) and other *Coprosma* hybrids, mānuka (*Leptospermum scoparium*) and cabbage trees (*Cordyline australis*). An area of harakeke flaxland with mānuka and tree ferns occurs on a flood prone river terrace approximately 80 m upstream of the bridge.

The furtherest inland part of the reserve is an area of stable dunes. These stable dunes are dominated by knobby clubrush (*Ficinia nodosa*) and coastal pohuehue (*Muehlenbeckia complexa*) amongst exotic grasses, of which cocks' foot (*Dactylis glomerata*) is most common. These areas are in a process of vegetation succession with larger plants establishing, including cliff flax (*Phormium cookianum*) and shrubs including coastal daisy (*Olearia solandri*).

These native dominant ecosystems are of very high representativeness, diversity and pattern, rarity and distinctiveness, ecological context so are of very high ecological value.

Fauna known to be present within the reserve include:

- North Island fern bird or mātātā (*Poodytes punctatus*) — At risk, Declining. This species is most common within areas of dense vegetation such as flaxland, shrubland areas.
- New Zealand pipit or pīhoihoi (*Anthus novaeseelandiae*) — At risk, Nationally uncommon. Present in open grassland and dune areas.
- Swamp harrier or kāhu (*Circus approximans*). Known to breed in the reserve.
- Katipō spider (*Latrodectus katipo*) — Nationally endangered. This species occurs in foredune areas and is often associated with pingao and driftwood lying above the mean high water spring tides mark.

- Northern grass skink *(Oligosoma polychroma*) — Not threatened. Likely present in dune areas.
- Other lizards which possibly could be present include
    - Kupe skink (*O. infrapunctatum*) — Threatened, Nationally critical.
    - barking green gecko (*Naultinus punctatus*) — At Risk, Declining and
    - ngahere gecko (*Mokopirirakau* 'southern North Island' — At Risk, Declining.

These lizards are most likely to occur within refugia such as dense areas of coastal pohuehue and flaxland, which are not present within the works area.

Outside of Whitiau Scientific Reserve, the Whangaehu estuary provides habitat for a wide range of wetland and wader birds including migratory species (Jim Campbell *pers.com.*). Species recorded on iNaturalistNZ and eBird bird lists between the Turakina and Whangaehu estuaries include:

- Pied shag or kāruhiruhi (*Phalacrocorax varius*) — Recovering.
- Black shag or māpunga (*Phalacrocorax carbo*) — Relict.
- Variable oyster catcher or tōrea pango (*Haematopus unicolor*) — Recovering.
- Royal spoon bill or kōtuku ngutupapa (*Platalea regia*) — Naturally uncommon.
- Black backed gull or karoro (*Larus dominicanus*). Large numbers regularly seen.
- Red billed gull or tarāpunga (*Chroicocephalus novaehollandiae*) — At risk, Declining.
- Caspian Tern or taranui (*Hydroprogne caspia*) — Threatened, National Vulnerable.
- Banded dotterel or pohowera (*Anarhynchus bicinctus*) — At risk, Declining.

During my site visit on 17th of June a small flock of dotterels (20–30 birds) were seen which were likely this species.

These birds potentially could breed in suitable open sandy sites within the reserve, though are more likely to breed near the river mouth:

- Black fronted dotterel (*Charadrius melanops*) — Naturally uncommon.
- Wrybill or ngutu pare (*Anarhynchus frontalis*) — Recovering. Migrant.
- Pectoral sandpiper (*Calidris melanotos*). Migrant
- Spur-winged plover (*Vanellus miles*). Likely breed at this site.
- Black swan or kakīānau (*Cygnus atratus*).
- Pied stilt (*Himantopus leucocephalus*).

3.2 Vegetation and ecological values within the proposed works area

The proposed works immediately including the tracks, etc. and around the bridge components are either non-vegetated or dominated by exotic plan species. Where the bridge staircase, foundations and anchor blocks are located, the vegetation is dominated (>80% cover) by two grasses, cock's foot (*Dactylis glomerata*) on stable dunes, and fescue (*Lolium arundinaceum*) on the alluvial flood prone terrace (Figure 3.1 and 3.2). Most other common species are also exotic, being herbaceous dicots and grasses.

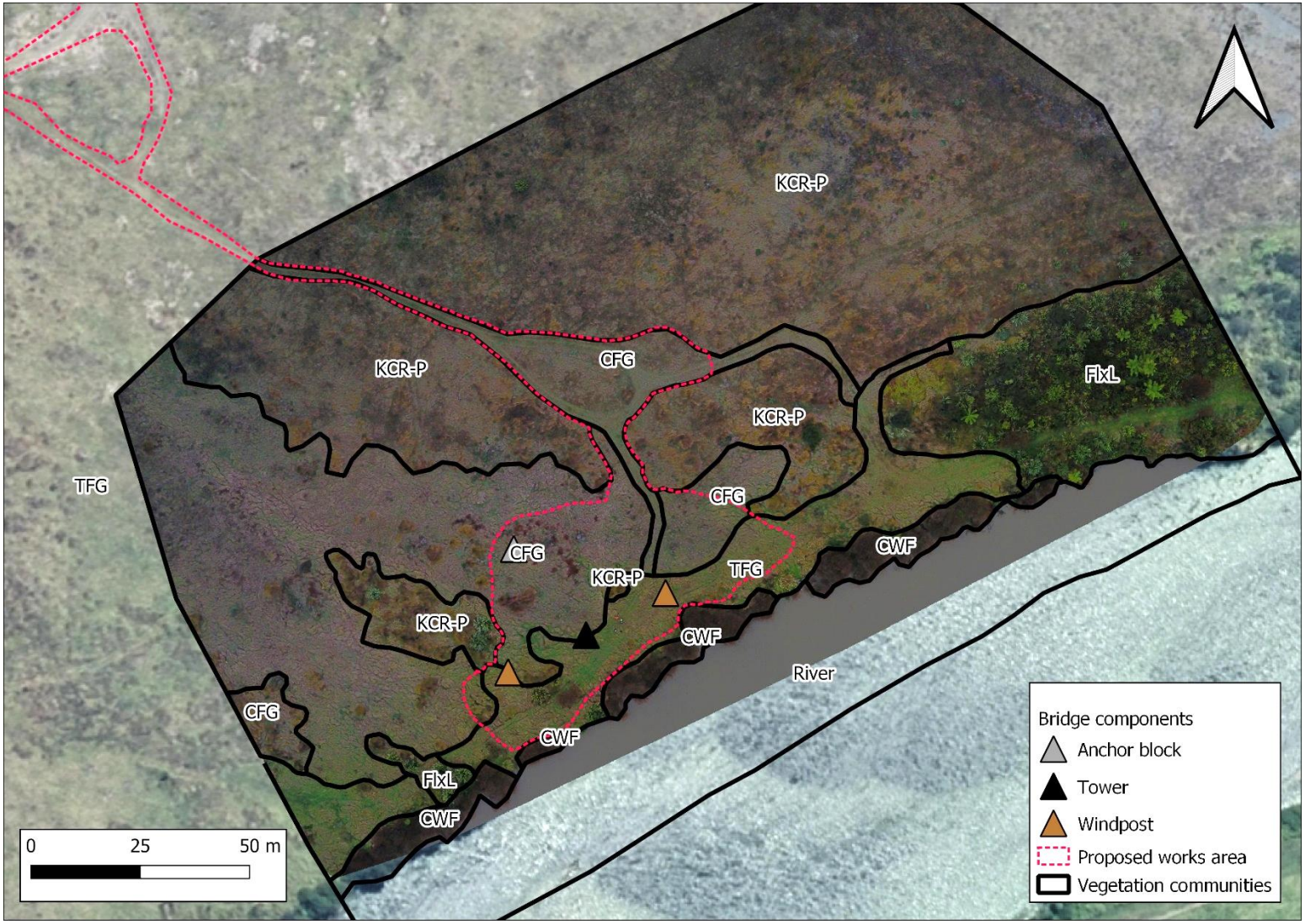
Figure 3.1: Dense exotic dominant grassland of cock's foot on dune toe slope (left) and tall fecuse on alluvial terrace (right). Jim Campbell (DoC Ranger) is standing at the approximate location of the bridge staircase. The line of crack willows (right) is the location of the Whangaehu River.

Less common native species within the works footprint include giant umbrella sedge (*Cyperus ustulatus*) and rautahi (*Carex geminata*) on the alluvial terrace. On the stable dune landform, knobby clubrush and coastal pōhuehue, and cliff flax are present.

Other areas included within the works area (as shown in Figure 3.1) are human modified tracks. These areas are all of comparatively low ecological value.

The location of the bridge on the south side of the river is entirely within improved pasture which has negligible ecological values.

Figure 3.2: Vegetation communities within and surrounding the proposed works area mapped using the June 2024 drone orthomosaic. Vegetation codes are: CFG= Cock's foot grassland, CWF= Crack willow forest, KCR—P= Knobby clubrush, coastal pohuehue rushland, vineland, FlxL= Harakake flaxand, TFG= Tall fescue grassland,



Vegetation communities immediately adjacent to the works area, including the knobby clubrush, coastal pohuehue rushland, vineland and harakeke flaxland shown in Figure 3.1, are of very high ecological value.

3.2.1 Summary of Vegetation values within or potentially within the Project Area

Table 3.1: Summary of vegetation values within the Project Area

Vegetation community	Area (ha) in works area	Significance criteria			
		Representativeness	Diversity and pattern	Rarity and distinctiveness	Ecological context
Cock'sfoot grassland	0.239	Negligible	Negligible	Negligible	Negligible
Knobby clubrush–coastal pohuehue vineland	0.001	High	Low	High	Very high
Tall fescue grassland	0.355	Negligible	Negligible	Negligible	Negligible

3.3 Fauna values

Most of the fauna values are associated with the Whangaehu estuary including coastal wetlands and active dunes. Native species known to be present within the reserve of value include fernbird, pipit, and kāhu. Banded dotterel may also use the reserve, though nesting is most likely to occur near the estuary.

There is currently insufficient information to accurately determine the lizard values within the Project Area. Exotic grasslands are typically poor habitats for native lizards and often have high numbers of lizard predators such as mice and hedgehogs. Thus, lizard abundance is expected to be very low or lizards may be potentially absent. There is a very small chance that a threatened lizard species is present within the works footprint. For this reason, it is recommended that further survey work is undertaken to determine lizard presence (see 4.3 Avoidance).

4. Assessment of Environmental Effects

The effects of this proposal can be split into temporary effects associated with construction activities, and permanent effects associated with the bridge and increased human use.

4.1 Temporary Construction effects

Temporary construction effects will occur for the construction team to access the site, excavate foundations and construct the bridge. This will include disturbance of soil and loss of vegetation. Whilst the area is dominated mostly by cock's foot and tall fescue, it does include a small component of native species.

Whilst unlikely to occur, construction could also have negative effects to any lizards present within the construction actually footprint. Lizards are absolutely protected wildlife under the Wildlife Act 1953. These effects are proposed to be addressed in section 4.3.

4.2 Permanent effects associated with the bridge

Construction of a bridge results in a small loss of habitat. Most bridges also require a small clear area around components to reduce ongoing effects. Whilst this habitat is exotic dominant habitat it has the potential to regenerate into native dominant vegetation. This permanent footprint expected to be less than 500m^2, when including the staircase, anchors, clear land around the bridge and development of a permanent track foot track to the bridge. Whitiau Scientific Reserve is 246.177 hectares, so this represents a loss of 0.002% of the reserve.

The bridge is constructed of corrosion resistant materials including stainless steel, treated wood and fibre reinforced polymer decking. These materials are expected to have a long life and require minimal maintenance. The anticipated life expectancy is for 50 years. The bridge is however located in an area where natural hazards may occur including, flooding, tsunami and liquefaction during a large earthquake. These stochastic factors may mean that ongoing maintenance or replacement is required. This could result in ongoing cumulative effects to the reserve.

4.2 Permanent human effects

The current access into the Whitiau Scientific Reserve is restricted, requiring users to traverse 11 km along the beach from an access near the Whanganui Airport. This distance limits visitors mostly to people on vehicles or occasional horse riders. Despite being prohibited, most recreational users access the reserve via the beach on motor bikes or other all-terrain vehicles.

Realignment of the Te Araroa Trail will dramatically increase hiking usage through the reserve. Given the scarcity of natural areas within the Whanganui—Marton area, it is likely that this walk will also become popular by day visitors especially during warmer months of the year. In general traversing through the area, recreational users will have negligible effect on the ecological values of the reserve or the estuary. Positive and negative effects are also possible.

Positive effects

Greater human use could potentially result in increased knowledge of species present through citizen science app platforms, which are increasingly used by the public. I note that there is not an eBird list for the Whangaehu estuary and very limited iNaturalistNZ records, most due to two observers. Citizen scientists regularly discover rare and uncommon species.

With greater access to the reserve and appreciation of the area, the community may become more willing to participate in association with DoC to better manage the reserve, such as pulling pink ragwort and tree lupin. Community pest control projects are also rapidly increasing across New Zealand and the community may establish and manage predators, such as to protect nesting banded dotterels, with improved access.

Negative effects

Greater human use could potentially result in several negative effects, from trail users such as clearance of vegetation for temporary camping sites, sewerage and rubbish. Whilst Koitiata has a suitable campsite, it is highly likely that some users will overnight camp within the reserve.

Whilst very unlikely, the greatest potential effect is the increased risk of fire, for example if trail users camp in the area and light fires. Stable dune vegetation dominated by grass and low woody species is highly flammable, especially in hot, dry and windy conditions.

Greater human disturbance could also result in disturbance and nest abandonment of nesting shore birds, such as banded dotterel, a declining species. This is more likely to occur as a result of day visitors with dogs.

4.2.1 Magnitude of effects

Table 4.1 summarises the magnitude of effects, applying Table 10 of the EIANZ methodology.

Table 4.1: Magnitude of effects

Effect	Value (Extent)	Magnitude of Effect	Overall Effect
Construction effects	Negligible value of exotic grassland within area impacted.	Negligible	Very low
Loss of habitat	Loss of up to 500 m^2 of exotic dominant grassland vegetation with potential to regenerate into native habitat	Negligible. Less than 0.002% of the reserve	Very low
Human use	Very high value dune ecosystems.	Negligible (daily use) to Very high (human caused wildfire).	Negligible to Very High (if fire occurred)
Human disturbance of wildlife	Moderate, fernbird, pipit and kāhu are unlikely to be affected by human disturbance. Effects on banded dotterel and other ground nesting birds are unknown.	Negligible to Low. Potential low effect on a small number of ground nesting birds.	Low

The overall effect of this proposal is generally very low to low. There is however potential to result in very high effects if wildfires resulted from recreational users occur. These effects are manageable (see section 4.3 Avoidance).

4.3 Effects management hierarchy

The effects management hierarchy has been applied when considering this proposal. The EIANZ Guidelines state that moderate level effects, or greater, typically require measures to avoid, remedy or mitigate effects, while low to very low effects levels are not normally of concern, although care may be required to minimise effects through design, construction, and operation of a project.

4.3.1 Avoidance

The following measures have been undertaken or a proposed to avoid effects:

- The bridge site has good vehicle access and is dominated by exotic vegetation. This location has avoided other locations of much higher ecological value.
- This assessment provides a construction footprint (Figure 1.3) which specifically limits all activities to within this boundary. Adhering to this will ensure that high value native dominant stable duneland is avoided. It is proposed that the works boundary be included within the Department's works approval and concession applications. Additionally, the project manager must be made aware to ensure all vehicles and activities occur within this area.
- All vehicles and equipment must be thoroughly cleaned before entering the reserve. Vehicles and equipment pose a threat of introducing unwanted organisms of threat to the reserve's values — such as weeds, pathogens, Argentine ants, plague skinks. Piles of pre-cut timber should be stored indoors to reduce the chance of introducing Argentine ants and plague skinks.
- Native lizards are absolutely protected species under the Wildlife Act 1953 and efforts must be made to avoid effects harming them. It is recommended that at least 30 artificial covers be placed 6 months before construction starts to detect whether lizards are present. These should be place within a 1 hectare area, within the works area and in adjacent native dominant. If lizards are found, suitable measures, for example undertaking visual searched before earthworks or pitfall trapping. Any lizards found should be relocated to a suitable habitat within the reserve.
- On occasion there will be a need to avoid the risk of wildfire, caused by recreation users. Section 21 (2) (b) of the Reserves Act 1997, enables the manager to prohibit entry of the public into a Scientific Reserve from time to time. It would be prudent to plan to undertake this action in extreme circumstances, for example in high to extreme fire risk conditions and when the neighbouring plantation forest had also enacted this measure. This would require trail users to avoid this route during this period.

Minimise

A number of measures are proposed to minimise construction effects including:

- Undertaking construction in dry weather conditions to minimise physical damage to soils when using a digger to excavate foundations.
- Pouring concrete in during a period of fine weather and when the river is at normal flow and not expected to flood. All concrete should be covered for a period of 72 hours if rain is expected to minimise high pH leachate entering the surrounding soil and river.
- Treated timber will be stored for at least two months to be fully cured, to minimise any CCA leachate (copper, chromium, and arsenic) entering the environment. All timber should be pre-cut at a suitable building facility to minimise treated timber saw dust entering the

environment. Any cutting on site should use a tarpaulin to catch saw dust and offcuts, to be disposed to landfill.

Remediation

The activity will result in disturbance of vegetation and soil. Site remediation should include:

- All indigenous plants impacted should be dug out using a digger and used as propagules for remediation, through cultivation within a local nursery, such as the Whanganui Prison Nursery. Suitable species for propagation include knobby clubrush, giant umbrella sedge, rautahi, harakeke and coastal pohuehue.
- On completion of the works, all stockpiled soil excavated from the foundations etc should be spread across disturbed areas.
- It is recommended that all areas of disturbed bare soil be planted to remediate vegetation cover. Only indigenous plants collected from the reserve should be used for this purpose. Other suitable species include sand coprosma, coastal tree daisy, manuka, harakeke and whararikі.

5. Conclusion and recommendations

Scientific Reserves are designated to preserve in perpetuity the values they contain. Whitiau contains dune ecosystems that are of very high ecological value and are regarded as rare habitats within schedule F (Horizons Regional Council). These ecosystems nationally and regionally have been greatly reduced in extent and are highly vulnerable to human activities. Many dune ecosystems are becoming increasingly degraded by these activities. Consequently, despite some local damage from vehicles, overall, the Whitiau Scientific Reserve is of high ecological condition. Having only visited the reserve twice, first in 1994 and again in 2024, 30 years apart, I was taken by the significant change that has occurred, with natural succession and improvement of both the dune plain and stable dune ecosystems.

This proposal will generally have negligible effects on indigenous vegetation values and wildlife values of the Whitiau Scientific Reserve, primarily because the location chosen is in an area of exotic vegetation with good vehicle access. There is a very low chance that lizards occur within the works footprint and measures are recommended to address this risk.

The proposal will result in additional management for the Department to ensure that the values of the reserve are preserved in perpetuity. Increased use by hikers especially those with dogs could result in greater disturbance of ground nesting birds. The effect of this is currently unknown as no information exists of what species nest here and how common they are. This effect is likely to be low and considerably less than other current users on recreational vehicles. Ensuring hikers do not camp within the reserve will also be another challenge for the department to manage.

Realignment of the Te Araroa Track through Whitiau Scientific Reserve has the potential to increase the risk of wildfire, which could have significant adverse effects on these values. Although the risk is very small and manageable, with climate change, increasing drought and fire risk is predicted. It is recommended that advocacy signage and information within digital platforms be used to inform users of the very high ecological value of the area and that overnight camping is prohibited. Monitoring should also be undertaken to ensure that over-night camping does not occur. Further, the Reserves

Act (1977) provides provision to restrict access from time to time and this measure should be used when required, such as during periods of high to extreme fire risk periods, especially when adjoining plantation forest land has enforced these same requirements. These measures are consistent with policies 3 and 4 of the NPSIB 2023.

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