

**DRAFT**

**Norfolk Island Waterway and Wetland Management Strategy 2026-  
2036**



**Managing cattle grazing on Norfolk Island to improve water quality  
in the Norfolk Marine Park**

## Document control

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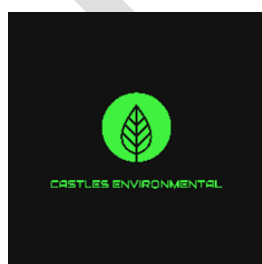
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## Executive Summary

Waterways and wetlands are central to Norfolk Island's environmental health, cultural identity, community wellbeing, and economic resilience. Although the island has few permanent freshwater systems, its creeks, wetlands, riparian zones, and groundwater-fed ecosystems play a critical role in supporting biodiversity, sustaining agriculture, protecting culturally significant species, and maintaining the ecological integrity of the Emily and Slaughter Bay lagoonal reef systems within the Norfolk Marine Park.

Recent studies have confirmed significant water quality issues across the island's waterways, including elevated levels of nutrients, faecal contamination, sediment, heavy metals, and other pollutants. These impacts stem from unrestricted cattle grazing, erosion, runoff from roads and urban areas, invasive species, acid sulfate soils, and legacy wastewater issues. Degraded water quality is directly affecting the health and resilience of the island's coral reefs, which are among Norfolk Island's most valued natural assets and a cornerstone of its tourism economy.

The Norfolk Island Waterway and Wetland Management Strategy 2026-2036 provides a coordinated, evidence-based framework to protect, restore, and enhance waterways and wetlands over the next decade. The Strategy identifies priority waterways and wetlands based on ecological value, cultural significance, economic importance, presence of acid sulfate soils, and the urgency of intervention. Using a defensible scoring system, waterways are categorised as Very High, High, Medium, or Low Priority, guiding investment and on-ground works.

The Strategy outlines a comprehensive suite of management actions addressing key threats, including stock access, erosion, invasive species, acid sulfate soils, climate change, and runoff from built-up areas. It includes detailed on-ground works plans for each priority waterway, covering fencing, revegetation, erosion control, weed management, alternative stock watering systems, and wetland protection.

A major focus of the Strategy is the protection of the Emily and Slaughter Bay lagoonal reef ecosystems. Improving upstream water quality is essential to reducing nutrient and sediment loads entering the reef, safeguarding coral health, and supporting the long-term viability of nature-based tourism.

The Strategy also recognises the cultural, social, and economic values associated with waterways and wetlands. Riparian zones contain species used in traditional crafts, and waterways have supported human settlement from early Polynesian habitation through to the present day. Scenic coastal views, recreational water use, and the island's tourism appeal are all closely tied to healthy waterways and wetlands.

Implementation of the Strategy will require strong partnerships with landholders, the Norfolk Island Regional Council, Parks Australia, Australian Marine Parks, community groups, and the tourism sector. Community engagement is central to the Strategy, with actions to strengthen awareness, support landholders, foster participation in on-ground works, and build long-term stewardship.

To support private-land restoration, the Strategy proposes the establishment of a waterway protection incentive scheme, supported by a cost-share framework that prioritises investment

in high-value and high-risk areas. This will complement existing but limited funding sources such as the Toon Trust Environmental Trust Fund.

The Strategy includes a detailed 10-year on-ground implementation plan, with costed on-ground works totaling \$1.91 million, or approximately \$191,000 per year across all priority waterways. Targets for on-ground works include fencing 15% of Very High Priority waterways, 10% of High Priority waterways, 5% of Medium Priority waterways, and less than 2% of Low Priority waterways over the life of the Strategy.

The Strategy also includes a detailed 10-year investment plan totaling \$1.75 million, including:

- \$40,000 to develop a formal cost-share system for the voluntary incentive scheme in year 1.
- \$750,000 for a dedicated Waterway Project Officer (0.6 FTE over 10 years)
- \$100,000 for catchment and stormwater runoff assessments
- \$250,000 for priority stormwater treatment infrastructure
- \$100,000 for acid sulfate soil management planning
- \$300,000 for pest animal management (feral chickens, Tarler birds, rats)
- \$140,000 for freshwater species research and monitoring

A Monitoring, Evaluation and Reporting (MER) Framework underpins the Strategy, ensuring progress is tracked, outcomes are measured, and management actions are adapted over time. Reporting will include annual MER updates, technical reports, and a State of Waterways and Wetlands Report every five years.

Through coordinated action, strong partnerships, community involvement, and sustained investment, the Norfolk Island Waterway and Wetland Management Strategy 2026-2036 provides a clear pathway to restoring and protecting the island's waterways, wetlands, and downstream marine environments. Its implementation will enhance ecological resilience, safeguard cultural and economic values, and ensure that Norfolk Island's unique natural heritage is protected for future generations.

# 1. Introduction

Waterways and wetlands are essential, offering environmental, economic, social, and cultural benefits that enhance human health and well-being.

Although Norfolk Island is a small landmass with few permanent waterways and wetlands, these natural features are highly valued by the local community and visitors to Norfolk Island, and they play a crucial role in providing water for livestock and agriculture while also holding significant ecological and environmental importance, particularly for the health of coral reefs associated with the Norfolk Marine Park.

Protecting and enhancing freshwater streams and wetland ecosystems is vital not only for preserving their own natural values but also for improving water quality and minimising the runoff of nutrients and sediments into the Norfolk Marine Park.

## 1.1. Purpose and scope

The Norfolk Island Waterway and Wetland Management Strategy 2026-36 aims to:

- Protect and enhance the ecological integrity of waterways and wetlands (including riparian zones) to support biodiversity and ecosystem services.
- Improve marine water quality by managing upstream impacts, particularly in areas influencing the Emily Bay and Slaughter Bay lagoonal reef systems.
- Support climate resilience by maintaining healthy waterways that buffer against extreme weather, erosion, and changing hydrological patterns including more extreme rainfall and runoff events.
- Promote sustainable land use practices on public and private land that reduce sedimentation, nutrient runoff, and weed invasion.
- Strengthen community stewardship through education, engagement, and collaborative management with landholders, local groups, and stakeholders.
- Ensure long-term viability of tourism by preserving the natural beauty and recreational value of waterways and wetlands.
- Ensure long-term viability of tourism by improving water quality in waterways and wetlands to protect Norfolk Marine Park values.
- Guide investment and prioritisation of restoration, monitoring, and protection efforts based on ecological, social, and cultural values.
- Leverage funding opportunities by providing a clear, strategic framework that aligns with Australian government, philanthropic, and environmental grant programs.

The strategy will cover:

- All freshwater and wetland systems on Norfolk Island, including ephemeral streams and wetlands.
- Waterways and wetlands on both public and private land, with an emphasis on voluntary financial incentive schemes and partnerships for private landholder engagement.
- Threats such as nutrient and sediment runoff from cattle grazing and erosion, acid sulfate soils, pest plants and animals, habitat fragmentation and climate change.

- Ecological values including threatened species (e.g. wetland-dependent birds, terrestrial birds and nesting seabirds), poorly represented riparian vegetation communities (and threatened flora) and high ecological value waterways.
- Waterways with high community value and use, historical significance or recreational importance.
- Waterways and wetlands that contribute to the eco-tourism appeal Norfolk Island, including scenic, recreational and heritage-linked sites, including waterways and wetlands where protection and restoration works will contribute to improved water quality to protect the values of the Norfolk Marine Park.
- On-ground management actions including fencing, revegetation, alternative water sources for cattle and other livestock, weed control, community education programs and monitoring.
- Coordination with Norfolk Island Regional Council and other public land managers, private landholders, tourism operators and the community.

### 1.1.1 Waterways and wetlands on Norfolk Island

The plateaus of Norfolk Island are characterised by dry valleys that lead into perennial and intermittent streams, which eventually flow into primary creeks. Most of these streams are generally active during periods of higher rainfall but often dry up or form isolated pools during drier conditions (Norfolk Island Regional Council, 2021a).

Recent studies of waterways, wetlands, and surface water on Norfolk Island, as well as in Emily and Slaughter Bays, have detected elevated levels of contaminants including faecal coliforms, nitrates, viruses, chloride, ammonia, phosphates, and heavy metals exceeding recommended guidelines (Vanderzalm et al., 2024; AECOM, 2017; Cuan et al., 2020; Sydney Institute of Marine Science, 2022). These water quality issues are due to improper wastewater management on private properties (e.g. leaking or poorly maintained septic systems), unrestricted cattle grazing, soil erosion and runoff from impervious roads and roadsides used for grazing and from urban areas. In addition, it is possible that past infrastructure failures like pump overflows and leaks from the Norfolk Island Water Assurance scheme have contributed to degraded water quality in local waterways and the Norfolk Marine Park.

Waterways that flow directly into Emily Bay are negatively impacting the Emily and Slaughter Bay Lagoonal Reef ecosystem (Sydney Institute of Marine Science, 2022). Soil erosion is also a significant driver of sedimentation in waterways, wetlands, and in the Norfolk Marine Park. The deeply weathered basaltic soils of Norfolk Island are particularly vulnerable to erosion through water runoff in steeper coastal zones, by wind in areas lacking vegetation or through other disturbances (including cattle grazing) in steep areas.

## 1.2. Strategy Objectives

The Norfolk Island Waterway and Wetland Management Strategy 2026-2036 aims to:

- Identify priority waterways on both public and private land on Norfolk Island by evaluating their environmental, social, cultural, and economic significance (including agriculture and tourism) and establish management objectives.

- Develop an implementation program for 10 years for on-ground works and other activities across waterways, wetlands on both public and private land to meet these management objectives.
- Provide a consistent and defensible process for identifying priority waterways, wetlands, and areas where unrestricted cattle grazing, erosion and other factors impact water quality to guide government investment in waterway and wetland management on Norfolk Island.
- Engage with the community, public land managers and key stakeholders in the development of the strategy to ensure that the selected priority waterways and wetlands targeted for environmental protection also reflect high community value.

### 1.3. Strategy Consultation

Community consultation and input into the waterway prioritisation process for the Norfolk Island Waterway and Wetland Management Strategy 2026-2036 commenced with the Norfolk Island Regional Council Environment and Sustainability Advisory Committee (ESAC) in 2025.

The first Draft Norfolk Island Waterway and Wetland Management Strategy was presented to ESAC in early 2026 for their endorsement before a broader community consultation period through local media, social media, and other methods identified during the initial consultation phase.

Following endorsement by ESAC and Norfolk Island Regional Council, the Draft Norfolk Island Waterway and Wetland Management Strategy will be placed on Public Exhibition for 28 days to allow the Norfolk Island community to provide comments and feedback.

The strategy will then be finalised in March-April 2026 incorporating input from the Norfolk Island community and key stakeholders.

## 2. Overview - Norfolk Island

The Norfolk Island Group, comprising Norfolk Island, Phillip Island, and Nepean Island, is a relatively remote cluster of oceanic islands in the Pacific Ocean. They are located approximately 1400 km from Australia's eastern seaboard and 800 km from the nearest landmass (Figure 1). Norfolk Island covers an area of about 3855 hectares, while Phillip Island and Nepean Island are smaller, with areas of 190 hectares and 10 hectares, respectively (Norfolk Island Regional Council 2021a). The Norfolk Island Waterway and Wetland Management Strategy 2026-2036 will focus on the waterways and wetlands of Norfolk Island.

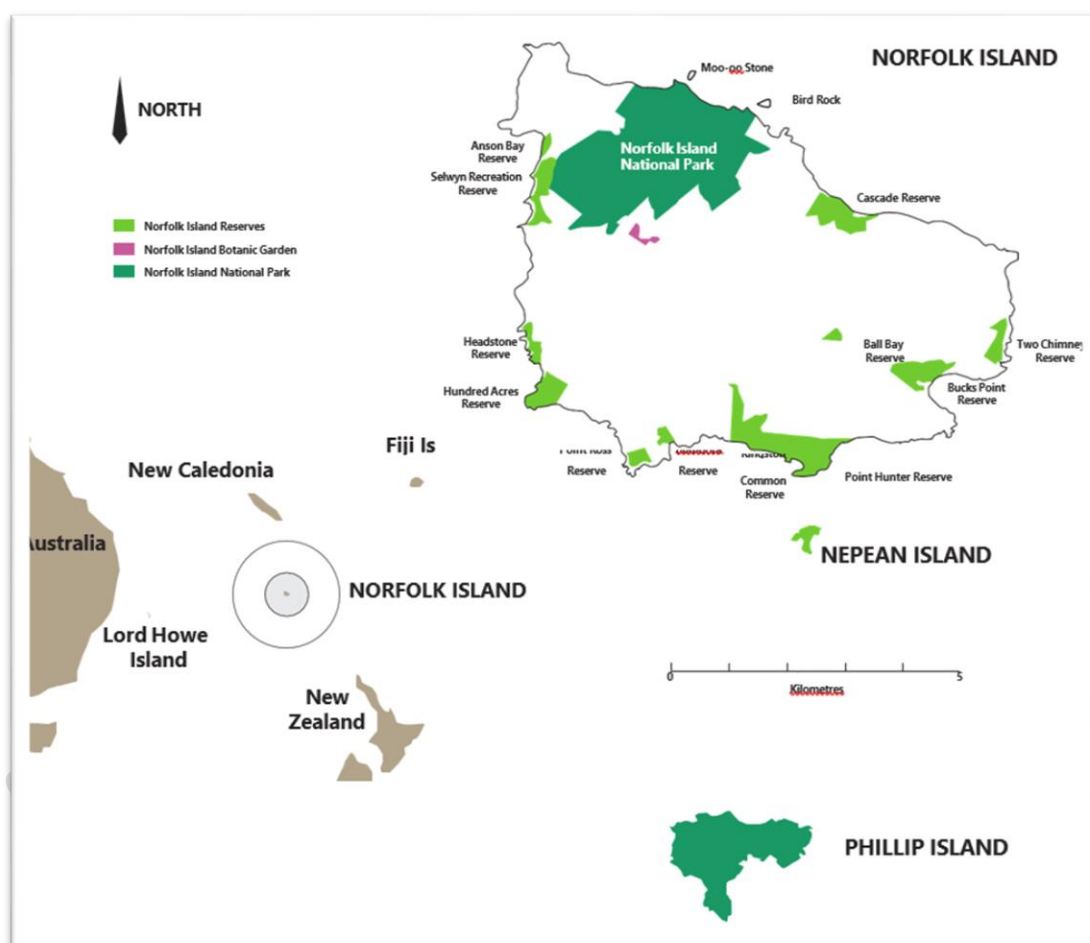


Figure 1. The Norfolk Island Group (Invasive Species Council and Island Conservation 2017)

Norfolk Island is predominantly a basalt plateau with rugged terrain and an average elevation of 110 metres. Its highest point, Mount Bates, rises to 319 metres above sea level. The island's coastline is largely defined by steep, dramatic cliffs that frame its landscape (Norfolk Island Regional Council 2021a).

The climate is ocean-moderated, offering mild conditions year-round. Winter temperatures typically range from 13-19°C, while summer averages sit between 18-25°C. Annual rainfall is approximately 1312 mm, with the majority falling during the winter months (Norfolk Island Regional Council 2021a).

While Norfolk Island is often recognised for its iconic Norfolk Island pines and jagged coastal cliffs, it also boasts pristine sandy beaches and reef-protected waters, such as the Emily Bay and Slaughter Bay lagoonal reefs. Surf beaches like Bumbora and Anson Bay also add to its coastal charm and the Norfolk Island National Park provides sweeping views over palm forests from vantage points like Mt Pitt and Mt Bates (Norfolk Island Regional Council 2021a).

Human history on the island dates back over 1000 years to Polynesian settlers, who introduced species such as the Polynesian rat (*Rattus exulans*) and cultivated edible plants including bananas. When Captain Cook arrived in 1774, the island was uninhabited and densely forested. Between 1788 and 1855, the British established two penal colonies. Norfolk Island is perhaps best known for its connection to the Bounty Mutiny, with descendants of the mutineers relocating from Pitcairn Island in 1856. Many current residents trace their ancestry to these original settlers (Norfolk Island Regional Council 2021a).

As with many oceanic islands, Norfolk Island supports a high proportion of endemic species. Its native flora includes around 43 endemic plants (nearly a quarter of its total native flora) alongside 15 endemic bird species and numerous invertebrates yet to be fully documented (Norfolk Island Regional Council 2021a).

Since human settlement, land-use activities such as agriculture, timber harvesting, cattle grazing, and development have led to widespread fragmentation and loss of native vegetation, including riparian and wetland communities. These changes have also impacted hydrological systems, marine ecosystems, and landform stability (Norfolk Island Regional Council 2021a).

Approximately 20% of Norfolk Island is designated as National Park, Botanic Garden, or public reserve. Including Phillip and Nepean Islands, this protected area totals around 200 hectares, representing roughly 23% of the Norfolk Island group's land area (Norfolk Island Regional Council 2021a).

Governance of the island is managed by the Norfolk Island Regional Council, which was formally established on 1 July 2016 under the Local Government Act 1993 (NSW) (NI). Norfolk Island is not part of any Australian state but functions as an External Territory under the Commonwealth of Australia. The Norfolk Island Act 1979 (CTH) remains the primary legislation governing its status (Norfolk Island Regional Council 2021a).

## 2.1 Population

Currently, Norfolk Island has a population of around 2,100 people with up to 30 000 visitors each year (Norfolk Island Regional Council 2021a).

The median age of people in Norfolk Island in the 2016 Census was 49 years. Children aged 0-14 years made up 16.9 per cent of the population and people aged 65 years and over made up 23.8 percent of the population. In Norfolk Island, 34.5 per cent had participated in voluntary work during the last 12 months, and 80.8 per cent of the population having internet access from their dwelling (Norfolk Island Regional Council 2021a).

## 2.2 Geology

Norfolk and Phillip Islands are the eroded remnants of a once-larger volcanic island that formed along the Norfolk Ridge - a submarine mountain chain stretching nearly 2,000 kilometers from New Caledonia to New Zealand. Both the Norfolk Ridge and the adjacent Lord

Howe Rise are part of the Australian continental plate, which separated from mainland Australia during the early Tertiary period (Green 1973 in Administration of Norfolk Island 2003).

Norfolk Island is composed almost entirely of gently layered basaltic lava flows and interbedded volcanic tuff, deposited during three major eruptive phases between 3.05 and 2.3 million years ago (Jones and McDougall 1973). Geological features such as pillow lavas and flow-foot breccias along the island's northern coastline suggest that sea levels during these eruptions were within 10 metres of their present height (Administration of Norfolk Island 2003).

In contrast, Nepean Island and the fringing reef and coastal rock formations at Kingston, including Point Hunter and the Lime Kiln, are not volcanic in origin. These features are composed of cross-bedded aeolianitic calcarenite, a type of sandstone formed in shallow marine environments or beneath the water table, where calcite-rich water cemented sand grains together. During the last two ice ages, extensive glaciation caused sea levels to drop significantly, exposing vast areas of sandy seabed and coral reef between and around Norfolk and Phillip Islands. It is believed that erosion of these exposed areas, followed by wind-driven deposition, created large dune systems composed primarily of coral and seashell sands. Nepean Island and the rocky outcrops at Kingston are thought to be remnants of these ancient dune systems (Administration of Norfolk Island 2003).

Assuming the original volcanic island had the typical symmetrical shape of shield volcanoes, it is estimated that more than two-thirds of the original landmass has since been lost to erosion. The volcanic surfaces of both Norfolk and Phillip Islands have undergone deep weathering—up to 45 to 50 metres in some areas. This prolonged weathering, followed by erosion, has sculpted the island's present-day landscape of rolling hills and deeply incised valleys (Administration of Norfolk Island 2003).

## 2.3 Climate

Norfolk Island sub-tropical climate is tempered by the surrounding sea. The climate of Norfolk Island is principally affected by the belt of high-pressure systems which oscillate north and south over the Island annually (Bureau of Meteorology 2023).

**Temperatures:** Diurnal and annual temperature ranges are small. Average maximum temperatures range from 18C to 19C in winter to between 23C and 25C in summer. The highest temperature ever recorded was 28.4C on 11th Feb 1996. Average minimum temperatures range from 13C to 15C in the winter and between 18C and 20C in the summer. The lowest temperature ever recorded was 6.2C on 29th July 1953 (Bureau of Meteorology 2023).

**Rainfall:** The median annual rainfall for Norfolk Island is 1302mm, and the annual mean rainfall is 1312mm. Rainfall is greatest during the four months from May to August, with monthly long-term means of about 130 to 147mm. Minimum monthly rainfall, averaging 75 to 87mm occurs from November to January. The wettest month is June, with an average 147mm and the driest month is November with an average of 75mm. The highest monthly rainfall was 473.2mm in December 1989. Norfolk Island averages 181 rain days per year, ranging from an average of 10 rain days in November to 21 rain days in July (Bureau of Meteorology 2023).

A notable feature of Norfolk Island's historical rainfall has been a decline in annual rainfall since about 1970, which manifested as long runs of dry years in recent decades (Petheram et al. 2020; Bureau of Meteorology 2023).

Relative to the period 1915 to 1969 (1334 mm/year), mean annual rainfall was 11% lower between 1970 and 2020 (1184 mm/year) (Petheram et al. 2020)

Relative to 1945 to 1969 (1386 mm/year), mean annual rainfall was 12% lower between 1970 and 1994 (1223 mm/year) and 17% lower between 1995 and 2019 (1145 mm/year) (CSIRO water resource assessment) (Petheram et al. 2020)

The decline in rainfall has occurred in all seasons except summer, with the largest decreases in autumn and winter (Petheram et al. 2020).

**Humidity:** Relative humidity is generally high. The relative humidity averages in the 74% to 79% range at 9am and in the 71% to 74% range at 3pm (Bureau of Meteorology 2023).

**Wind:** Winds are predominantly east to south-east during summer and autumn swinging to the south to south-westerly in winter and returning to the south in spring. The maximum wind gust recorded on Norfolk Island was 135km/h from the SSW on 19th March 1992 (Bureau of Meteorology 2023).

**Thunderstorms:** Thunderstorms are most prevalent during the winter and spring, with an average of 12 thunderstorms per year. Hail occasionally accompanies thunderstorms in winter, with an average of one hailstorm per year (Bureau of Meteorology 2023).

**Cyclones:** Tropical cyclones occasionally have an influence in the early months of the year. Mid latitude depressions move in from the Australian continent or southwest Tasmanian Sea and effect the island mostly from February to August (Bureau of Meteorology 2023).

Due to the decline in annual rainfall the hydrology of Norfolk Island has changed with streamflow and groundwater recharge all decreasing. CSIRO modelling (Norfolk Island Water Resource Assessment 2020) shows that long-term groundwater recharge and streamflow have decreased by approximately 45,000 ML ( $\pm 50\%$ ) or about one-fifth of the stored volume since the mid-1970s (Pinion Advisory 2022).

Approximately 500 groundwater bores are present on the island (CSIRO, 2020) and roughly 210 of these are now dry. There has been a moratorium on drilling any new bores since 1996 due to the reduction in groundwater recharge, and concern that this resource is being over-exploited (Pinion Advisory 2022).

## 2.4 Waterways and wetlands

Unfortunately, little has been recorded about the ecology of the few permanent natural freshwater ecosystems on Norfolk Island. Permanent streams and wetlands have been significantly modified over time directly or indirectly by extensive clearing of native vegetation, groundwater extraction and through other disturbances such as land clearing and unrestricted cattle grazing (Administration of Norfolk Island 2003). Many creeks are un-named, so for the purpose of this strategy names have been assigned to un-named waterways based on their location on the Island, for example the Northern Creeks, Selwyn Creeks and

Music Valley Creek, and grouped in some cases where hydrology, vegetation cover and other characteristics are similar.

The dry valleys on Norfolk Island lead into perennial and intermittent streams, which then discharge into primary creeks. Most streams are only active through periods with higher rainfall and are dry or reduced to localised pools during dry periods (Norfolk Island Regional Council 2021a).

On the southern side of the island Rocky Point Creek, Watermill Creek and Town Creek extend into the water table mound under the southern plateau and are effective discharge features because, unlike other creek lines on Norfolk Island, they drain down to sea level (Petheram et al. 2020). Watermill and Town Creek discharge directly into the Emily and Slaughter Bay lagoonal reef system, and Rocky Point Creek discharges into the Norfolk Marine Park at Bumboras Reserve.

The northern part of the island contrasts with the southern part due to its limited discharge features. Creeks on the northern side of the island are intermittent and, according to local residents, seldom (if ever) carry flow (Petheram et al. 2020). However, these waterways still hold ecological significance, supporting diverse vegetation communities and providing essential habitat for various plant and animal species.

Increased runoff following heavy rainfall events due to vegetation clearing and road construction and drainage results in more rapid peaking of stream flows, increased flooding, soil erosion and significant sedimentation in waterways. Past and current ground Water extraction and seasonal dry periods and the resulting lower water tables also leads to reduced streamflow (Administration of Norfolk Island 2003).

The lower reaches of many of Norfolk Island's streams have been modified by clearing out or deepening the bed of the waterway (or channeling), dam construction, cattle grazing and trampling (or pugging), and introduced aquatic weeds (Administration of Norfolk Island 2003).

Past removal of riparian vegetation around waterways has increased available light and water temperatures, promoting the growth and spread of introduced weed species better adapted to these modified conditions than native plant species (Administration of Norfolk Island 2003).

Prior to European settlement, small wetland habitats are likely to have occurred in the lower reaches of some of the larger catchments, such as Broken Bridge Creek, Cascade Creek and Mission Creek. Records show that a relatively extensive and heavily-vegetated wetland covered the whole of what is now Kingston Common. A channel was cut through the calcarenite barrier near the Lime Kiln in 1789 to drain this wetland to provide land for agriculture. Up until around 2021, both Watermill and Town creeks ran in channels through the Kingston Common and the wetland was limited to a series of small swamps (Administration of Norfolk Island 2003). A record rainfall year in 2022 resulted in increased stream flows and resulted in the lower reaches of Watermill and Town Creek reverting back wetlands.

Native vegetation around wetlands on Norfolk Island has not been well documented but may have been dominated by River Clubrush (*Schoenoplectus validus*). Today Native Rush (*Juncus continuus*) and Drain Flags (or Bullrush) (*Typha orientalis*) largely dominate these habitats, but

it is possible that they may have been early introductions like Taro (*Colocasia esculenta*), which today inhabits wetland areas on Norfolk Island (Administration of Norfolk Island 2003).

Unrestricted cattle grazing on public and private land is affecting the condition of waterways and wetlands, water quality, and biodiversity in most public land waterways and wetlands on Norfolk Island (Administration of Norfolk Island 2003). The 2024 Norfolk Island Water Quality Assessment (Vanderzalm et al. 2024) concluded that unrestricted cattle grazing around waterways and wetlands contributes to high nutrient levels and increased sediment loads, which degrades water quality. Unrestricted cattle grazing and other factors including poorly managed septic tanks pose a major threat to the health of Norfolk Island's coral reefs, particularly within the Emily Bay and Slaughter Bay lagoons.

Most Norfolk Island soils are well drained, clay-based soils with high plasticity, making them vulnerable to slippage and erosion. Slippage can lead to sedimentation and subsequent impacts on surface water quality, particularly following native vegetation clearing and through inappropriate land use, including unrestricted cattle grazing (Administration of Norfolk Island 2003).

Water and soil tests have identified acidity issues within the lower reaches of the Headstone catchment and other streams on Norfolk Island. Work conducted by the CSIRO in 2020 (Petheram et al. 2020) confirmed the presence of Acid Sulfate Soils formed by peat-bearing material in the Headstone catchment and in other catchments on Norfolk Island. The work on Acid Sulfate Soils in the 2023 Norfolk Island Water Resource Assessment (Fitzpatrick et al. 2023) concluded that Acid Sulfate Soils pose significant environmental risks on Norfolk Island. The report emphasised that the disturbance of Acid Sulfate Soils (including through “pugging” by cattle) or drying of acid sulfate soils can negatively impact water quality, including the marine environments within the Emily and Slaughter Bays lagoonal reef systems. The impacts of Acid Sulfate Soils also extend to human and animal health and infrastructure, including heritage bridges and other structures in the Kingston and Arthur's Vale Historic Area (KAVHA) (Fitzpatrick et al. 2023). The report stressed the need for careful management and monitoring of Acid Sulfate Soils to mitigate their adverse effects and protect Norfolk Island's ecosystems and heritage sites.

Poorly maintained or ineffective septic tanks have resulted in nutrient contaminated ground water in some of the more populated areas of Norfolk Island. Work is currently underway to design a new wastewater treatment plant for Norfolk Island, and it is hoped that households in identified priority areas will be connected to the island's piped sewerage system (known on Norfolk Island as the “Water Assurance Scheme”) in the future depending on the availability of funding.

## **2.4.1 Waterway and wetland management on Public Land**

Many of Norfolk Island's waterways and wetlands run through public land, including public reserves and the Norfolk Island National Park. Some riparian fencing has been installed to control cattle grazing on Cascade Creek and on Watermill Creek in the Kingston and Arthurs Vale Historic Area (KAVHA), although fencing setbacks are generally well below recommended distances of 20 metres or more.

Other waterways on Norfolk Island are protected through cattle exclusion fencing installed on public reserve boundaries to restrict stock access to public reserves, for example Rocky Point Creek in Bumboras Reserve and creeks running through Selwyn Reserve and Two Chimneys Reserve.

Major modified wetlands occur in the KAVHA area/Watermill Creek catchment, in Stock Reserve (part of the lower section of the un-named creek that runs through “Mission Pool”) and in the lower reaches of the creek that forms Headstone Dam and runs through Headstone Reserve.

Figure 2 shows the location of recognised/mapped waterways on Norfolk Island.

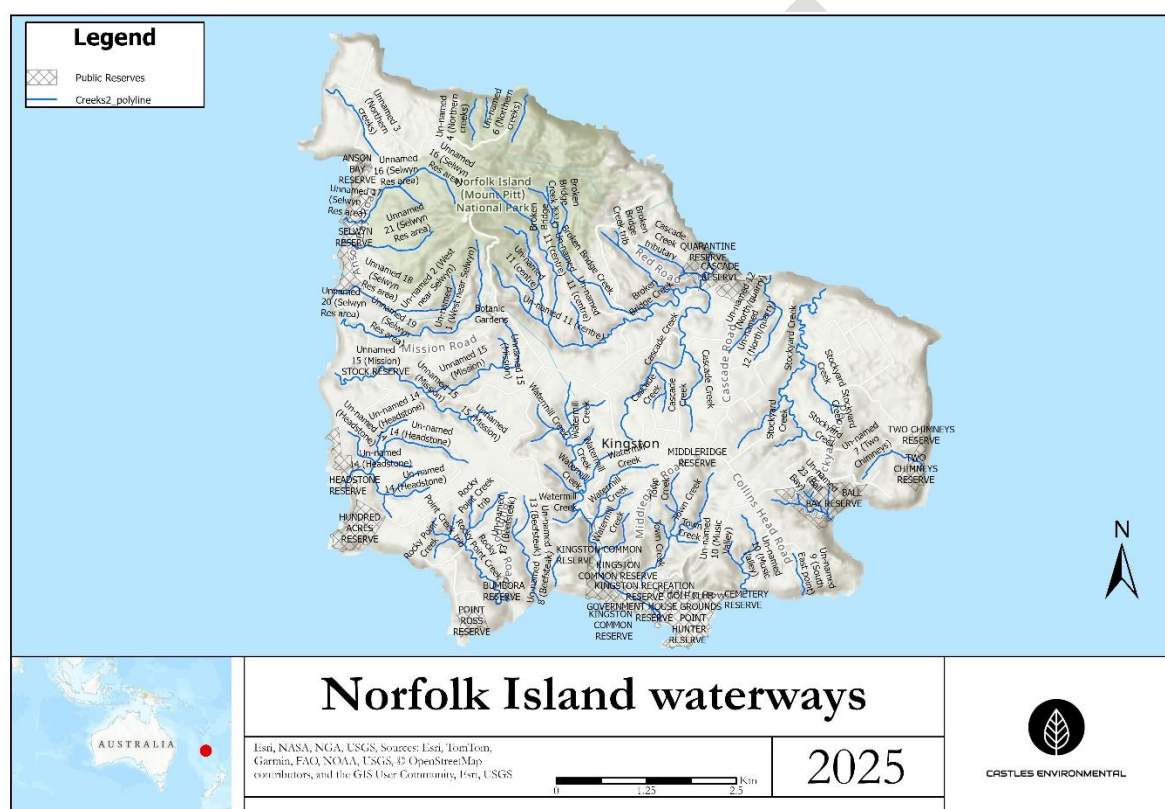


Figure 2. Waterways on Norfolk Island

## 2.4.2 Waterway and wetland management on Private land

Norfolk Island does not currently have a voluntary financial incentive program primarily targeted at waterway and wetland protection on private land.

Some property owners on Norfolk Island have undertaken waterway protection and enhancement works at their own expense, and more recently through the Toon Trust Environmental Trust Fund, which was re-opened in 2023 with a focus on works to improve water quality in private land waterways and wetlands.

The Norfolk Island Waterway and Wetland Management Strategy 2026-36 has been prepared in part so that it can be used as a basis to obtain government funding to establish a voluntary private land waterway protection incentive scheme on Norfolk Island. Participation in a private land waterway and wetland management incentive program will be completely voluntary, with

higher levels of funding directed to the higher priority waterways and wetlands as identified within this strategy.

## 2.5 Native Vegetation Communities

Early records of Norfolk Island describe Norfolk Island's vegetation as dense subtropical forest dominated by the endemic Norfolk Island Pine. These salt-tolerant conifers grow to 70 metres tall and tower up to 30m above the forest canopy of mixed hardwoods. The forest understorey comprised ferns, orchids, climbing vines, and a variety of shrubs. Native Flax was abundant along the coastal cliffs (Green 1994).

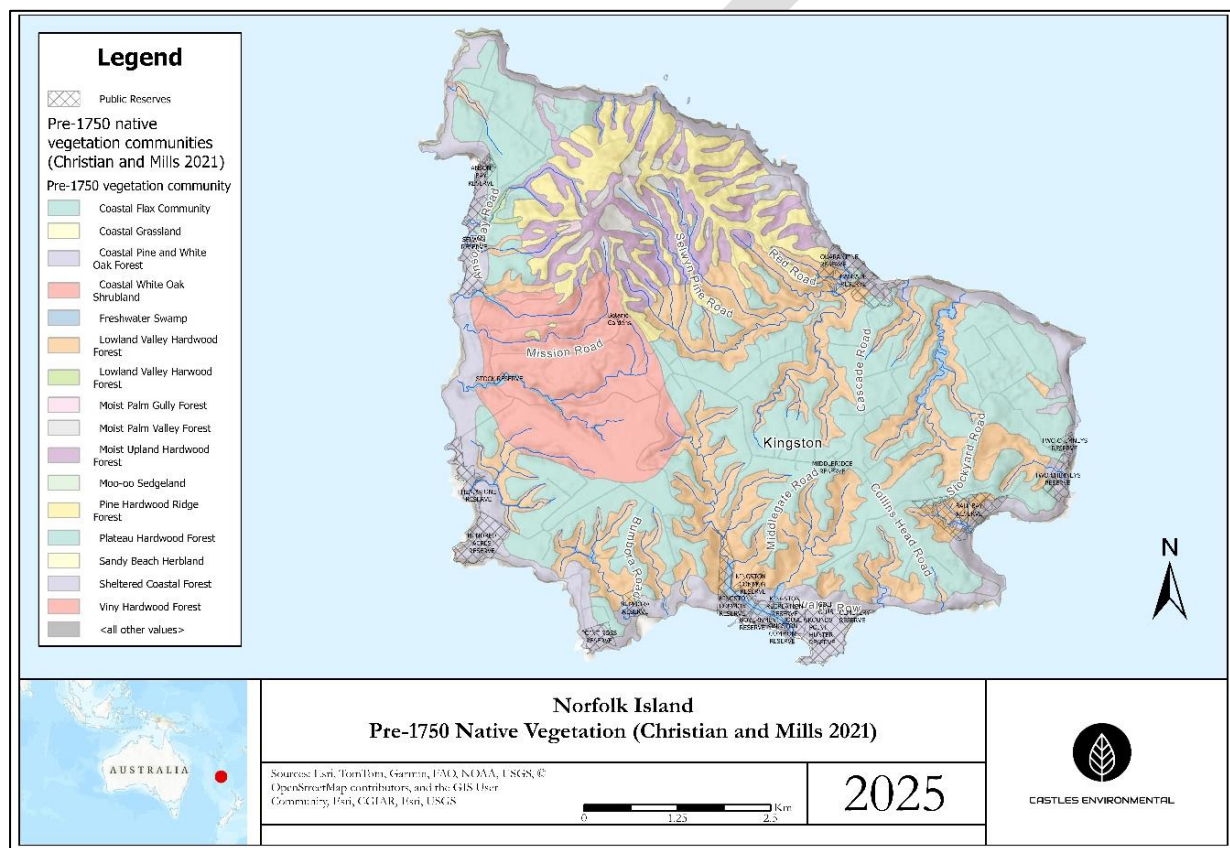
The Norfolk Island Vegetation Mapping Project (Christian and Mills 2021), which involved mapping current and historic (pre-1750) native plant communities between 2018-2021, created the first comprehensive maps of current (Figure 3) and historical (Figure 4) plant communities on Norfolk Island.

Fourteen distinct native plant communities, each shaped by environmental factors such as rainfall and moisture, wind, aspect, slope and soil type were described by Christian and Mills (2021). These communities range from lush forests to coastal shrublands and swamps (Table 1).

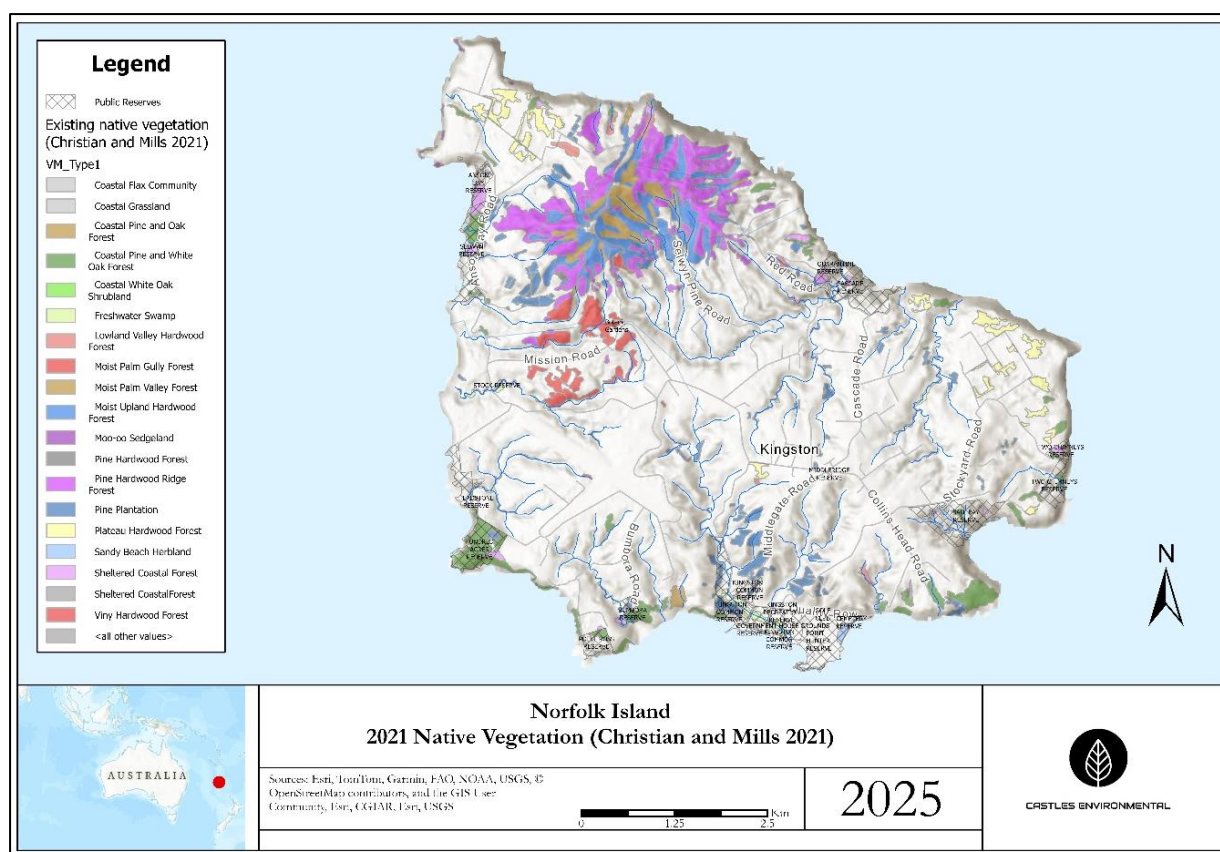
**Table 1. Native vegetation communities on Norfolk Island (Christian and Mills 2021).**

| Forest communities                |                                                                                                                     |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Moist Palm Valley Forest          | Dense stands of Norfolk Island palm and tree ferns in mountain valleys; vital habitat for the endemic green parrot. |
| Moist Upland Hardwood Forest      | Diverse hardwood forest on mountain slopes; includes sharkwood with garlic-scented flowers.                         |
| Pine-Hardwood Ridge Forest        | Dominated by tall Norfolk pines on ridges; seeds feed the green parrot.                                             |
| Viny Hardwood Forest              | Low-altitude rainforest with whitewood trees and Samson's sinew vine.                                               |
| Plateau Hardwood Forest           | Mixed hardwoods on flat terrain; features white oak and birdcatcher trees.                                          |
| Lowland Valley Hardwood Forest    | Similar to plateau forest but in valley floors; includes Norfolk evergreen and hardy ferns.                         |
| Sheltered Coastal Forest          | Found near coastlines protected from wind; includes ironwood and coastal ferns.                                     |
| Coastal and Shrubland Communities |                                                                                                                     |
| Coastal Pine and White Oak Forest | Hardy open forest along coastlines; includes rare euphorbia and coprosma.                                           |
| Coastal White Oak Shrubland       | Stunted white oaks and melky trees on exposed cliffs; includes pigface and native spinach.                          |
| Sandy Beach Herbland              | Low-growing herbs on sandy beaches; includes salt couch and native vigna.                                           |

|                                 |                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------|
| Coastal Grassland               | Salt-tolerant grasses and sedges; includes yellow daisy and club rush.                                |
| <b>Other Unique Communities</b> |                                                                                                       |
| Moo-oo Sedgeland                | Dominated by Moo-oo sedge on Phillip Island and northern slopes; dense growth excludes other plants.  |
| Coastal Flax Community          | Sparse evidence remains; includes flax and Dianella intermedia.                                       |
| Freshwater Swamp                | Found in shallow valleys; historically widespread but now limited due to erosion and forest clearing. |



**Figure 3. Native vegetation communities on Norfolk Island prior to 1750 (Christian and Mills 2021).**



**Figure 4. Native vegetation communities on Norfolk Island in 2021 (Christian and Mills 2021).**

## 2.6 Waterway and wetland dependent terrestrial species

Conversion of formerly heavily vegetated wetlands to wet grasslands, grazing land and public open space, such as the golf course, has provided modified habitat that would not have occurred on Norfolk Island prior to European settlement. This open habitat suits migratory waders such as Pacific Golden Plover, Whimbrel, Bar-tailed Godwit, and occasional Sharp-tailed Sandpipers and Greenshanks and vagrant Cattle Egrets (Administration of Norfolk Island 2003).

Two resident wetland birds, the Tarler Bird (or Purple Swamphen) (*Porphyrio porphyrio*) and White-faced Heron (*Egretta novaehollandiae*), are common on the island.

The Pacific Black Duck now rarely occurs on Norfolk Island, because of competition from the introduced Mallard with which it interbreeds.

The Buff-banded Rail, last recorded at Mission swamp in 1975 and the Spotless Crake which was recorded nesting in the Hundred Acres Reserve in 1909 and was last observed at Cascade Creek in 1980, may no longer be present, possibly due to loss of quality wetland habitat.

## 2.7 Freshwater aquatic species on Norfolk Island

As part of an over-arching Australian Crayfish Project, Norfolk Island was surveyed for freshwater aquatic species in early 2009. No crayfish were recorded at any of the surveyed sites. A land crab that had previously been discovered on Norfolk Island was also unable to be located, although it has apparently been detected on Norfolk Island and Phillip Island within

the last decade. Other crustaceans such as the smaller crab (*Amarinus lacustris*), a native freshwater shrimp (*Paratya norfolkensis*) and amphipods occur on Norfolk Island (McCormack and Coughran 2009).

The only native freshwater fish recorded are two eels, the long-finned eel (*Anguilla reinhardtii*) and the short-finned eel (*Anguilla australis*). Apart from eels, the only fish recorded are three exotic species, Guppy, Gambusia and Swordtail, all of which are widely recognised as serious ecological pests (McCormack and Coughran 2009).

The small freshwater shrimp, *Paratya norfolkensis*, are endemic to Norfolk Island and are abundant, capable of producing numerous offspring. During the March 2009 Australian Crayfish Project survey, many egg-carrying shrimp were collected. While eels are known predators of these shrimp, potential fish predators are relatively limited compared to mainland streams with larger fish species. However, juveniles or molting shrimp may be vulnerable to predation by small exotic fish species, insect larvae, such as mudeyes (dragonfly larvae), and waterbirds (McCormack and Coughran 2009).

## 2.7.1 Management Actions to protect and improve knowledge about freshwater aquatic species

### *a) Assessments and Monitoring*

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#### **Freshwater survey program**

- Conduct updated island-wide surveys to:
  - confirm the distribution and abundance of the endemic freshwater shrimp *Paratya norfolkensis*
  - assess eel populations
  - determine whether the land crab species persists in freshwater habitats
  - map the distribution of exotic fish species
- Use standardised sampling methods to allow comparison with the 2009 survey (McCormack and Coughran 2009).

#### **Habitat Condition Monitoring**

- Monitor water quality, sedimentation, and hydrological changes that may affect freshwater fauna.
- Identify sites where erosion, stock access, or weed invasion are degrading habitat.

### *b) Protection and Restoration of Freshwater Habitats*

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#### **Riparian and Wetland Restoration**

- Restore riparian vegetation to improve shading, reduce sedimentation, and stabilise banks.
- Prioritise sites supporting *Paratya norfolkensis* and eel habitat.

#### **Stock Exclusion from Freshwater Habitats**

- Install fencing around creeks, wetlands, and drainage lines to prevent trampling, sedimentation, and disturbance of aquatic habitat.
- Provide alternative watering points to reduce reliance on natural waterbodies.

#### **Erosion and Sediment Control**

- Stabilise eroding banks and gullies to reduce sediment entering freshwater systems.
- Install sediment traps or forebays where necessary.

### ***c) Research and Knowledge Gaps***

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#### **Land Crab Rediscovery and Ecology**

- Conduct targeted surveys to confirm the presence and habitat requirements of the land crab species previously recorded but not found during the 2009 survey (McCormack and Coughran 2009).

#### **Eel Migration Pathways**

- Investigate barriers to eel movement between freshwater and marine environments.
- Identify opportunities to improve connectivity.

## **2.8 Erosion**

The soils of Norfolk Island are relatively fertile, but highly erodible (especially when there is limited vegetation cover) and dispersive aggregated clay loams or ferrosols. Slopes steeper than 32° are highly susceptible to slumping and soil creep once deep-rooted vegetation has been removed. Without roots binding the soil and extracting water through transpiration, saturated surface soils are more likely to slip downslope and be susceptible to sheet and gully erosion. Tetraacetates are common on steep hillsides that are grazed by cattle (Figure 5) (Administration of Norfolk Island 2003).

Clearing native vegetation on steeper slopes together along with unrestricted cattle grazing increases the risk of landslides and slumping, when larger blocks of saturated soil become unstable and move rapidly downslope. Landslides and slumping are also more likely to occur where the toe of the slope has been mechanically disturbed to form roads, such as along the coast and above streams and road cuttings (Administration of Norfolk Island 2003).



**Figure 5. Drone image showing Tetraacetates formed by cattle (left of image) on a steeper section of land adjacent to Country Road in the Kingston and Arthurs Vale Historic Area (KAVHA)**

In most cases, erosion on Norfolk Island is occurring “naturally” along the steep coastal cliffs, but in some areas (including within Ball Bay and Cascade Reserves) excessively concentrated stock movement, overgrazing, soil disturbance and modified and concentrated overland flows and run-off have resulted in an increase in erosion.

In some areas (within Ball Bay Reserve, for example), erosion is associated with changed surface water flow, especially where increased volumes of water are directed down steep, bare slopes or along roadsides through modified drainage.

## 2.9 Ground water

Most of Norfolk Island’s groundwater is stored in weathered volcanic rocks, agglomerate, and fractured basalt bedrock located above sea level. Around 500 wells and bores tap into these systems (Petheram et al. 2020).

A few bores draw from minor aquifers found in shallow alluvial deposits, fractured basalt below sea level and carbonate-rich calcarenite near Kingston lowlands. These aquifers are small and more prone to seawater contamination (Petheram et al. 2020).

Groundwater generally flows within local drainage basins. The aquifers are connected with water leaking downward from the weathered volcanic layers to recharge deeper agglomerate and basalt layers (Petheram et al. 2020).

Most recharge happens in high areas like the southern and northern plateaus and upper drainage basins. However, groundwater flow near Mount Pitt and Mount Bates is still not well understood (Petheram et al. 2020).

A key highlight is the elevated water table under the southern plateau—over 100 meters above sea level. This is due to high recharge rates, the shape of the bedrock and the low permeability of volcanic rock (Petheram et al. 2020).

In high recharge zones water may take a few to several decades to move, in lower areas flow can take hundreds of years (Petheram et al. 2020).

A natural boundary runs from Mission Creek to Broken Bridge Creek. It marks a shift in volcanic structure, separating the central volcanic vent (Mount Pitt and Mount Bates) from the southern plateau. This split creates two distinct groundwater zones on Norfolk Island (Petheram et al. 2020).

## 2.10 Norfolk Island community participation in waterway and wetland management

Norfolk Island currently has no dedicated voluntary financial incentive program focused specifically on improving waterway and wetland condition or enhancing water quality on private land. While the recently revived Toon Trust Environmental Trust Fund provides some support for environmental works, the remaining funding - currently less than \$60,000 - is insufficient to drive meaningful, catchment-scale improvements. The scale of investment required to address erosion, cattle and other livestock access, invasive species, and riparian degradation on private land far exceeds the capacity of existing local funding sources.

The Norfolk Island Waterway and Wetland Management Strategy 2026-2036 will serve as a key foundation for securing government investment to establish a targeted private-land waterway protection incentive scheme. Such a scheme would support landholders to undertake on-ground works that protect waterways, wetlands, and the Norfolk Marine Park, while also improving land productivity and resilience.

### 2.10.1 Management Actions to support community participation in waterway and wetland management

#### *a) Establish a Dedicated Waterway Protection Incentive Scheme*

---

##### **Develop a Funding Proposal Based on the Strategy**

- Use the Strategy as the evidence base to seek Commonwealth and external funding for a multi-year incentive program.
- Highlight priority issues such as stock access erosion, riparian degradation, and acid sulfate soil disturbance.

##### **Provide financial support for actions such as:**

- riparian fencing and stock exclusion
- erosion control and gully stabilisation

- weed control and native revegetation
  - wetland restoration
  - off-stream watering systems
- Offer higher incentives for works in high-priority catchments (e.g., Watermill Creek, Town Creek).

## ***b) Strengthen and Expand the Toon Trust Environmental Trust Fund***

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### **Review and Enhance Funding Capacity**

- Assess current governance, funding levels, and eligibility criteria.
- Explore opportunities to expand the Trust through:
  - government contributions
  - philanthropic partnerships
  - tourism-linked environmental levies
  - community fundraising

### **Align Toon Trust Priorities with the Strategy where appropriate**

- Prioritise projects that deliver measurable water quality and riparian-health improvements.
- Ensure funding supports both small-scale and larger, strategic works.

## ***c) Support Landholders to Participate***

---

### **Provide Technical Assistance**

- Offer free or subsidised site assessments, design support, and restoration planning.
- Develop simple guidelines for fencing, erosion control, and riparian planting.

### **Reduce Barriers to Participation**

- Provide materials (e.g., fencing, plants, erosion-control products) where financial resources are limited.
- Offer staged payments or reimbursement options to suit landholder capacity.

### **Recognise and Celebrate Stewardship**

- Establish a voluntary “Waterway Steward” recognition program for participating landholders.
- Share success stories to encourage broader community involvement.

## ***d) Target Priority waterways and wetlands and High-Impact Areas***

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### **Focus Incentives where they deliver the greatest benefit**

- Prioritise areas where private-land management directly affects:

- water quality entering Emily and Slaughter Bays
- wetland condition
- erosion hotspots
- acid sulfate soil disturbance
- riparian habitat connectivity

### **Integrate Incentives with Other Programs**

- Align with grazing management reforms, invasive species control, and erosion-management initiatives.
- Ensure incentives complement existing public-land works.

## **2.11 Land use**

Norfolk Island land use is dominated by rural land used for rural residential purposes, accounting for 48% (1,538 hectares) and rural farmland accounting for 15.5% (499 hectares) of the total land area (3,199 hectares) (Pinion Advisory 2022)

Table 2 details land use on Norfolk Island in 2022 (Pinion Advisory 2022).

**Table 2. Norfolk Island land use activity (Pinion Advisory 2022)**

| Land use activity                                     | Area (ha) |
|-------------------------------------------------------|-----------|
| Airport                                               | 118       |
| Business and residential                              | 163       |
| Conservation area (National Park and Public Reserves) | 659       |
| Industry/light industry                               | 4         |
| Open space                                            | 69        |
| Rural business                                        | 16        |
| Rural exempt                                          | 61        |
| Rural farmland                                        | 499       |
| Rural residential                                     | 1538      |
| Rural residential business                            | 27        |
| Special use                                           | 45        |

## 2.12 Public land

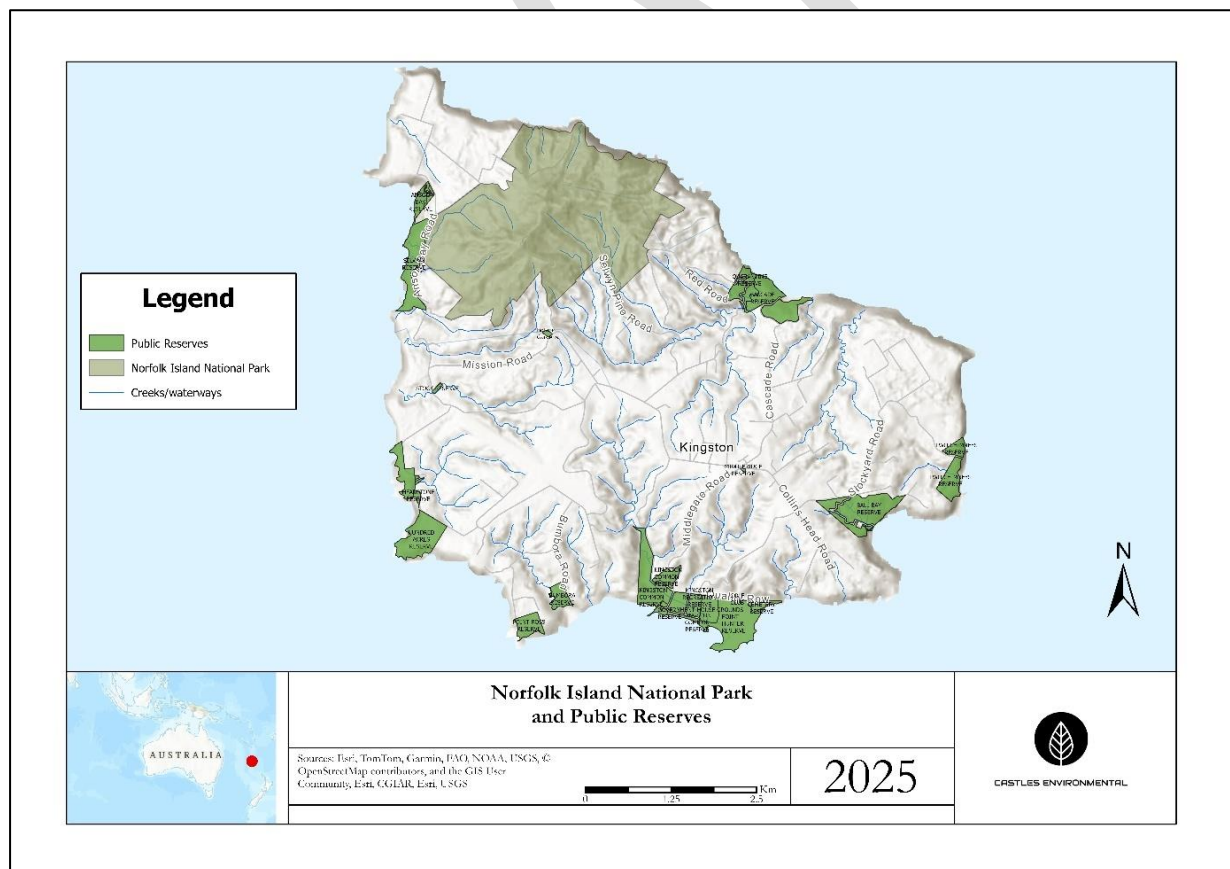
Public land makes up approximately 23% of land on Norfolk Island (Table 3).

**Table 3. Breakdown of land tenure on Norfolk Island**

| Land tenure                      | Area (ha)                                 |
|----------------------------------|-------------------------------------------|
| Public Reserve                   | 224.4 hectares (excluding Nepean Island)  |
| National Park and Botanic Garden | 465.5 hectares (excluding Phillip Island) |
| Public Roads, vacant Crown lands | 133 hectares.                             |
| Freehold                         | 1700 hectares                             |
| Crown Leasehold                  | 1006 hectares                             |

Just under one-fifth (19.55%) of Norfolk Island (or about 689.9 hectares) is within the National Park and Botanic Garden or within a public reserve. Including Phillip and Nepean Islands (which total about 200 hectares), about 23% of all land in the Norfolk Island group is within the National Park and Botanic Garden, or in one of the 20 public reserves (Norfolk Island Regional Council 2021a).

Figure 6 shows the location of the Norfolk Island National Park and Norfolk Island Public Reserves.



**Figure 6. Norfolk Island National Park and Public Reserves**

## 2.13 Social, Economic and Cultural Heritage values

Waterways and wetlands on Norfolk Island provide substantial socio-cultural and economic benefits. They support recreation, aesthetic appreciation, and nature-based tourism, and they contribute to the overall livability of the island and its economic resilience.

The coral reef systems of Emily Bay and Slaughter Bay serve as key recreational areas for the local community and are one of the main attractions for the tourism sector on the island. These reefs receive freshwater inputs from Watermill Creek and Town Creek, and elevated concentrations of nutrients and contaminants in creek runoff have been shown to impair coral health and reduce reef resilience (Sydney Institute of Marine Science, 2022). Maintaining high water quality within these catchments is essential to safeguarding the ecological integrity of the reef ecosystems and ensuring the long-term viability of nature-based tourism on Norfolk Island.

Coastal views are also highly valued on Norfolk Island and are a critical component of the tourism appeal of the island. They offer visitors unique opportunities to experience the natural beauty of the island and take in excellent ocean views. It is important that vegetation management and restoration activities in riparian areas strikes a balance between enhancing the quality of riparian areas while preserving unobstructed visual access to coastal environments.

The island's waterways and wetlands have historically supported human settlement and resource use, from early Polynesian habitation through to European settlement. Riparian zones support native flora species that are culturally significant, including *Cordyline australis* (Ti), traditionally used for weaving, and *Phormium tenax* (Flax), which was historically utilised by Polynesian communities for textiles and fishing nets, and continues to be used by Norfolk Islanders today for traditional crafts and cultural practices.

### 2.13.1 Management Actions to protect social, economic and cultural values

#### *a) Protect Water Quality to Support Tourism and Community Recreation*

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##### **Reduce Nutrient and Sediment Inputs to Reef Connected Catchments**

- Prioritise stock exclusion, stormwater management and erosion control in the Watermill Creek and Town Creek catchments.
- Implement targeted monitoring to track improvements in water quality entering Emily and Slaughter Bays.

##### **Maintain Safe and High-Quality Recreational Waters**

- Monitor bacterial contamination, turbidity, and nutrient levels at key swimming and snorkelling sites.
- Communicate results to the community and tourism operators.

## ***b) Preserve Scenic and Aesthetic Values***

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### **Integrate Scenic Values into Riparian Restoration**

- Design riparian planting plans that enhance ecological function while maintaining important coastal views.
- Use low-growing native species in designated view corridors.

### **Engage Tourism Operators in Landscape Stewardship**

- Work with tourism providers to identify and protect high-value scenic lookouts and coastal vistas.
- Promote responsible visitor behaviour around sensitive riparian and wetland areas.

## ***c) Protect and Promote Cultural Heritage Values***

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### **Support Cultural Use of Native Riparian Plants**

- Identify and protect populations of culturally significant species such as Ti (*Cordyline australis*) and Flax (*Phormium tenax*).
- Incorporate these species into riparian restoration projects where culturally appropriate.

### **Collaborate with the Norfolk Island Council of Elders**

- Ensure cultural perspectives guide restoration, access, and vegetation management decisions.
- Document and incorporate traditional knowledge relating to freshwater systems and plant use.

### **Protect Culturally Significant Waterway Sites**

- Identify sites of historical or cultural importance along waterways and wetlands.
- Integrate cultural heritage protection into on-ground works and planning processes.

## ***d) Strengthen Community and Economic Benefits***

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### **Support Nature-Based Tourism**

- Promote waterway and wetland restoration as part of Norfolk Island's eco-tourism offering.
- Develop interpretive signage and guided experiences that highlight ecological and cultural values.

### **Enhance Community Access and Enjoyment**

- Maintain safe, well-designed access points for walking, swimming, birdwatching, and nature appreciation.
- Ensure restoration works do not unintentionally restrict community access to valued sites.

### **Build Local Capacity and Employment**

- Engage local contractors, community groups, and young people in restoration, monitoring, and maintenance activities.
- Explore opportunities for cultural tourism linked to riparian plant use and traditional practices.

## ***e) Integrate Cultural, Social and Economic Values into Planning***

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### **Multi-Value Assessment for All Projects**

- Require all waterway and wetland projects to consider cultural heritage, scenic values, recreation, and tourism alongside ecological outcomes.

### **Ongoing Engagement with Community and Cultural Groups**

- Maintain regular dialogue with the Council of Elders, tourism operators, and community groups to ensure management actions reflect evolving community values.

### **Monitoring of Social and Cultural Outcomes**

- Track community satisfaction, cultural-plant availability, and tourism feedback as part of the MER framework.

### 3 Riparian land and waterway management

Riparian zones are critical ecosystems that line the banks of waterways and wetlands and play an essential role in maintaining water quality and supporting biodiversity.

A healthy riparian zone will usually contain a combination of large trees forming a canopy, along with a diverse understorey of native shrubs, herbs, and grasses. The thick vegetation at ground level filters surface runoff and provides shade, which is crucial for regulating water temperatures. The extensive root systems developed by riparian vegetation are instrumental in stabilising riverbanks, preventing erosion, and intercepting nutrients carried by water flow across adjoining landscapes.

Healthy riparian vegetation plays several crucial roles, including:

- Maintaining and improving water quality by filtering out sediments, nutrients, and pathogens from runoff originating from various land uses and catchment activities such as grazing, agriculture, onsite domestic wastewater management systems (septic tanks), and urban development. This process protects public water supplies, enhances water quality, and helps reduce impacts on marine ecosystems.
- Maintaining bank stability and reducing erosion and sedimentation.
- Regulating instream temperature and primary production through shading, which benefits aquatic species and reduces the likelihood of algal blooms and aquatic weed invasion.
- Storing carbon.
- Supplying energy and nutrients to native flora and fauna.
- Providing essential aquatic habitat.
- Maintaining the integrity and stability of the waterway through plant roots that prevent undercutting of banks (GBCMA 2014).

Implementing the Norfolk Island Waterway and Wetland Management Strategy 2025-2035 will involve collaborating with the community and key stakeholders to address various challenges and to maximise opportunities to improve waterway and wetland health.

#### 3.2 Water resources

Norfolk Island lacks large dams and a reticulated water supply, so individual households and businesses are responsible for their own potable water supply (Petheram et al. 2020), which is usually supplied through the installation of rainwater tanks.

The largest surface-water storage dam on the island is behind Watermill Dam. Other smaller storage facilities include an earth dam on Headstone Creek and a small concrete dam on an upper tributary of Watermill Creek, which provides an emergency water supply for what was previously the Norfolk Hotel. Several other small storages exist on properties with access to Watermill, Stockyard, and Mission Creeks (Abell & Falkland, 1991).

Due to the dispersed nature of the residential population and tourist accommodations, a reticulated water supply system for the entire island would be prohibitively expensive (Petheram et al. 2020). Over 95% of households primarily source their water from roof-

harvested rainwater tanks. During extended dry periods, many households replenish their supplies using groundwater.

The weathered basalts of Norfolk Island allowed for the relatively easy construction of hand-dug wells (Petheram et al. 2020). Groundwater bores were not constructed until the 1960s with the arrival of drilling rigs. In 1996, a moratorium on new bores was implemented (Petheram et al. 2020).

Today, there are more than 500 known wells and bores, with many more abandoned and unregistered bores (Petheram et al. 2020). Prior to World War II and the availability of Southern Cross piston pumps, residents only extracted enough groundwater to meet their needs due to the laborious effort involved. With the electrification of the island in 1969, significant increases in groundwater extraction likely occurred (Petheram et al. 2020).

Groundwater use on Norfolk Island is not regulated or measured. The mean annual groundwater extraction is estimated to be approximately 120 ML, about three times the amount estimated prior to World War II (Petheram et al. 2020).

### 3.3 Water quality

Water quality issues within waterways and wetlands Norfolk Island arise from a range of environmental and human caused factors. One of the primary concerns is nutrient and sediment runoff. Unrestricted cattle grazing and various land use activities contribute to elevated nutrient levels and increased sediment loads in waterways and wetlands. This runoff significantly degrades water quality and has adverse effects on marine ecosystems, particularly the coral reefs located in Emily Bay and Slaughter Bay (Vanderzalm et al., 2024).

Another major issue is the presence of acid sulfate soils. When these soils are disturbed or allowed to dry, they can release harmful substances into the surrounding environment. This poses serious risks to both soil and water resources and impacts to sensitive marine habitats in Emily and Slaughter Bays as well as implications for human health, animal welfare and infrastructure integrity (Fitzpatrick et al., 2023).

The interactions between groundwater and surface water systems on Norfolk Island are complex and not yet fully understood. This lack of clarity presents challenges for effective water resource management and complicates efforts to maintain water quality across different hydrological zones on Norfolk Island.

Seawater intrusion is another concern, particularly in aquifers located within the Kingston lowland. These aquifers are susceptible to saline contamination, which can further compromise the quality of freshwater resources.

Addressing these water quality challenges requires coordinated action among the Norfolk Island community, public land managers, key stakeholders, and government agencies. Collaborative efforts are currently underway to develop and implement strategies aimed at improving the condition of waterways and wetlands across the island.

Enhancing water quality on Norfolk Island will depend on the adoption of improved land management practices, the expansion of monitoring programs, and sustained engagement with local communities and stakeholders.

### 3.4 Supporting the Norfolk Island Community

The small size of the Norfolk Island community fosters a high level of individual participation in planning and decision-making processes related to waterway and wetland protection. Voluntary incentive programs are crucial for enhancing the ecological health of waterways and wetlands across the island, especially on private land where targeted on-ground works such as riparian fencing and revegetation can have significant impact.

Financial support to landholders for environmental projects on private land from the Toon Trust has so far resulted in excellent on-ground outcomes, but more funding is needed to expand the reach and effectiveness of voluntary incentive schemes on Norfolk Island. Priority actions include fencing to exclude livestock from sensitive riparian zones, provision of alternative water sources for stock, and revegetation to restore native riparian vegetation. The local nursery is now operational and supplying plants for revegetation projects, which will help to accelerate habitat recovery.

In addition to on-ground works, community education is an important part of any environmental restoration program. Regular field days, workshops, and planting events will not only build capacity in the community but also strengthen the collective commitment to protecting Norfolk unique waterways and wetlands.

#### Community Engagement

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Strong community engagement is essential to the success of the Norfolk Island Waterway and Wetland Management Strategy. Waterways and wetlands are deeply connected to the island's identity, culture, economy, and way of life. Their protection relies on the collective efforts of landholders, graziers, community groups, schools, businesses, and visitors.

Engagement ensures that management actions are grounded in local knowledge, culturally appropriate, and supported by those who live, work, and recreate on the island. It also strengthens transparency, builds trust, and encourages shared responsibility for the health of Norfolk Island's land, freshwater, and marine environments.

The Strategy promotes a collaborative approach where community members are active partners in planning, implementation, monitoring, and long-term stewardship.

#### 3.3.1 Management Actions to support and engage with the community

##### *a) Strengthen Awareness and Understanding*

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#### Community Education Campaigns

- Provide and promote accessible information on waterway and wetland values, threats, and best practice management.
- Use local media, social media, community events, and signage at key sites.
- Highlight links between land management, water quality, and the health of the Norfolk Marine Park.

## **School and Youth Engagement**

- Partner with Norfolk Island Central School to integrate waterway and wetland topics into learning programs.
- Support student-led monitoring, restoration activities, and citizen-science projects.

## **Visitor and Tourism Engagement**

- Provide information to tourists about the importance of protecting waterways, wetlands, and the lagoonal reef.
- Work with tourism operators to promote responsible recreation and environmental awareness.

## ***b) Support Landholders and Graziers***

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### **Practical Support Programs**

- Offer technical advice, training, and financial incentives for fencing, erosion control, weed management, and stock exclusion.
- Provide design assistance for riparian fencing, off-stream watering points and riparian restoration.

### **Stewardship and Incentive Programs**

- Provide incentive schemes to support landholders who protect waterways and wetlands.
- Recognise and celebrate landholders who demonstrate best-practice management.

### **Co-design of Grazing Solutions**

- Work closely with cattle owners to implement the Public Land Grazing Management Strategy.
- Ensure cultural values and local livelihoods are respected while protecting sensitive areas.

## ***c) Foster Community Participation in on-Ground Works***

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### **Community Restoration Days**

- Organise volunteer planting days, weed control events, and clean-up activities in priority riparian and wetland areas.
- Provide tools, plants, and training to support safe and effective participation.

### **Citizen Science Programs**

- Engage community members in water quality monitoring, erosion tracking, and biodiversity surveys.
- Provide simple monitoring kits and training to ensure data quality.

### **Partnerships with Local Groups**

- Collaborate with the Norfolk Island Flora and Fauna Society, Council of Elders, tourism groups, and environmental volunteers to deliver restoration and monitoring projects.

## ***d) Strengthen Communication and Transparency***

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### **Regular Reporting to the Community**

- Share updates on project progress, monitoring results, and success stories through newsletters, community meetings, and online platforms.
- Provide plain-language summaries of technical findings.

### **Feedback and Dialogue Mechanisms**

- Maintain open channels for community feedback throughout implementation.
- Host annual community forums to discuss progress, challenges, and future priorities.

### **Recognition of Cultural Values**

- Ensure communication materials acknowledge the cultural significance of land and water on Norfolk Island.
- Work with the Council of Elders to ensure cultural perspectives are reflected in messaging and decision-making.

## ***e) Build Long-Term Stewardship and Capacity***

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### **Training and Skills Development**

- Provide workshops on riparian restoration and management, weed management, and water quality monitoring.
- Build local capacity to deliver ongoing management and maintenance.

### **Support for Local Employment and Contractors**

- Where possible, engage local contractors, community groups, and young people in restoration and monitoring activities.
- Explore opportunities for environmental traineeships or ranger-style programs.

### **Celebrate Success**

- Publicly acknowledge community contributions and project achievements.
- Share stories of positive change to build momentum and pride in local stewardship.

## 4 Management issues and threats to waterways and wetlands on Norfolk Island

Norfolk Island's waterways and wetlands provide numerous important values, including the provision of habitat for native flora and fauna, important and poorly represented native vegetation communities, recreation opportunities and water supply for stock.

Several threats impact the water quality and overall health of Norfolk Island's waterways and wetlands. These include overgrazing by livestock on public and private land, clearing native vegetation from stream banks, invasion by pest plants and animals and mismanagement or disturbance of acid sulfate soils.

These threats lead to various negative impacts on the environment and water quality, including increased input of contaminants such as sediment and nutrients, changes in vegetation structure and species composition, reduced regeneration of native vegetation, decline in the diversity and abundance of wetland-dependent flora and fauna and a loss of important and poorly represented wetland habitats.

Table 4 lists some of the values, threats and impacts to waterways and wetlands on Norfolk Island.

**Table 4. Waterway and wetland values, threats and impacts on Norfolk Island.**

| Values                                    | Threats                                   | Impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tourism                                   | Catchment clearing                        | Increased input of contaminants such as sediment or nutrient causing deterioration in in-stream habitat.<br><br>Changed vegetation structure and species composition.<br><br>Reduced regeneration of native vegetation.<br><br>Reduced input of organic matter and structural woody habitat to rivers.<br><br>Changed streambed and channel shape.<br><br>A decline in the diversity and abundance of wetland dependent flora and fauna.<br><br>Disruption of lifecycles and breeding cues.<br><br>Loss of wetland habitat and complexity.<br><br>Modified wetting and drying cycles.<br><br>Physical degradation of soils.<br><br>Reduced primary production and nutrient cycling.<br><br>Reduced water quality and temperature increases.<br><br>The release harmful chemicals from inappropriately managed acid sulfate soils, affecting marine environments, human and animal health and infrastructure. |
| Native flora and fauna                    | Poor land management                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Native vegetation communities             | Overgrazing or poorly managed grazing     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Recreation                                | Stock access to waterways to access water |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Water supply - domestic                   | Clearing of stream banks                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Water supply for stock                    | Pest plant and animal invasion            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Water supply for agriculture and industry | Climate change                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Cultural heritage                         | Urban and agricultural development        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Aesthetics                                | Inappropriate recreational practices      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Lifestyle                                 | Groundwater extraction                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                           | Disturbance of Acid Sulfate Soils         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                           | Water extraction                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                           | Inappropriate instream infrastructure.    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## 4.2 Impacts of unrestricted stock access to waterways

Stock access can have a significant detrimental impact on waterway and wetland condition and presents risks to reef health and human health through reduced water quality.

Impacts of unrestricted stock access to waterway and wetland health include:

- soil pugging and reducing grass cover, resulting in increased sediment and nutrient runoff into a waterway and ultimately into the Norfolk Marine Park (including the Emily and Slaughter Bay lagoonal reef);
- restricting regeneration of native vegetation;
- increased erosion and sedimentation;
- reduced habitat for native fauna (both aquatic and terrestrial);
- soil compaction;
- Disturbance of Acid Sulfate Soils, resulting in significant environmental issues and damage to infrastructure; and
- increased weed invasion into riparian land.

Restricting stock access to waterways can have many benefits. These include:

- reduced nutrient inputs into waterways and wetlands;
- reduced erosion;
- improved water quality for livestock through the provision of alternative watering points (which has been shown to improve the health of livestock);
- improved stock management;
- benefits to the broader community through reduced pollution in waterways and marine areas; and
- a reduction in the disturbance of acid sulfate soils.

## 4.3 Unrestricted stock access to waterways on Norfolk Island

Although it is recognized that unrestricted cattle grazing does have significant detrimental impact on waterway and wetland condition, cattle grazing on public land and roadsides on Norfolk Island does have cultural and aesthetic appeal to some members of the community and to tourists. Cattle grazing also provides income for some local families with public land grazing rights, and it is recognized that cattle grazing does reduce the need for (and the costs involved with) mowing on public land grazed by cattle.

A lack of stock exclusion fencing in sensitive areas such as waterways, wetlands, dams, steep slopes and along cliff edges is having a negative impact on the Norfolk Island terrestrial and freshwater environment and on the unique values of the Norfolk Marine Park.

Selective grazing of palatable native vegetation and seedlings can significantly decrease the populations and distribution of native plants. Changes to the physical structure of remnant vegetation by grazing and trampling and changes in species composition disrupts native forest regeneration and can promote invasion by exotic weeds (Administration of Norfolk Island 2003).

In some public reserves on Norfolk Island, cattle management fences have been erected to reduce over-grazing and erosion (eg. Quarantine Reserve and some public reserves within

KAVHA) and some reserves are totally protected from cattle grazing (eg. Hundred Acres Reserve and Bumboras Reserve) (Figure 7).

Cattle grazing also disturbs acid sulfate soils through pugging, which leads to water quality issues, damage to the environment and damage to infrastructure (including historic bridges within KAVHA) (Fitzpatrick et al. 2024).

The development of the Public Land Grazing Management Strategy, Norfolk Island (Cadeema 2025), which is funded through the Parks Australia *Our Marine Parks Grants Program* funded *Managing Cattle Grazing on Norfolk Island to Improve Water Quality in the Norfolk Marine Park Project*, is currently underway and due for completion in early 2026. The Public Land Grazing Management Strategy aims to support and improve cattle productivity on Norfolk Island whilst addressing cattle grazing factors which present an increased risk of adverse environmental impacts. The Public Land Grazing Management Strategy will recommend the protection of sensitive areas around waterways and wetlands on Norfolk Island to address environmental impacts through current cattle grazing practices, including water quality impacts and impacts from the disturbance of acid sulfate soils. Potential “new” public land grazing areas where cattle will have significantly less environmental impact are being explored and discussed with public land managers on Norfolk Island through the Norfolk Island Grazing Project Working Group. Figures 7, 8 and 9 show draft current, potential future and proposed reduced public land grazing areas on Norfolk Island (Cadeema 2025).

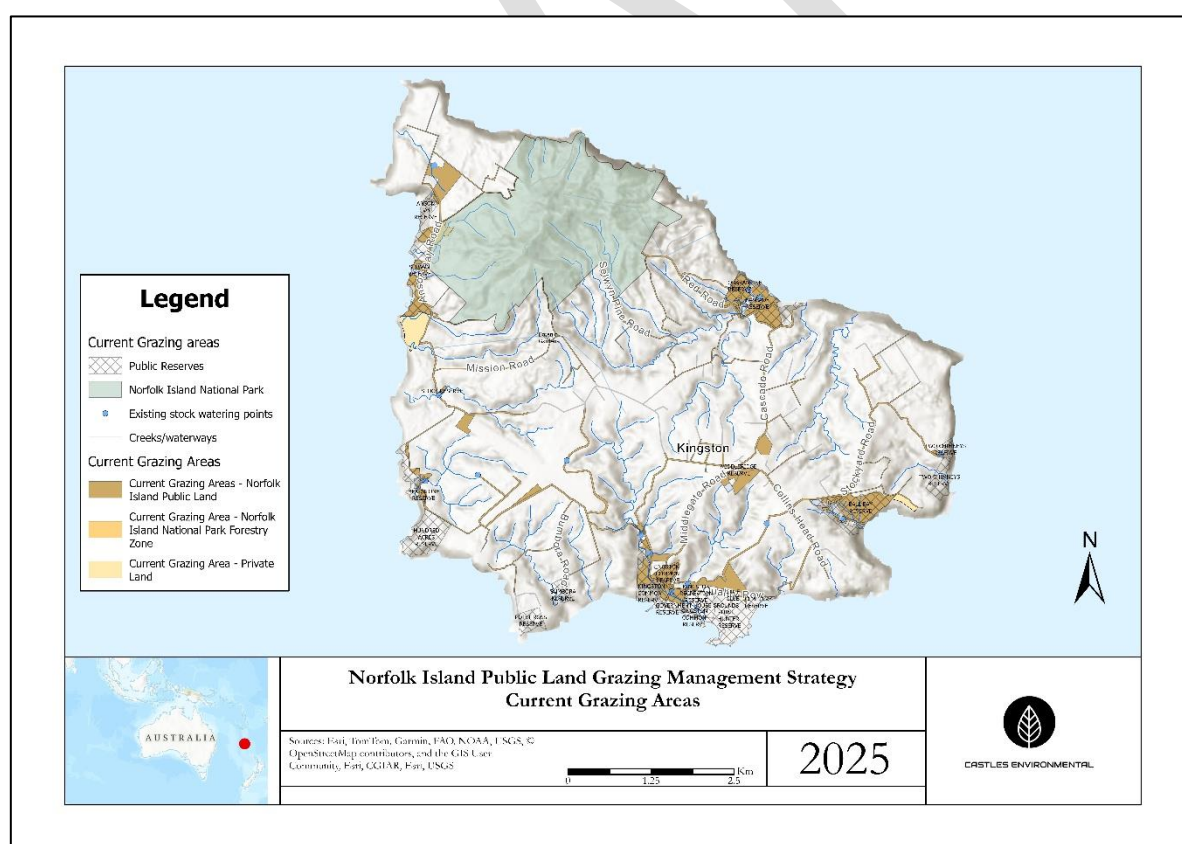


Figure 7. Current public land grazing areas on Norfolk Island (November 2025)

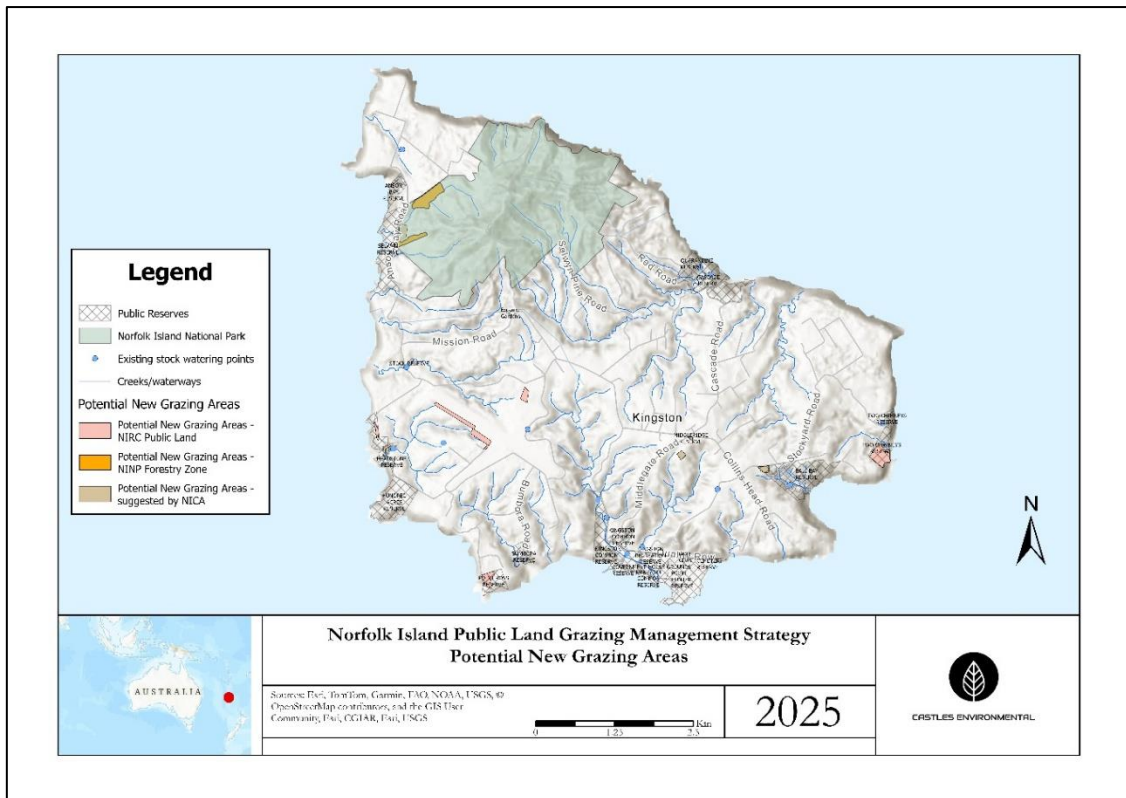


Figure 8 Potential future public land grazing areas on Norfolk Island (as of November 2025)

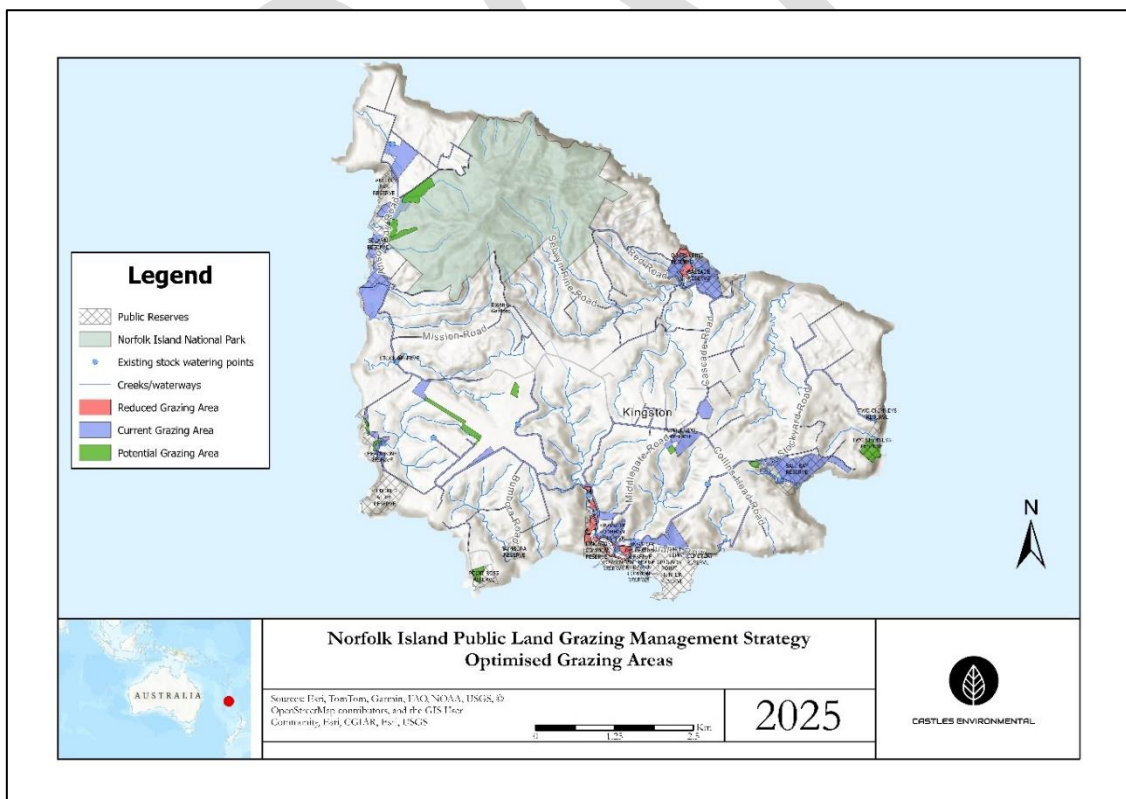


Figure 9. “Optimised” (including reduced) public land grazing areas on Norfolk Island.

## 4.2.1 Management Actions to reduce impacts of unrestricted stock access to waterways on Norfolk Island

### *a) Assessment and Prioritisation*

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#### **Map Current Grazing Areas and Sensitive Zones**

- Map all public land grazing areas, including roadside grazing zones.
- Identify sensitive areas where grazing is causing:
  - sediment and nutrient runoff
  - soil pugging
  - erosion
  - disturbance of acid sulfate soils
  - damage to riparian vegetation
  - impacts on historic infrastructure (e.g., bridges in KAVHA)

#### **Condition Assessment of Grazed Reserves**

- Assess vegetation structure, native seedling recruitment, and weed invasion.
- Identify reserves where grazing is preventing forest regeneration or altering species composition.

#### **Water Quality and Soil Monitoring**

- Monitor turbidity, nutrients, and sediment loads downstream of grazed areas.
- Assess soil compaction and pugging in wetlands and drainage lines.
- Identify areas where grazing is exposing or disturbing acid sulfate soils.

### *b) Design and Planning*

---

#### **Develop Grazing Exclusion Zones**

- Identify waterways, wetlands, dams, steep slopes and cliff edges where grazing should be excluded to protect environmental and cultural values.
- Align exclusion zones with recommendations from the **Public Land Grazing Management Strategy** and current plan of management for Norfolk Island public reserves.

#### **Design Stock-Exclusion Fencing**

- Develop fencing designs for priority areas, ensuring appropriate fencing setbacks to guarantee the effectiveness of the riparian buffer.
- Ensure fencing protects:
  - riparian zones
  - wetland margins
  - ASS-prone peatlands
  - historic infrastructure

#### **Identify and Plan New Low-Impact Grazing Areas**

- Work with the Norfolk Island Grazing Project Working Group to identify “new” public land grazing areas with significantly lower environmental risk.
- Assess suitability based on soil type, slope, proximity to waterways, and cultural values.

#### **Develop Alternative Management Options for Public Land**

- Explore mowing, slashing, or rotational grazing as alternatives in more sensitive “high-risk” areas.
- Assess cost implications and opportunities for community involvement.

### ***c) On-Ground Works***

---

#### **Install Fencing in Priority Areas**

- Construct stock-exclusion fencing on private and public land to protect:
  - waterways and wetlands
  - dams
  - steep slopes and cliff edges
  - ASS-prone areas
- Use durable materials suited to Norfolk Island’s climate and grazing systems.

#### **Restore Degraded Riparian and Wetland Areas**

- Replant native vegetation to stabilise banks and improve habitat.
- Remove weeds promoted by grazing disturbance.
- Use temporary barriers to allow vegetation to establish.

#### **Implement Controlled Grazing in Designated Areas**

- Introduce rotational grazing or seasonal grazing where appropriate.
- Use grazing to manage grass height in low-risk areas, reducing mowing costs.

#### **Protect Historic and Cultural Infrastructure**

Install fencing or barriers around vulnerable structures such as historic bridges in KAVHA, which are being damaged by cattle.

## **4.4 Accelerated erosion due to inappropriate land management**

Erosion is a natural process, and all soils are susceptible to some degree of erosion, though some are more vulnerable than others. Soils with dispersible subsoils, for example, can experience severe erosion through tunneling and gully formation.

The downstream effects of soil erosion include a reduction in water quality in waterways, wetlands and marine environments and sedimentation of watercourses, wetlands, and water storages.

Eroded soil, which can contain high nutrient levels, fertilisers, herbicides, pesticides, and other contaminants, can be deposited where the land slope decreases. This deposition can

occur in waterways, dams, wetlands, or marine ecosystems where a waterway flows into the ocean (such as the Emily and Slaughter bays lagoonal reef).

Heavier soil particles are the first to settle, while finer colloidal clay particles may remain suspended in the water column. Soil removed by erosion, especially finer colloidal clay, can be transported directly into creeks, wetlands and marine environments.

Erosion poses a significant threat to both land productivity and waterway health. As soil is displaced, essential nutrients are lost from the landscape and carried into nearby creeks, rivers, and wetlands. This nutrient runoff can contribute to water quality degradation, promoting algal blooms and disrupting aquatic ecosystems. Additionally, erosion strips away the fertile topsoil layer, reducing the depth of productive soil and limiting the amount of water available to plants. The resulting sedimentation can smother aquatic habitats, clog waterways, and reduce the capacity of wetlands to filter pollutants and buffer floods. Managing erosion is therefore critical not only for sustaining agricultural productivity but also for protecting the ecological integrity of downstream environments.

Waterway erosion can be divided into two broad categories as summarised in Table 5.

**Table 5. The two broad categories of waterway erosion – bed deepening and bank erosion.**

| Category                                                                                                                                                                                                                                                        | Causes                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bed deepening - a common process that erodes the waterway bed and destabilises the adjacent banks. Once initiated, bed deepening can continue and migrate upstream until it reaches solid and stable bedrock.                                                   | <ul style="list-style-type: none"> <li>• Increase in water flow from adjacent development runoff.</li> <li>• Increased bed slope due to human-made or natural processes.</li> <li>• Increased erosion of bed sediments due to removal of a downstream water storage or natural blockage.</li> <li>• Reduced supply of sediment to the bed from upstream sources.</li> </ul>                                                                             |
| Bank erosion - a natural process, that can be greatly accelerated by human activities. An unstable, eroding bank can be steep sided (greater than 30°) and exhibit constant sloughing of soil. It can result from bed deepening or through abrasive water flow. | <ul style="list-style-type: none"> <li>• Loss of waterway vegetation.</li> <li>• Rapid rise in water level placing additional load on banks.</li> <li>• Groundwater flowing through the stream banks.</li> <li>• Obstruction to flow causing turbulence along the bank.</li> <li>• Large flow events.</li> <li>• Bed deepening, or filling with sediment.</li> <li>• Natural adjustment of the waterway (e.g. ongoing movement of meanders).</li> </ul> |

Erosion is a natural process, but the rate of erosion can be accelerated by disturbances such as cattle grazing or the removal of native vegetation and can be addressed through better land management.

## 4.4.1 Management Actions to reduce impacts of erosion

### *a) Assessment and Prioritisation*

---

#### **Island-Wide Erosion Risk Mapping**

- Map areas prone to:
  - gully erosion
  - tunnelling in dispersible subsoils
  - bank erosion
  - bed deepening
  - slope instability
- Prioritise sites where erosion is contributing sediment and contaminants to waterways, wetlands, dams, or the Norfolk Marine Park.

#### **Waterway Condition Assessment**

- Assess waterways for:
  - bed deepening
  - unstable banks (>30° slopes, slumping)
  - vegetation loss
  - sediment deposition zones

#### **Water Quality Baseline Monitoring**

- Measure turbidity, suspended solids, nutrients, and contaminants.

### *b) Design and Planning*

---

#### **Erosion Control Plans for Priority Catchments**

- Develop site-specific plans addressing:
  - hydrological drivers
  - soil type and dispersibility
  - vegetation condition
  - stock access
  - upstream land use
- Use staged works to avoid large scale soil disturbance and downstream impacts.

#### **Bed Deepening Mitigation Designs**

- Design grade-control structures (rock chutes, riffles, log weirs) to stabilise bed levels.
- Plan sediment-retention structures where upstream sediment supply has been reduced.

#### **Bank Stabilisation Designs**

- Use bioengineering approaches:
  - live staking
  - coir logs
  - brush mattresses

- revegetation with deep-rooted native species
- Incorporate hard engineering only where necessary (e.g., rock armouring in high-energy sections).

### **Stormwater and Runoff Management**

- Design swales, sediment traps, and energy dissipators to reduce erosive flows.
- Address increased runoff from development and compacted surfaces.

### **Stock Exclusion and Grazing Management**

- Integrate erosion control with stock-management actions.
- Design fencing to exclude cattle from eroding banks, gullies, and ASS-prone wetlands.

## ***c) On-Ground Works***

---

### **Stabilise Eroding Waterway Beds**

- Install grade-control structures to halt upstream migration of bed deepening.
- Reconstruct riffle-pool sequences where natural morphology has been lost.

### **Stabilise Eroding Banks**

- Regrade steep banks to stable angles.
- Install coir logs or brush layers to protect banks during vegetation establishment.
- Plant native riparian vegetation to provide long-term stability.

### **Gully and Tunnel Erosion Remediation**

- Fill and compact active tunnels.
- Install check dams or contour banks to slow flows.
- Replant with deep-rooted species suited to dispersible soils.

### **Reduce Sediment Delivery to Wetlands and Marine Areas**

- Install sediment traps and forebays at inflow points to wetlands and dams.
- Stabilise drainage lines delivering sediment to the Emily and Slaughter Bay lagoonal reef.

### **Restore Vegetation Cover**

- Replant native groundcovers, shrubs, and trees to improve soil structure and reduce runoff.
- Remove invasive weeds that destabilise banks or alter hydrology.

## 4.5 Runoff from roads and other built-up areas

Runoff from impervious and compacted areas - including roads, parking areas, rooftops, and grazed road reserves - is a major contributor to water quality decline on Norfolk Island. When heavy rainfall occurs, water rapidly flows across these surfaces rather than infiltrating into the soil. This creates a concentrated delivery of pollutants, sediments, and nutrients into creeks, wetlands, and ultimately the marine environment.

### Key Impacts

#### Increased Pollution

As runoff travels across hard surfaces and roadside grazing areas, it mobilises a range of contaminants including:

- Nutrients from cattle manure deposited along roadsides
- Hydrocarbons and heavy metals from vehicles
- Pesticides and herbicides from land management activities
- Litter and organic debris enter drainage lines and wetlands, degrading water quality and contributing to algal blooms, oxygen depletion, and reduced aquatic ecosystem health.

#### Sedimentation

High-energy runoff transports soil, gravel, and organic matter into waterways. Excess sediment:

- Clouds the water and reduces light penetration
- Smothers aquatic plants and invertebrate habitat
- Alters wetland hydrology and reduces storage capacity
- Impacts coral and marine ecosystems downstream

#### Flooding/flash floods

Impervious surfaces increase the volume and speed of runoff, contributing to:

- Localised flooding
- Erosion of roadside drains and creeklines
- Damage to wetland vegetation and infrastructure
- Higher peak flows that destabilise channels

#### Ecosystem Disruption

Rapid pulses of polluted water disrupt natural ecological processes. Excess nutrients can trigger algal blooms, while sediment and contaminants reduce habitat quality for fish, macroinvertebrates, and wetland species.

#### Human Health Risks

Contaminated runoff entering wetlands and coastal waters can affect:

- Drinking water sources

- Recreational swimming areas
- Shellfish and marine food safety

## 4.5.1 Management Actions to reduce impacts of runoff from roads and built-up areas

### *a) Undertake Catchment and Runoff Source Assessments*

---

#### **Conduct a Catchment-Wide Runoff Survey**

- Map all impervious surfaces, compacted areas, and roadside grazing zones.
- Identify key runoff pathways, drainage lines, and direct discharge points into wetlands and marine areas.
- Prioritise hotspots based on pollutant load risk, erosion severity, and proximity to sensitive ecosystems.

#### **Roadside Drainage Condition Assessment**

- Survey existing roadside drains, culverts, and outlets for erosion, sediment build-up, and structural failure.
- Identify locations where cattle access contributes to nutrient and sediment loading.

#### **Wetland and Waterway Vulnerability Assessment**

- Assess wetland inflow points for sedimentation, vegetation damage, and hydrological disruption.
- Identify opportunities for natural filtration, buffer enhancement, and flow attenuation.

### *b) Design and Plan Water Quality Improvement Structures*

---

#### **Develop Concept and Detailed Designs for appropriate Stormwater Treatment Systems, including:**

- Vegetated swales
- Sediment traps and gross pollutant traps
- Constructed wetlands or biofiltration systems
- Rock chutes or energy dissipators to reduce flow velocity
- Check dams in eroding drains

#### **Designs for Runoff Diversion and Infiltration**

- Infiltration basins or soakage trenches to reduce direct discharge
- Permeable surface retrofits in high-use areas
- Roadside berms or contour banks to redirect flow into vegetated areas

#### **Cattle Exclusion and Drain Stabilisation Designs**

- Fencing or other barriers to prevent stock from accessing drainage lines
- Stabilisation of eroding drains using rock armouring, coir logs, and/or revegetation
- Sediment forebays at key inflow points to wetlands

### *c) On-Ground Works to Improve Water Quality*

---

#### **Install Priority Stormwater Treatment Infrastructure**

- Construct sediment traps, swales, and biofilters at high-risk discharge points.
- Install gross pollutant traps near high-traffic areas.

#### **Stabilise Eroding Drains and Roadside Channels**

- Regrade and stabilise eroding sections of roadside drains using rock, vegetation, or engineered structures.
- Install check dams to slow flow and capture sediment.

#### **Enhance Riparian and Wetland Buffers**

- Plant native vegetation along inflow channels and wetland margins.
- Create buffer zones to filter runoff before it enters sensitive areas.

#### **Reduce Nutrient Inputs from Roadside Grazing**

- Install fencing or cattle-exclusion measures in priority runoff zones.
- Provide alternative stock access routes and off-road grazing areas.

## **4.6 Acid Sulfate soils**

Acid sulfate soils (ASS) are naturally occurring soils, unconsolidated sediments, or organic accumulations (peat) that contain iron sulfides. Under waterlogged, anaerobic conditions – such as those found in Norfolk Island’s peaty wetlands – these sulfides remain stable. However, when disturbed or aerated, they oxidise and produce sulfuric acid, creating some of the most acidic soil and water conditions found anywhere in the world (Petheram et al. 2020; Fitzpatrick et al. 2023).

Although the mapped areas of acid peat sulfate soils on Norfolk Island are relatively small (Figures 10 - 13), they occur in numerous drainage lines and low-lying wetland systems. Their distribution means they play a disproportionately large role in the island’s hydrology and water quality. During dry periods, when water levels drop and soils crack or are disturbed, acidification can severely affect the quality of water available in wetlands, streams, and dams.

ASS are considered benign when left undisturbed. However, when exposed to oxygen through cattle pugging, excavation, drainage works, or erosion, they rapidly become highly reactive and damaging. Fitzpatrick et al. (2023) describe them as “the most benign soils in the world if left undisturbed” but “the nastiest soils in the world” when disturbed.

## Key Impacts

### Generation of Sulfuric Acid

Disturbance exposes iron sulfides to air and water, triggering oxidation and the formation of sulfuric acid. This dramatically lowers soil and water pH, creating conditions toxic to plants, animals, and microorganisms.

### Release of Heavy Metals

Acidification mobilises metals such as iron, aluminium, and manganese. These metals contaminate water sources, harm aquatic ecosystems, and pose risks to human health.

### Environmental Damage

Highly acidic, metal-rich runoff:

- kills vegetation
- reduces biodiversity
- contaminates streams, wetlands, and estuaries
- impacts fisheries and marine ecosystems downstream

### Infrastructure Corrosion

Sulfuric acid corrodes:

- concrete
- steel
- culverts
- pipelines
- stormwater infrastructure

This leads to costly repairs and reduced asset lifespan.

### Human Health Risks

Exposure to acidic soils and metal-rich water can cause:

- skin and respiratory irritation
- contamination of drinking water sources
- long-term health impacts from metal ingestion

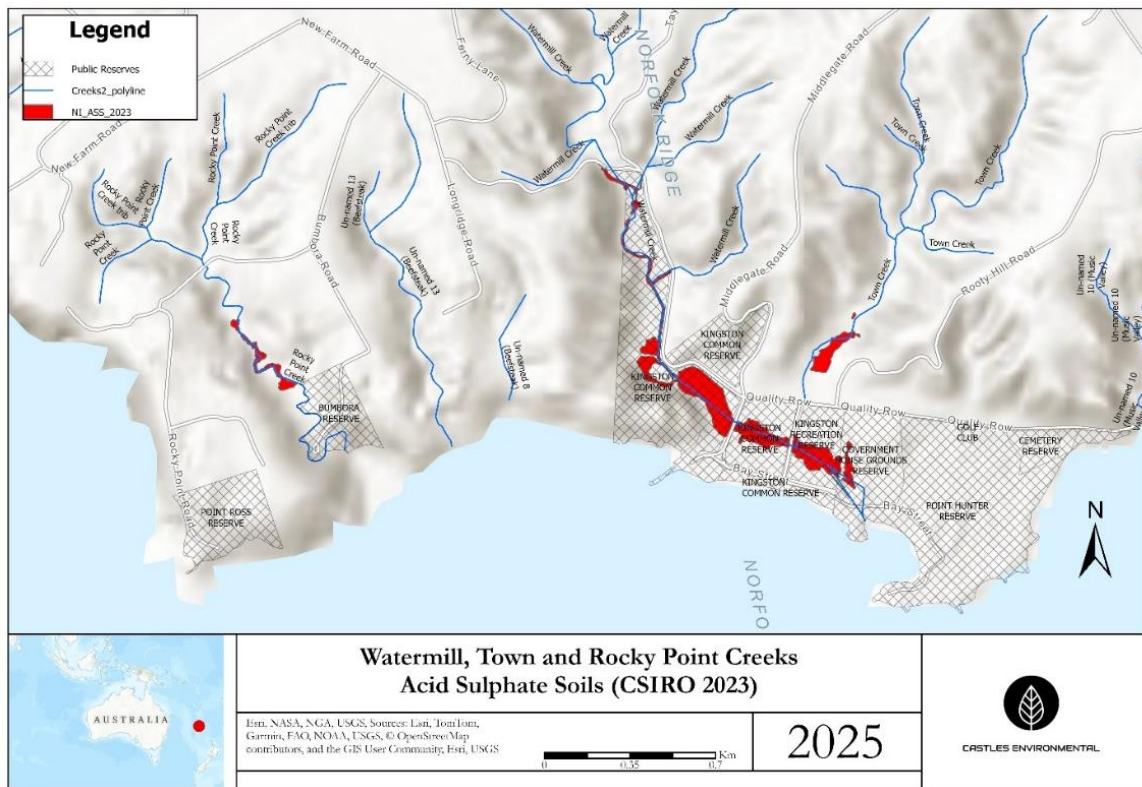


Figure 10. Location of Acid Sulphate Soils on Watermill, Town and Rocky Point Creeks (Fitzpatrick et al. 2023)

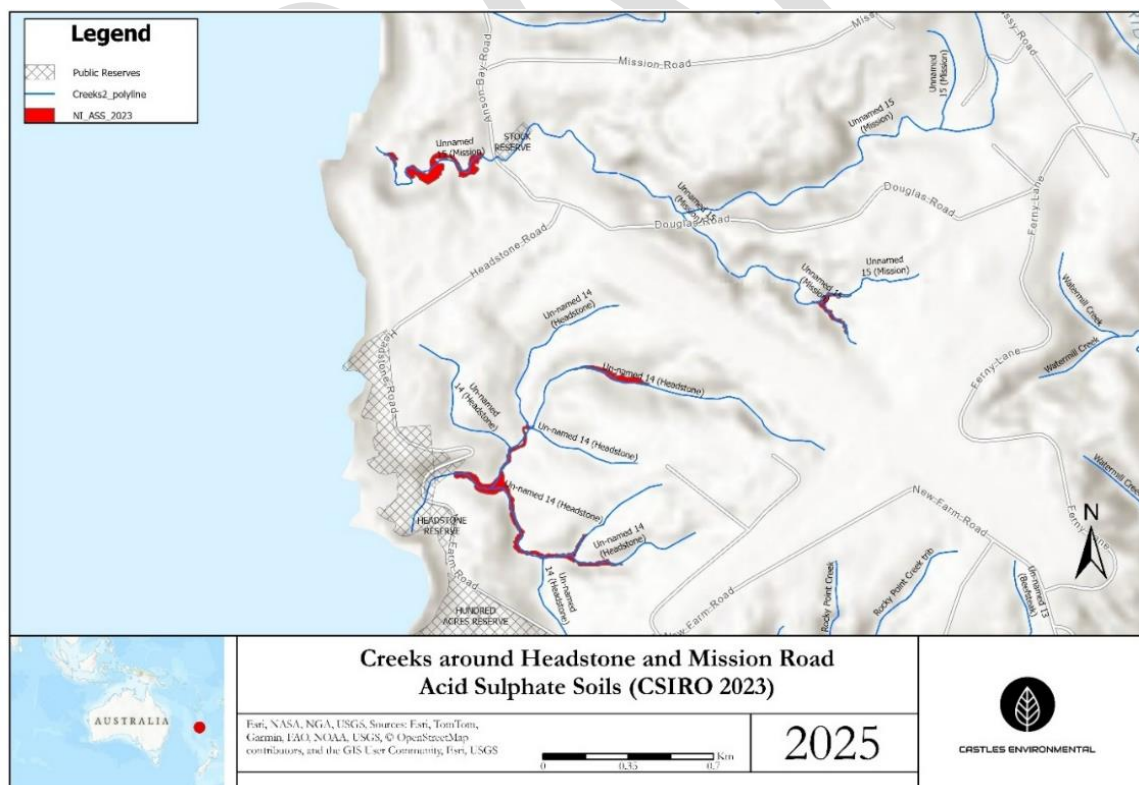


Figure 11. Location of Acid Sulphate Soils in the Headstone and Mission Road area (Fitzpatrick et al. 2023)

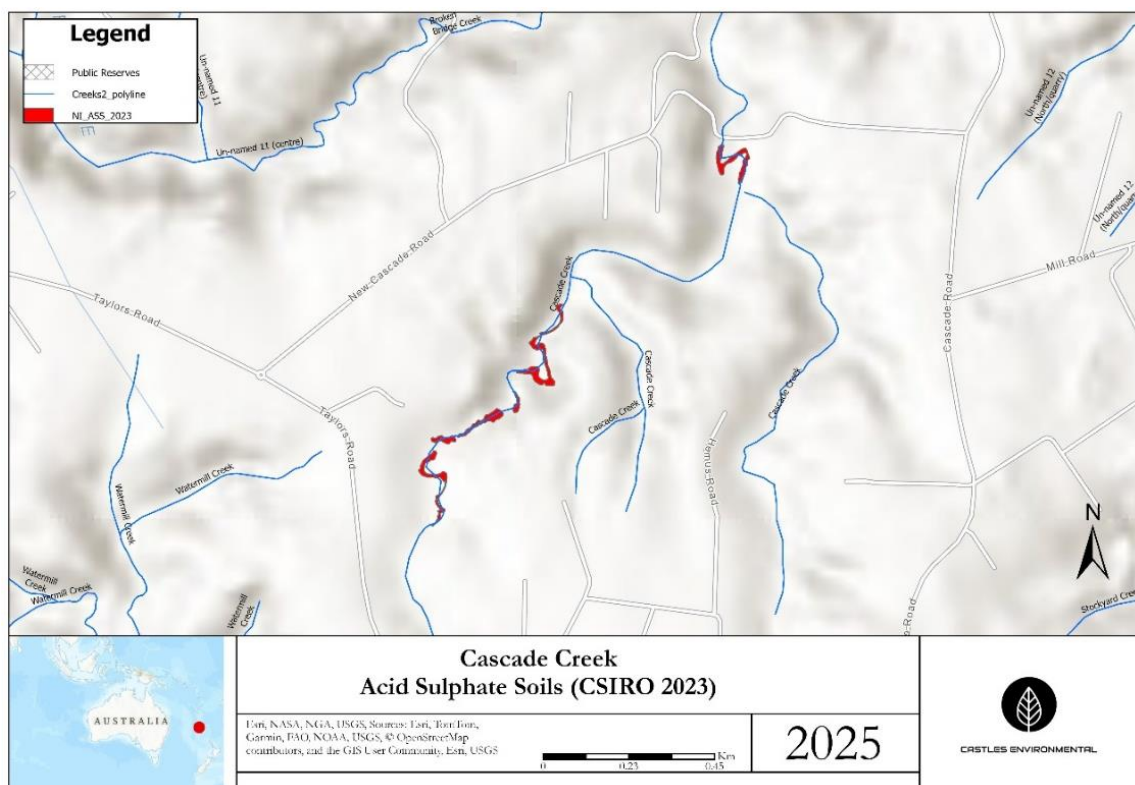


Figure 12. Location of Acid Sulfate Soils on Cascade Creek (Fitzpatrick et al. 2023)

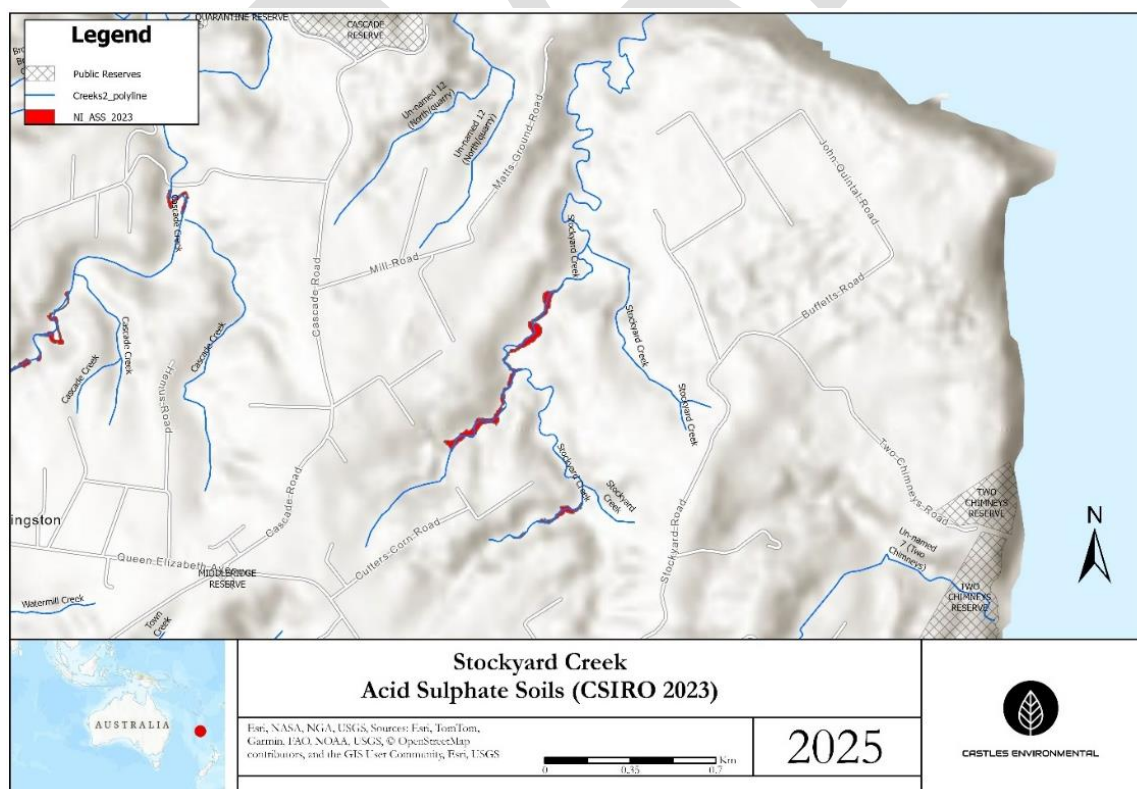


Figure 13. Location of Acid Sulfate Soils on Stockyard Creek (Fitzpatrick et al. 2023)

When acid sulfate soils are disturbed, they can cause significant environmental and infrastructure issues, including:

- **Generation of Sulfuric Acid:** Disturbing Acid Sulfate Soils exposes iron sulfides to air and water, leading to the formation of sulfuric acid. This acidification significantly lowers the pH of the soil and water, making it highly acidic and toxic to plants, animals and microorganisms.
- **Release of Heavy Metals:** The acidification process releases heavy metals such as iron, aluminum, and manganese. These metals can contaminate water sources, affecting both natural ecosystems and human health.
- **Environmental Damage:** The high acidity and metal content can poison plants, making the land unsuitable for agriculture and leading to a loss of biodiversity. Acidic waters draining from these soils can contaminate rivers, streams, and estuaries, negatively impacting aquatic organisms and fisheries.
- **Infrastructure Corrosion:** Sulfuric acid can corrode infrastructure, including buildings, roads, and pipelines, causing substantial economic damage. The high acidity can erode concrete and metals, compromising the structural integrity of infrastructure.
- **Health Risks:** Exposure to acid sulfate soils can pose health risks, such as respiratory issues and skin irritation. The release of heavy metals can contaminate drinking water sources, leading to long-term health problems.

## 4.6.1 Management Actions for Acid Sulfate Soils

### *a) Assessment and mapping*

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#### **Island-Wide ASS Risk Mapping**

- Update and refine existing ASS maps where (or if) required using soil cores, peat sampling, and geochemical testing.
- Identify high-risk drainage lines, wetlands, and depressions where ASS are likely to be exposed during dry periods.
- Map areas where cattle grazing overlaps with ASS-prone soils.

#### **Soil and Water Chemistry Baseline**

- Conduct pH, acidity, and metal concentration testing in priority wetlands and streams.
- Establish baseline conditions for seasonal variation, particularly during late dry season when exposure risk is highest.

#### **Infrastructure and Earthworks Risk Assessment**

- Identify culverts, drains, and road cuttings intersecting ASS layers.
- Assess erosion hotspots where ASS exposure is likely or already occurring.
- Review historical earthworks and drainage modifications that may have altered hydrology.

## ***b) Design and Planning***

---

### **ASS Management Plans for Priority Sites**

Develop site-specific plans that include:

- soil handling protocols
- water management measures
- stock exclusion requirements
- emergency response procedures for acidification events

### **Hydrological Protection and Water Level Management**

Design interventions to:

- maintain waterlogged conditions in ASS-prone wetlands
- prevent unnecessary drainage or dewatering
- reduce seasonal exposure of peat layers

Options include:

- low-flow weirs
- wetland rehydration structures
- controlled drainage systems

### **Erosion and Disturbance Prevention Designs**

- Stabilisation designs for eroding gullies and drains intersecting ASS.
- Fencing or cattle exclusion infrastructure to prevent pugging in sensitive peatlands.
- Vegetation buffers to reduce soil disturbance and maintain moisture.

## ***c) On-Ground Works***

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### **Protect and Rehydrate ASS-Prone Wetlands**

- Install structures to maintain higher water levels during dry periods.
- Block or modify drains that are unnecessarily exposing ASS layers.
- Restore wetland vegetation to improve shading, moisture retention, and soil stability.

### **Stabilise Eroding Drains and Gullies**

- Apply rock armouring, coir logs, or geotextiles to prevent further exposure of ASS.
- Construct check dams to slow flows and reduce incision.
- Regrade unstable banks and revegetate with moisture-tolerant native species.

### **Manage Cattle Access**

- Install fencing around high-risk peatlands and drainage lines.
- Provide alternative stock routes or off-stream watering points.
- Work with graziers to reduce pugging during wet periods.

## Neutralisation and Treatment (Where Necessary)

- Apply agricultural lime or dolomite to neutralise acidity in small, localised areas.
- Use passive treatment systems (e.g., limestone drains) to buffer acidic flows.
- Only apply chemical treatments where hydrological protection is insufficient.

## 4.7 Climate Change

Climate projections for Norfolk Island show a clear and consistent trend toward a hotter, drier climate with higher evaporative demand. These changes will have significant implications for waterway health, wetland resilience, water security, and the functioning of catchment systems across the island.

There is strong agreement among global climate models that mean annual rainfall will decrease, while potential evaporation will increase (Petheram et al. 2020). This combination intensifies water stress, reduces baseflows, and increases the likelihood of wetlands drying out during critical periods.

### Projected Rainfall Changes

Across 21 global climate models:

- ~80% project a **decrease in mean annual rainfall**
- 100% project a **decrease in spring rainfall**
- 90% project a **decrease in winter rainfall**
- 40% of models project **>20% reduction in spring rainfall**
- 25% project **>20% reduction in winter rainfall**
- There is **no clear agreement** on rainfall changes for summer and autumn

This means Norfolk Island is likely to experience:

- Longer dry periods
- Reduced soil moisture
- Lower wetland water levels
- Reduced streamflow and groundwater recharge
- Higher reliance on storm events for water availability

### Temperature and Evaporation Trends

There is a substantial warming trend in both air temperature and sea surface temperature, with strong agreement that warming will continue. Higher temperatures increase:

- Evaporative demand
- Soil moisture loss
- Stress on wetland vegetation
- Frequency of algal blooms in warm, nutrient-rich waters

Modelled increases in evaporation are driven by:

- Rising temperatures
- Increased wind speeds since 1990

Wind speed increases are consistent with global patterns over oceans and contribute to:

- Faster drying of soils and wetlands
- Higher transpiration rates
- Greater water loss from open water bodies

## **Implications for Waterways and Wetlands**

---

### **Reduced Baseflows and Wetland Drying**

Lower rainfall and higher evaporation will:

- Reduce the duration and extent of wetland inundation
- Increase the frequency of dry-out events
- Stress wetland vegetation and fauna
- Reduce natural filtration and water-quality buffering capacity

### **Increased Risk of Acid Sulfate Soil Exposure**

Drying of peat wetlands increases the likelihood of:

- Cracking and oxidation of acid sulfate soils
- Acidification events during rewetting
- Metal mobilisation into waterways

### **Higher Pollutant Concentrations**

Lower flows mean:

- Less dilution of nutrients, sediments, and contaminants
- Higher risk of algal blooms
- Greater stress on aquatic ecosystems

### **More Intense Rainfall Events (Likely)**

Even with lower annual rainfall, climate change often increases rainfall intensity during storms, leading to:

- Flash flooding
- Erosion of drains and gullies
- Sediment pulses into wetlands and marine environments

## **4.7.1 Management Actions to reduce impacts of climate change**

### ***a) Assessment and Planning***

---

#### **Climate Vulnerability Assessment for Waterways and Wetlands**

- Identify wetlands, streams, and catchments most sensitive to drying.

- Map areas where reduced rainfall will impact water supply, ecological function, or water quality.
- Assess the interaction between climate change and acid sulfate soil exposure.

### **Hydrological Modelling Under Future Climate Scenarios**

- Model future water availability, wetland hydroperiods, and baseflow changes.
- Identify thresholds where wetlands shift from permanent to seasonal.
- Assess impacts on stormwater infrastructure under more intense rainfall events.

### **Water Security Risk Assessment**

- Evaluate risks to dams, wetlands, and natural water sources during prolonged dry periods.
- Identify priority areas for water retention, rehydration, or flow buffering.

## ***b) Design and Adaptation Measures***

---

### **Wetland Rehydration and Water Retention Designs**

- Restore natural hydrology where past drainage has increased drying.
- Design systems to reduce ASS exposure during drought.

### **Climate-Resilient Stormwater and Drainage Designs**

- Increase capacity for high-intensity rainfall events.
- Incorporate energy dissipation, erosion control, and sediment capture.
- Use nature-based solutions (swales, wetlands, buffers) to slow and filter runoff.

### **Drought-Resilient Vegetation and Riparian Planting**

- Select native species tolerant of higher temperatures and lower moisture.
- Strengthen riparian shading to reduce evaporation and water temperature.
- Stabilise banks to reduce erosion during intense storms.

## ***c) On-Ground Works***

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### **Wetland and Waterway Rehydration**

- Block or modify drains that accelerate drying.
- Restore peatland hydrology to reduce ASS oxidation.

### **Erosion and Sediment Control**

- Stabilise gullies and drains vulnerable to intense rainfall.
- Install check dams, rock chutes, and vegetated buffers.
- Reduce sediment delivery to wetlands and marine environments.

### **Water Conservation and Storage Enhancements**

- Improve water retention in catchments through revegetation, improved soil health and stability, and infiltration measures.
- Enhance natural and constructed water storage capacity.

#### *d) Monitoring and Adaptive Management*

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##### **Climate-Sensitive Water Quality Monitoring**

- Monitor pH and metals in ASS-prone wetlands during dry periods.

##### **Hydrological Monitoring**

- Measure wetland water levels, streamflow, and groundwater trends.
- Use data to refine rehydration and water-retention strategies.

##### **Climate Trend Tracking**

- Maintain local datasets on rainfall, evaporation, and wind speed.
- Compare local trends with model projections to adjust management actions.

## **4.8 Invasive species**

### **Weeds**

Weeds are among the most significant threats to biodiversity and ecosystem function on Norfolk Island. Their rapid growth, competitive nature, and adaptability to the island's climate make them particularly challenging and costly to manage. Without strategic control, invasive plant species can dramatically alter the island's natural values, disrupting ecological processes and degrading habitat quality.

### ***Norfolk Island's Unique Challenges***

Norfolk Island's climate supports fast-growing weed species that require ongoing management. If left unmanaged, these species can alter microclimates, change vegetation structure, and reduce habitat quality (Norfolk Island Regional Council, 2021). There are approximately 430 exotic plant species on Norfolk Island, which is more than twice the number of known indigenous species (182).

Weed competition threatens native vegetation communities, including riparian zones and wetlands, and disrupts critical ecological processes. All 46 listed threatened plant species on Norfolk Island are at risk from weed invasion (Invasive Species Council and Island Conservation, 2017).

### ***Ecological Impacts***

**Displacement of native species:** Weeds compete aggressively for sunlight, nutrients, and water, often outcompeting native plant species and reducing biodiversity.

**Habitat degradation:** As native vegetation declines, habitat quality for native fauna, including insects and birds, also diminishes.

**Altered fire regimes:** Some invasive plants increase fuel loads or modify fire frequency and intensity, heightening the risk of wildfires. Although wildfire has not been a high risk on Norfolk Island in the past, it is likely that a drier climate will lead to a higher risk of wildfire.

**Waterway impacts:** Aquatic weeds can choke waterways, reduce oxygen levels, and disrupt aquatic ecosystems. Terrestrial weeds have been shown to contribute to sedimentation and nutrient loading in creeks and wetlands.

**Loss of ecosystem services:** Weed invasions compromise essential services such as water filtration, carbon storage, and pollination.

## ***Riparian Area Impacts***

Weeds in riparian zones can significantly disrupt ecological balance and reduce the environmental, cultural, and recreational value of waterways and wetlands.

The impact of weeds in riparian areas include:

**Alteration of vegetation community composition:** Invasive weeds often dominate riparian zones, replacing diverse native plant communities with monocultures. This shift reduces ecological resilience and alters the structure and function of the ecosystem.

**Inhibition of native plant recruitment and growth:** Weeds compete with native seedlings for light, nutrients, and space, suppressing the regeneration of native species and leading to long-term declines in native vegetation cover.

**Reduction in food and habitat for native fauna:** Many native animals rely on indigenous plants for food, shelter, and breeding sites. When weeds displace these plants, the availability of suitable habitat and food sources diminishes, affecting species such as birds and insects.

**Disruption of aquatic food webs:** Weeds can alter the composition of leaf litter and organic matter entering waterways, which affects the base of aquatic food chains. Changes in plant types and timing of leaf fall can impact macroinvertebrates and aquatic species populations.

**Provision of shelter and food for exotic animals:** Dense weed growth can create ideal conditions for invasive fauna such as feral chickens, rats, or blackbirds.

**Modification of soil nutrient cycling:** Some weeds alter microbial communities in the soil, affecting nutrient availability and cycling. This can lead to imbalances that hinder native plant growth and reduce soil health.

**Degradation of water quality:** Weeds contribute to increased sedimentation, nutrient loading, and organic matter in waterways. This can lead to algal blooms, reduced oxygen levels, and poor water clarity.

**Influence on sedimentation, erosion, and hydrological processes:** Invasive plants may have shallow or poorly structured root systems that fail to stabilise banks, increasing erosion. Others may trap sediment excessively, altering channel morphology and flow patterns.

**Reduction in water quantity through transpiration:** Some weed species consume large volumes of water through transpiration, reducing stream flow and groundwater recharge, particularly during dry periods.

**Overshading of waterways:** Dense weed growth along banks or overhanging branches can block sunlight, lowering water temperatures and reducing light penetration. This affects photosynthesis in aquatic plants and disrupts thermal regimes critical for aquatic organisms.

**Limitation of access and recreational use:** Thick infestations of weeds can obstruct walking tracks, fishing spots, and swimming areas, reducing the aesthetic and recreational value of riparian zones for locals and tourists alike.

## ***Soil and Land Productivity***

Weeds can have a significant impact on the productivity of soil and land.

The impact of weeds on soil and land include:

**Soil erosion:** Weeds with shallow root systems can destabilise soil, increasing erosion.

**Reduced agricultural output:** Weeds compete with pasture species on Norfolk Island, lowering pasture yields for livestock and increasing pasture management costs.

**High control costs:** Significant resources are invested on Norfolk Island to manage weeds, particularly woody weeds.

**Community involvement:** Effective weed control programs require coordinated efforts across both public and private land, supported by education, workshops, and volunteer programs.

## **Pest animals**

### ***Feral Chickens***

Feral chickens occur in most habitat types across Norfolk Island and are having a dramatic impact on the environment. Observations over many years suggest that feral chickens are changing the soil moisture regime through extensive disturbance of litter, which reduces germination, disturbs seedling roots of native plants, and reduces the number of some invertebrates - including critically endangered land snails (Norfolk Island Regional Council 2021). Feral chickens roosting and foraging around riparian areas also contribute a significant amount of nutrients to waterways through their droppings (Vanderzalm et al. 2024).

The population of feral chickens on Norfolk Island fluctuates due to environmental factors, and it is uncertain if there has been any attempt in the past to estimate the population of feral chickens on the Island (Norfolk Island Regional Council 2021).

A targeted Feral Chicken eradication program in some Norfolk Island Public Reserves in late 2019 and early 2020 resulted in a noticeable reduction in feral chickens within targeted areas. A total of 728 feral chickens were culled from July 2019 and March 2020 (Norfolk Island Regional Council 2021).

Within days following control programs, feral chickens from surrounding land move back into the areas where targeted control is carried out, highlighting the need for continued feral chicken control across all land tenures on Norfolk Island (Norfolk Island Regional Council 2021).

## ***Tarler Bird (Purple Swamp Hen)***

A population of Australasian Swampheh (or Tarler birds on Norfolk Island) (*Porphyrio melanotus*) has become established on Norfolk and Phillip Islands. The presence of the Tarler Birds is believed to be impacting upon the breeding cycle of seabirds as a result of the swamphehs destroying and eating eggs and killing young chicks (Norfolk Island Regional Council 2021).

Norfolk Island Regional Council and Norfolk Island National Park have permits for the control of 500 Tarler Birds over a five-year period across public and private land on Norfolk Island and on Phillip Island (Norfolk Island Regional Council 2021).

It is not known if there has been any attempt in the past to accurately estimate the population of Tarler Birds on Norfolk Island, but the current population on both Norfolk and Phillip Islands was estimated to be around 500 in 2020 (Norfolk Island Regional Council 2021).

Norfolk Island National Park carry out regular planned control programs on Phillip Island and Norfolk Island Regional Council have assisted occasionally by undertaking Tarler Bird control on Norfolk Island, although this work could be better planned, resourced and coordinated (Norfolk Island Regional Council 2021).

## ***Rats***

Although rats are unlikely to contribute significantly to water quality issues on Norfolk Island, they do have a significant impact on the ecology of the island and it is likely that they have played a role in the decline (and cover) of many flora and fauna species that inhabit riparian areas.

Eradication of the Rats from Lord Howe Island, several New Zealand off-shore islands and other islands around the world, and the recovery of flora and fauna populations following these eradication programs, has demonstrated that this introduced species has had a devastating effect on native flora and fauna on islands (Norfolk Island Regional Council 2021).

In recognition of the devastating effect of introduced rats on native and endemic biota on islands, predation by exotic rats on Australian offshore islands of less than 1000 km<sup>2</sup> (100,000 ha) has been listed as a key threatening process under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (Norfolk Island Regional Council 2021).

The Polynesian Rat (*Rattus exulans*) was introduced to Norfolk Island by Polynesian settlers approximately 800 years ago and the Ship Rat or Black Rat (*Rattus rattus*) by Europeans, reportedly from the wreck of the MV Ronaki on Kingston reef during World War II (Norfolk Island Regional Council 2021).

It is likely that rats were a major cause of the extinction of many of the endemic terrestrial land snail species on Norfolk Island and perhaps in conjunction with cats, the two species of lizard that formerly occurred on Norfolk and are now only found on off-shore islets and Phillip Island (Norfolk Island Regional Council 2021).

The Black Rat has had a significant impact on Norfolk's biota, including the post-war extinction of the Black and White Sparrow and Guava Bird, and serious decline in other birds such as the Green Parrot, Norfolk Island Morepork, Pacific Robin and the White-breasted Silvereye, and

the extinction of both species of bat (Gould's Wattled Bat and the Norfolk Island Free-tail Bat) (Norfolk Island Regional Council 2021).

Rats have also had a significant impact on the Island's flora by interrupting the dispersal and germination of seeds. For example, prior to the rat baiting program in the National Park, the endemic Bastard Oak (*Ungeria floribunda*) was reduced to widely scattered mature individuals, with few if any seedlings or young trees. However, a few years after rat baiting commenced, the germination of Bastard Oak seeds significantly increased in the vicinity of mature trees, suggesting that this species had been seriously affected by rats (Norfolk Island Regional Council 2021).

A well designed and funded rat control program is underway within the Norfolk Island National Park. Some targeted rat control currently occurs within Public Reserves on Norfolk Island, although funding is limited and rat bait stations are not re-baited as often as they should be and are empty for the majority of time. Rat control on private land is limited, patchy and uncoordinated (Norfolk Island Regional Council 2021).

A recent island wide rodent eradication project on Lord Howe Island appears to have been successful, and the feasibility of undertaking an island wide rodent eradication project on Norfolk Island could be explored in the future (Norfolk Island Regional Council 2021).

## 4.8.1 Management Actions to reduce the impacts of pest plants

### *a) Assessment and Prioritisation*

---

#### **Island-Wide Weed Risk Mapping**

- Update and refine weed distribution maps, focusing on riparian zones, wetlands, and erosion-prone areas.
- Identify high-risk species that alter hydrology, increase sedimentation, or reduce water quality (e.g., species with shallow roots or high transpiration rates).

#### **Riparian Weed Impact Assessment**

- Assess weed dominance, overshadowing, bank stability, and impacts on aquatic food webs.
- Prioritise sites where weeds are reducing water quality, increasing sedimentation, or inhibiting the regeneration of native plant species.

#### **Fire-Risk Assessment**

- Identify weed species contributing to increased fuel loads, noting that drier climate conditions may heighten wildfire risk.

## *b) Design and Planning*

---

### **Strategic Weed Control Plans**

- Develop site-specific plans for priority catchments and wetlands.
- Use staged removal methods where required to avoid sudden bank destabilisation or habitat loss.

### **Native Vegetation Recovery Plans**

- Design revegetation programs using species that stabilise banks, improve shading, and support aquatic ecosystems.
- Incorporate culturally significant and endemic species.

### **Soil and Hydrology Protection Measures**

- Plan erosion-control structures where weed removal may expose bare soil.
- Integrate weed control with stormwater and sediment-management designs.

## *c) On-Ground Works*

---

### **Targeted Weed Removal**

- Prioritise removal of species that:
  - displace native vegetation
  - destabilise banks
  - overshadow waterways
  - contribute to sedimentation and nutrient loading
  - provide shelter for invasive fauna (e.g., rats, feral chickens)

### **Riparian and Wetland Restoration**

- Replant native species to restore structure, shading, and habitat.
- Use dense native groundcovers to suppress weed regrowth.

### **Aquatic Weed Control**

- Remove choking aquatic weeds that reduce oxygen and disrupt aquatic ecosystems.

### **Cross-Tenure Weed Control**

- Coordinate programs across public and private land, recognising that effective weed control requires coordinated community involvement .

## *d) Monitoring and Adaptive Management*

---

### **Weed Regrowth Monitoring**

- Conduct seasonal surveys to track regrowth and treatment effectiveness.

### Water Quality Monitoring

- Monitor turbidity, nutrients, and oxygen levels to assess improvements following weed control.

### Vegetation Condition Monitoring

- Track native plant recruitment and canopy recovery.

## 4.8.2 Management Actions to reduce the impact of Pest Animals

### Feral Chickens

Feral chickens cause extensive ecological damage, including disturbing soil moisture regimes, reducing native seedling survival, and contributing nutrients to waterways.

#### *a) Assessment and Planning*

---

- Conduct island-wide population surveys (noting that no past population estimate exists).
- Map hotspots in riparian zones and wetlands where nutrient loading is highest.

#### *b) On-Ground Control*

---

- Implement coordinated, cross-tenure eradication programs.
- Prevent reinvasion by synchronising control across public and private land.

#### *c) Monitoring*

---

- Track recolonisation rates, noting that chickens rapidly move back into controlled areas.
- Monitor nutrient levels in waterways near roosting sites.

### Tarler Birds (Australasian Swamphen)

Tarler birds are impacting seabird breeding success by destroying eggs and killing chicks.

#### *a) Assessment and Planning*

---

- Conduct population surveys (current estimate ~500 birds in 2020).
- Map nesting and foraging areas affecting seabird colonies.

## *b) On-Ground Control*

---

- Continue the permitted control program (500 birds over five years).
- Improve coordination between NIRC and Norfolk Island National Park.

## *c) Monitoring*

---

- Track seabird breeding success before and after control.
- Monitor Tarler bird population trends on both Norfolk and Phillip Islands.

## **Rats**

Rats have caused severe ecological damage, including extinctions of birds, bats, snails, and lizards, and suppression of native plant regeneration.

## *a) Assessment and Planning*

---

- Map rat distribution and density across public and private land.
- Assess impacts on riparian vegetation, seedling recruitment, and invertebrates.

## *b) On-Ground Control*

---

- Expand the successful National Park rat-control program.
- Increase bait-station maintenance in Public Reserves (currently “empty for the majority of time” due to limited resourcing) .
- Develop incentives and support for coordinated private-land control.

## *c) Long-Term Eradication Feasibility*

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- Investigate the potential for island-wide eradication, drawing on the successful Lord Howe Island program.

## *d) Monitoring*

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- Track seedling recruitment of sensitive species (e.g., Bastard Oak).
- Monitor bird populations known to be impacted by rats.

## **All Pest Species**

## *a) Governance and Coordination*

---

- Establish a Norfolk Island Invasive Species Working Group.
- Develop cross-tenure agreements for coordinated action.

## *b) Data Management*

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- Maintain a central invasive-species database.
- Standardise monitoring methods across agencies.

## *c) Community Engagement*

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- Promote responsible pet ownership and pest-animal reporting.
- Support landholders with training, equipment, and incentives.

## *d) Research and Innovation*

---

- Partner with universities and conservation organisations.
- Trial new technologies (eDNA, automated monitoring, remote cameras).

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## 5 Strategy approach

### 5.1 Vision

*Norfolk Island's waterways and wetlands are healthy, resilient, and thriving – supporting rich biodiversity, sustaining community wellbeing, and protecting the island's unique cultural and natural heritage. Clean, clear water flows to the sea, nourishing wetlands, creeks, and the Norfolk Marine Park, while restored riparian zones and stable catchments safeguard the island's soils, landscapes, and reef ecosystems.*

*The community, landholders, and agencies work together to care for waterways through informed, adaptive management grounded in science, local knowledge, and shared responsibility. Sustainable land use, responsible grazing practices, and effective control of invasive species protect sensitive environments and ensure that future generations inherit a landscape where native plants and animals flourish.*

*Through coordinated action, innovation, and long-term stewardship, Norfolk Island's waterways and wetlands remain central to the island's identity – supporting cultural values, enhancing tourism, strengthening climate resilience, and contributing to a healthy, productive, and vibrant island community.*

### 5.2 Strategy goals

Eight goals have been developed to assist in the priority setting process for Norfolk Island waterways (Table 6).

**Table 6. The goals that were used to assist in the priority setting process of Norfolk Island Waterways.**

| Goal number | Goal                                                                                                                                                                                                          |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1           | Safeguard marine water quality by protecting and enhancing waterways and wetlands that most influence the health of the Norfolk Marine Park, supporting long-term improvements in coastal ecosystems.         |
| 2           | Preserve and restore key wetlands that play a critical role in biodiversity and water filtration.                                                                                                             |
| 3           | Protect high-value ecosystems first by maintaining or improving waterways with exceptional ecological or biodiversity significance—prioritising protection /conservation of the best before enhancing others. |
| 4           | Strengthen environmental outcomes through collaboration with the community, partners, and key stakeholders to ensure inclusive and effective waterway management.                                             |
| 5           | Support threatened species by increasing populations of rare aquatic and wetland-dependent species (e.g., wetland birds and nesting seabirds) and expanding riparian vegetation cover across the island.      |
| 6           | Engage local communities to better understand and protect waterways with high social value, especially those within frequently visited areas.                                                                 |
| 7           | Build climate resilience by maintaining or improving waterways that contribute to adaptation under variable and changing climate conditions.                                                                  |
| 8           | Enhance waterways and wetlands that are important for tourism by protecting and improving the health of aquatic systems that directly support Norfolk Island's tourism appeal and visitor experiences.        |

## 5.3 Asset-based approach

Norfolk Island boasts unique and diverse natural environments and biodiversity. However, its significant environmental assets face threats such as declining water quality, habitat loss, climate change, invasive species and poorly managed grazing.

To maximise the impact of public investment, efforts should focus on Very High and High value waterways and wetlands first, rather than spreading resources thinly across larger areas and low priority assets. This asset-based approach identifies key areas based on their values, allowing for integrated programs to address threats and prioritise investments.

A major challenge for the Norfolk Island community is achieving the best environmental outcomes with limited resources. An asset-based approach should focus on protecting and improving the most significant environmental, social, cultural, and economic assets that are under the greatest threat and have a high likelihood of success.

Success in this approach requires close collaboration with the community, public land managers, private landholders and key stakeholders. Additionally, targeted investments should be balanced with programs that support and build capacity in the broader community.

## 5.4 Guiding Principles

Successful implementation of this strategy will require a long-term commitment from the Norfolk Island Regional Council, the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, Parks Australia/Norfolk Island National Park, key stakeholders, and the Norfolk Island community. Adequate investment in on-ground works on public land and financial incentives for private landholders to protect important assets on private land will be essential.

Guiding Principles:

- **Partnership Approach:** Waterway and wetland management will be a collaborative effort between the Norfolk Island Regional Council, funding providers, and the community.
- **Community Involvement:** Communities will be engaged in all major phases of waterway management, fostering increased stewardship of waterways.
- **Appropriate Tools:** A comprehensive set of instruments and approaches will be used to improve waterway and wetland condition in priority areas, including government investment in on-ground works on public land, voluntary private land incentive programs, management agreements with landholders, and educational activities.
- **Value for Money:** Funding will be directed to priority management activities on key waterways and wetlands and within priority erosion prone areas, ensuring efficient and effective long-term improvements and community benefits.
- **Evidence-Based Decision-Making:** Decisions and programs will be based on the best available knowledge.

## 5.5 Priority setting

The Priority Setting Process for the Norfolk Island Waterway and Wetland Management Strategy 2026-36 is outlined below:

### 1. Identify Key Areas:

- **Map and Assess:** Conduct a comprehensive mapping and assessment of all waterways and wetlands to identify their current condition and ecological value.
- **Criteria Development:** Develop criteria for prioritisation based on environmental, social, cultural, and economic values.

### 2. Evaluate Threats:

- **Threat Analysis:** Identify and evaluate the main threats to each waterway and wetland such as overgrazing, pollution (from various sources), habitat loss, invasive species, and climate change.
- **Impact Assessment:** Assess the potential impact of these threats on the ecological health and function of the waterways and wetlands.

### 3. Rank Priorities:

- **Scoring System:** Develop a scoring system to rank each waterway and wetland based on their values and the severity of threats.
- **Stakeholder Input:** Engage with stakeholders, including community members, land managers, and experts, to validate and refine the rankings.

### 4. Set Objectives:

- **Define Goals:** Set clear, achievable objectives for the management of high-priority waterways, and wetlands.
- **Action Plans:** Develop specific action plans for each priority area, detailing the necessary interventions and resources required.

### 5. Allocate Resources:

- **Budgeting:** Allocate financial and human resources based on the priority rankings and action plans.
- **Funding Sources:** Identify and secure funding from various sources, including government grants, private investments, and community/landowner contributions.

### 6. Implement and Monitor:

- **On-Ground Works:** Implement action plans through on-ground works, such as habitat restoration, pollution control, and community engagement activities.
- **Monitoring and Evaluation:** Establish a monitoring and evaluation framework to track progress, measure outcomes, and adapt strategies as needed.

### 7. Review and Adapt:

- **Regular Reviews:** Conduct regular reviews of the priority-setting process and management outcomes to ensure continuous improvement.
- **Adaptive Management:** Adjust priorities and strategies based on new information, changing conditions, and feedback from stakeholders.

## 5.6 Strategy Priorities

A scoring system was developed and used to rank waterways, wetlands and erosion prone areas in the categories of Very High (15 points or more), High (12-14 points), Medium (7-10 points) and Low (less than 6 points) as follows:

### 1. Threat level and urgency of intervention

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- High (5 Points): Contributes large volumes of nutrient and sediment-rich water to Norfolk Marine Park, urgent intervention required.
- Medium (3 Points): Contributes moderate volumes of nutrient and sediment-rich water to Norfolk Marine Park.
- Low (1 point): Contributes small volumes of nutrient and sediment-rich water to Norfolk Marine Park.

### 2. Ecological value - biodiversity and/or habitat

---

- High (3 Points): High level of endangered or rare aquatic or waterway/wetland dependent species and/or vegetation communities or important aquatic or terrestrial habitat.
- Medium (2 Points): Some endemic/native species but no endangered species or communities.
- Low (1 point): Limited biodiversity.

### 3. Economic benefits (including agriculture and tourism)

---

- High (3 Points): Significant economic benefit (eg. tourism and water supply for livestock).
- Medium (2 Points): Some economic benefit (eg. water supply for livestock)
- Low (1 point): Little economic benefit (eg. ephemeral stream)

### 4. Presence of Acid Sulfate Soils (ASS)

---

- High (5 Points): Acid sulfate soils present.
- Low (1 point): No acid sulfate soils.

### 5. Social and cultural significance

---

- High (3 Points): Significant cultural, historical or community value.
- Medium (2 Points): Some cultural, historical or community value.
- Low (1 point): Very little cultural, historical or community value.

The total score for each waterway (including tributaries and associated wetlands) was calculated by adding the scores for:

- (1) threat level and urgency of intervention;
- (2) ecological value - biodiversity and/or habitat;
- (3) economic benefits (including agriculture and tourism);
- (4) presence of acid sulfate soils; and
- (5) social and cultural significance (Table 7).

**Table 7. Criteria and scores for the prioritisation of waterways and wetlands on Norfolk Island.**

| Waterway, wetland or erosion prone area                                               | Criteria/score                              |                         |                          |                                       |                                         | Score/19 and rank |
|---------------------------------------------------------------------------------------|---------------------------------------------|-------------------------|--------------------------|---------------------------------------|-----------------------------------------|-------------------|
|                                                                                       | 1<br>(Threat level/urgency of intervention) | 2<br>(Ecological value) | 3<br>(Economic benefits) | 4<br>(Presence of Acid Sulfate Soils) | 5<br>(social and cultural significance) |                   |
| Watermill Creek + tributaries/wetlands                                                | 5                                           | 3                       | 3                        | 5                                     | 3                                       | 19/19<br>VH       |
| Town Creek + tributaries/wetlands                                                     | 5                                           | 3                       | 3                        | 5                                     | 3                                       | 19/19<br>VH       |
| Cascade Creek + tributaries/wetlands                                                  | 3                                           | 3                       | 3                        | 5                                     | 3                                       | 17/19<br>VH       |
| Rocky Point Creek + tributaries/wetlands                                              | 3                                           | 3                       | 3                        | 5                                     | 3                                       | 17/19<br>VH       |
| Un-named 15 (Mission Pool/Mission Road area) + tributaries/wetlands                   | 3                                           | 3                       | 3                        | 5                                     | 3                                       | 17/19<br>VH       |
| Stockyard Creek + tributaries/wetlands                                                | 3                                           | 3                       | 2                        | 5                                     | 1                                       | 14/19<br>H        |
| Un-named 14 (Headstone area) + tributaries/wetlands                                   | 1                                           | 2                       | 2                        | 5                                     | 2                                       | 12/19<br>H        |
| Broken Bridge Creek + tributaries/wetlands                                            | 3                                           | 3                       | 3                        | 1                                     | 3                                       | 13/19<br>H        |
| Un-named 11 (Burnt Pine/centre)                                                       | 1                                           | 3                       | 2                        | 1                                     | 3                                       | 10/19<br>M        |
| Un-named 10 (Music Valley) + tributaries/wetlands                                     | 1                                           | 3                       | 2                        | 1                                     | 3                                       | 10/19<br>M        |
| Un-named 3, 4, 5 and 6 (Northern Creeks Captain Cook Road) + tributaries/wetlands     | 1                                           | 3                       | 1                        | 1                                     | 3                                       | 9/19<br>M         |
| Unnamed 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) + tributaries/wetlands | 1                                           | 3                       | 2                        | 1                                     | 2                                       | 9/19<br>M         |
| Un-named 23, 24, 25 and 26 (Ball Bay) +                                               | 3                                           | 2                       | 1                        | 1                                     | 2                                       | 9/19<br>M         |

|                                                           |   |   |   |   |   |           |
|-----------------------------------------------------------|---|---|---|---|---|-----------|
| tributaries/wetlands                                      |   |   |   |   |   |           |
| Un-named 7 (Two Chimneys area) + tributaries/wetlands     | 1 | 3 | 1 | 1 | 2 | 8/19<br>M |
| Un-named 12 (Quarry area) + tributaries/wetlands          | 1 | 2 | 1 | 1 | 1 | 6/19<br>L |
| Un-named 8 and 13 (Beefsteak area) + tributaries/wetlands | 1 | 2 | 1 | 1 | 1 | 6/19<br>L |
| Un-named 9 (south-east point) + tributaries/wetlands      | 1 | 1 | 1 | 1 | 1 | 5/19<br>L |

Table 8 lists the waterways and associated tributaries and wetlands on Norfolk Island in order of priority

**Table 8. Norfolk Island Waterways and associated tributaries and wetlands listed in order of priority**

| Priority                         | Waterway name                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Very High (in order of priority) | Watermill Creek + tributaries/wetlands<br>Town Creek + tributaries/wetlands<br>Cascade Creek + tributaries/wetlands<br>Rocky Point Creek + tributaries/wetlands<br>Un-named 15 (Mission Pool/Mission Road area) + tributaries/wetlands                                                                                                                                       |
| High (in order of priority)      | Stockyard Creek + tributaries/wetlands<br>Broken Bridge Creek + tributaries/wetlands<br>Un-named 14 (Headstone area) + tributaries/wetlands                                                                                                                                                                                                                                  |
| Medium (in order of priority)    | Un-named 11 (Burnt Pine/Centre) + tributaries/wetlands<br>Un-named 10 (Music Valley) + tributaries/wetlands<br>Northern Creeks (4) + tributaries/wetlands<br>Un-named 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) + tributaries/wetlands<br>Un-named 23, 24, 25 and 26 (Ball Bay) + tributaries/wetlands<br>Un-named 7 (Two Chimneys area) + tributaries/wetlands |
| Low (in order of priority)       | Un-named 12 (Quarry area) + tributaries/wetlands<br>Un-named 8 and 13 (Beefsteak area) + tributaries/wetlands<br>Un-named 9 (south-east point) + tributaries/wetlands                                                                                                                                                                                                        |

## 6 Strategy implementation

The Norfolk Island Waterway and Wetland Management Strategy 2026-2036 provides a clear, prioritised pathway for improving the condition of waterways and wetlands over the next decade. Successful implementation will depend on adequate resourcing, strong partnerships, and a long-term commitment to maintenance and adaptive management.

### 6.1 Resourcing the strategy

Delivering the Strategy requires sustained investment, coordinated effort, and dedicated staffing. The Norfolk Island Regional Council will employ a Waterway Project Officer responsible for coordinating on-ground works, supporting landholders, engaging with the community, managing partnerships, and overseeing monitoring and reporting.

Funding will be sought from Commonwealth, philanthropic sources, environmental trusts and other available funding providers to support on-ground works, community engagement, research and ongoing maintenance. The Strategy will also guide future budget allocations within Council.

#### 6.1.1 Management actions to assist with resourcing and the implementation of the strategy:

##### *a) Dedicated Waterway Project Officer*

---

A dedicated Waterway Project Officer will be employed responsible coordinate on-ground works, support landholders, engage with the community, manage partnerships, and oversee monitoring and reporting.

##### *b) Efficient delivery of on-ground works*

---

The Waterway Project Officer will coordinate annual work programs, community engagement, budgets and reporting to ensure efficient delivery of on-ground works.

##### *c) Working together*

---

Work with partner agencies, key stakeholders and the community to seek investment to implement the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

##### *d) Preparation of funding proposals*

---

Prepare funding proposals aligned with national and state environmental priorities, including water quality improvement, climate resilience, biodiversity protection and sustainable agriculture.

##### *e) Allocation of funds*

---

Establish a transparent process for allocating funds to priority waterways, ensuring investment aligns with the Strategy's priority ranking system.

### *f) Expand the capacity of the Toon Trust Environmental Trust fund*

---

Explore opportunities to expand the capacity of the Toon Trust Environmental Trust Fund to support waterway and wetland restoration.

## **6.2 Partnerships**

Strong, collaborative partnerships are essential for achieving the Strategy's long-term outcomes. Norfolk Island Regional Council, Commonwealth Government agencies (including Parks Australia and DITRDC), public land managers, landholders, and the broader community all play critical roles in protecting waterways and wetlands.

Partnerships will focus on shared planning, coordinated on-ground works, knowledge exchange, and transparent communication.

### **6.2.1 Management actions to establish and/or maintain strong partnerships with key stakeholders:**

#### *a) Working together*

---

Norfolk Island Regional Council (NIRC), public land managers and the community will work together to achieve the outcomes articulated in the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

#### *b) Coordination meetings*

---

NIRC will convene regular coordination meetings with partner agencies to align priorities, share data, and coordinate works across land tenures.

#### *c) Support Community involvement*

---

NIRC will support community involvement through volunteer programs, citizen-science initiatives, school engagement and landholder field days.

#### *d) Development of clear communication materials*

---

NIRC will develop clear communication materials (e.g., annual updates, project summaries, maps) to keep the community informed and engaged.

#### *e) Work closely with relevant committees*

---

NIRC will work with the Norfolk Island Environmental Sustainability Advisory Committee and the Water Quality Working Group (and future water quality related committees) to ensure technical oversight and adaptive management.

## 6.3 Maintenance

A long-term maintenance program is essential to ensure that works delivered under this Strategy remain effective and continue to improve waterway and wetland condition.

Maintenance includes weed control, fence repairs, erosion-control upkeep, revegetation support, and ongoing grazing management.

Voluntary Landholder Management Agreements will be used for all works on private land. These agreements outline initial works, landholder responsibilities, and the long-term maintenance requirements needed to protect investment and environmental outcomes.

The maintenance program will focus on supporting landholders, building skills, and ensuring that best-practice management is consistently applied.

Principles of the maintenance program:

- Continued landholder engagement, skills development and capacity building are the main focus of the maintenance program.
- Previous works should be regularly inspected and maintained to ensure their ongoing effectiveness.
- Current best management practices will be utilised.
- Maintenance requirements will be clearly communicated and supported through VMAs.
- Monitoring results will inform adaptive management and prioritisation of maintenance needs.

The Norfolk Island Regional Council estimates that an effective maintenance program will cost approximately \$20,000 per year. This investment will help ensure that previous waterway works continue to deliver their intended outcomes.

### 6.3.1 Management Actions to develop and establish an ongoing maintenance program:

#### *a) Seek appropriate funding*

---

Seek appropriate funding for a maintenance program to ensure the success of on-ground works on public and private land across Norfolk Island.

#### *b) Develop inspection Schedule*

---

Develop a structured inspection schedule for all completed works, including annual assessments.

#### *c) Provide technical support to landholders*

---

The Waterway Project Officer will provide ongoing technical support to landholders to help them meet their maintenance obligations under Voluntary Landholder Management Agreements.

#### *d) Deliver training and capacity building activities*

---

Norfolk Island Regional Council will deliver training and capacity-building activities (e.g., weed-control workshops, fencing maintenance demonstrations, grazing-management guidance).

#### *e) Develop a central maintenance database*

---

Norfolk Island Regional Council will maintain a central database of completed works, maintenance requirements, inspection results and follow-up actions to support adaptive management.

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## 7 On Ground works plan

This section details targeted on-ground works on each of the waterways (or groups of waterways) (Figure 14) over the 10-year period of the Norfolk Island Waterway and Wetland Management Strategy.

Waterways are listed in order of priority with a brief description of each waterway (or group of waterways) and their values along with proposed management actions for each waterway or group of waterways.

Targets have been set based on the following:

1. 10-15% of private frontages on VERY HIGH PRIORITY waterways protected and enhanced over 10 years.
2. 7-9% of private frontages on HIGH PRIORITY waterways protected and enhanced over 10 years.
3. ~5% of private frontages on MEDIUM PRIORITY waterways protected and enhanced over 10 years, with a focus on protecting areas with high quality riparian habitat.
4. Less than 5% of private frontages on LOW PRIORITY waterways protected over 10 years, with a focus on protecting areas with high quality riparian habitat.

Targets have also been set for on-ground works on public land frontages where required (eg. KAVHA).

Management actions have been costed based on estimated costs for on-ground works (eg. fencing, revegetation, weed control) at the time of writing the strategy.

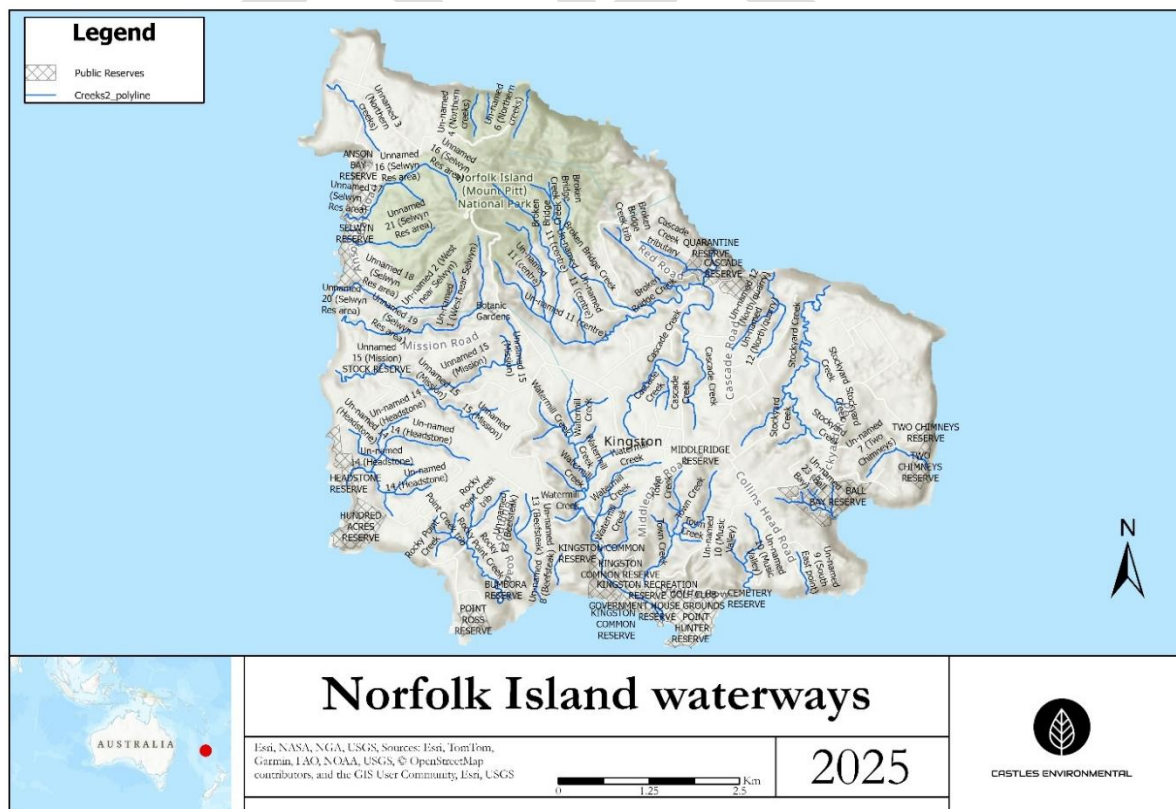


Figure 14. Norfolk Island Waterways

## 7.1 Watermill Creek and tributaries and associated wetlands (Very High Priority)

Watermill Creek is a Very High Priority north-south flowing waterway that discharges into the Emily and Slaughter Bay lagoonal reef via the Emily Bay outlet (Figure 15). The total length of the creek, including its tributaries and associated wetlands, is approximately 10,215 meters, running through a landscape that is predominantly under private ownership. Approximately 80% of the adjoining land is private, comprising 71 separate freehold or other private portions, while the remaining 20% is public land located within the Kingston and Arthurs Vale Historic Area (KAVHA). Of this adjoining public land, an estimated 50% of the riparian zone (including significant wetlands) is grazed, with cattle having unrestricted access (Figure 15 and Table 9).

The existing native vegetation in riparian zones surrounding Watermill Creek includes native vegetation communities such as Freshwater Swamp and Pine Plantation (Christian and Mills 2021) (Figure 16). Prior to 1750, the area supported a range of native vegetation communities including Freshwater Swamp, Coastal Pine and White Oak Forest, Viny Hardwood Forest, Lowland Valley Hardwood Forest, and Plateau Hardwood Forest (Figure 17).

The presence of acid sulfate soils in the lower reaches of the creek and adjacent wetland areas presents potential environmental risks. These risks are particularly relevant to water quality, land management practices, and the conservation of culturally significant features such as historic rock bridges within KAVHA (Figure 15).

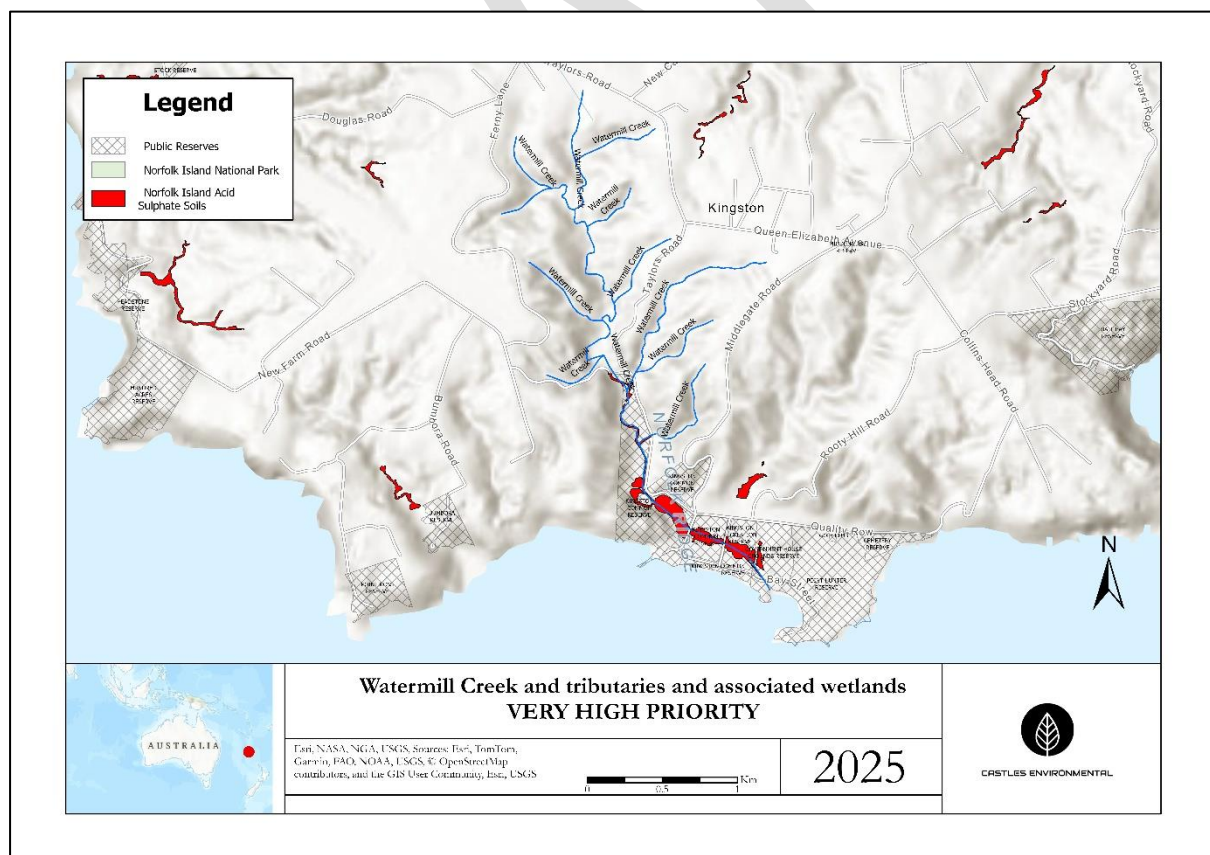
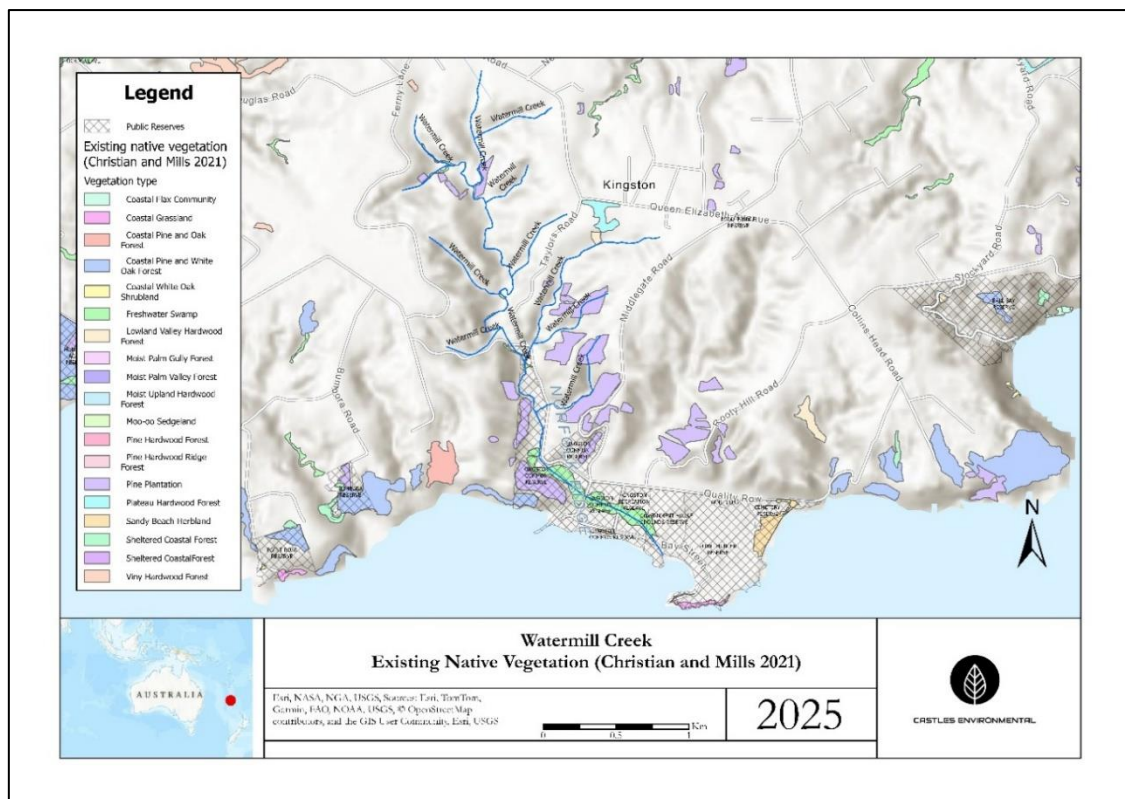
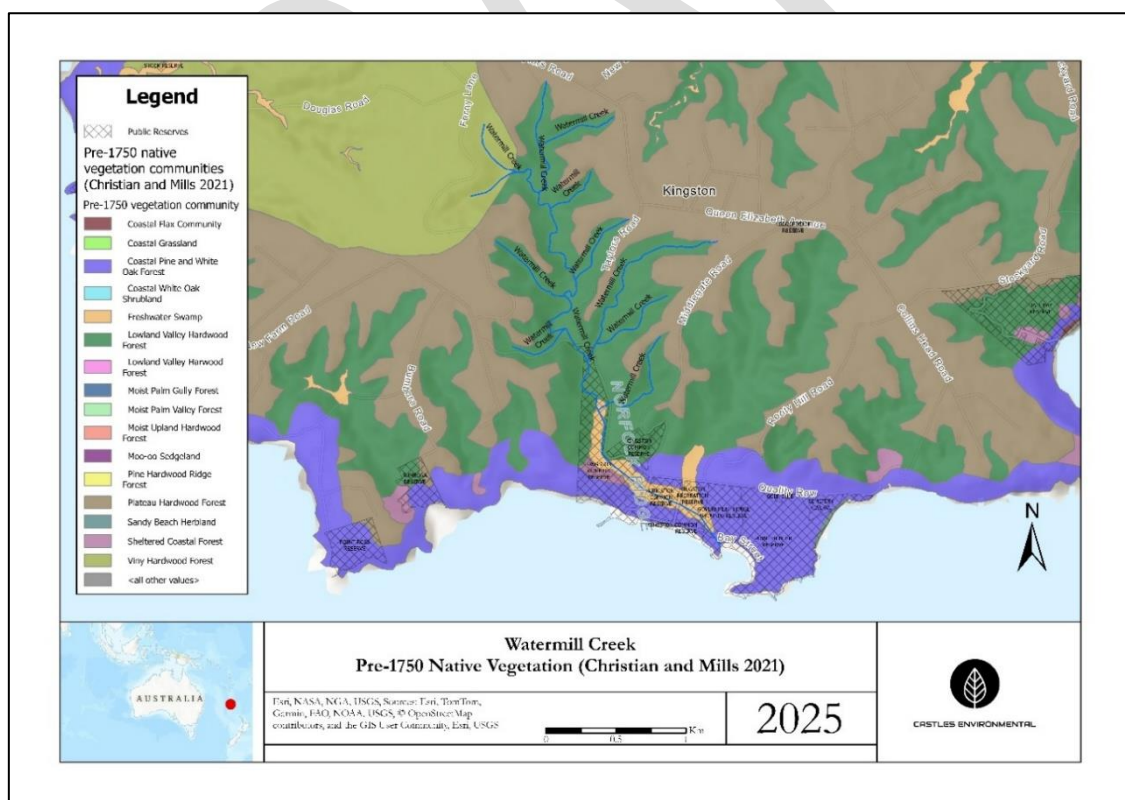


Figure 15. Location of Watermill Creek and mapped Acid Sulfate Soils on Norfolk Island (Fitzpatrick et al. 2023).



**Figure 16. Existing native vegetation communities on Watermill Creek (Christian and Mills 2021)**



**Figure 17. Pre-1750 native vegetation communities on Watermill Creek (Christian and Mills 2021)**

**Table 9. Watermill Creek and adjoining land details.**

|                                                                             |                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 10,215                                                                                                                                                                                                                         |
| Both sides of the creek (m)                                                 | 20,430                                                                                                                                                                                                                         |
| Estimated percentage private land (%)                                       | 80%                                                                                                                                                                                                                            |
| Estimated percentage public land (%)                                        | 20%                                                                                                                                                                                                                            |
| Total number private land/freehold/other portions adjoining                 | 71                                                                                                                                                                                                                             |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 50%                                                                                                                                                                                                                            |
| Existing (or remnant) native vegetation (Christian and Mills 2021)          | <ul style="list-style-type: none"> <li>• Freshwater Swamp</li> <li>• Pine Plantation</li> </ul>                                                                                                                                |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Freshwater Swamp</li> <li>• Coastal Pine and White Oak Forest</li> <li>• Viny Hardwood Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Plateau Hardwood Forest</li> </ul> |

## Watermill Creek - On-ground Management Actions

Management activities for Watermill Creek and tributaries and associated wetlands are provided in Table 10. Targets are based on the protection and enhancement of 15% of very high priority waterway frontages (both sides of the creek) on private land and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 10. Watermill Creek management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                          | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                            | 2.5 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                                 | 2.0 km (KAVHA)        | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                                    | 20 agreements         | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                                  | 10 Stock troughs      | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                                | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                            | n/a                   | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                             | Included in 1.2 above | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                                  | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                          | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas        | 2.5 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 20 metre average setback on fenced areas | 3.0 hectares (KAVHA)  | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                         | 2.5 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                     | 2.5 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                          | 3.0 hectares (KAVHA)  | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                                    | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                                 | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 4.9 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | 1                     | NIRC                                                                   |

## 7.2 Town Creek and tributaries and associated wetlands (Very High Priority)

Town Creek is a Very High Priority north - south flowing waterway that runs through private land in upper reaches and then the Kingston and Arthurs Vale Historic Area (KAVHA) before joining Watermill Creek. The creek (including its tributaries) is approximately 3,740 meters long, flowing through a landscape that is mainly privately owned. Around 95% of the adjoining riparian land is private, comprising 32 separate freehold or other private portions, while 5% is public land within KAVHA. Cattle are excluded from Town Creek within KAVHA (Figure 18 and Table 11).

The surrounding native vegetation includes Pine Plantations (Christian and Mills 2021) (Figure 19). Prior to 1750 the surrounding area contained a more diverse range of native vegetation communities, including Freshwater Swamp and Lowland Valley Hardwood Forest (Christian and Mills 2021) (Figure 20).

The presence of acid sulfate soils in the lower reaches of Town creek and associated wetland areas presents significant risks. These risks are particularly relevant to water quality, land management practices and the conservation of culturally significant features such as historic rock bridges within KAVHA (Fitzpatrick et al. 2023) (Figure 18).

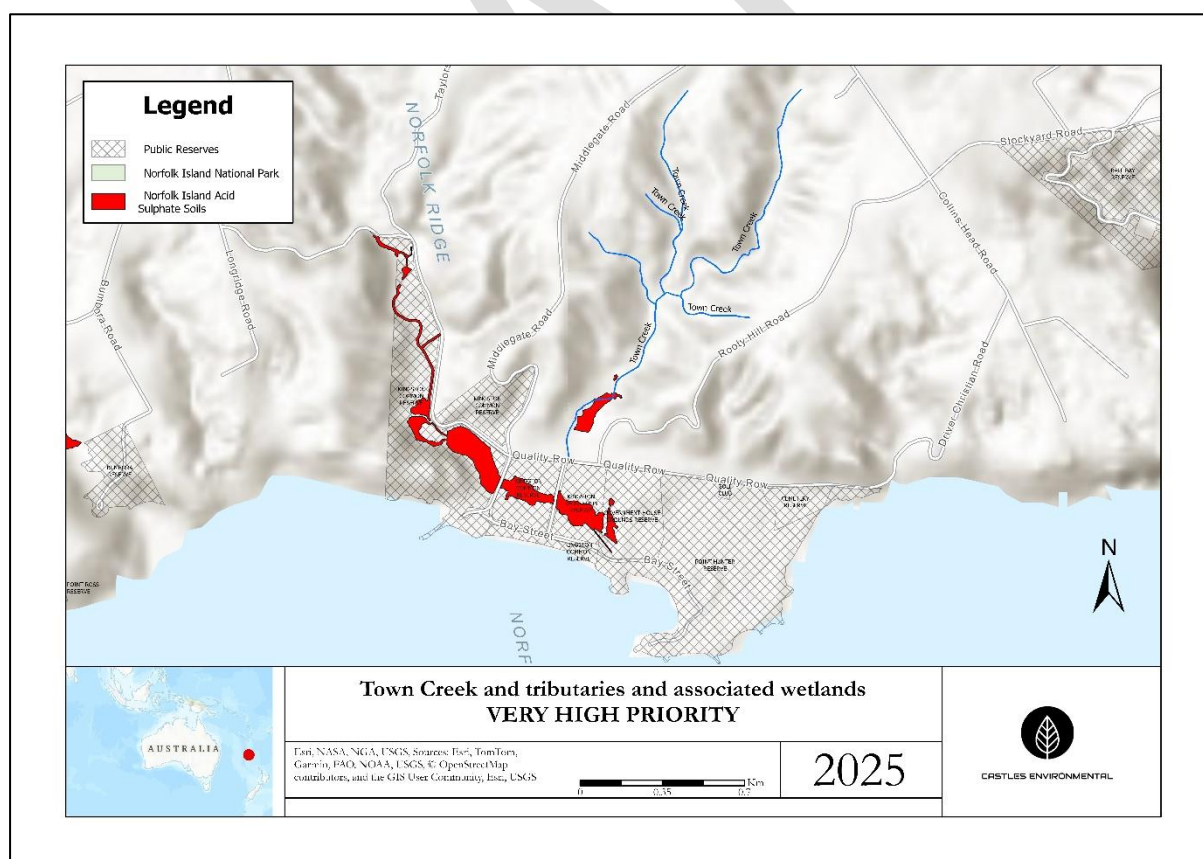


Figure 18. Location of Town Creek and mapped Acid Sulfate Soils (Fitzpatrick et al. 2023).

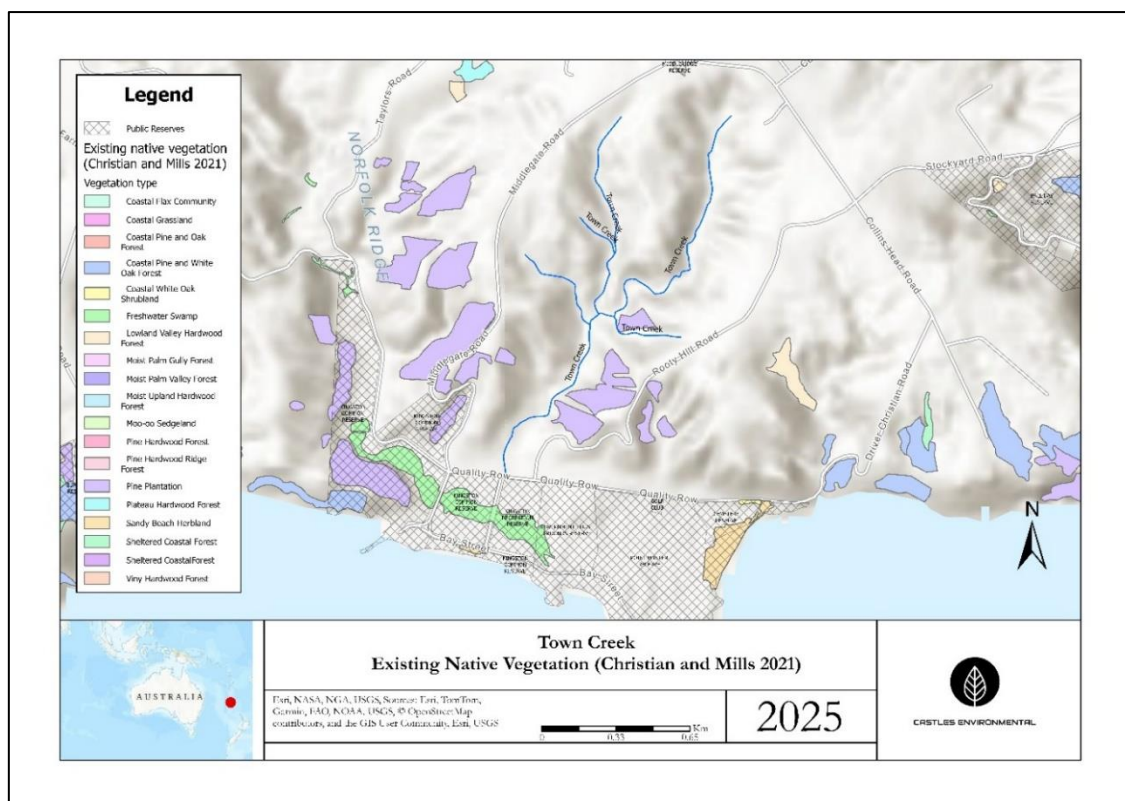


Figure 19. Existing native vegetation communities on Town Creek (Christian and Mills 2021)

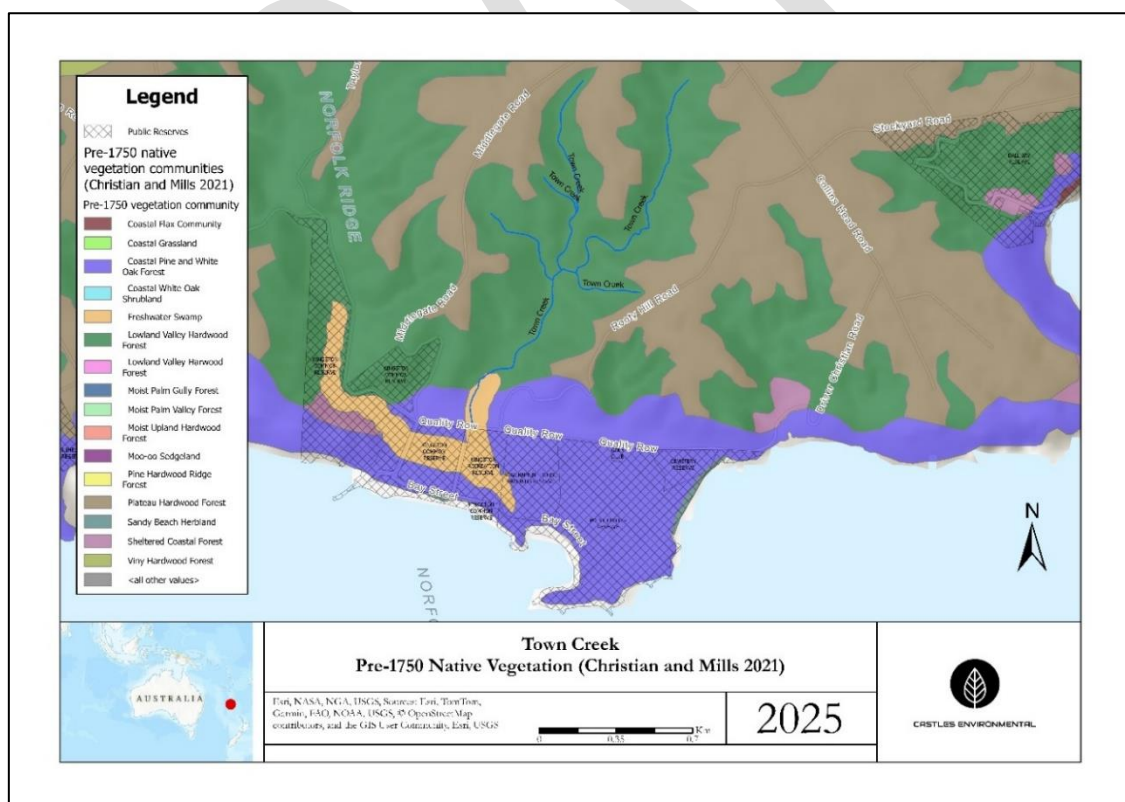


Figure 20. Pre-1750 native vegetation communities on Town Creek (Christian and Mills 2021)

**Table 11. Town Creek and adjoining land details.**

|                                                                             |                                                                                                                |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 3,740                                                                                                          |
| Both sides of the creek (m)                                                 | 7,480                                                                                                          |
| Estimated percentage private land (%)                                       | 95%                                                                                                            |
| Estimated percentage public land (%)                                        | 5%                                                                                                             |
| Total number private land/freehold/other portions adjoining                 | 32                                                                                                             |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                             |
| Existing (or remnant) native vegetation (Christian and Mills 2021)          | <ul style="list-style-type: none"> <li>• Pine Plantation</li> </ul>                                            |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Freshwater Swamp</li> <li>• Lowland Valley Hardwood Forest</li> </ul> |

## Town Creek - On-ground Management Actions

Management activities for Town Creek and tributaries and associated wetlands are provided in Table 12. Targets are based on the protection and enhancement of 15% of very high priority waterways frontages (both sides of the creek) on private land and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 12. Town Creek management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 1 km                  | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 10 agreements         | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 5 Stock troughs       | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | -                     | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 1 hectare             | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 1 hectare             | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 1 hectare             | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | -                     | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 1 hectare             | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | -                     | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | 1                     | NIRC                                                                   |

### 7.3 Cascade Creek and tributaries and associated wetlands (Very High Priority)

Cascade Creek is a Very High Priority south - north flowing waterway that runs through private land and then Quarantine Reserve in its lower reaches, where it discharges into the Norfolk Marine Park. The creek (including its tributaries and associated wetlands) is approximately 6,881 meters long, flowing through a landscape that is mainly privately owned. Approximately 90% of the land adjoining Cascade Creek is private and is made up of 70 separate freehold or other private portions. The remaining 10% of adjoining land is public land. Cattle have unrestricted access to around 50% of the creek in the adjoining public land (Figure 21 and Table 13).

The existing native vegetation includes a mix of existing native communities including Pine Plantation, Freshwater Swamp, Sheltered Coastal Forest and Lowland Valley Hardwood Forest (Christian and Mills 2021) (Figure 22). Prior to 1750, the area contained a broad diversity of native vegetation communities, including Coastal Pine and White Oak Forest, Freshwater Swamp, Sheltered Coastal Forest, Plateau Hardwood Forest and Lowland Valley Hardwood Forest (Christian and Mills 2021) (Figure 23).

The presence of acid sulfate soils in the upper tributaries and associated wetland areas presents potential risks, particularly in relation to water quality, land management, and the ecological health of downstream environments, including those within the Norfolk Marine Park (Fitzpatrick et al. 2023) (Figure 22).

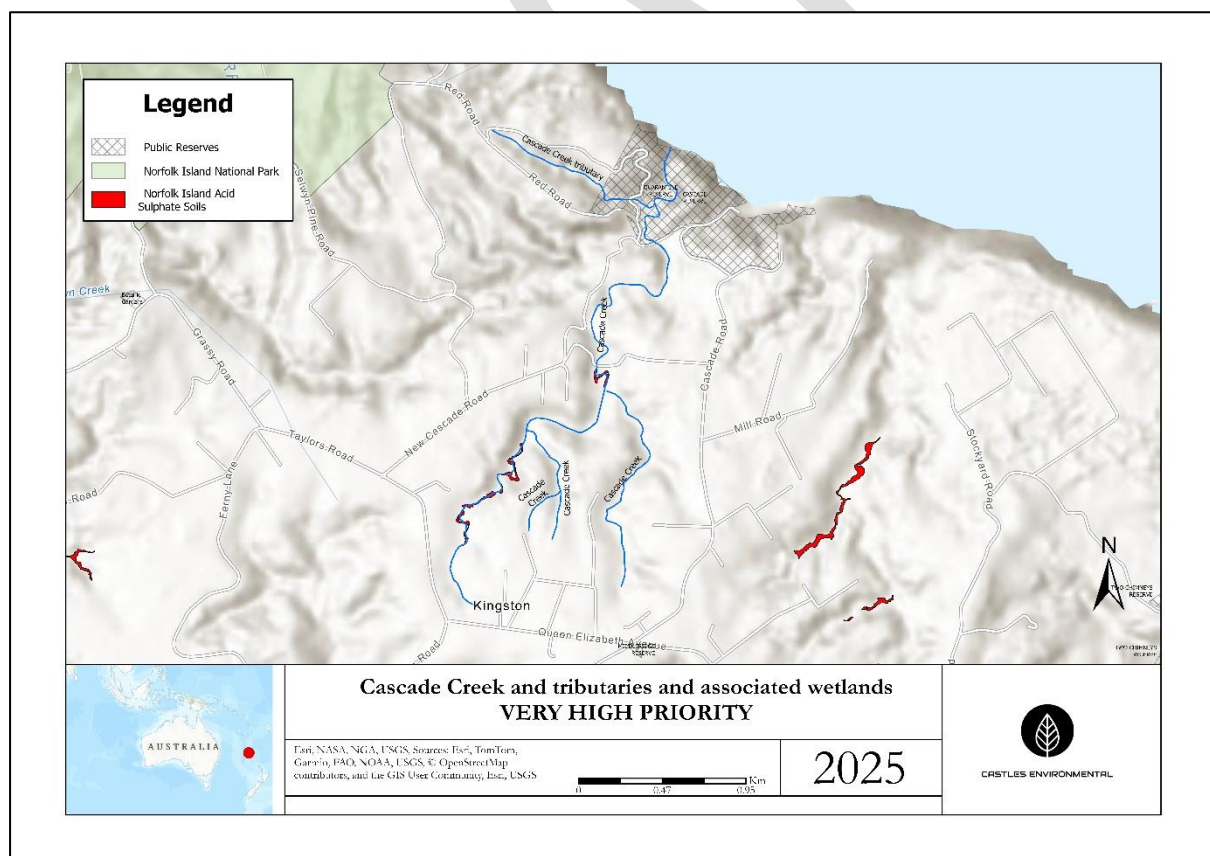


Figure 21. Location of Cascade Creek and mapped Acid Sulfate Soils (Fitzpatrick et al. 2023).

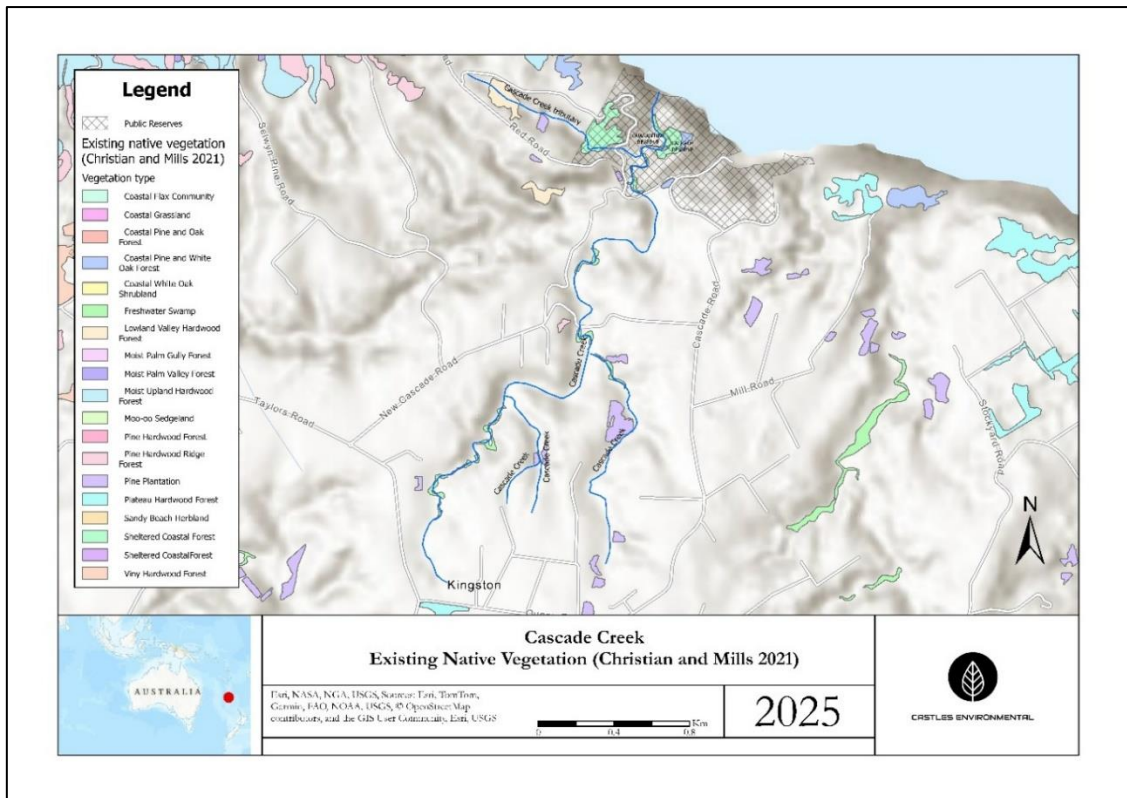


Figure 22. Existing native vegetation communities on Cascade Creek (Christian and Mills 2021)

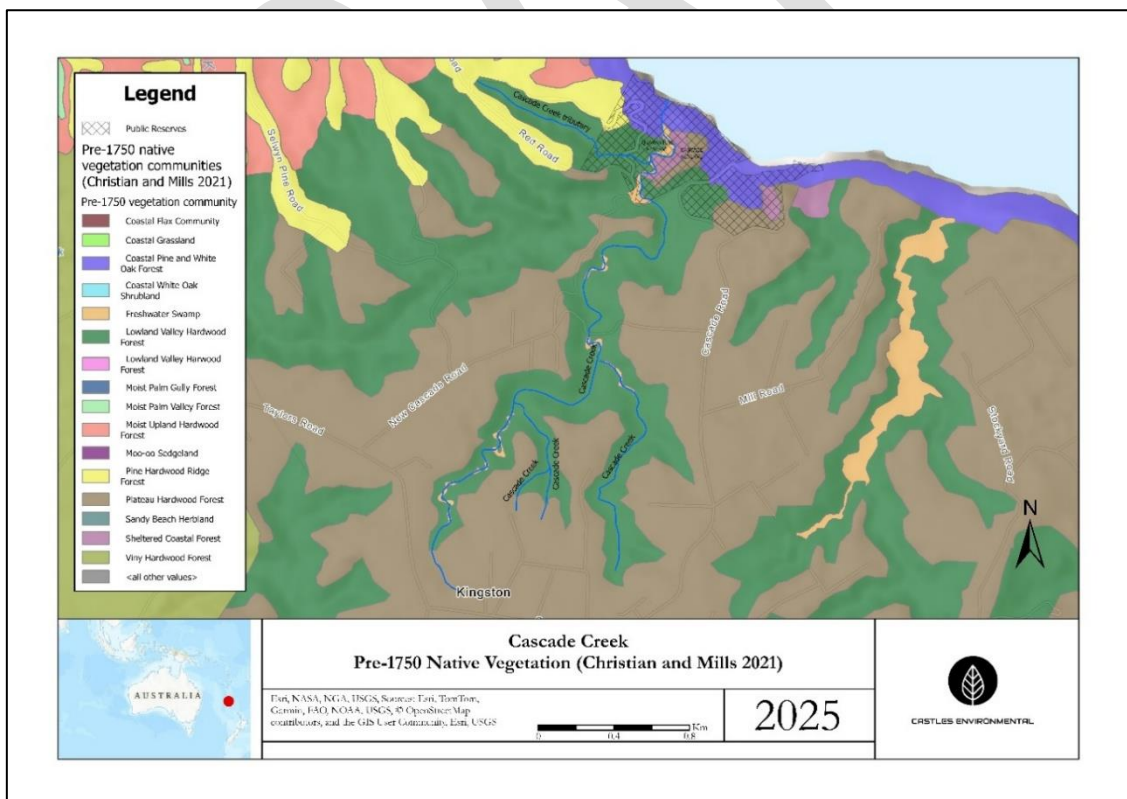


Figure 23. Pre-1750 native vegetation communities on Cascade Creek (Christian and Mills 2021)

**Table 13. Cascade Creek and adjoining land details.**

|                                                                             |                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 6,881                                                                                                                                                                                                                                                          |
| Both sides of the creek (m)                                                 | 13,762                                                                                                                                                                                                                                                         |
| Estimated percentage private land (%)                                       | 90%                                                                                                                                                                                                                                                            |
| Estimated percentage public land (%)                                        | 10%                                                                                                                                                                                                                                                            |
| Total number private land/freehold/other portions adjoining                 | 70                                                                                                                                                                                                                                                             |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 50%                                                                                                                                                                                                                                                            |
| Existing (or remnant) native vegetation (Christian and Mills 2021)          | <ul style="list-style-type: none"> <li>• Pine Plantation</li> <li>• Freshwater Swamp</li> <li>• Sheltered Coastal Forest</li> <li>• Lowland Valley Hardwood Forest</li> </ul>                                                                                  |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Freshwater Swamp</li> <li>• Sheltered Coastal Forest</li> <li>• Plateau Hardwood Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Freshwater Swamp</li> </ul> |

## Cascade Creek - On-ground Management Actions

Management activities for Cascade Creek and tributaries and associated wetlands are provided in Table 14. Targets are based on the protection and enhancement of 10 - 15% of very high priority waterways on private land and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 14. Cascade Creek management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 1.9 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | 0.6 km                | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 15 agreements         | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 10 Stock troughs      | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | Included in 1.2 above | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 1.9 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | 1.2 hectares          | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 1.9 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 1.9 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | 1.2 hectares          | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and                             |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  |     |                                                                                                                                    |                       | community groups/volunteers                                            |
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 2.5 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | 1                     | NIRC                                                                   |

## 7.4 Rocky Point Creek and tributaries and associated wetlands (Very High Priority)

Rocky Point Creek is a Very High Priority north - south flowing waterway that discharges into the Norfolk Marine Park at Bumboras Reserve. The creek (including its tributaries and associated wetlands) is approximately 3,994 meters long, flowing through mainly privately owned land. Approximately 95% of the adjoining land is private, comprising 40 separate freehold or other private portions, while the remaining 5% is public land. None of the adjoining public land at Bumboras Reserve is grazed, and all public riparian zones are protected through reserve boundary fencing (Figure 24 and Table 15).

The existing native vegetation adjoining Rocky Point Creek includes native vegetation communities such as Coastal Pine and White Oak Forest, Freshwater Swamp, and Sheltered Coastal Forest (Christian and Mills 2021) (Figure 25). Prior to 1750, the surrounding landscape supported a broad range of native vegetation communities, including Coastal Pine and White Oak Forest, Lowland Valley Hardwood Forest, Sheltered Coastal Forest, and Freshwater Swamp (Figure 26).

The presence of acid sulfate soils in the lower reaches of Rocky Point Creek (just above Bumboras Reserve) presents potential environmental risks. These risks are particularly relevant to water quality, land management, and the ecological health of downstream environments Rocky Point Creek and the Norfolk Marine Park (Fitzpatrick et al. 2023) (Figure 25).

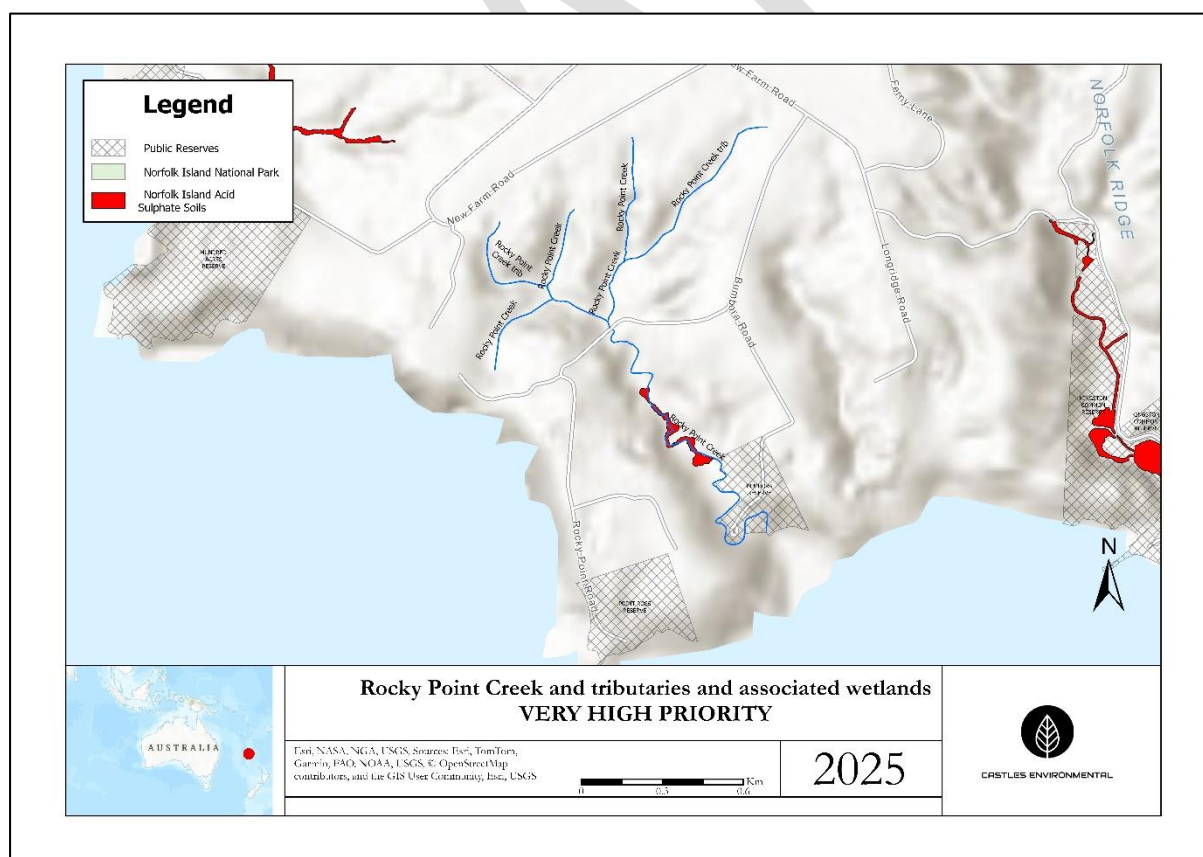


Figure 24. Location of Rocky Point Creek and mapped Acid Sulfate Soils (Fitzpatrick et al. 2023).

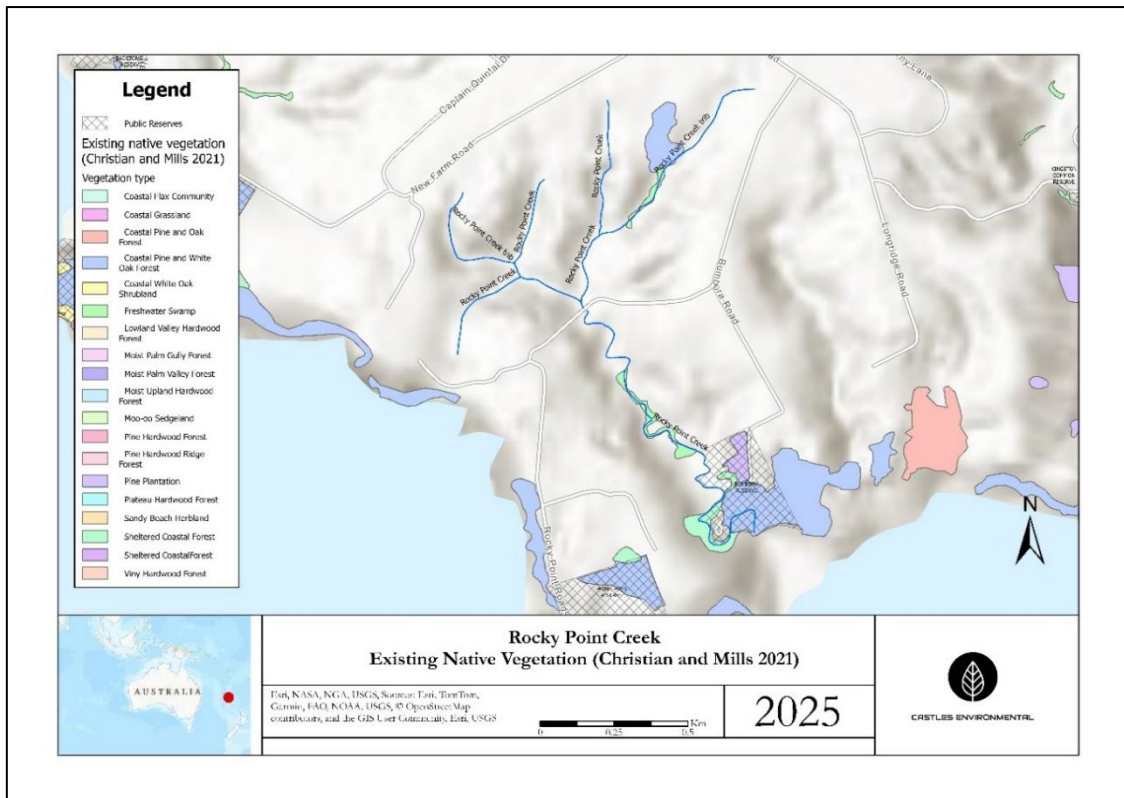


Figure 25. Existing native vegetation communities on Rocky Point Creek (Christian and Mills 2021)

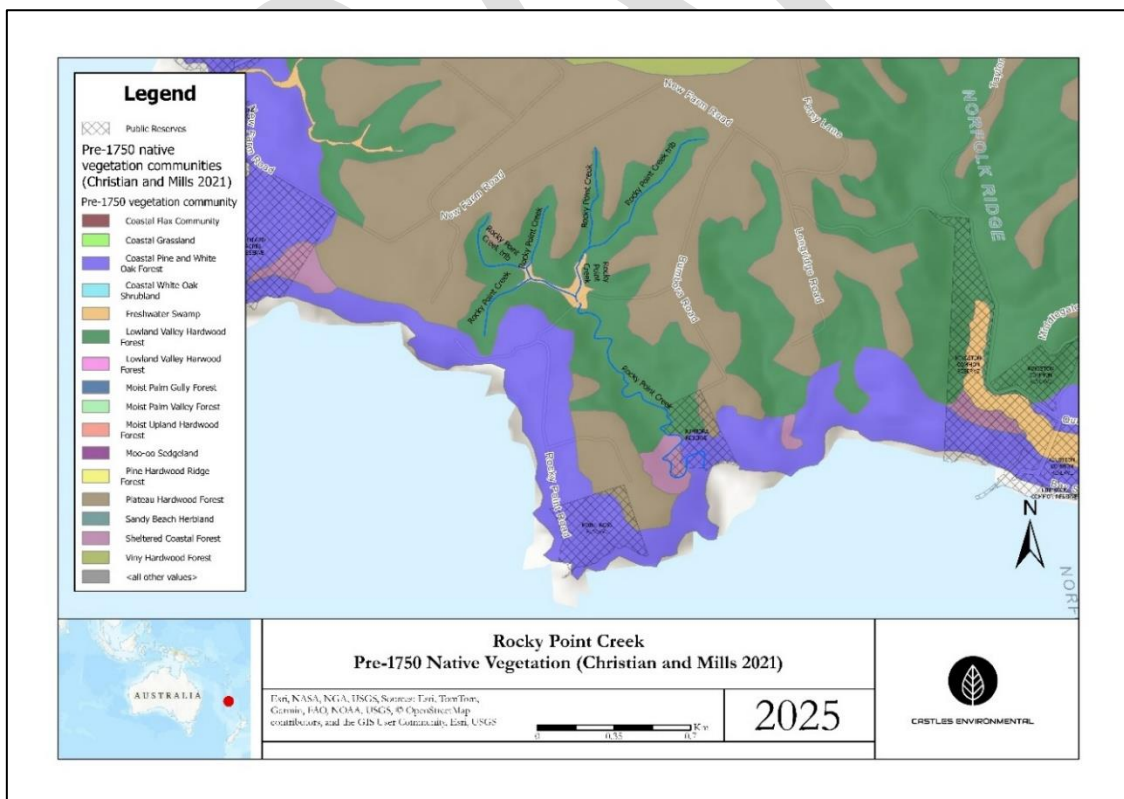


Figure 26. Pre-1750 native vegetation communities on Rocky Point Creek (Christian and Mills 2021)

**Table 15. Rocky Point Creek and adjoining land details.**

|                                                                             |                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 3,994                                                                                                                                                                                           |
| Both sides of the creek (m)                                                 | 7,988                                                                                                                                                                                           |
| Estimated percentage private land (%)                                       | 95%                                                                                                                                                                                             |
| Estimated percentage public land (%)                                        | 5%                                                                                                                                                                                              |
| Total number private land/freehold/other portions adjoining                 | 40                                                                                                                                                                                              |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                                              |
| Existing (or remnant) native vegetation (Christian and Mills 2021)          | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Freshwater Swamp</li> <li>• Sheltered Coastal Forest</li> </ul>                                           |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Sheltered Coastal Forest</li> <li>• Freshwater Swamp</li> </ul> |

## Rocky Point Creek - On-ground Management Actions

Management activities for Rocky Point Creek and tributaries and associated wetlands are provided in Table 16. Targets are based on the protection and enhancement of 10 - 15% of very high priority waterways on private land and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 16. Rocky Point Creek management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                       | Quantity                     | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                         | 1.2 km                       | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                              | -                            | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                                 | 10 agreements                | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                               | 5 Stock troughs              | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                             | Included in 1.1 above        | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                         | n/a                          | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                          | Included in 1.2 above        | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                               | Included in 1.4 above        | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                       | Ongoing                      | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas     | 1.2 hectares                 | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas | 1 hectare (Bumboras Reserve) | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                      | 1.2 hectares                 | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 1.2 hectares                 | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                       | 1 hectare                    | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                                 | Included in 3.3 above        | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                              | Included in 3.1 above        | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 2.8 hectare           | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | 1                     | NIRC                                                                   |

## 7.5 Un-named Creek 15 (Mission Road area) (Very High Priority)

Un-named Creek 15, which is a Very High Priority waterway located in the Mission Road area (Figure 13), is an east - west flowing waterway that runs through a mix of private and public land before discharging into the Norfolk Marine Park over steep cliffs just north of Headstone Reserve. The creek and its tributaries and associated wetlands extend approximately 5,378 meters, with 95% of the adjoining land under private ownership, made up of 30 separate freehold or other private portions. The remaining 5% is public land, primarily within Stock Reserve, where 100% of the wetland and riparian zone is currently grazed and unfenced (Figure 27 and Table 17).

The adjoining native vegetation includes existing native types such as Viny Hardwood Forest and Freshwater Swamp (Christian and Mills 2021) (Figure 28). Prior to 1750, the area supported a diverse range of native vegetation communities, including Freshwater Swamp, Coastal Pine and White Oak Forest, and Viny Hardwood Forest (Figure 29).

Acid sulfate soils are present in a wetland within an upper tributary and in an area below Mission Pool (which is located within Stock Reserve) (Fitzpatrick et al. 2023) (Figure 27).

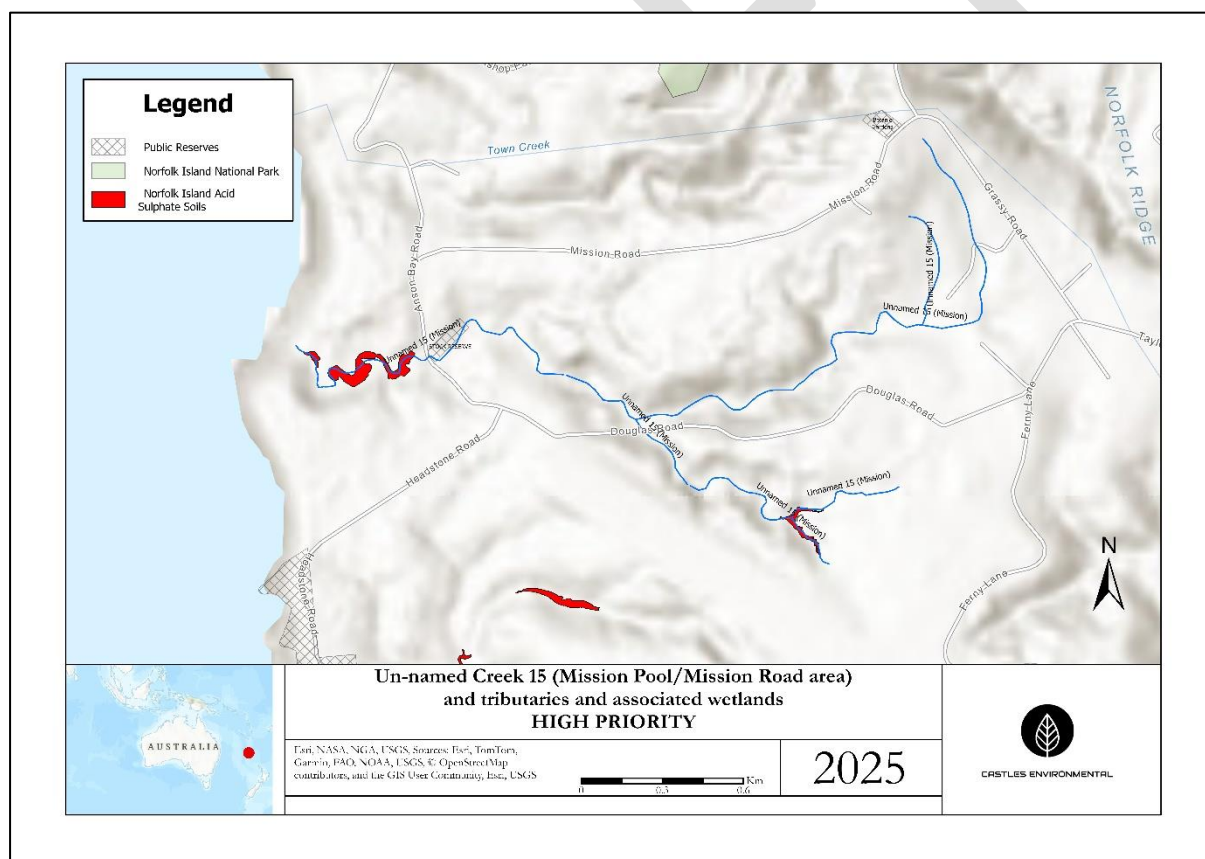


Figure 27. Location of un-named Creek 15 (Mission Road area) and mapped Acid Sulfate Soils (Fitzpatrick et al. 2023).

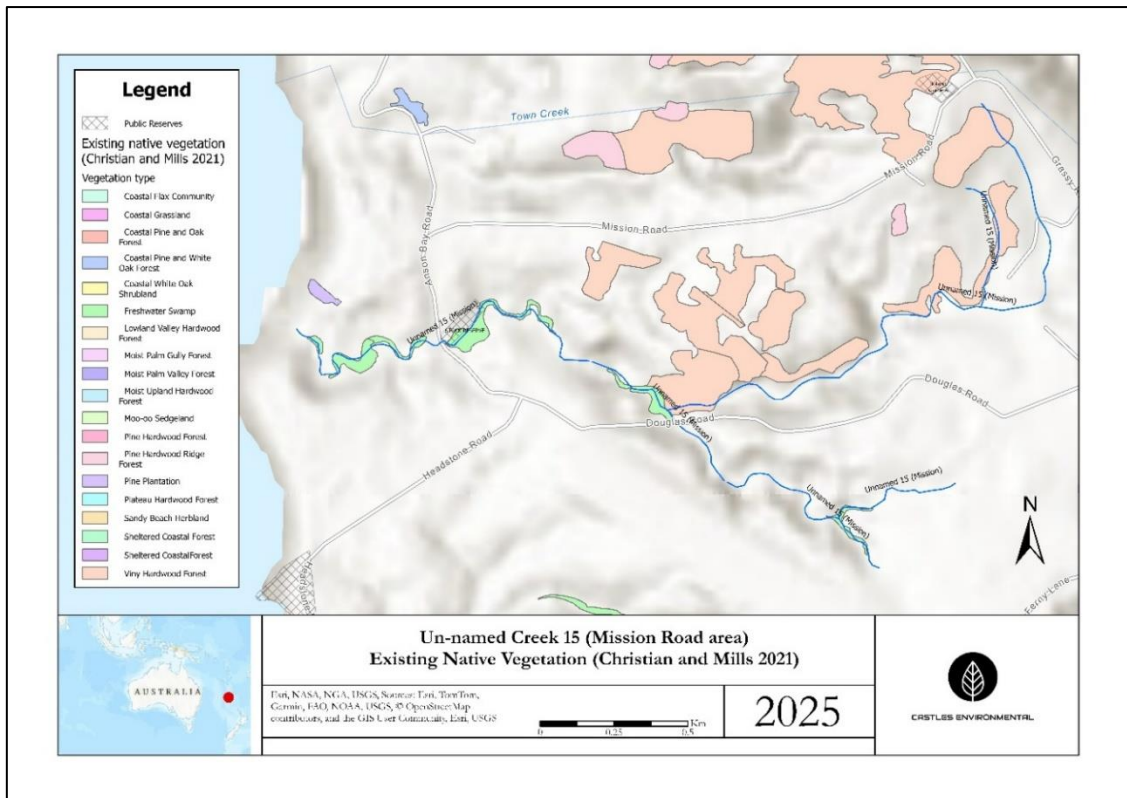


Figure 28. Existing native vegetation communities on un-named creek 15 (Christian and Mills 2021)

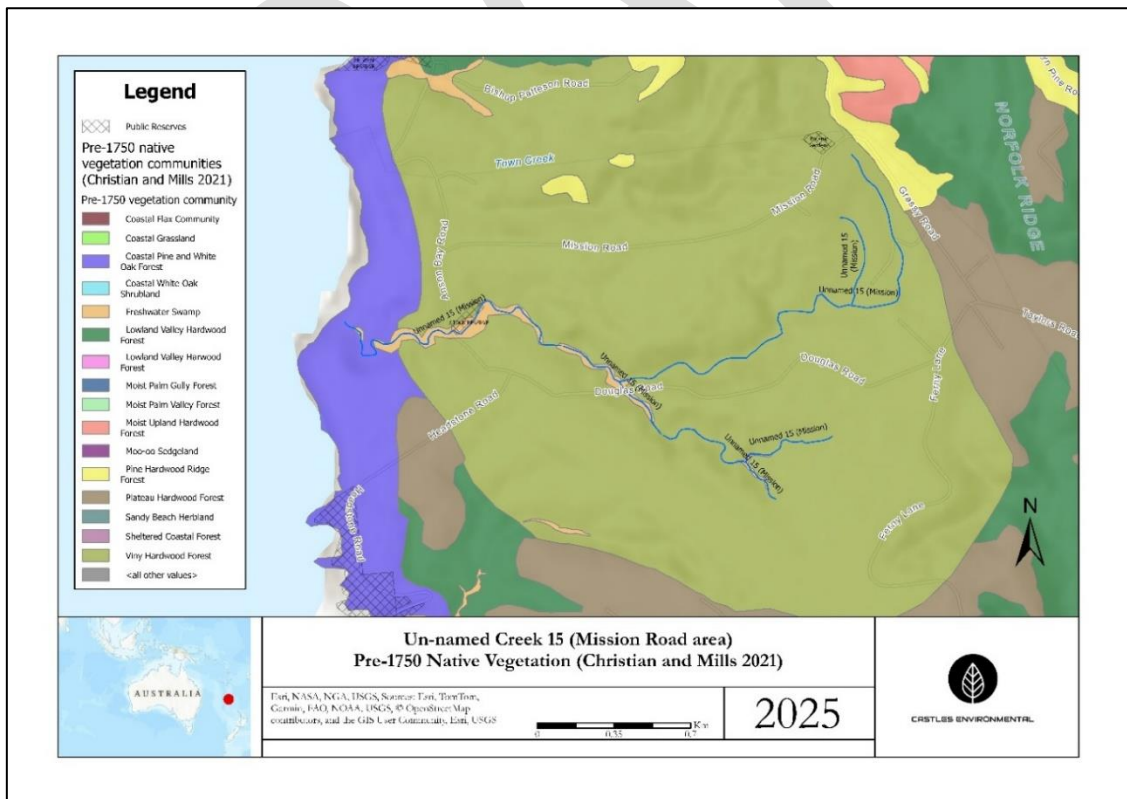


Figure 29. Pre-1750 native vegetation communities on un-named creek 15 (Christian and Mills 2021)

**Table 17. Un-named Creek 15 (Mission Road area) and adjoining land details.**

|                                                                             |                                                                                                                                                   |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 5,378                                                                                                                                             |
| Both sides of the creek (m)                                                 | 10,756                                                                                                                                            |
| Estimated percentage private land (%)                                       | 95%                                                                                                                                               |
| Estimated percentage public land (%)                                        | 5%                                                                                                                                                |
| Total number private land/freehold/other portions adjoining                 | 30                                                                                                                                                |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 100%                                                                                                                                              |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Viny Hardwood Forest</li> <li>• Freshwater Swamp</li> </ul>                                              |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Freshwater Swamp</li> <li>• Coastal Pine and White Oak Forest</li> <li>• Viny Hardwood Forest</li> </ul> |

## Un-named Creek 15 (Mission Road area) - On-ground Management Actions

Management activities for un-named Creek 15 (Mission Road area) and tributaries and associated wetlands are provided in Table 18. Targets are based on the protection and enhancement of 10 - 15% of very high priority waterways on private land and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 18. Un-named creek 15 management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity                     | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 1.5 km                       | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | 0.4 km (Stock Reserve)       | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 10 agreements                | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 5 Stock troughs              | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above        | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | n/a                          | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | Included in 1.2 above        | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above        | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing                      | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 1.5 hectares                 | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas  | 0.4 hectares (Stock Reserve) | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 1.5 hectares                 | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 1.5 hectares                 | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | 0.4 hectares (Stock Reserve) | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above        | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above        | NIRC (public land), private landowners and                             |

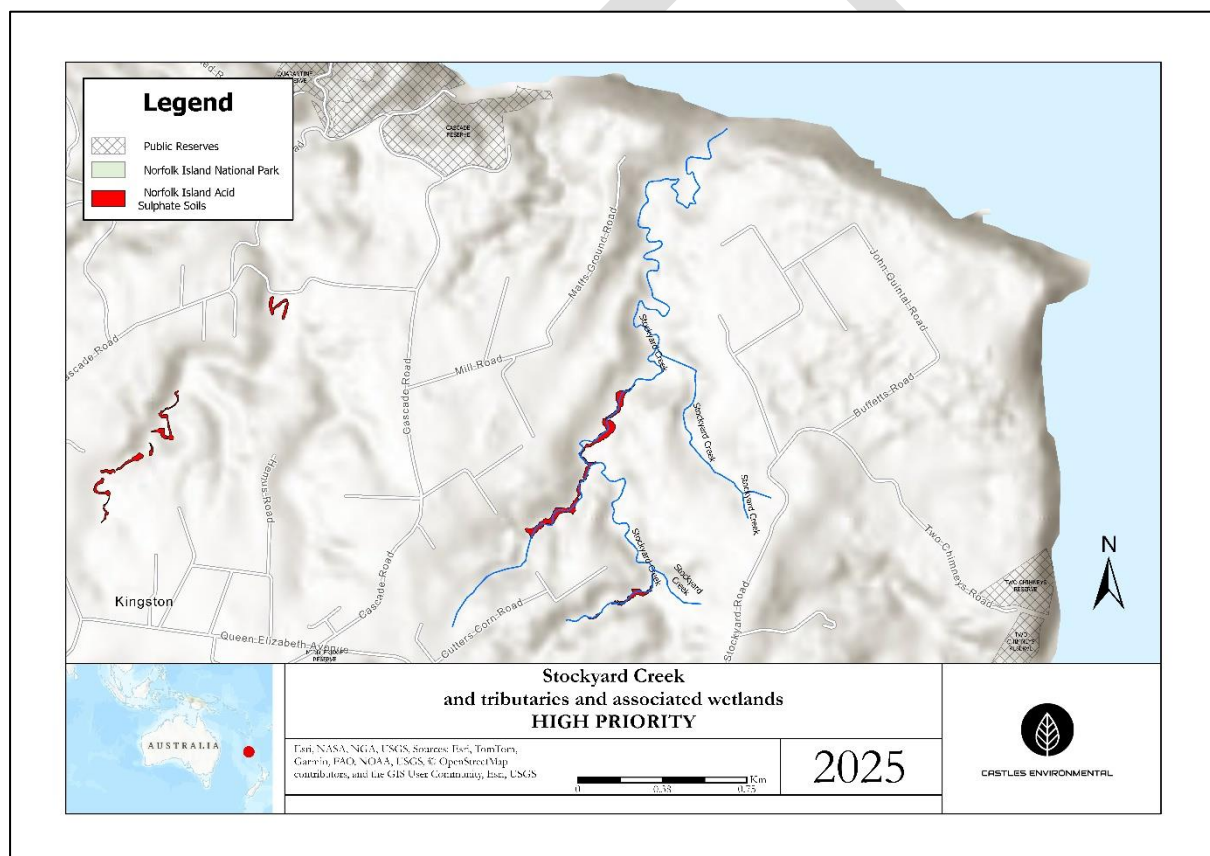
|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  |     |                                                                                                                                    |                       | community groups/volunteers                                            |
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 1.5 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | 1                     | NIRC                                                                   |

## 7.6 Stockyard Creek and tributaries and associated wetlands (High Priority)

Stockyard Creek is a High Priority south - north flowing waterway that discharges into the Norfolk Marine Park on the northern edge of Norfolk Island. The creek (including its tributaries) is approximately 6,070 meters long, flowing entirely through privately owned land. The adjoining private land comprises 71 separate freehold or other private portions, with no adjoining public land (Figure 30 and Table 19).

The surrounding vegetation includes existing native types such as Freshwater Swamp and Pine Plantation (Christian and Mills 2021) (Figure 31). Prior to 1750, the area supported a range of native vegetation communities, including Coastal Pine and White Oak Forest, Freshwater Swamp, and Lowland Valley Hardwood Forest (Figure 32).

Acid sulfate soils are present within the mid and upper reaches of Stockyard Creek (Fitzpatrick et al. 2023) (Figure 30).



**Figure 30. Location of Stockyard Creek and mapped Acid Sulfate Soils (Fitzpatrick et al. 2023).**

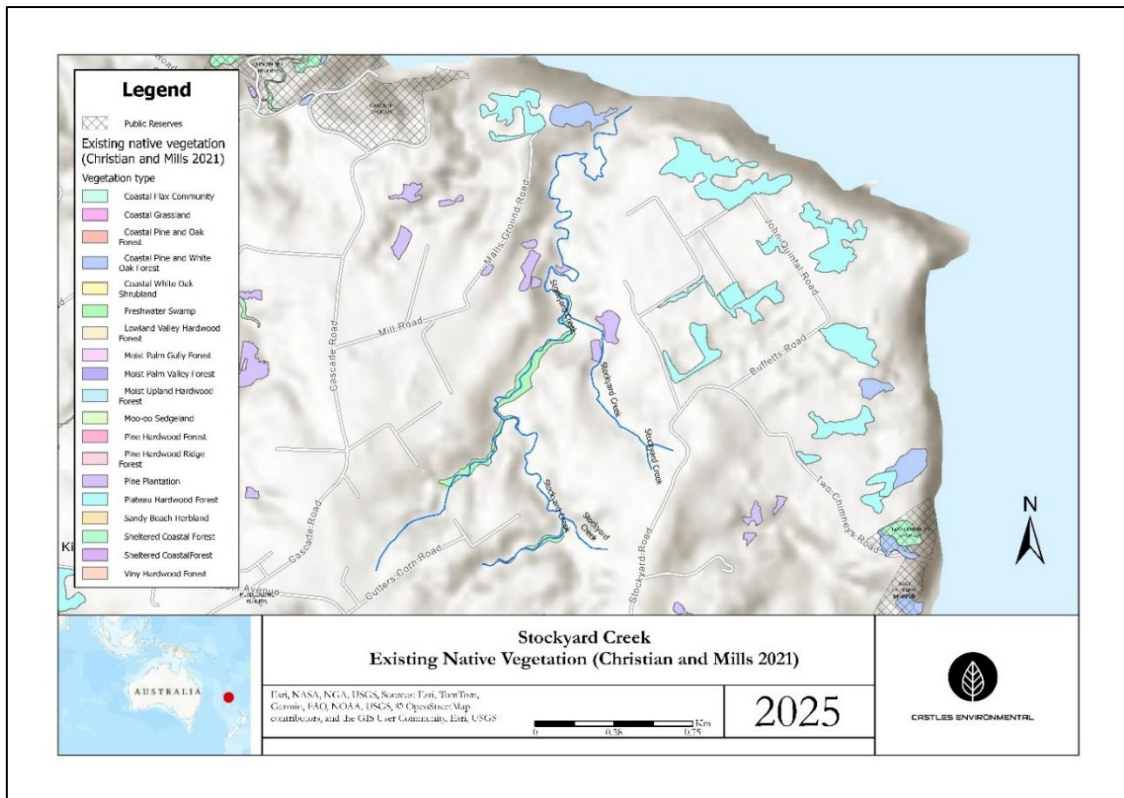


Figure 31. Existing native vegetation communities on Stockyard Creek (Christian and Mills 2021)

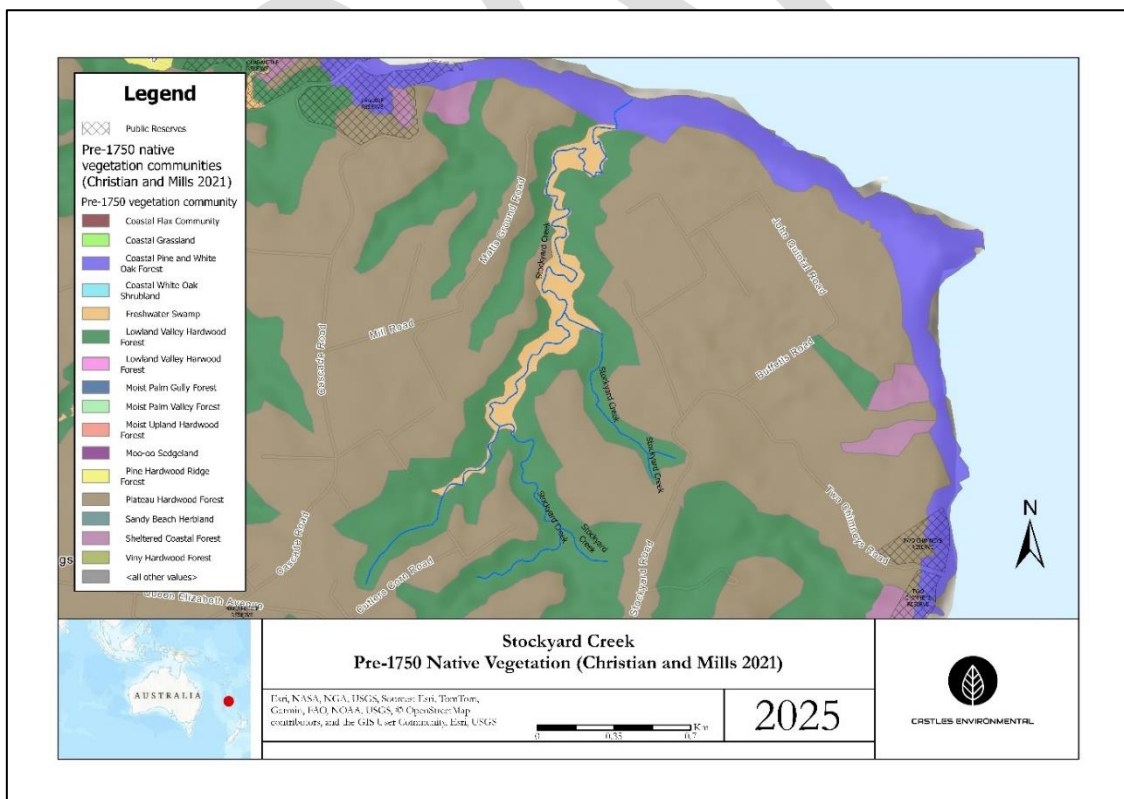


Figure 32. Pre-1750 native vegetation communities on Stockyard Creek (Christian and Mills 2021)

**Table 19. Stockyard Creek and adjoining land details.**

|                                                                             |                                                                                                                                                             |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 6,070                                                                                                                                                       |
| Both sides of the creek (m)                                                 | 12,140                                                                                                                                                      |
| Estimated percentage private land (%)                                       | 100%                                                                                                                                                        |
| Estimated percentage public land (%)                                        | 0%                                                                                                                                                          |
| Total number private land/freehold/other portions adjoining                 | 71                                                                                                                                                          |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                          |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Freshwater Swamp</li> <li>• Pine Plantation</li> </ul>                                                             |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Freshwater Swamp</li> <li>• Lowland Valley Hardwood Forest</li> </ul> |

## Management Actions - Stockyard Creek

Management activities for Stockyard Creek and tributaries and associated wetlands are provided in Table 20. Targets are based on the protection and enhancement of 7 - 9% of High Priority waterways on private land and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 20. Stockyard Creek management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 1.0 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 10 agreements         | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 5 Stock troughs       | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | n/a                   | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 1.0 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 1.0 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 1.0 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | -                     | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

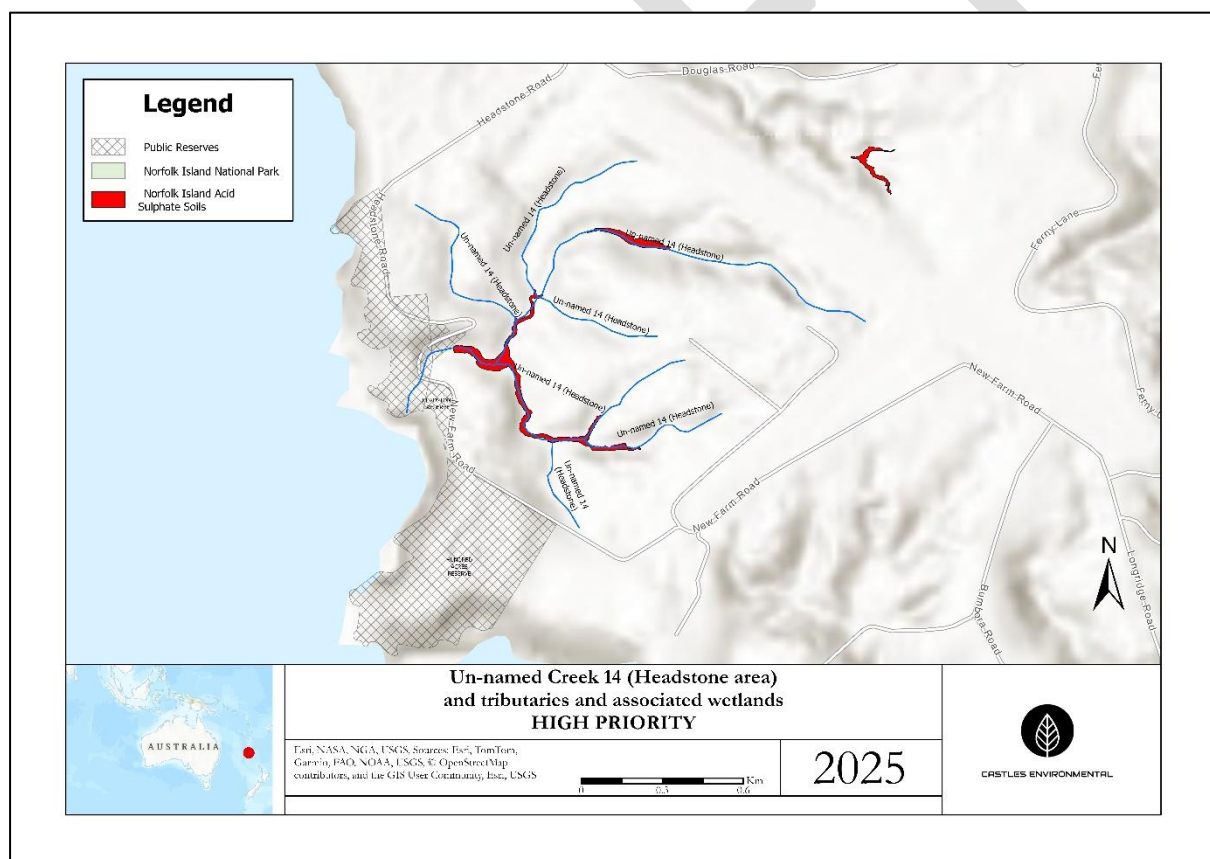
|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 1.0 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | 1                     | NIRC                                                                   |

## 7.7 Un-named creek 14 (Headstone) and tributaries and associated wetlands (High Priority)

Un-named Creek 14, a High Priority waterway located on the western side of Norfolk Island near Headstone Reserve, discharges into the Norfolk Marine Park at “Headstone”. The creek (including its tributaries and associated wetlands) is approximately 5,426 meters long, passing through predominantly privately owned land. Around 95% of the adjoining land is private, made up of 22 separate freehold or other private portions, while the remaining 5% is public land. An estimated 50% of the riparian zone within the adjoining public land is grazed with cattle having unrestricted access (Figure 33 and Table 21).

The adjoining native vegetation includes Viny Hardwood Forest and Freshwater Swamp (Christian and Mills 2021) (Figure 34). Prior to 1750, the surrounding area contained vegetation communities including Coastal Pine and White Oak Forest, Plateau Hardwood Forest, Lowland Valley Hardwood Forest, Viny Hardwood Forest, and Freshwater Swamp (Christian and Mills 2021) (Figure 35).

There is acid sulfate soils present in the mid and lower reaches of the creek and its tributaries and associated wetlands (Fitzpatrick et al. 2023) (Figure 33).



**Figure 33. Location of un-named creek 14 (Headstone area) and mapped Acid Sulfate Soils (Fitzpatrick et al. 2023).**

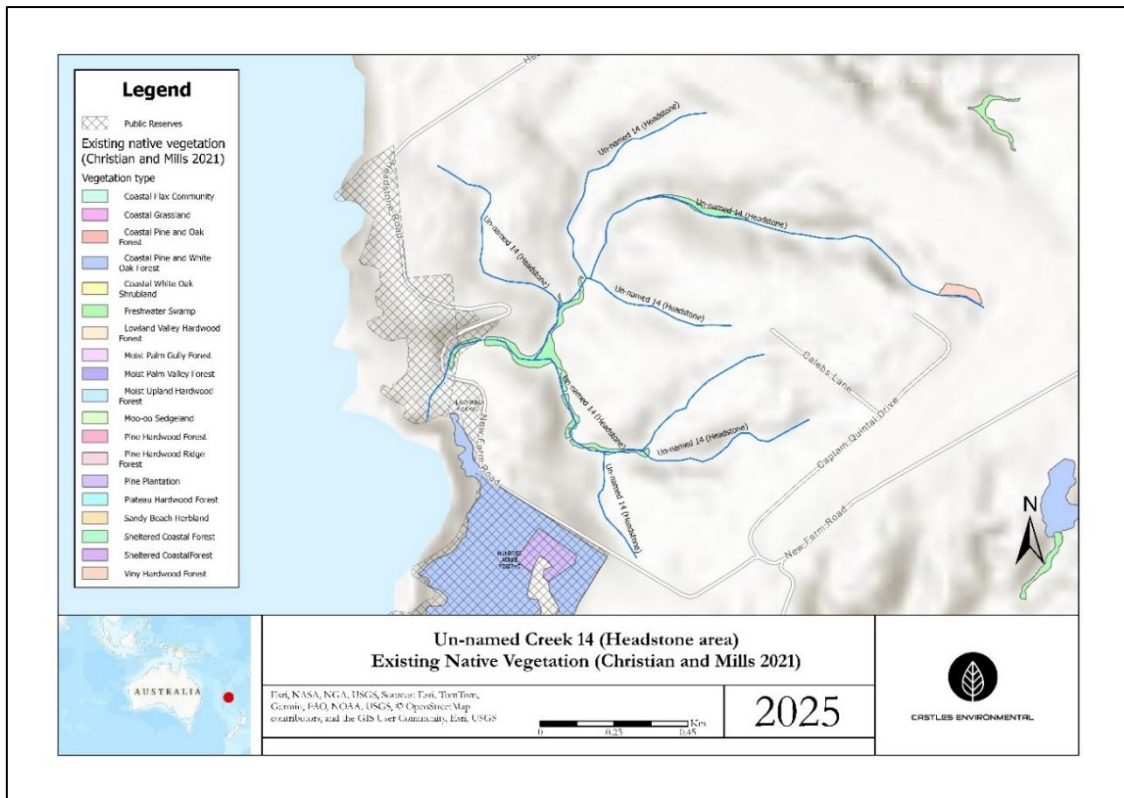


Figure 34. Existing native vegetation communities on un-named creek 14 (Headstone area) (Christian and Mills 2021)

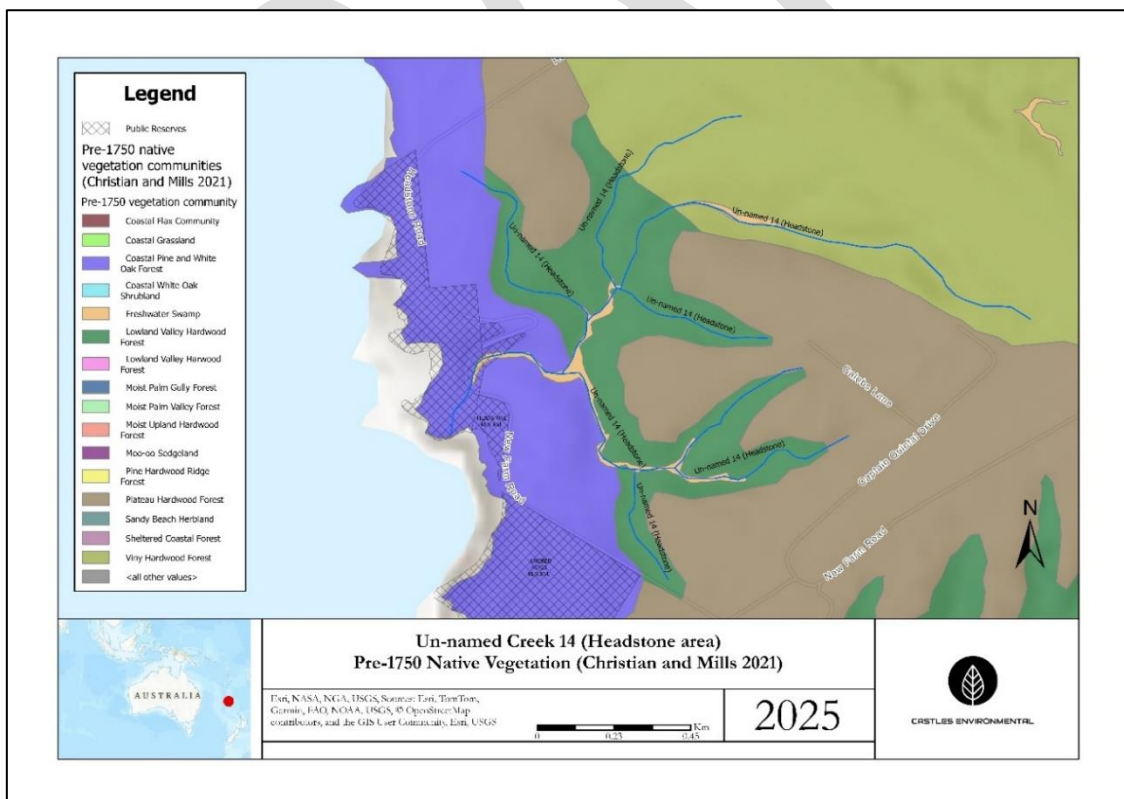


Figure 35. Pre-1750 native vegetation communities on un-named creek 14 (Headstone area) (Christian and Mills 2021)

**Table 21. Un-named creek 14 (Headstone area) and adjoining land details.**

|                                                                             |                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 5,426                                                                                                                                                                                                                          |
| Both sides of the creek (m)                                                 | 10,852                                                                                                                                                                                                                         |
| Estimated percentage private land (%)                                       | 95%                                                                                                                                                                                                                            |
| Estimated percentage public land (%)                                        | 5%                                                                                                                                                                                                                             |
| Total number private land/freehold/other portions adjoining                 | 22                                                                                                                                                                                                                             |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 50%                                                                                                                                                                                                                            |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Viny Hardwood Forest</li> <li>• Freshwater Swamp</li> </ul>                                                                                                                           |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Plateau Hardwood Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Viny Hardwood Forest</li> <li>• Freshwater Swamp</li> </ul> |

## Un-named creek 14 (Headstone area) - On-ground Management Actions

Management activities for un-named creek 14 and tributaries and associated wetlands are provided in Table 22. Targets are based on the protection and enhancement of 7 - 9% of High Priority waterways on private land and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 22. Un-named creek 14 (Headstone area) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 0.8 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | 0.5 km                | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 10 agreements         | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 5 Stock troughs       | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | Included in 1.2 above | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 0.8 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | 0.2 hectares          | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.8 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 0.8 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | 0.2 hectares          | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 1 hectare             | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | 1                     | NIRC                                                                   |

## 7.8 Broken Bridge Creek and tributaries and associated wetlands (High Priority)

Broken Bridge Creek is a High Priority west - east flowing waterway that discharges into Cascade Creek above Quarantine Reserve. The creek and its tributaries and associated wetlands extend approximately 6,131 meters and flow through a landscape composed of both private and public land. Approximately 70% of the adjoining land is privately owned, comprising 35 separate freehold or other private portions, while the remaining 30% is within the Norfolk Island National Park. None of the adjoining public land is grazed (Figure 36 and Table 23).

The existing surrounding native vegetation includes native vegetation communities such as Moist Palm Valley Forest, Moist Upland Hardwood Forest, and Lowland Valley Hardwood Forest (Christian and Mills 2021) (Figure 37). Prior to 1750, the surrounding area contained a range of native vegetation communities, including Moist Palm Valley Forest, Freshwater Swamp, Moist Upland Hardwood Forest, and Lowland Valley Hardwood Forest (Christian and Mills 2021) (Figure 38).

Acid sulfate soils have not been mapped within Broken Bridge Creek (Fitzpatrick et al. 2023).

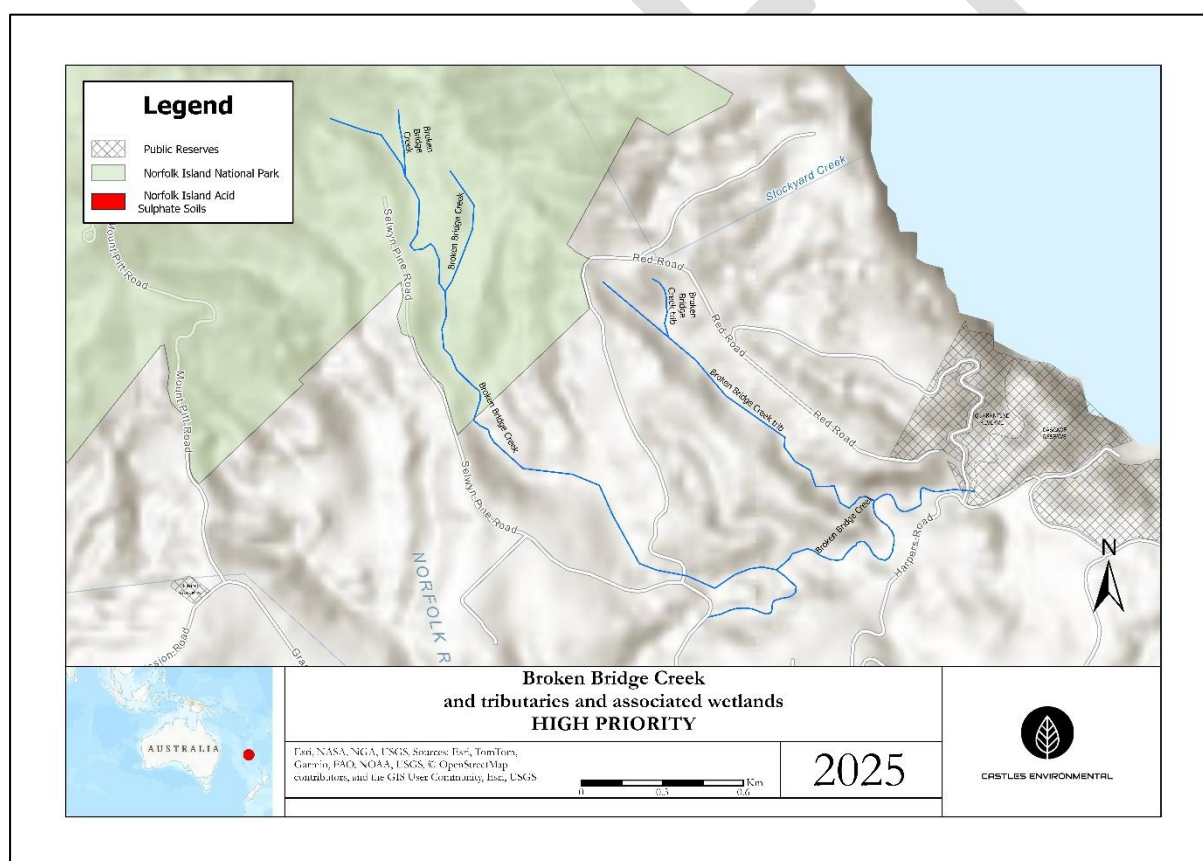


Figure 36. Location of Broken Bridge Creek.

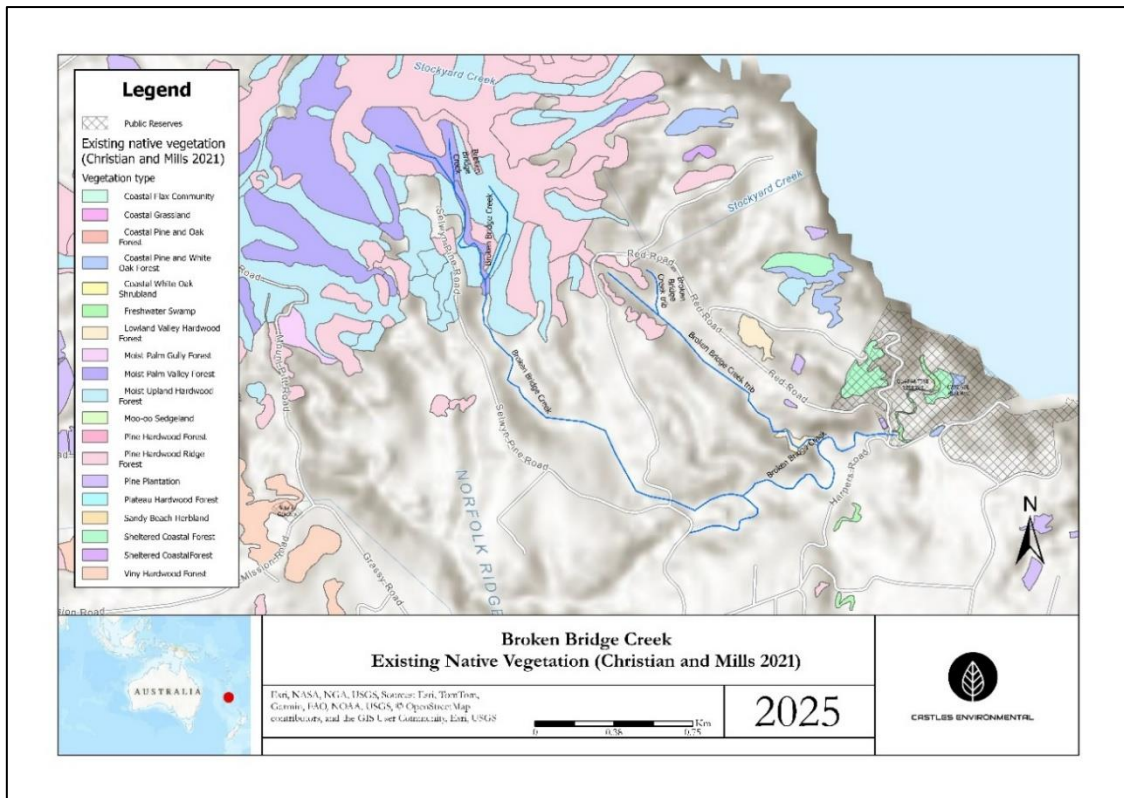


Figure 37. Existing native vegetation communities on Broken Bridge Creek (Christian and Mills 2021)

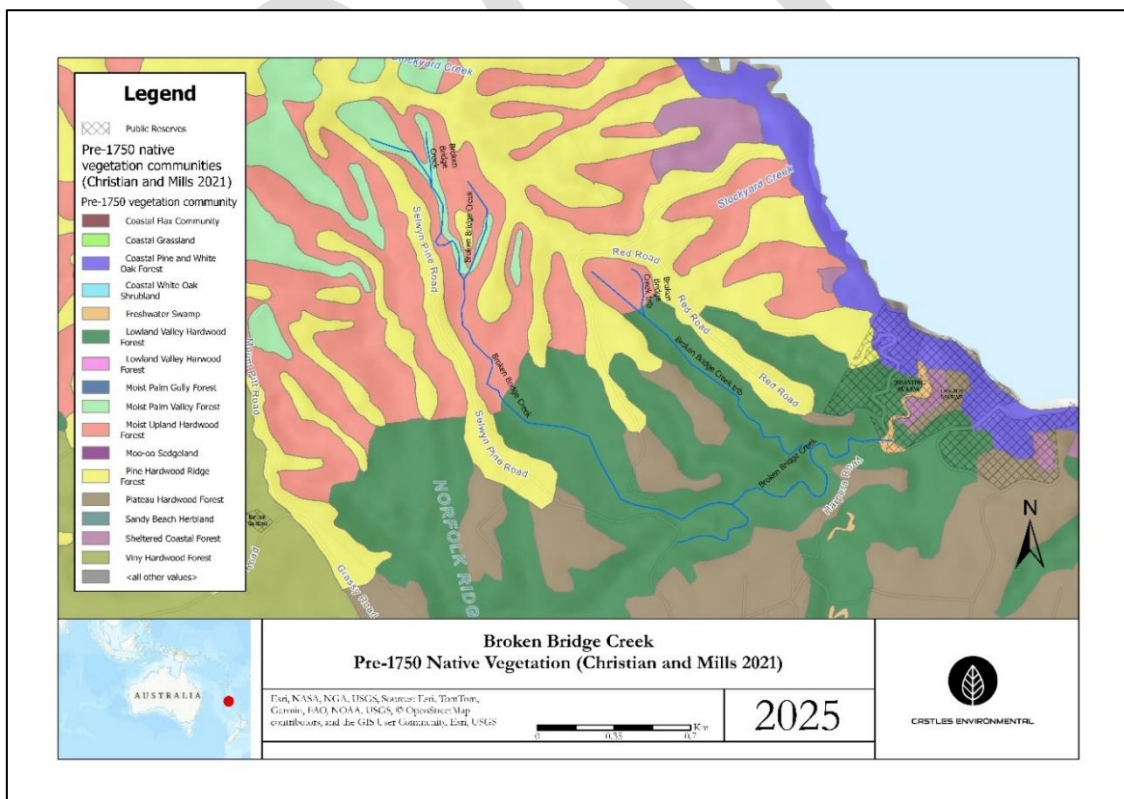


Figure 38. Pre-1750 native vegetation communities on Broken Bridge Creek (Christian and Mills 2021)

**Table 23. Broken Bridge Creek and adjoining land details.**

|                                                                             |                                                                                                                                                                                            |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 6,131                                                                                                                                                                                      |
| Both sides of the creek (m)                                                 | 12,262                                                                                                                                                                                     |
| Estimated percentage private land (%)                                       | 70%                                                                                                                                                                                        |
| Estimated percentage public land (%)                                        | 30%                                                                                                                                                                                        |
| Total number private land/freehold/other portions adjoining                 | 35                                                                                                                                                                                         |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                                         |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Moist Palm Valley Forest</li> <li>• Moist Upland Hardwood Forest</li> <li>• Lowland Valley Hardwood Forest</li> </ul>                             |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Moist Palm Valley Forest</li> <li>• Freshwater Swamp</li> <li>• Moist Upland Hardwood Forest</li> <li>• Lowland Valley Hardwood Forest</li> </ul> |

## Broken Bridge Creek - On-ground Management Actions

Management activities for Broken Bridge Creek and tributaries and associated wetlands are provided in Table 24. Targets are based on the protection and enhancement of 7 - 9% of High Priority waterways on private land and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 24. Broken Bridge Creek management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                       | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                         | 0.7 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                              | 0.5 km                | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                                 | 5 agreements          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                               | 4 Stock troughs       | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                             | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                         | n/a                   | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                          | n/a                   | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                               | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                       | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas     | 0.7 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas | 0.5 hectares          | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                      | 0.7 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.7 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                       | 0.5 hectares          | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                                 | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                              | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 1.2 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | 1                     | NIRC                                                                   |

## 7.9 Un-named creek 11 (Burnt Pine/centre) (Medium Priority)

Un-named Creek 11, which is located in the centre of Norfolk Island, is a medium priority waterway that discharges into Broken Bridge Creek. The creek (including its tributaries and associated wetlands) is approximately 7,293 meters long and flows through a landscape that is predominantly privately owned. Approximately 80% of the land adjoining un-named creek 11 is private, comprising 49 separate freehold or other private portions, while the remaining 20% is public land within Norfolk Island National Park (none of which is grazed) (Figure 39 and Table 25).

The native vegetation surrounding the creek includes existing native communities such as Moist Upland Hardwood Forest, Moist Palm Valley Forest, and Pine Hardwood Ridge Forest (Christian and Mills 2021) (Figure 40). Prior to 1750, the area contained a range of native vegetation communities, including Moist Upland Hardwood Forest, Moist Palm Valley Forest, Plateau Hardwood Forest, and Lowland Valley Hardwood Forest (Christian and Mills 2021) (Figure 41).

Acid sulfate soils have not been mapped within Un-named Creek 11 (Fitzpatrick et al. 2023).

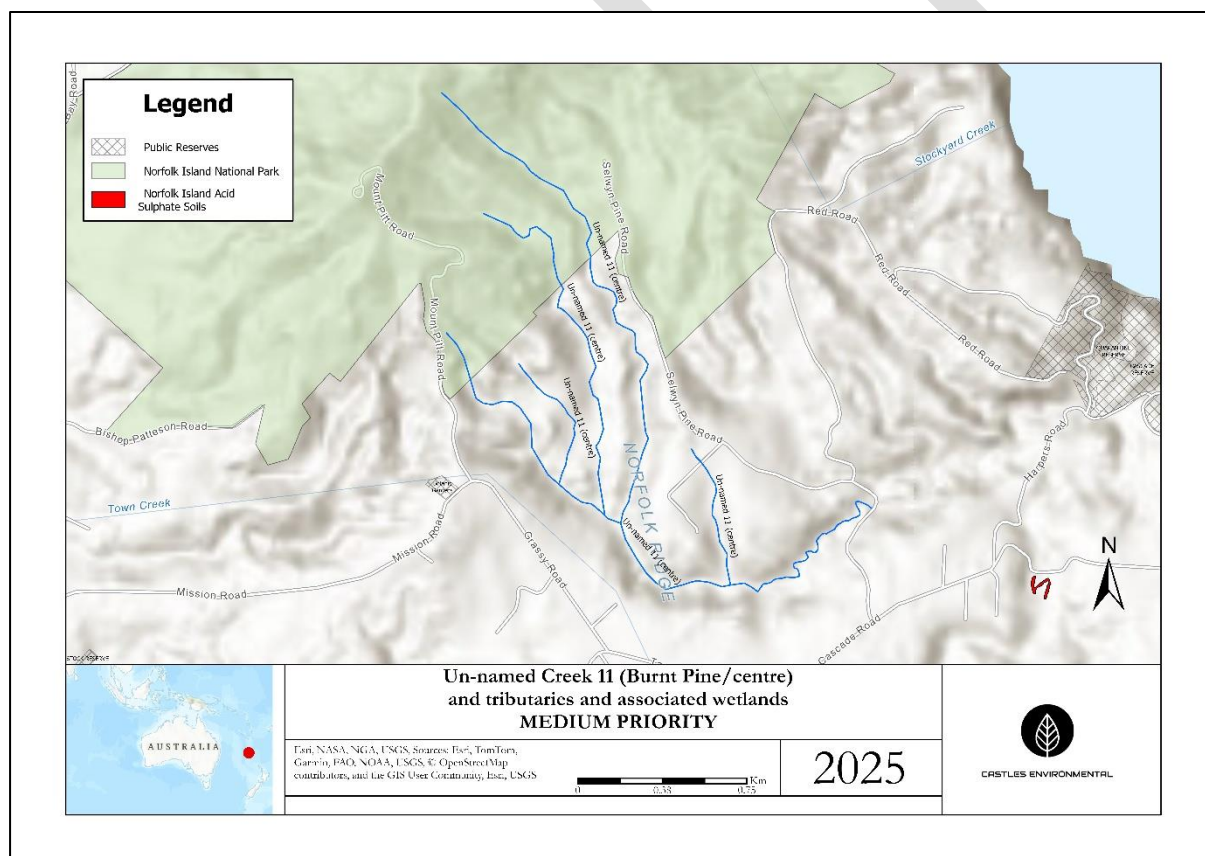


Figure 39. Location of un-named creek 11 (Burnt Pine/centre).

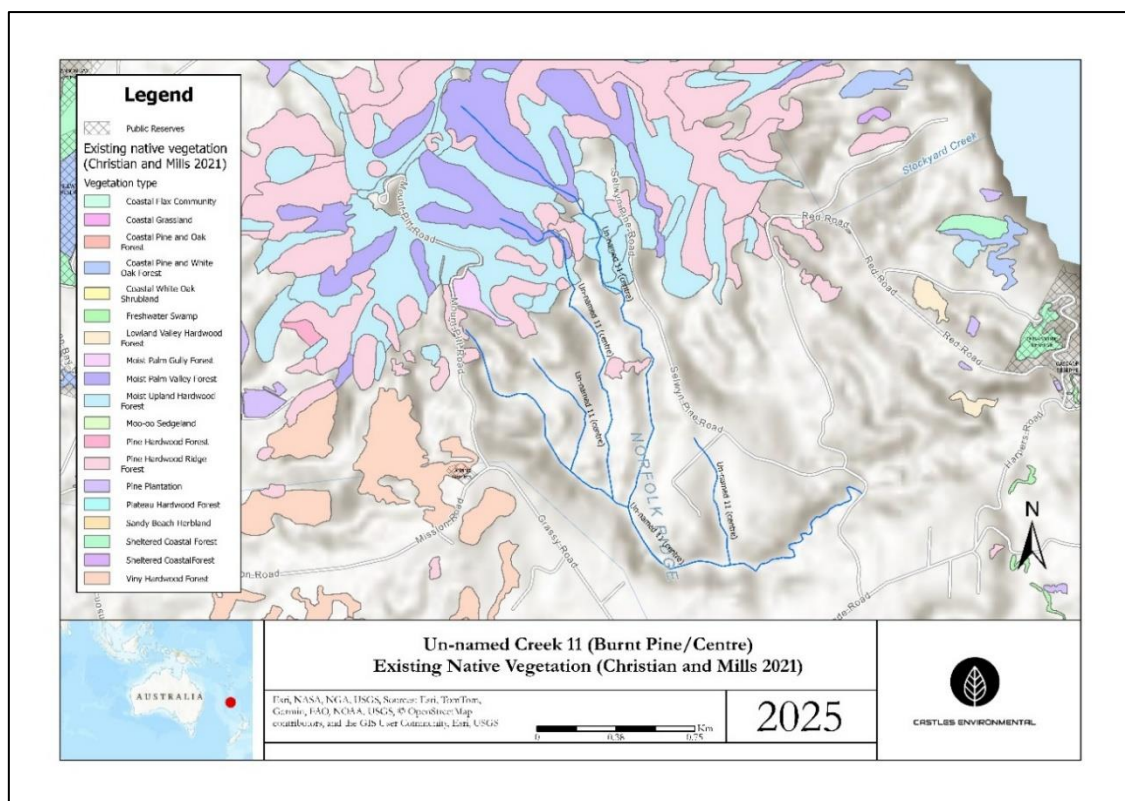


Figure 40. Existing native vegetation communities on un-named creek 11 (Burnt Pine/centre) (Christian and Mills 2021)

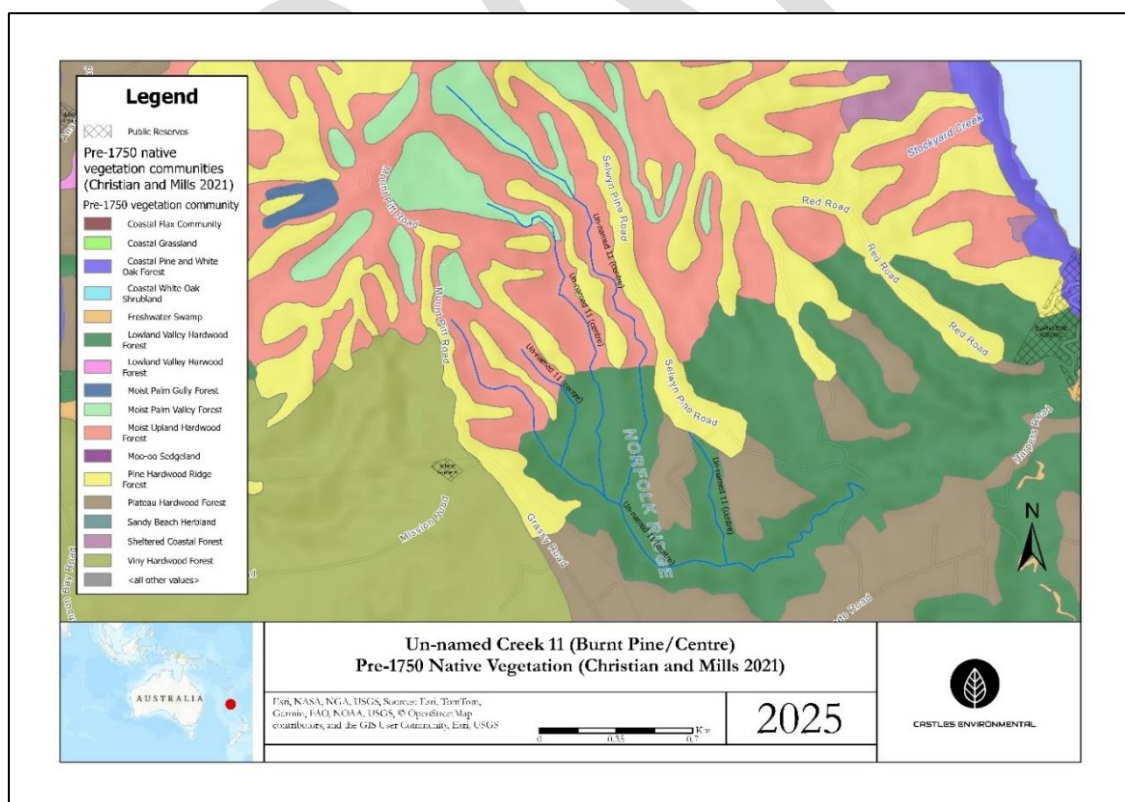


Figure 41. Pre-1750 native vegetation communities on un-named creek 11 (Burnt Pine/centre) (Christian and Mills 2021)

**Table 25. Un-named Creek 11 (Burnt Pine/centre) and adjoining land details.**

|                                                                             |                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 7,293                                                                                                                                                                                             |
| Both sides of the creek (m)                                                 | 14,586                                                                                                                                                                                            |
| Estimated percentage private land (%)                                       | 80%                                                                                                                                                                                               |
| Estimated percentage public land (%)                                        | 20%                                                                                                                                                                                               |
| Total number private land/freehold/other portions adjoining                 | 49                                                                                                                                                                                                |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                                                |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Moist Upland Hardwood Forest</li> <li>• Moist Palm Valley Forest</li> <li>• Pine Hardwood Ridge Forest</li> </ul>                                        |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Moist Upland Hardwood Forest</li> <li>• Moist Palm Valley Forest</li> <li>• Plateau Hardwood Forest</li> <li>• Lowland Valley Hardwood Forest</li> </ul> |

## Un-named creek 11 (Burnt Pine/centre) - On-ground Management Actions

Management activities for un-named creek 11 (Burnt Pine/centre) and tributaries and associated wetlands are provided in Table 26. Targets are based on the protection of around 5% of waterway frontages and the protection of areas with high quality riparian habitat on Medium Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 26. Un-named creek 11 (Burnt Pine/centre) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 0.6 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | -<br>(National Park)  | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 5 agreements          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 5 Stock troughs       | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | n/a                   | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | n/a                   | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 0.6 hectare           | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | -<br>(National Park)  | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.6 hectare           | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 0.6 hectare           | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | -<br>National Park    | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and                             |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  |     |                                                                                                                                    |                       | community groups/volunteers                                            |
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 0.6 hectare           | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | -                     | NIRC                                                                   |

## 7.10 Un-named creek 10 (Music Valley) and tributaries and associated wetlands (Medium Priority)

Un-named Creek 10, which is located in the Music Valley area, is a Medium Priority waterway that flows north to south and discharges into the Norfolk Marine Park near Bloody Bridge. The creek and its tributaries extend approximately 1,711 meters and flow entirely through privately owned land, comprising 17 separate freehold or other private portions (Figure 42 and Table 27).

The surrounding vegetation includes existing native vegetation communities such as Lowland Valley Hardwood Forest, and Coastal Pine and White Oak Forest (Christian and Mills 2021) (Figure 43). Prior to 1750 the area contained a range of native vegetation communities, including Coastal Pine and White Oak Forest, Lowland Valley Hardwood Forest, and Sheltered Coastal Forest (Christian and Mills 2021) (Figure 44).

Acid sulfate soils have not been mapped within Un-named Creek 10 (Fitzpatrick et al. 2023).

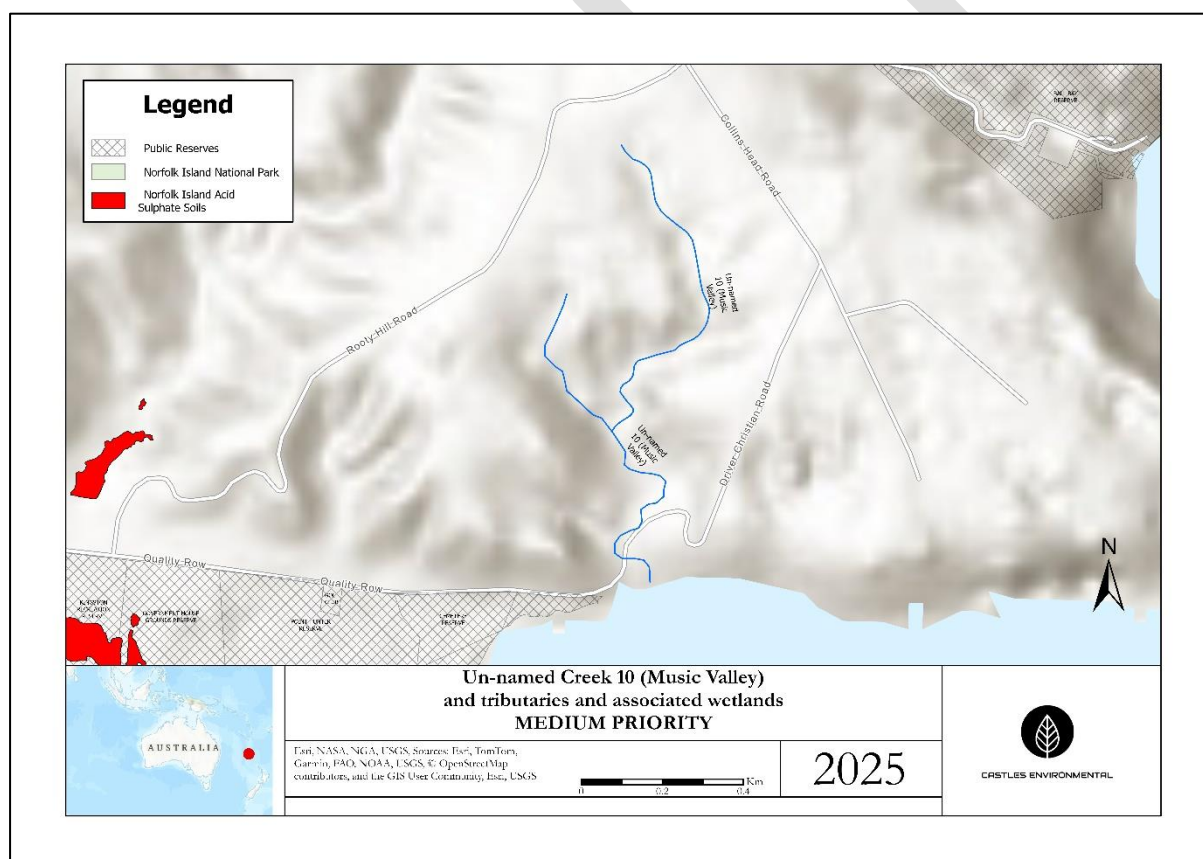


Figure 42. Location of un-named creek 10 (Music Valley) and mapped acid sulfate soils (Fitzpatrick et al. 2023).

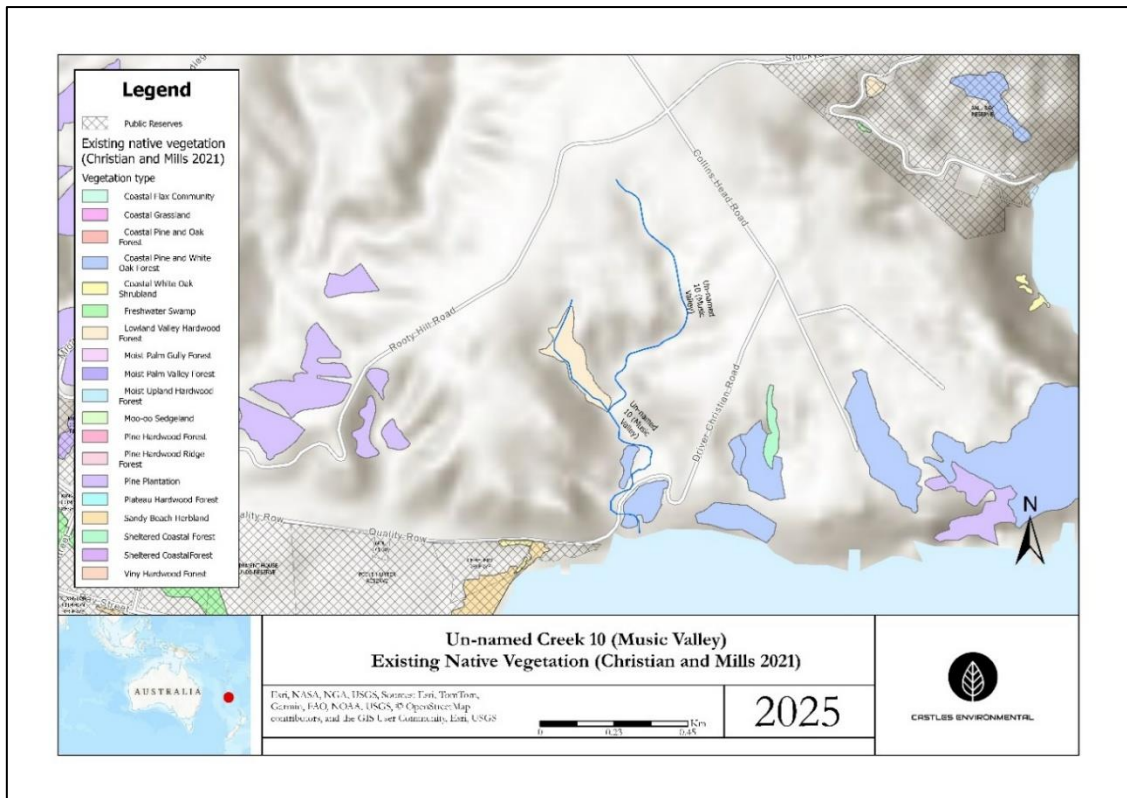


Figure 43. Existing native vegetation communities on un-named creek 10 (Music Valley) (Christian and Mills 2021)

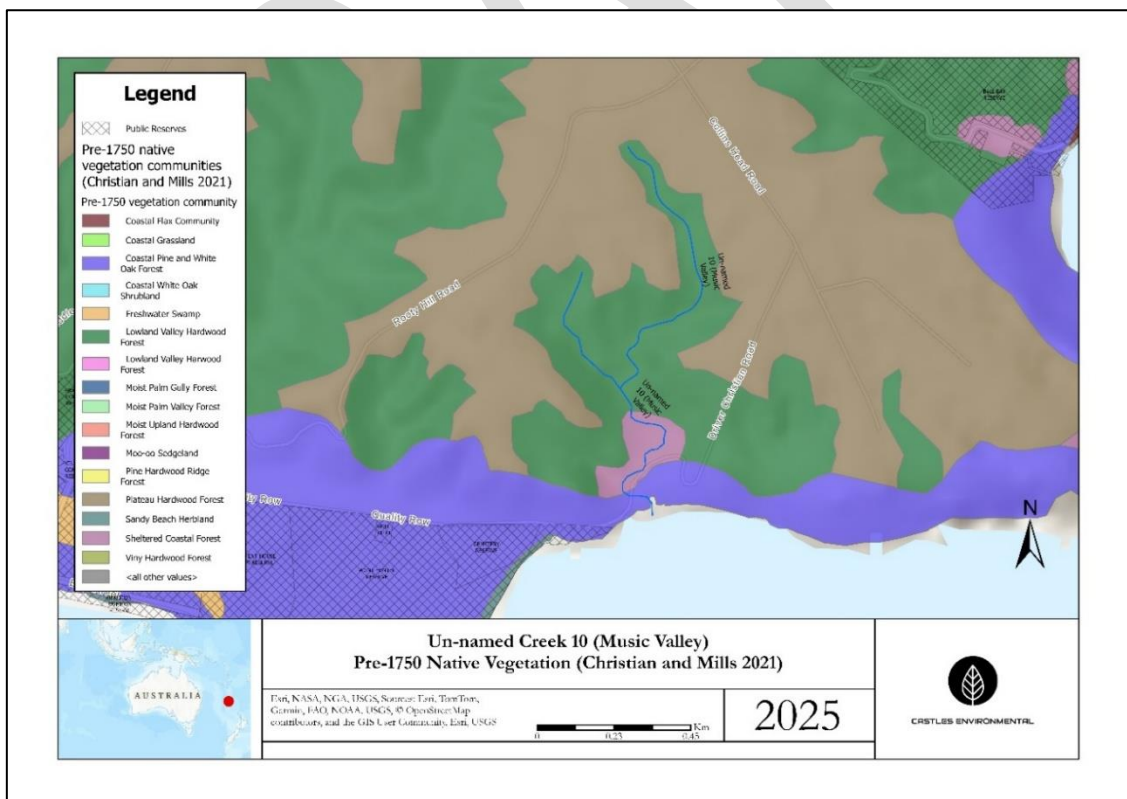


Figure 44. Pre-1750 native vegetation communities on un-named creek 10 (Music Valley) (Christian and Mills 2021)

**Table 27. Un-named Creek 10 (Music Valley) and adjoining land details.**

|                                                                             |                                                                                                                                                                     |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 1,711                                                                                                                                                               |
| Both sides of the creek (m)                                                 | 3,422                                                                                                                                                               |
| Estimated percentage private land (%)                                       | 100%                                                                                                                                                                |
| Estimated percentage public land (%)                                        | 0%                                                                                                                                                                  |
| Total number private land/freehold/other portions adjoining                 | 17                                                                                                                                                                  |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                  |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Lowland Valley Hardwood Forest</li> <li>• Coastal Pine and White Oak Forest</li> </ul>                                     |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Sheltered Coastal Forest</li> </ul> |

## Un-named Creek 10 (Music Valley) - On-ground Management Actions

Management activities for un-named creek 10 (Music Valley) and tributaries and associated wetlands are provided in Table 28. Targets are based on the protection of around 5% of waterway frontages and the protection of areas with high quality riparian habitat on Medium Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 28. Un-named creek 10 (Music Valley) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 0.2 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 2                     | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 2 Stock troughs       | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | n/a                   | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | n/a                   | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | -                     | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 0.2 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | -                     | NIRC                                                                   |

## 7.11 Un-named Creeks 3, 4, 5 and 6 (northern creeks) and tributaries and associated wetlands (Medium Priority)

Un-named Creeks 3, 4, 5, and 6 are a group of Medium Priority south-north intermittent flowing waterways located in the north-western corner of Norfolk Island. These creeks occasionally discharge into the Norfolk Marine Park (following heavy rainfall) off steep coastal cliffs. These creeks and their tributaries are (collectively) around 2,686 meters long and flow through both private and public land. Approximately 40% of the adjoining land is privately owned (adjacent to un-named creek 3), comprising five separate freehold or other private portions, while the remaining 60% is public land within the Norfolk Island National Park (adjacent to un-named creeks 4, 5 and 6). None of the adjoining public land is grazed (Figure 45 and Table 28).

The existing and pre-1750 surrounding vegetation includes native vegetation communities such as Coastal Pine and White Oak Forest, Pine Hardwood Ridge Forest, Lowland Valley Hardwood Forest, Moist Upland Hardwood Forest, and Sheltered Coastal Forest (Christian and Mills 2021) (Figures 46 and 47).

Acid sulfate soils have not been mapped within Un-named Creeks 3, 4, 5, and 6 (Fitzpatrick et al. 2023).

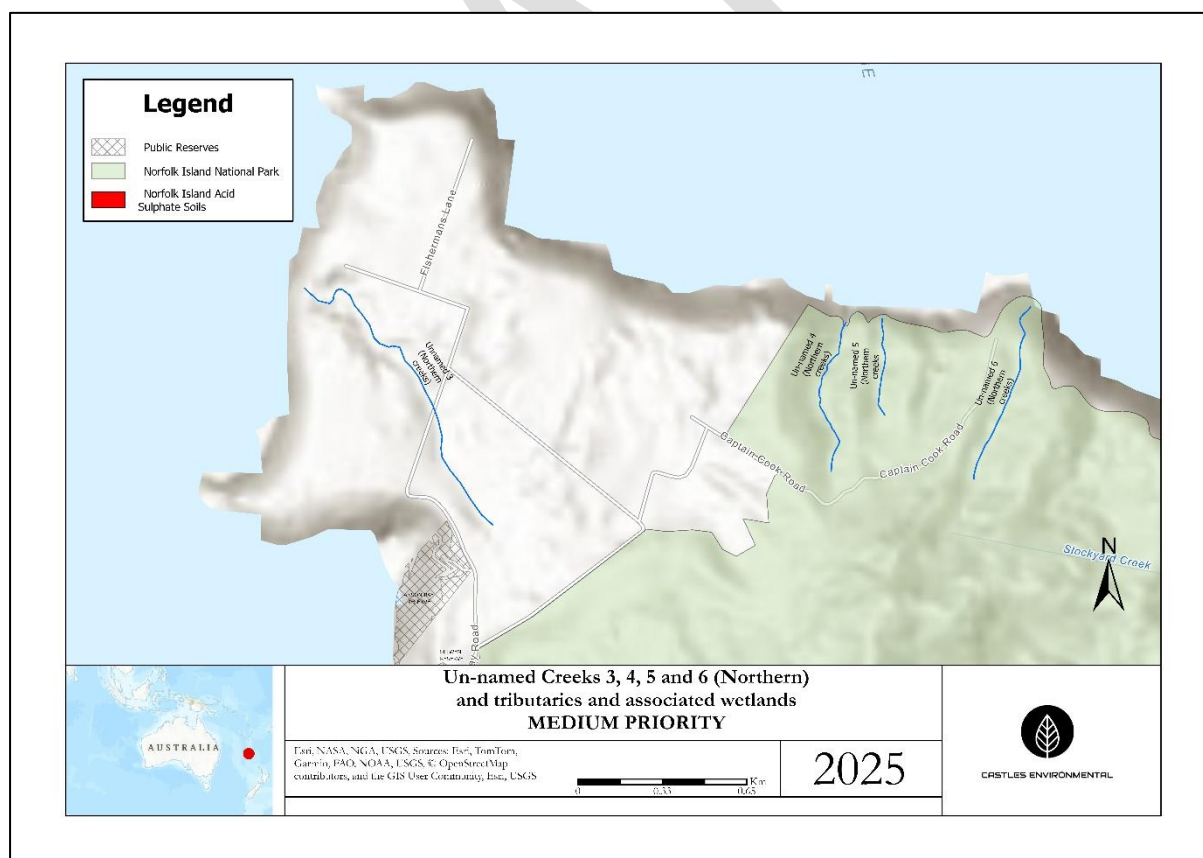


Figure 45. Location of un-named creeks 3, 4, 5 and 6 (northern creeks).

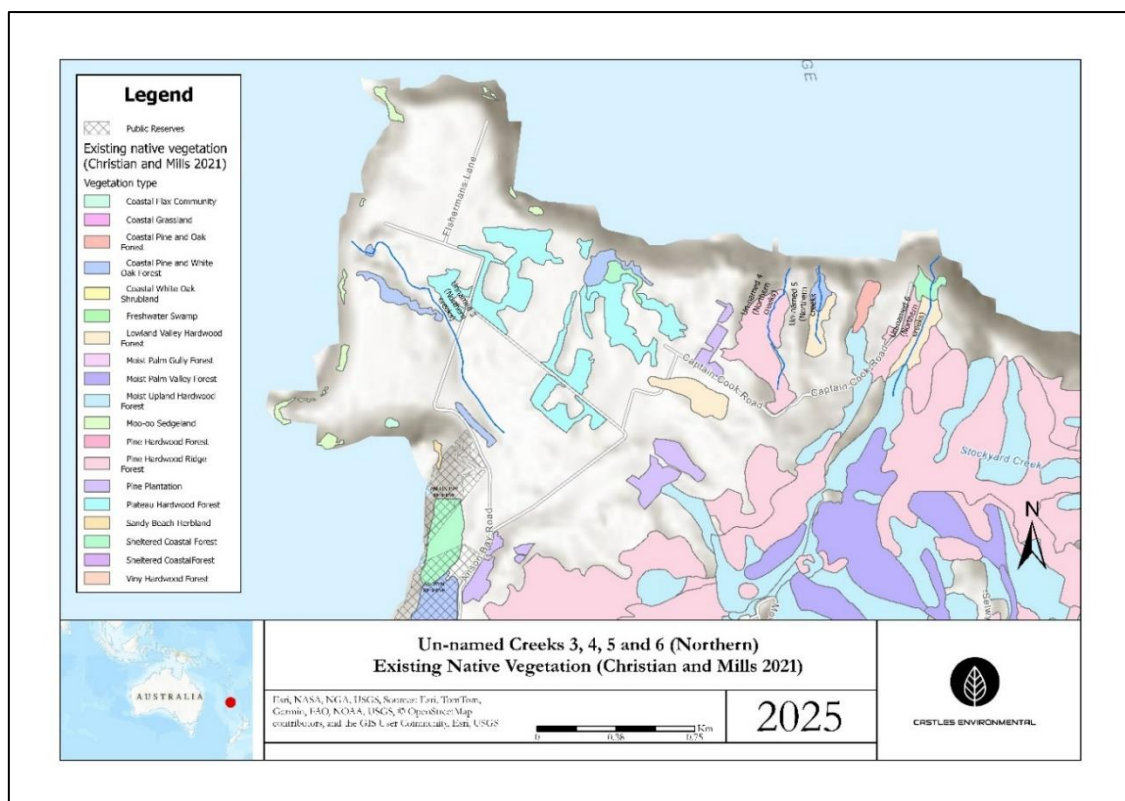


Figure 46. Existing native vegetation communities on un-named creeks 3, 4, 5 and 6 (northern creeks) (Christian and Mills 2021)

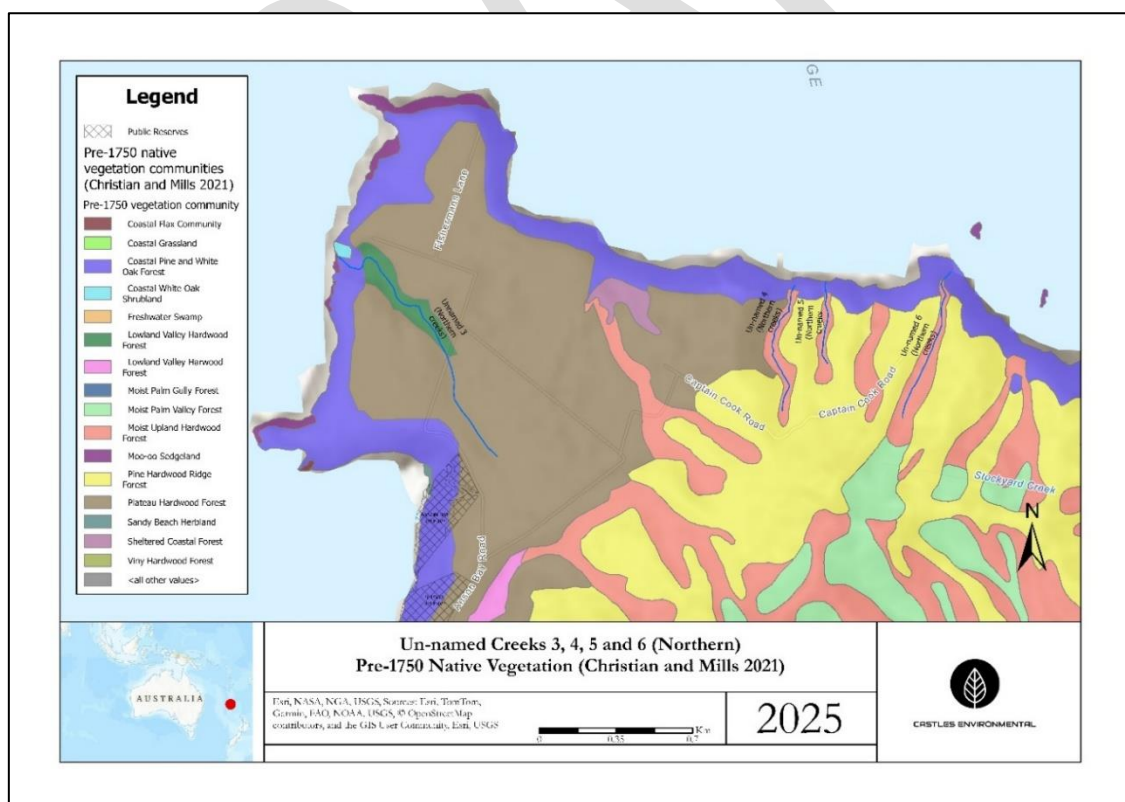


Figure 47. Pre-1750 native vegetation communities on un-named creeks 3, 4, 5 and 6 (northern creeks) (Christian and Mills 2021)

**Table 29. Un-named creeks 3, 4, 5 and 6 (northern creeks) and adjoining land details.**

|                                                                             |                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 2,686                                                                                                                                                                                                                                             |
| Both sides of the creek (m)                                                 | 5,372                                                                                                                                                                                                                                             |
| Estimated percentage private land (%)                                       | 50%                                                                                                                                                                                                                                               |
| Estimated percentage public land (%)                                        | 50%                                                                                                                                                                                                                                               |
| Total number private land/freehold/other portions adjoining                 | 5                                                                                                                                                                                                                                                 |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                                                                                                |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Pine Hardwood Ridge Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Moist Upland Hardwood Forest</li> <li>• Sheltered Coastal Forest</li> </ul> |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Plateau Hardwood Forest</li> <li>• Moo-oo Sedgeland</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Moist Upland Hardwood Forest</li> </ul>            |

## Un-named creeks 3, 4, 5 and 6 (northern creeks) - On-ground Management Actions

Management activities for un-named creeks 3, 4, 5 and 6 (northern creeks) and tributaries and associated wetlands are provided in Table 30. Targets are based on the protection of around 5% of waterway frontages and the protection of areas with high quality riparian habitat on Medium Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 30. Un-named creeks 3, 4, 5 and 6 (northern creeks) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 0.2 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | -<br>(National Park)  | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 2 agreements          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 1 Stock trough        | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | n/a                   | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | Included in 1.2 above | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | -                     | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and                             |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  |     |                                                                                                                                    |                       | community groups/volunteers                                            |
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 0.2 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | -                     | NIRC                                                                   |

## 7.12 Un-named creeks 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) and tributaries and associated wetlands (Medium Priority)

Un-named Creeks 1, 2, 16, 17, 18, 19, 20, 21, and 22 are a group of Medium Priority intermittent waterways located to the east of the Selwyn Reserve/Puppies Point area. These creeks only flow following heavy rainfall. Collectively, the creeks and their tributaries and associated wetlands, extend approximately 8,812 meters and flow through both private and public land. Approximately 40% of the adjoining riparian land is privately owned, comprising 18 separate freehold or other private portions, while the remaining 60% of adjoining riparian land is public land. Of this adjoining public land, an estimated 10% of the riparian zone is grazed (a section of Selwyn Reserve and a section of the Norfolk Island National Park Forestry Zone) (Figure 48 and Table 31).

The existing surrounding native vegetation includes Sheltered Coastal Forest, Moist Upland Hardwood Forest, Pine Plantation, Coastal Pine and White Oak Forest, Viny Hardwood Forest, Moist Palm Valley Forest, and Pine Hardwood Ridge Forest (Christian and Mills 2021) (Figure 49). Prior to 1750, the area supported a broader diversity of native vegetation communities, including Moist Palm Valley Forest, Moist Upland Hardwood Forest, Sheltered Coastal Forest, Lowland Valley Hardwood Forest, Coastal Pine and White Oak Forest, Freshwater Swamp, Viny Hardwood Forest, and Plateau Hardwood Forest (Christian and Mills 2021) (Figure 50).

Acid sulfate soils have not been mapped within Un-named Creeks 1, 2, 16, 17, 18, 19, 20, 21, and 22 (Fitzpatrick et al. 2023).

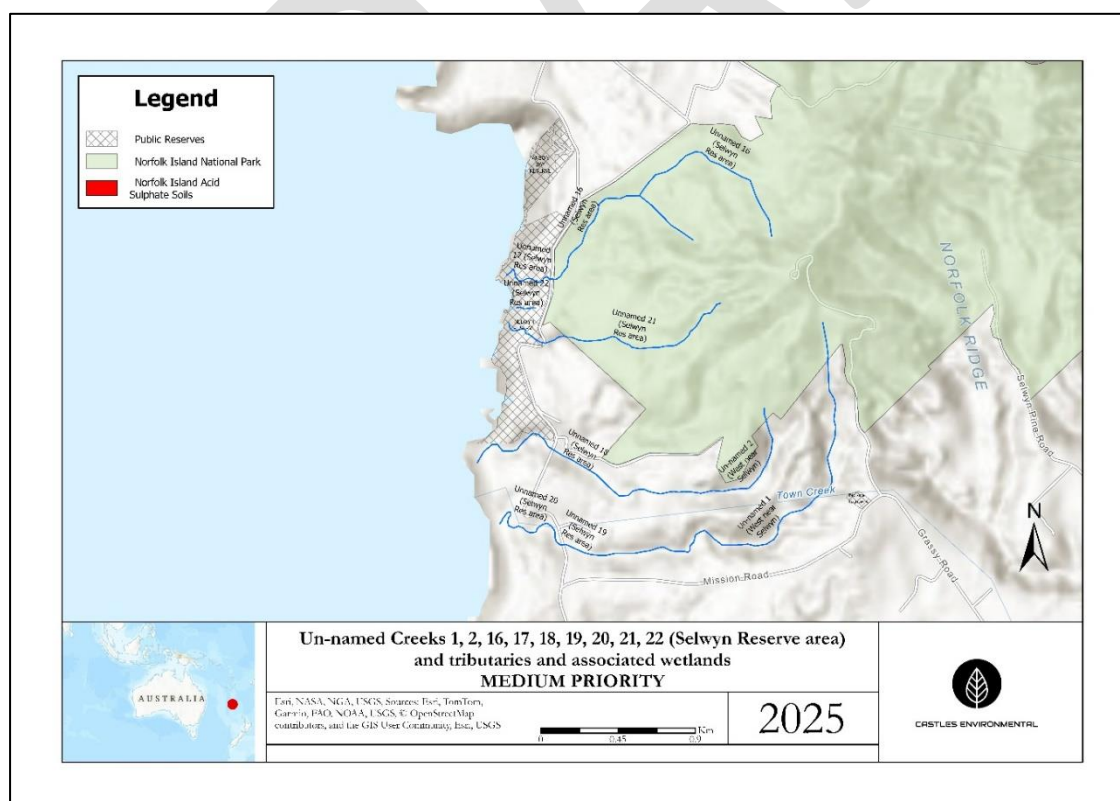


Figure 48. Location of Un-named creeks 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area).

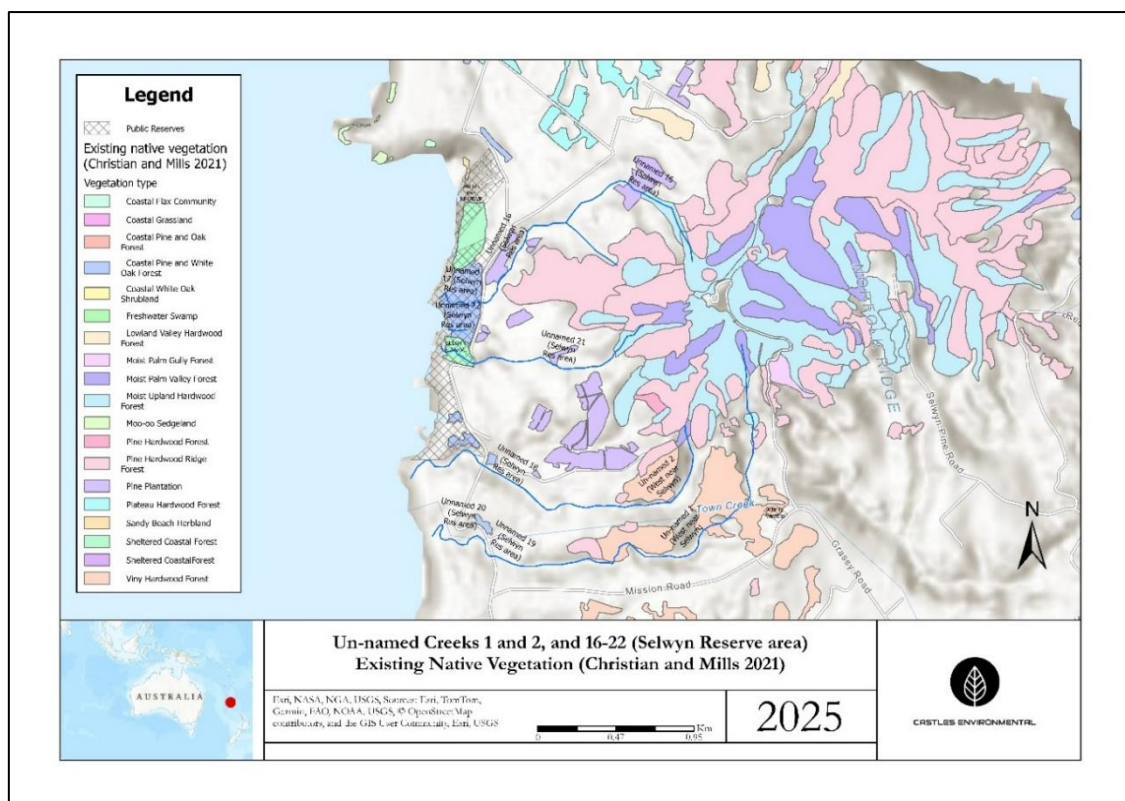


Figure 49. Existing native vegetation communities on un-named creeks 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) (Christian and Mills 2021)

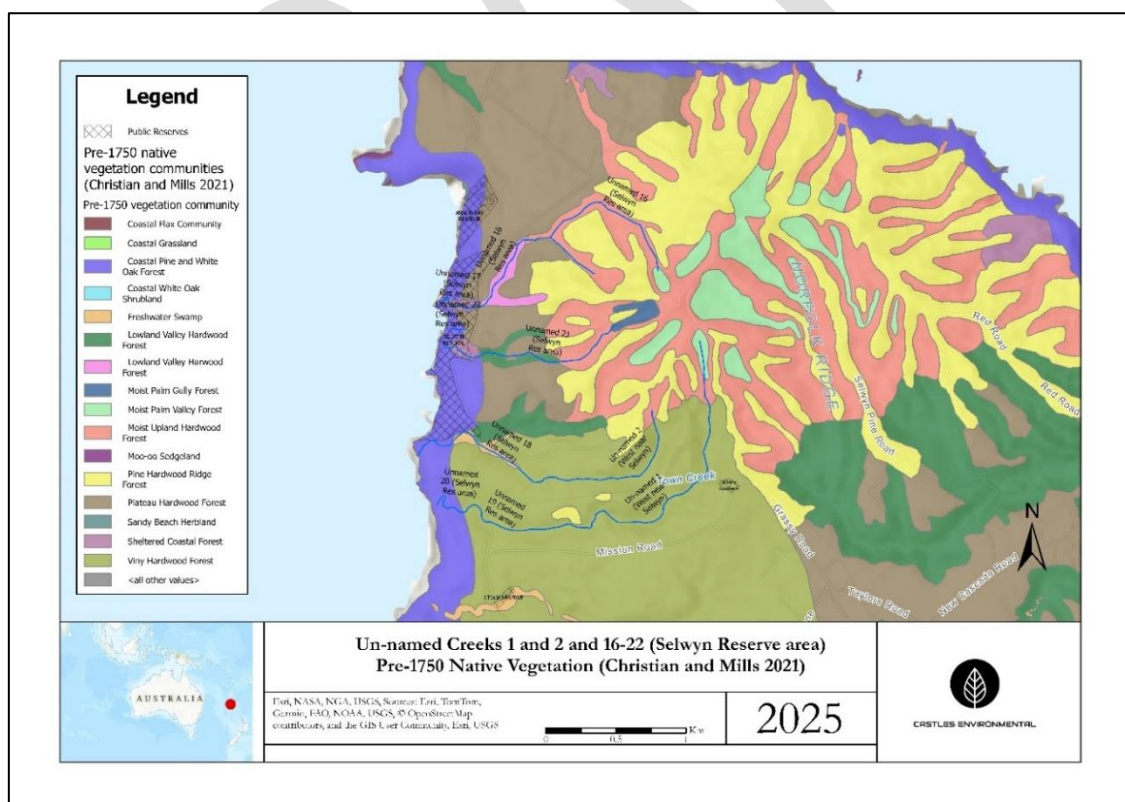


Figure 50. Pre-1750 native vegetation communities on un-named creeks 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) (Christian and Mills 2021)

**Table 31. Un-named Creeks 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) and adjoining land details.**

|                                                                             |                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 8,812                                                                                                                                                                                                                                                                                                                                         |
| Both sides of the creek (m)                                                 | 17,624                                                                                                                                                                                                                                                                                                                                        |
| Estimated percentage private land (%)                                       | 40%                                                                                                                                                                                                                                                                                                                                           |
| Estimated percentage public land (%)                                        | 60%                                                                                                                                                                                                                                                                                                                                           |
| Total number private land/freehold/other portions adjoining                 | 18                                                                                                                                                                                                                                                                                                                                            |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 10%                                                                                                                                                                                                                                                                                                                                           |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Sheltered Coastal Forest</li> <li>• Moist Upland Hardwood Forest</li> <li>• Pine Plantation</li> <li>• Coastal Pine and White Oak Forest</li> <li>• Viny Hardwood Forest</li> <li>• Moist Palm Valley Forest</li> <li>• Pine Hardwood Ridge Forest</li> </ul>                                        |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Moist Palm Valley Forest</li> <li>• Moist Upland Hardwood Forest</li> <li>• Sheltered Coastal Forest</li> <li>• Lowland Valley Harwood Forest</li> <li>• Coastal Pine and White Oak Forest</li> <li>• Freshwater Swamp</li> <li>• Viny Hardwood Forest</li> <li>• Plateau Hardwood Forest</li> </ul> |

## Un-named creeks 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) - On-ground Management Actions

Management activities for un-named creeks 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) and tributaries and associated wetlands are provided in Table 32. Targets are based on the protection of around 5% of waterway frontages and the protection of areas with high quality riparian habitat on Medium Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 32. Un-named creeks 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity                        | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 0.4 km                          | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | 1 km<br>NINP Forestry Zone      | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 2 agreements                    | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 2 Stock troughs                 | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above           | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | n/a                             | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | n/a                             | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above           | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing                         | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 0.4 hectares                    | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | 2 hectares (NINP Forestry Zone) | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.4 hectares                    | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 0.4 hectares                    | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | -                               | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above           | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above           | NIRC (public land), private landowners and                             |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  |     |                                                                                                                                    |                       | community groups/volunteers                                            |
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 0.4 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | -                     | NIRC                                                                   |

### 7.13 Un-named creeks 23, 24, 25 and 26 (Ball Bay) and tributaries and associated wetlands (Medium Priority)

Un-named Creeks 23, 24, 25, and 26 are a group of Medium Priority intermittent waterways located almost entirely within Ball Bay Reserve. These creeks only flow following heavy rainfall. Collectively, the creeks and their tributaries, including associated wetlands, extend approximately 8,812 meters and flow through both private and public land. Approximately 5% of the adjoining riparian land is privately owned, comprising 4 separate freehold or other private portions, while the remaining 95% is public land within Ball Bay Reserve. Of this adjoining public land, an estimated 90% of the riparian zone is grazed, with cattle having unrestricted access to waterways (Figure 51 and Table 33).

The surrounding vegetation includes existing native communities such as Lowland Valley Hardwood Forest, Coastal Pine and White Oak Forest and Freshwater Swamp (Christian and Mills 2021) (Figure 52). Prior to 1750, the area contained a range of native vegetation communities, including Coastal Pine and White Oak Forest, Lowland Valley Hardwood Forest and Sheltered Coastal Forest (Christian and Mills 2021) (Figure 53).

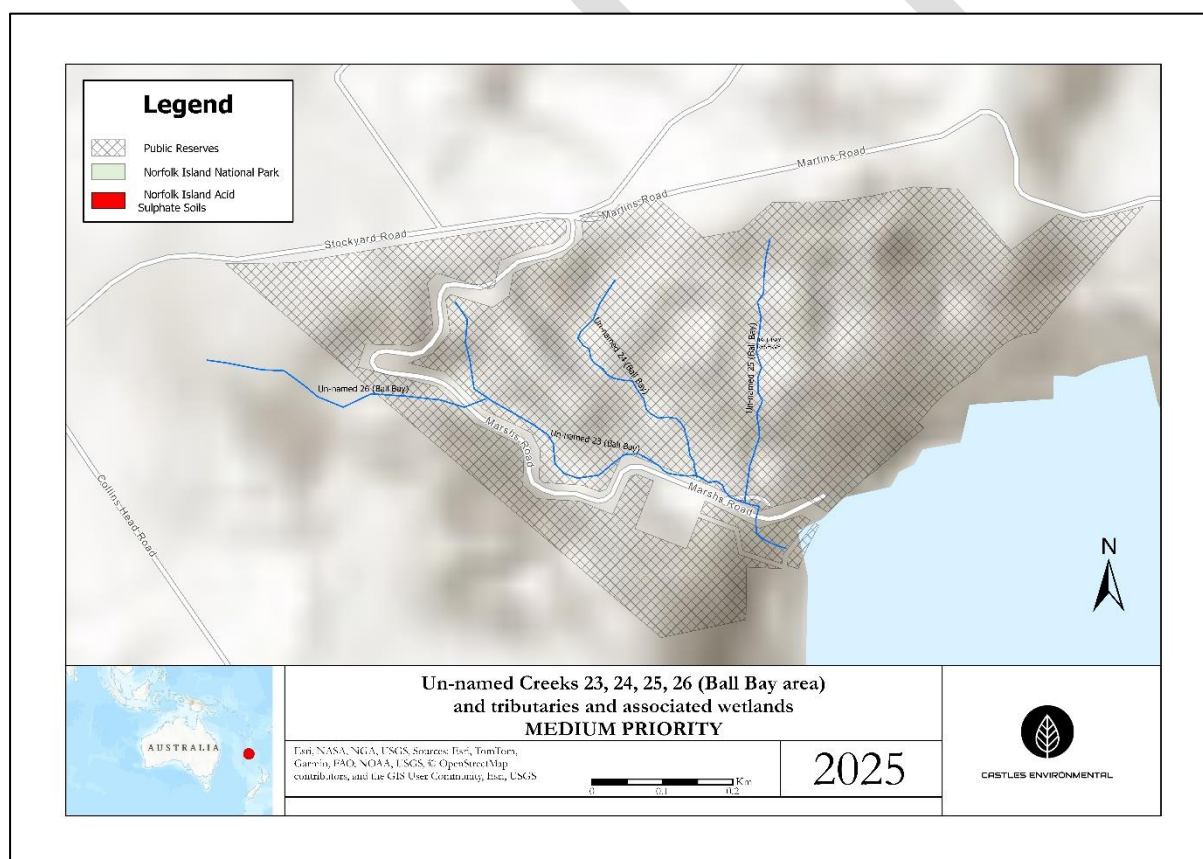


Figure 51. Location of un-named creeks 23, 24, 25 and 26 (Ball Bay).

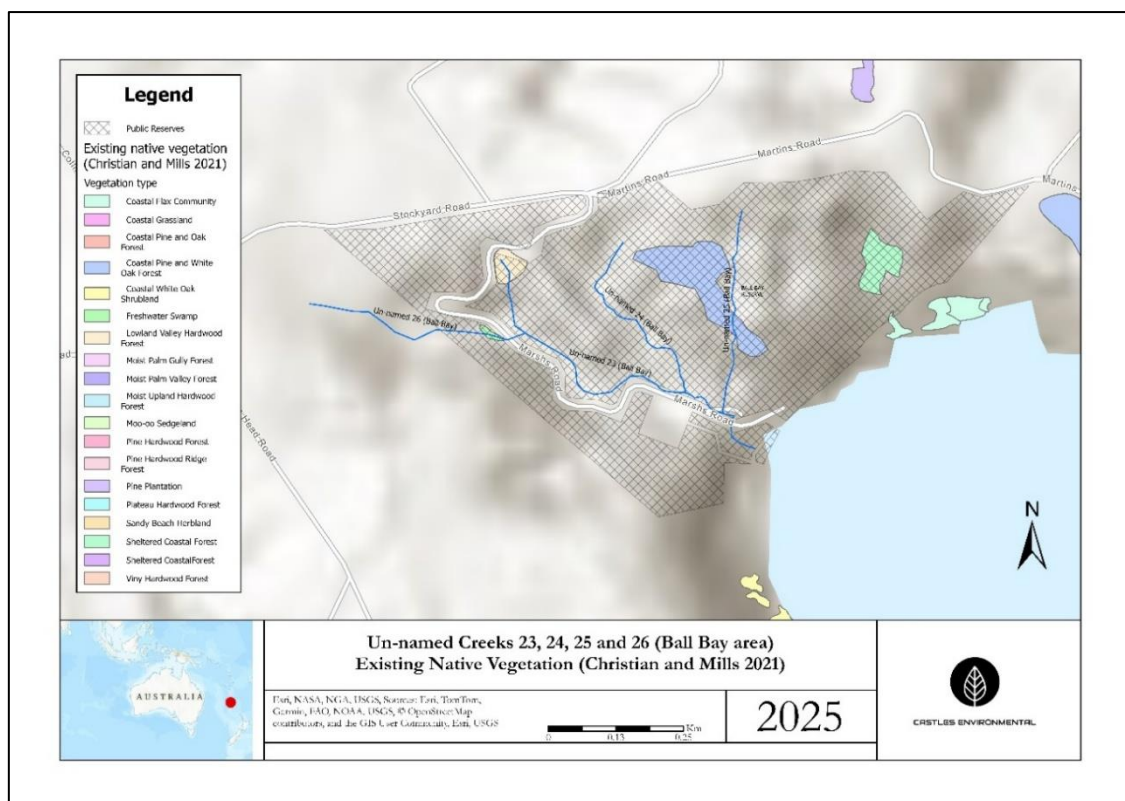


Figure 52. Existing native vegetation communities on un-named creeks 23, 24, 25 and 26 (Ball Bay) (Christian and Mills 2021)

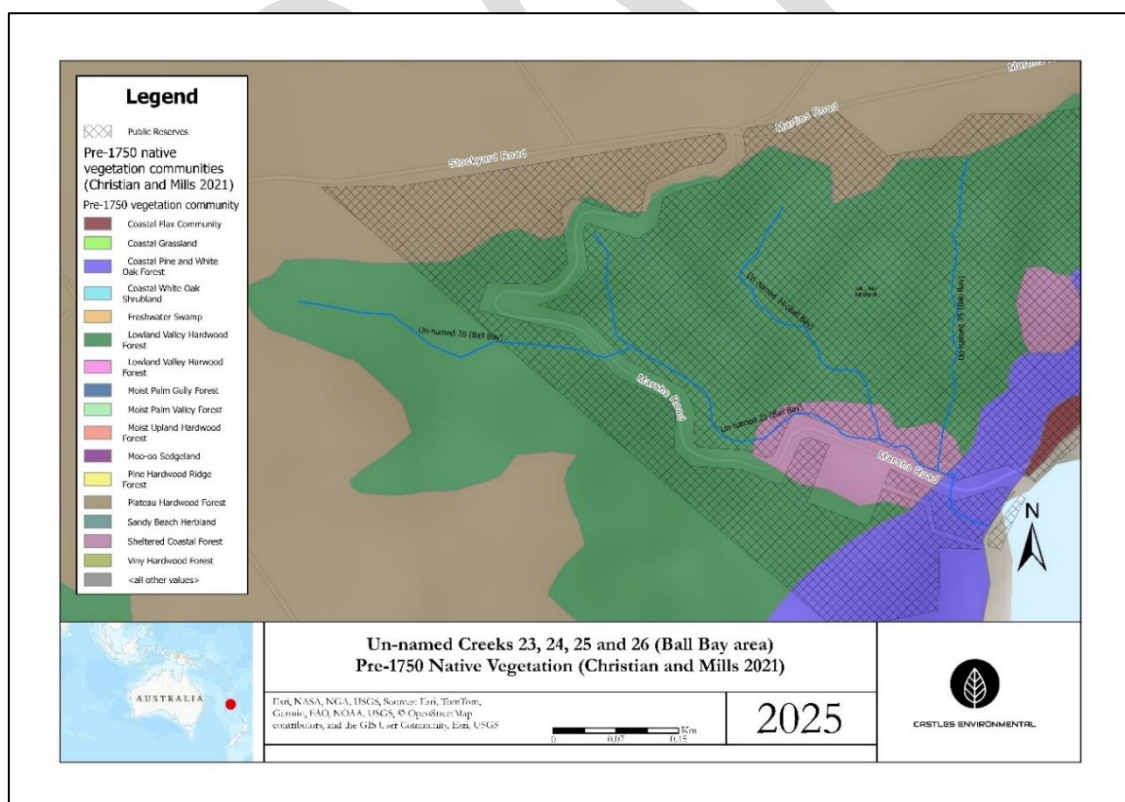


Figure 53. Pre-1750 native vegetation communities on un-named creeks 23, 24, 25 and 26 (Ball Bay) (Christian and Mills 2021)

**Table 33. Un-named creeks 23, 24, 25 and 26 (Ball Bay) and adjoining land details.**

|                                                                             |                                                                                                                                                                     |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 1,673                                                                                                                                                               |
| Both sides of the creek (m)                                                 | 3,346                                                                                                                                                               |
| Estimated percentage private land (%)                                       | 5%                                                                                                                                                                  |
| Estimated percentage public land (%)                                        | 95%                                                                                                                                                                 |
| Total number private land/freehold/other portions adjoining                 | 4                                                                                                                                                                   |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 90%                                                                                                                                                                 |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Lowland Valley Hardwood Forest</li> <li>• Coastal Pine and White Oak Forest</li> <li>• Freshwater Swamp</li> </ul>         |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Sheltered Coastal Forest</li> </ul> |

## Un-named creeks 23, 24, 25 and 26 (Ball Bay) - On-ground Management Actions

Management activities for un-named creeks 23, 24, 25 and 26 (Ball Bay) and tributaries and associated wetlands are provided in Table 34. Targets are based on the protection of around 5% of waterway frontages and the protection of areas with high quality riparian habitat on Medium Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 34. Un-named creeks 23, 24, 25 and 26 (Ball Bay) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | -                     | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | 0.5 km                | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | -                     | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | -                     | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | -                     | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | -                     | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | -                     | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | -                     | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | 1 hectare             | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | -                     | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | -                     | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | 1 hectare             | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 1                     | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | -                     |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | -                     | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | -                     | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | -                     | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | -                     | NIRC                                                                   |

## 7.14 Un-named creek 7 (Two Chimneys Reserve) and tributaries and associated wetlands (Medium Priority)

Un-named Creek 7, located in the Two Chimneys area, is a Medium Priority intermittent waterway that only flows occasionally following heavy rainfall. The creek and its tributaries, including associated wetlands, extend approximately 1,063 meters and flow west to east through mainly private land. Approximately 75% of the adjoining land is private, made up of 12 separate freehold or other private portions, while the remaining 25% is public land within Two Chimneys Reserve. None of the adjoining public riparian land is currently grazed (Figure 54 and Table 35).

The existing surrounding native vegetation includes Coastal Pine and White Oak Forest (Christian and Mills 2021) (Figure 55). Prior to 1750, the area contained a range of native vegetation communities, including Coastal Pine and White Oak Forest, Lowland Valley Hardwood Forest, and Sheltered Coastal Forest (Christian and Mills 2021) (Figure 56).

Acid sulfate soils have not been mapped within this creek system (Fitzpatrick et al. 2023).

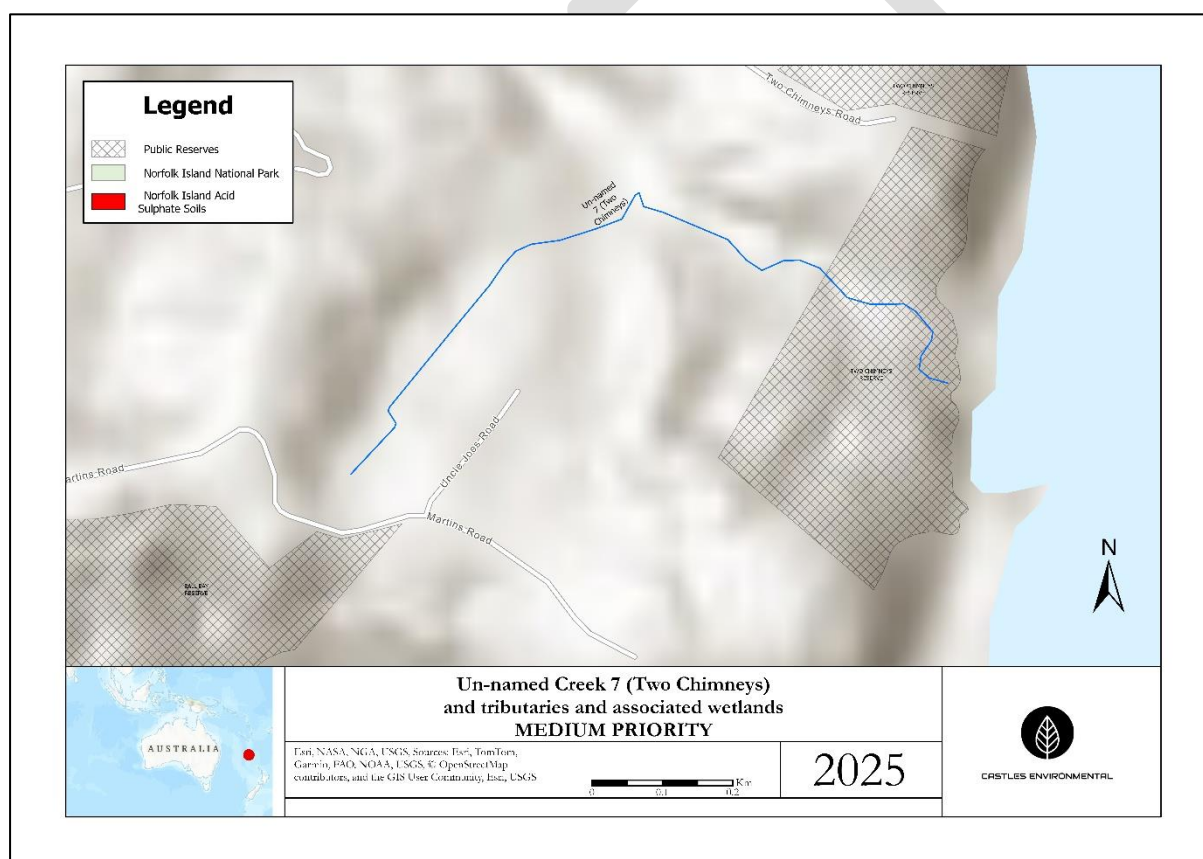


Figure 54. Location of un-named Creek 7 (Two Chimneys).

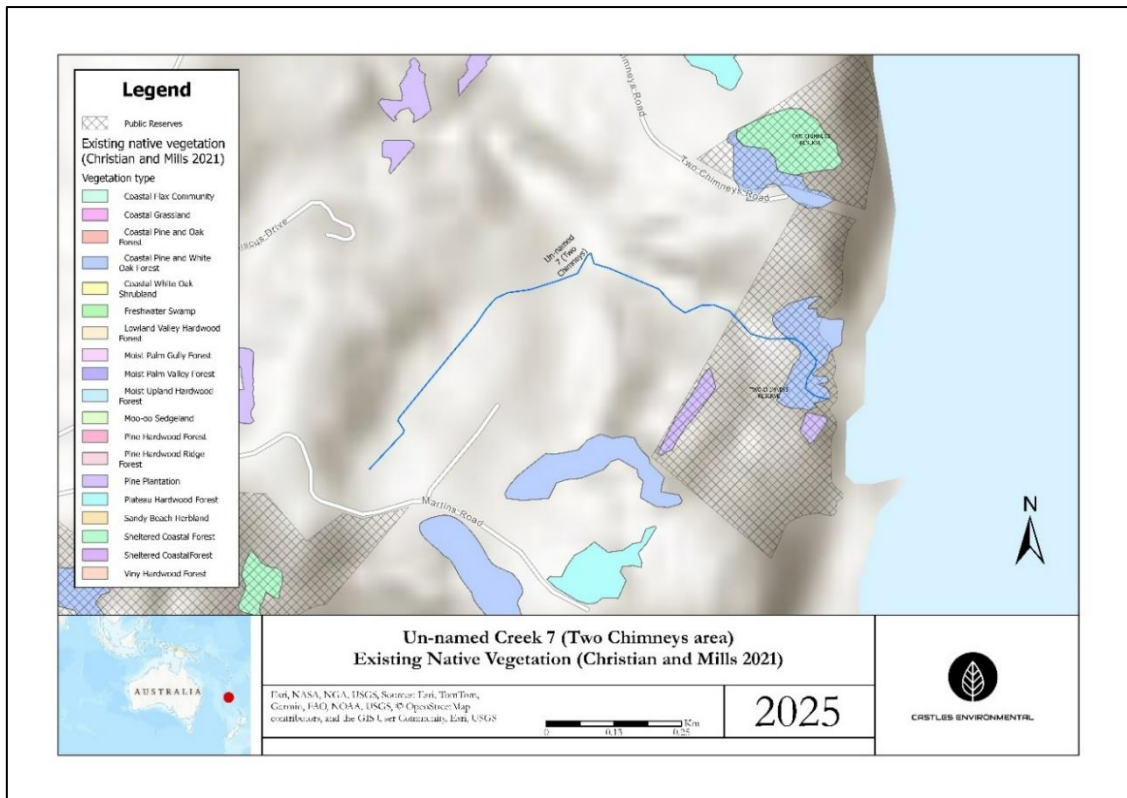


Figure 55. Existing native vegetation communities on un-named Creek 7 (Two Chimneys) (Christian and Mills 2021)

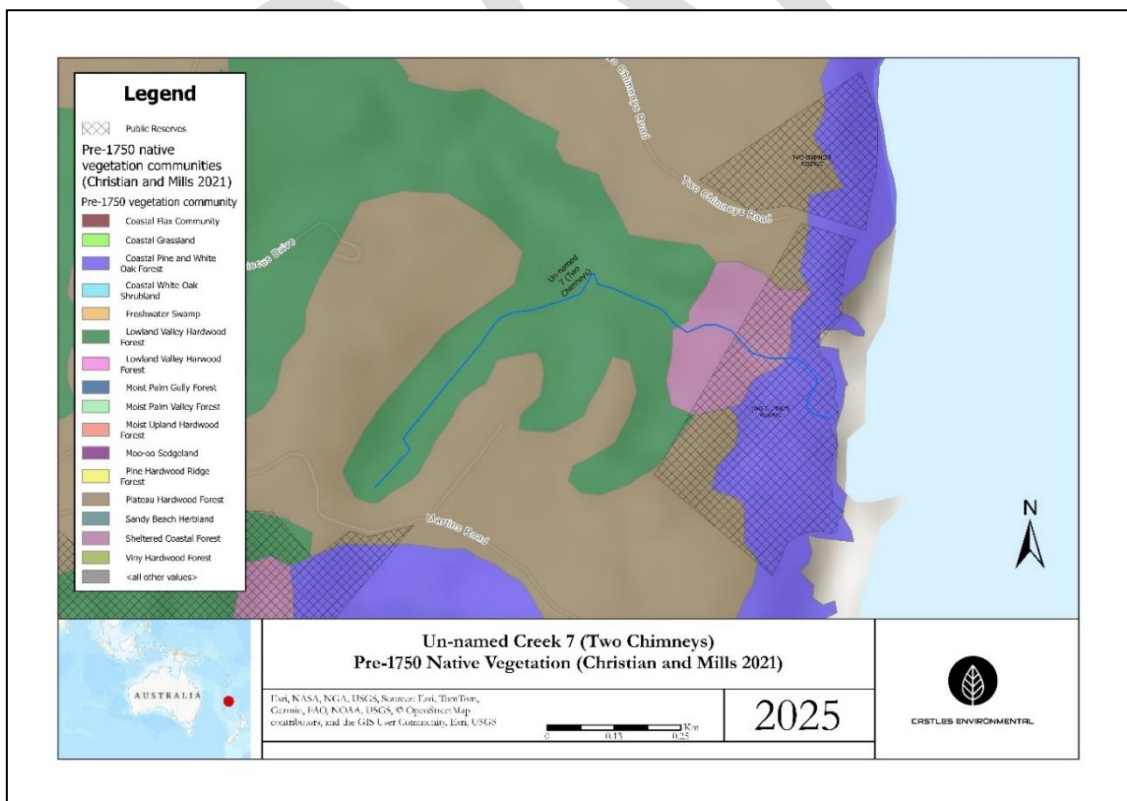


Figure 56. Pre-1750 native vegetation communities on un-named Creek 7 (Two Chimneys) (Christian and Mills 2021)

**Table 35. Un-named Creek 7 (Two Chimneys Reserve area) and adjoining land details.**

|                                                                             |                                                                                                                                                                     |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 1,063                                                                                                                                                               |
| Both sides of the creek (m)                                                 | 2,126                                                                                                                                                               |
| Estimated percentage private land (%)                                       | 75%                                                                                                                                                                 |
| Estimated percentage public land (%)                                        | 25%                                                                                                                                                                 |
| Total number private land/freehold/other portions adjoining                 | 12                                                                                                                                                                  |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                  |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> </ul>                                                                               |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Sheltered Coastal Forest</li> </ul> |

## Un-named Creek 7 (Two Chimneys) - On-ground Management Actions

Management activities for un-named creek 7 (Two Chimneys) and tributaries and associated wetlands are provided in Table 36. Targets are based on the protection of around 5% of waterway frontages and the protection of areas with high quality riparian habitat on Medium Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 36. Un-named creek 7 (Two Chimneys) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity                      | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 0.1 km                        | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | 0.5 km (Two Chimneys Reserve) | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 2                             | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 2 Stock troughs               | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above         | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | -                             | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | -                             | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above         | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing                       | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 0.1 hectares                  | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | 1 hectare (Two Chimneys)      | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.1 hectares                  | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 0.1 hectares                  | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | 1 hectare (Two Chimneys)      | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above         | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above         | NIRC (public land), private landowners and                             |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  |     |                                                                                                                                    |                       | community groups/volunteers                                            |
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 1.1 hectare           | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | -                     | NIRC                                                                   |

## 7.15 Un-named creek 12 (Quarry area) and tributaries and associated wetlands (Low Priority)

Un-named Creek 12, located on the northern side of Norfolk Island, is a Low Priority intermittent waterway that only flows occasionally following heavy rainfall. The creek (including its tributaries and associated wetlands) extends approximately 2,173 meters and flows entirely through cleared privately owned land, comprising 21 separate freehold or other private portions (Figure 57 and Table 37).

The existing surrounding vegetation includes nearby Pine Plantations (Christian and Mills 2021) (Figure 58). Prior to 1750, the surrounding area supported a range of native vegetation communities including Coastal Pine and White Oak Forest, Lowland Valley Hardwood Forest, Sheltered Coastal Forest, and Plateau Hardwood Forest (Christian and Mills 2021) (Figure 59).

Acid sulfate soils have not been mapped within this creek system (Fitzpatrick et al. 2023).

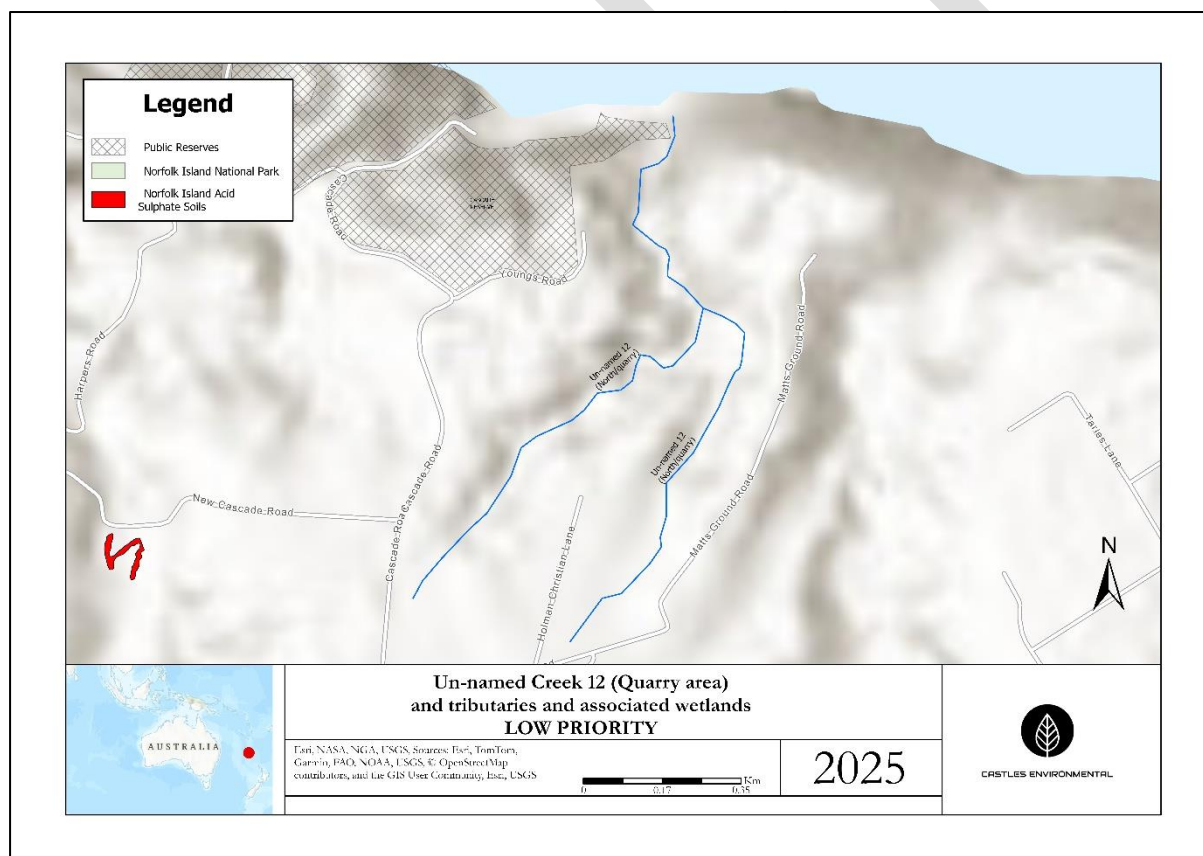


Figure 57. Location of un-named creek 12 (quarry area).

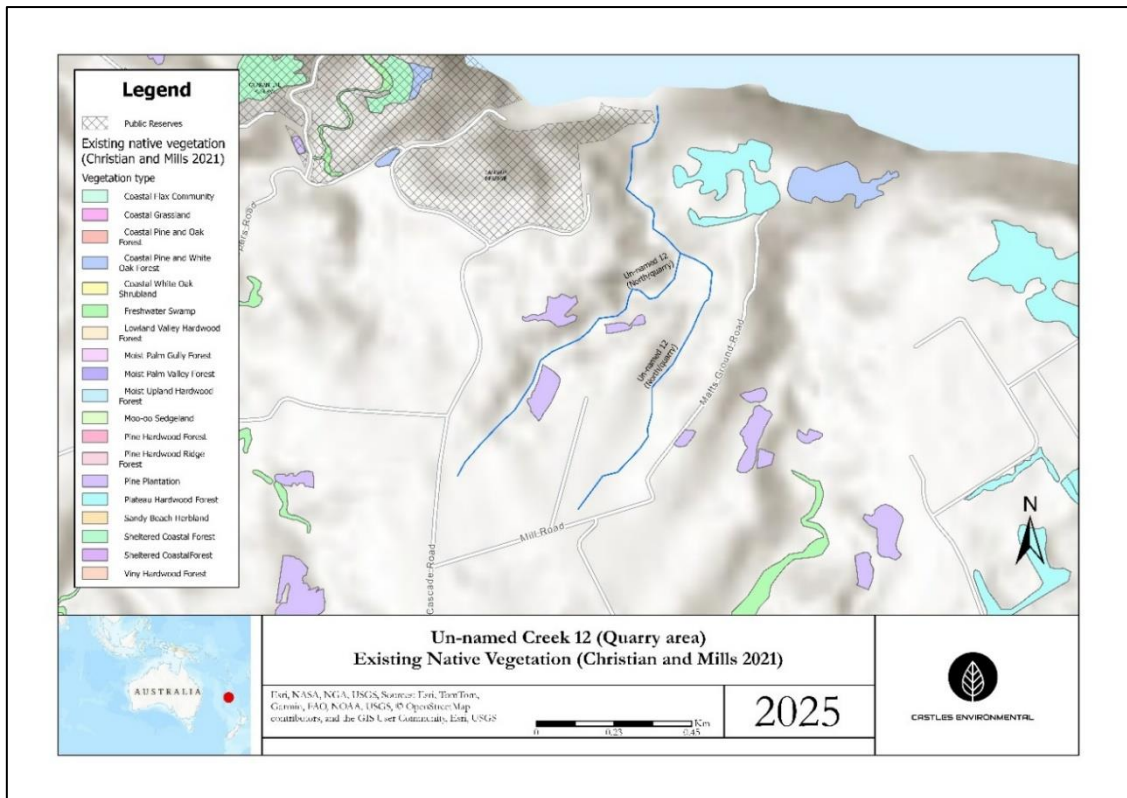


Figure 58. Existing native vegetation communities on un-named creek 12 (quarry area) (Christian and Mills 2021)

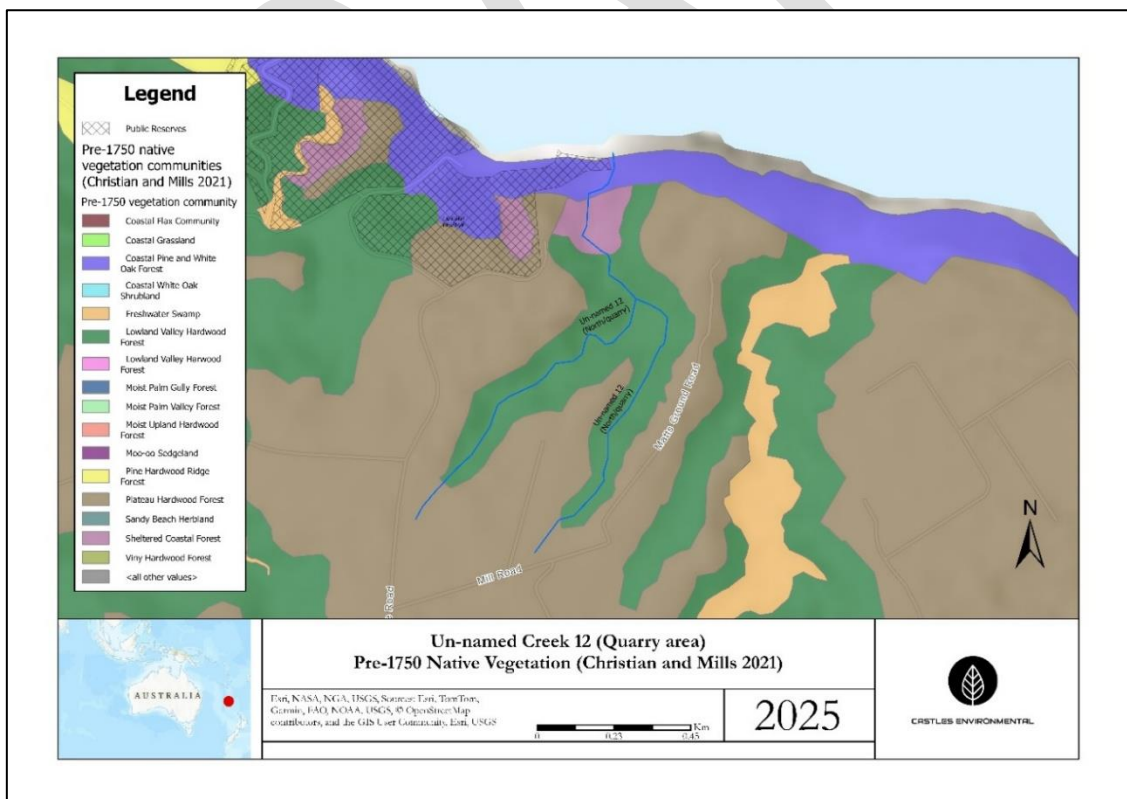


Figure 59. Pre-1750 native vegetation communities on un-named creek 12 (quarry area) (Christian and Mills 2021)

**Table 37. Un-named Creek 12 (quarry area) and adjoining land details.**

|                                                                             |                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 2,173                                                                                                                                                                                                  |
| Both sides of the creek (m)                                                 | 4,346                                                                                                                                                                                                  |
| Estimated percentage private land (%)                                       | 100%                                                                                                                                                                                                   |
| Estimated percentage public land (%)                                        | 0%                                                                                                                                                                                                     |
| Total number private land/freehold/other portions adjoining                 | 21                                                                                                                                                                                                     |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                                                     |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Pine Plantation (nearby)</li> </ul>                                                                                                                           |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Sheltered Coastal Forest</li> <li>• Plateau Hardwood Forest</li> </ul> |

## Un-named creek 12 (quarry area) - On-ground Management Actions

Management activities for un-named creek 12 (quarry area) and tributaries and associated wetlands are provided in Table 38. Targets are based on the protection of less than 5% of waterway frontages and the protection of areas with high quality riparian habitat on Low Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 38. Un-named creek 12 (quarry area) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                       | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                         | 0.2 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                              | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                                 | 1 agreement           | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                               | 1 stock trough        | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                             | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                         | -                     | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                          | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                               | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                       | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas     | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                      | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                       | -                     | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                                 | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                              | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 0.2 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | -                     | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | -                     | NIRC                                                                   |

## 7.16 Un-named creeks 8 and 13 (Beefsteak area) and tributaries and associated wetlands (Low Priority)

Un-named Creeks 8 and 13, which are located in the Beefsteak area just east of Bumboras Reservoir, are Low Priority intermittent waterways that only flow following heavy rainfall. The creeks and their tributaries, including associated wetlands, extend approximately 2,154 meters and flow entirely through privately owned land, comprising 23 separate freehold or other private portions (Figure 60 and Table 39).

The existing surrounding native vegetation includes native vegetation communities such as Coastal Pine and Oak Forest in the lower reaches (Christian and Mills 2021) (Figure 61). Prior to 1750, the area supported a range of native vegetation communities, including Coastal Pine and White Oak Forest, Plateau Hardwood Forest, Lowland Valley Hardwood Forest, and Sheltered Coastal Forest (Christian and Mills 2021) (Figure 62).

Acid sulfate soils have not been mapped within these creek systems (Fitzpatrick et al. 2023).

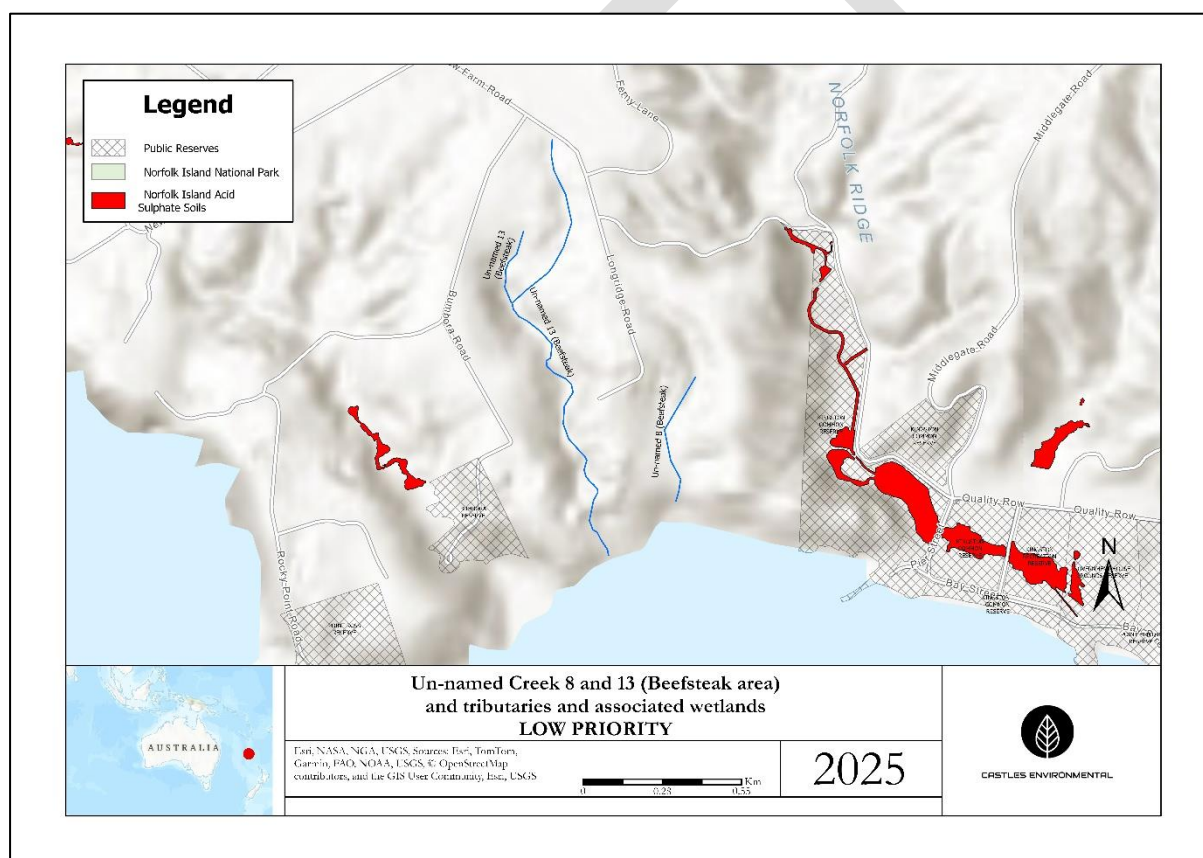


Figure 60. Location of un-named creeks 8 and 13 (Beefsteak area).

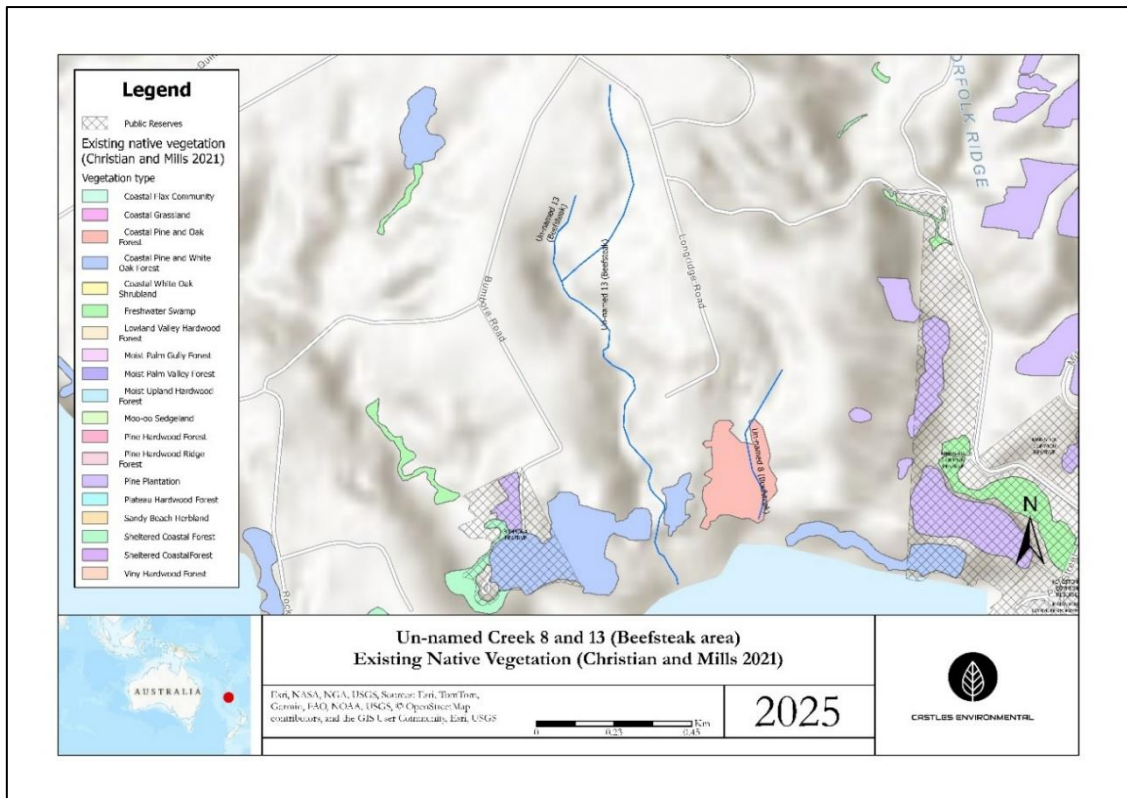


Figure 61. Existing native vegetation communities on un-named creeks 8 and 13 (Beefsteak area) (Christian and Mills 2021)

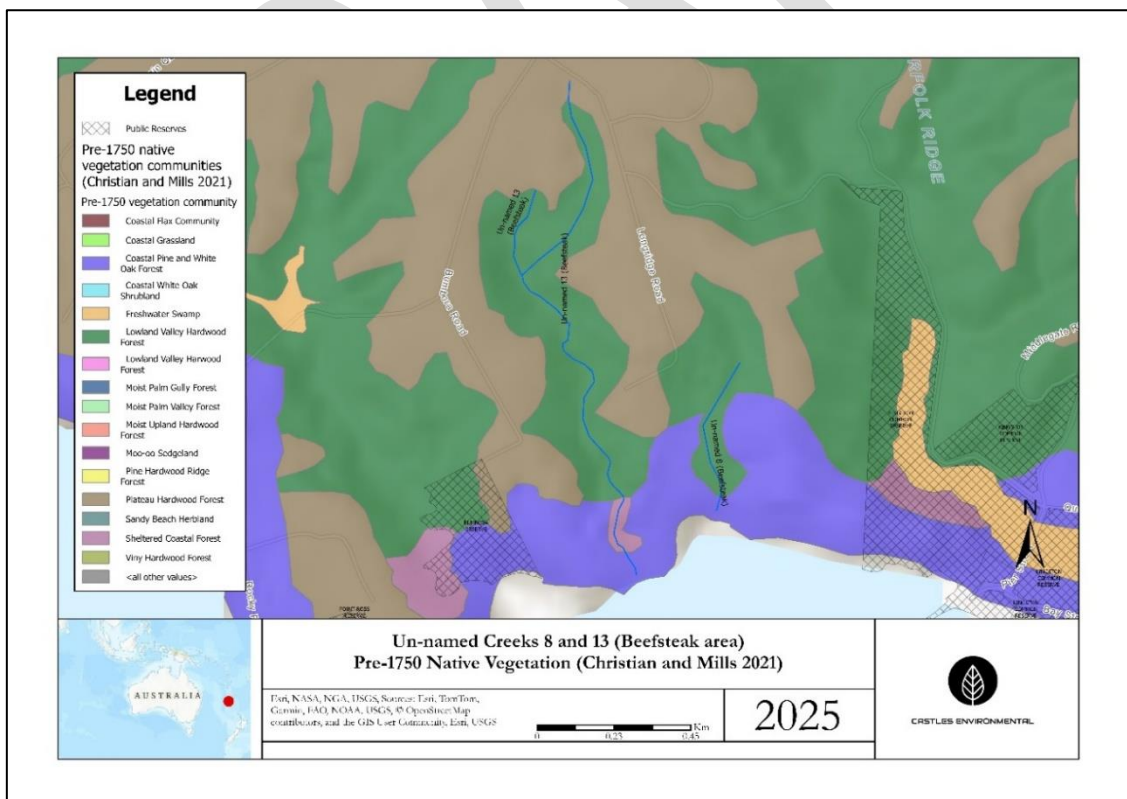


Figure 62. Pre-1750 native vegetation communities on un-named creeks 8 and 13 (Beefsteak area) (Christian and Mills 2021)

**Table 39. Un-named creeks 8 and 13 (Beefsteak area) and adjoining land details.**

|                                                                             |                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 2,154                                                                                                                                                                                                  |
| Both sides of the creek (m)                                                 | 4,308                                                                                                                                                                                                  |
| Estimated percentage private land (%)                                       | 100%                                                                                                                                                                                                   |
| Estimated percentage public land (%)                                        | 0%                                                                                                                                                                                                     |
| Total number private land/freehold/other portions adjoining                 | 23                                                                                                                                                                                                     |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                                                     |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Coastal Pine and Oak Forest</li> </ul>                                                                                                                        |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Plateau Hardwood Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Sheltered Coastal Forest</li> </ul> |

## Un-named creeks 8 and 13 (Beefsteak area) - On-ground Management Actions

Management activities for un-named creeks 8 and 13 (Beefsteak area) and tributaries and associated wetlands are provided in Table 40. Targets are based on the protection of less than 5% of waterway frontages and the protection of areas with high quality riparian habitat on Low Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 40. Un-named creeks 8 and 13 (Beefsteak area) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                   | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                     | 0.2 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                          | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                             | 2                     | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | 2 Stock troughs       | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                     | -                     | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                      | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                           | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                   | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas  | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                              | 0.2 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                   | -                     | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                             | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                          | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 0.2 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | Included in 1.2 above | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 | -                     | NIRC                                                                   |

## 7.17 Un-named creek 9 (south-east point) and tributaries and associated wetlands (Low Priority)

Un-named Creek 9, located in the southeast corner of Norfolk Island, is a Low Priority intermittent waterway that only flows following heavy rainfall. The creek and its tributaries, including associated wetlands, extend approximately 650 meters and flow entirely through privately owned land, comprising 10 separate freehold or other private portions (Figure 63 and Table 41).

The surrounding vegetation includes existing native communities such as Coastal Pine and White Oak Forest (Christian and Mills 2021) (Figure 64). Prior to 1750, the area supported a broader diversity of native vegetation communities, including Coastal Pine and White Oak Forest, Lowland Valley Hardwood Forest, and Plateau Hardwood Forest (Christian and Mills) (Figure 65).

Acid sulfate soils have not been mapped within this creek system (Fitzpatrick et al. 2023).

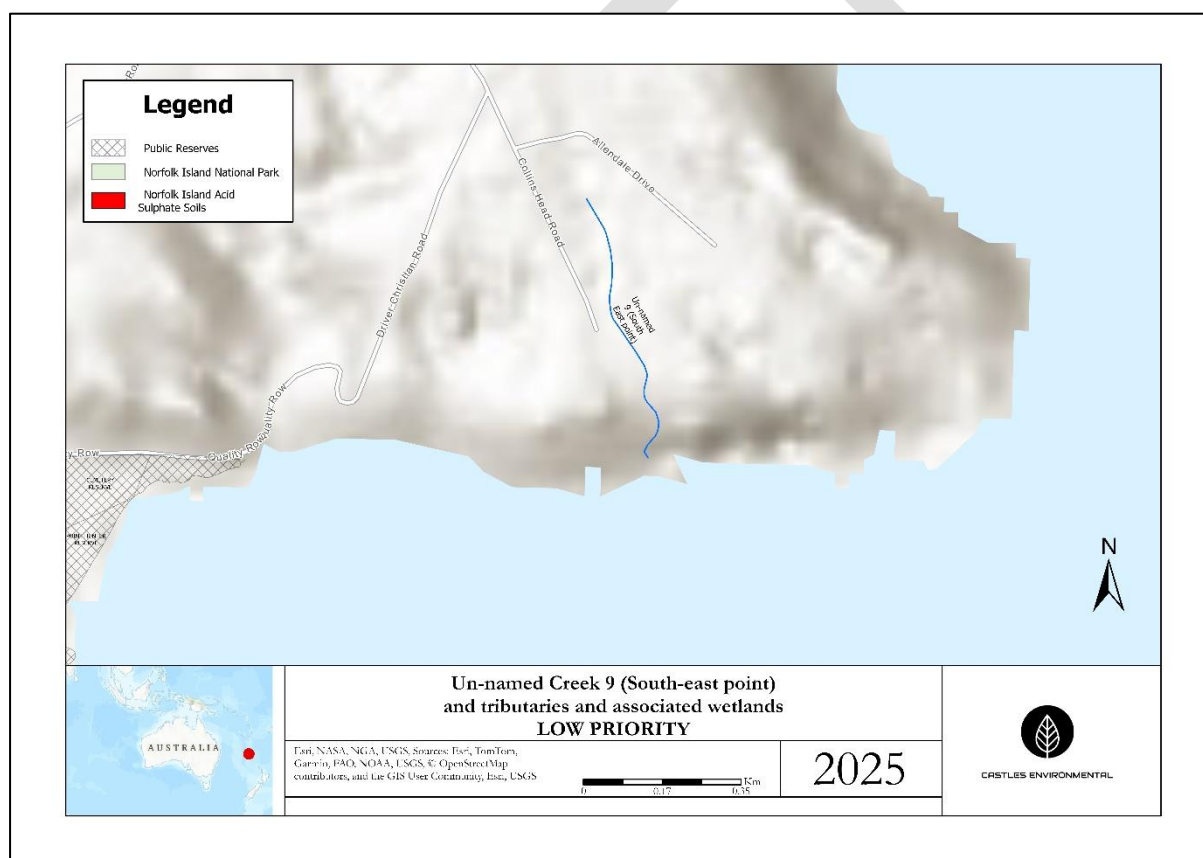


Figure 63. Location of un-named creek 9 (south-east point).

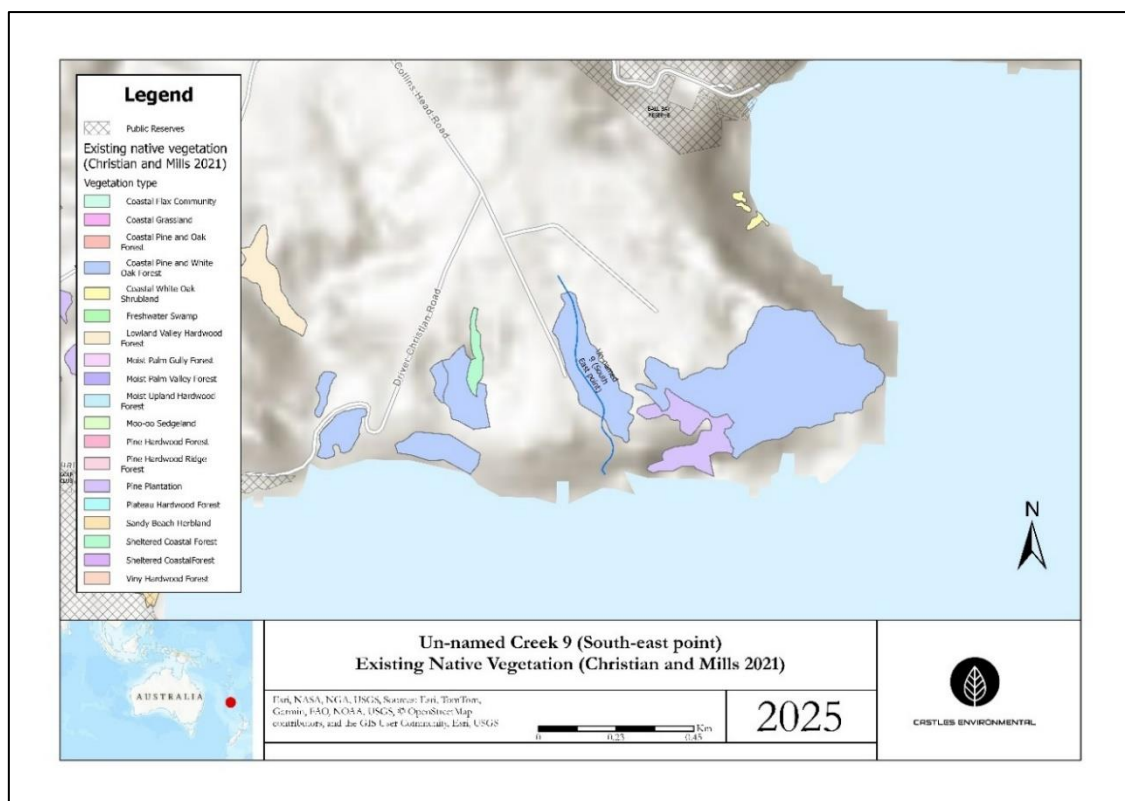


Figure 64. Existing native vegetation communities on un-named creek 9 (south-east point) (Christian and Mills 2021)

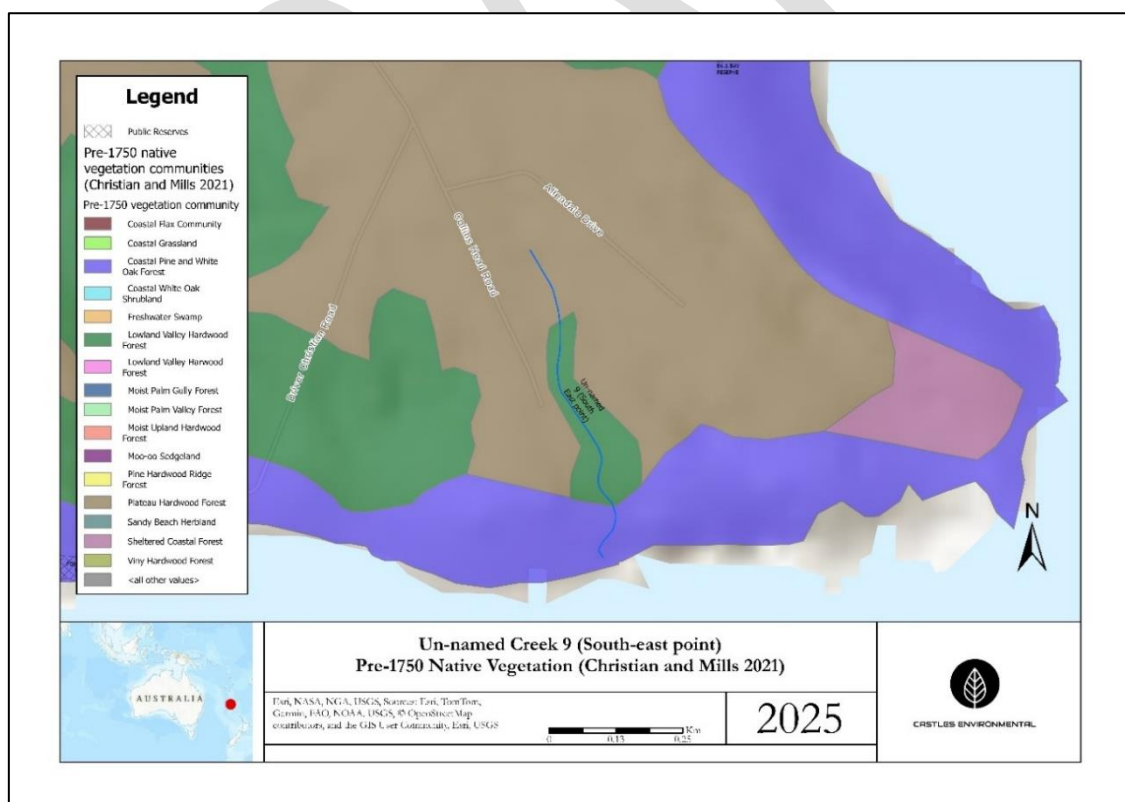


Figure 65. Pre-1750 native vegetation communities on un-named creek 9 (south-east point) (Christian and Mills 2021)

**Table 41. Un-named creek 9 (south-east point) and adjoining land details.**

|                                                                             |                                                                                                                                                                    |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Approximate length including tributaries (m)                                | 650                                                                                                                                                                |
| Both sides of the creek (m)                                                 | 1,300                                                                                                                                                              |
| Estimated percentage private land (%)                                       | 100%                                                                                                                                                               |
| Estimated percentage public land (%)                                        | 0%                                                                                                                                                                 |
| Total number private land/freehold/other portions adjoining                 | 10                                                                                                                                                                 |
| % adjoining public land grazed, not fenced (estimated, excluding roadsides) | 0%                                                                                                                                                                 |
| Existing (remnant) native vegetation (Christian and Mills 2021)             | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> </ul>                                                                              |
| Pre-1750 native vegetation communities (Christian and Mills 2021)           | <ul style="list-style-type: none"> <li>• Coastal Pine and White Oak Forest</li> <li>• Lowland Valley Hardwood Forest</li> <li>• Plateau Hardwood Forest</li> </ul> |

## Un-named creek 9 (south-east point) - On-ground Management Actions

Management activities for un-named creek 9 (south-east point) and tributaries and associated wetlands are provided in Table 42. Targets are based on the protection of less than 5% of waterway frontages and the protection of areas with high quality riparian habitat on Low Priority waterways on private land, and landowner and community engagement and participation in coordinated pest animal control programs over the 10-year life of the Norfolk Island Waterway and Wetland Management Strategy 2026-2036.

Note: All management activities outlined in the Norfolk Island Waterway and Wetland Management Strategy are subject to available funding. Norfolk Island Regional Council will work with the Australian Government and other funding providers and the community to seek investment to implement the Strategy.

**Table 42. Un-named creek 9 (south-east point) management activities**

| Management outcome target |                                                                                                                                                                   | Management activity |                                                                                                                                                                       | Quantity              | Responsibility                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| 1                         | Controlled livestock access or exclusion along 10% of waterway frontage (both banks)                                                                              | 1.1                 | Construction of riparian fencing on private land frontages (both sides of the creek) to manage cattle grazing                                                         | 0.1 km                | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 1.2                 | Construction of riparian fencing on public land to manage cattle grazing                                                                                              | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 1.3                 | Establish Management Agreements with private landowners participating in voluntary incentive programs                                                                 | 1 agreement           | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 1.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                               | 1 Stock troughs       | NIRC and private landowners                                            |
| 2                         | Maintain or improve water quality                                                                                                                                 | 2.1                 | Construction of riparian fencing on private land to manage cattle grazing                                                                                             | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.2                 | Construction of riparian fencing on private land to manage Acid Sulfate Soils                                                                                         | -                     | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.3                 | Construction of riparian fencing on public land to manage Acid Sulfate Soils                                                                                          | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 2.4                 | Provision of off-stream watering points (stock troughs) on private land                                                                                               | Included in 1.4 above | Funding providers, NIRC, landowners and the community                  |
|                           |                                                                                                                                                                   | 2.5                 | Undertake feral chicken control                                                                                                                                       | Ongoing               | NIRC and private landowners                                            |
| 3                         | Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1                 | Establish native vegetation on private land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas     | 0.1 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.2                 | Establish native vegetation on public land land (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas | -                     | Public land managers                                                   |
|                           |                                                                                                                                                                   | 3.3                 | Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                      | 0.1 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.4                 | Undertake non-woody weed control on private land waterway frontages Assumes 10 metre fencing setback                                                                  | 0.1 hectares          | NIRC and private landowners                                            |
|                           |                                                                                                                                                                   | 3.5                 | Undertake woody and non-woody weed control on public land waterway frontages. Assumes 15 metre fencing setback.                                                       | -                     | Public land managers                                                   |
| 4                         | Reduction of woody weeds along creek frontages                                                                                                                    | 4.1                 | Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                                 | Included in 3.3 above | NIRC (public land), private landowners and community groups/volunteers |
|                           |                                                                                                                                                                   | 4.2                 | Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                              | Included in 3.1 above | NIRC (public land), private landowners and community groups/volunteers |

|   |                                                                                                  |     |                                                                                                                                    |                       |                                                                        |
|---|--------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
|   |                                                                                                  | 4.3 | Maintain weed control and revegetation sites                                                                                       | 0.1 hectares          | NIRC (public land), private landowners and community groups/volunteers |
| 5 | Reduce the impact of feral and free roaming cats and rats to support and maintain bird breeding. | 5.1 | Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.2 | Undertake coordinated rat control programs across public land and private land (with permission from landowners).                  | On-going              | NIRC and private landowners.                                           |
|   |                                                                                                  | 5.3 | Coordinate and deliver feral animal related community engagement events                                                            | 5                     |                                                                        |
|   |                                                                                                  | 5.4 | Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |                                                                        |
| 6 | Increased landowner skills and awareness in riparian management practices                        | 6.1 | Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |                                                                        |
|   |                                                                                                  | 6.2 | Coordinate and deliver waterway and wetland health related community engagement events                                             | 5 (every second year) |                                                                        |
| 7 | Strengthen community involvement in waterway management                                          | 7.1 | Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |                                                                        |
|   |                                                                                                  | 7.2 | Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |                                                                        |
| 8 | Improve bank stability                                                                           | 8.1 | Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation         | Included in 1.1 above | Funding providers, NIRC, landowners and the community                  |
|   |                                                                                                  | 8.2 | Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation          | -                     | Public land managers                                                   |
|   |                                                                                                  | 8.3 | Establish Management Agreements with private landowners participating in voluntary incentive programs                              | Included in 1.3 above | NIRC and private landowners                                            |
|   |                                                                                                  | 8.4 | Provision of off-stream watering points (stock troughs) on private land                                                            | Included in 1.4 above | NIRC and private landowners                                            |
| 9 | Increased knowledge of eel populations and other freshwater aquatic species                      | 9.1 | Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands                 |                       | NIRC                                                                   |

## 8 Proposed targeted waterway and wetland Management Actions

### 8.1 Prioritised on-ground riparian management activities

The Norfolk Island Waterway and Wetland Management Strategy adopts a prioritised, staged approach to riparian protection and restoration. This ensures that limited resources are directed to the areas where they will deliver the greatest environmental benefit, particularly in improving water quality, stabilising banks, reducing sediment and nutrient inputs, and protecting downstream reef ecosystems.

Priority levels have been assigned based on environmental condition, risk, and contribution to water quality outcomes. Fencing of riparian zones is a core management action across all priority categories, preventing stock access, reducing erosion, and supporting natural regeneration of native vegetation.

The following targets and cost estimates outline the proposed investment required over the 10-year life of the Strategy.

#### **On-ground works investment required - Very High Priority Waterways**

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**Target:** Fence and restore 15% of Very High Priority riparian frontages within 10 years.

- Private land frontages requiring fencing: 8.1 km
- Public land frontages requiring fencing: 3.0 km
- **Total proposed on-ground works cost (10 years): \$1,150,850**
- Annual investment required: \$115,085

Very High Priority waterways represent the highest risk to water quality and ecosystem health. Works in these areas will deliver the most significant improvements to sediment and nutrient reduction, riparian stability, and downstream reef protection.

#### **On-ground works investment required - High Priority Waterways**

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**Target:** Fence and restore 10% of High Priority riparian frontages within 10 years.

- Private land frontages requiring fencing: 2.5 km
- Public land frontages requiring fencing: 1.0 km
- **Total proposed on-ground works cost (10 years): \$375,450**
- Annual investment required: \$37,545

High Priority waterways contribute substantially to catchment health and water quality. Fencing and restoration in these areas will reduce erosion, improve riparian vegetation condition, and support long-term ecological resilience.

### On-ground works investment required - Medium Priority Waterways

---

Target: Fence and restore 5% of Medium Priority riparian frontages within 10 years, with a focus on protecting high-quality riparian habitat.

- Private land frontages requiring fencing: 1.5 km
- Public land frontages requiring fencing: 1.1 km
- **Total proposed on-ground works cost (10 years): \$313,500**
- Annual investment required: \$27,625

Medium Priority waterways often contain intact or high-quality riparian vegetation. Protecting these areas now will prevent future degradation and maintain important ecological refuges.

### On-ground works investment required - Low Priority Waterways

---

Target: Fence and restore 2% of Low Priority riparian frontages within 10 years, focusing on areas with high-quality habitat requiring protection.

- Private land frontages requiring fencing: 0.5 km
- Public land frontages requiring fencing: 0 km
- **Total proposed on-ground works cost (10 years): \$70,000**
- Annual investment required: \$7,000

Low Priority waterways generally pose lower immediate risk but may contain pockets of high-value habitat that warrant protection to maintain ecological connectivity and prevent future decline.

### Total on-ground works investment required

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Across all priority categories, the total estimated cost of proposed on-ground riparian works over the 10-year Strategy period is:

- **Total 10-year investment: \$1,909,800**
- **Annual investment required: \$190,980**

This investment will deliver substantial improvements to waterway and wetland condition, reduce sediment and nutrient loads entering the Norfolk Marine Park, and support long-term ecological and cultural values across the island.

## 8.2 Breakdown of costs for on-ground riparian works

### 8.2.1 Very High Priority Waterways

**Table 43. Cost of proposed on-ground riparian management activities – Very High Priority Waterways**

| Waterway name       |                                                   |        |         |                  | Priority            |
|---------------------|---------------------------------------------------|--------|---------|------------------|---------------------|
| 7.1                 | Watermill Creek + tributaries/wetlands            |        |         |                  | VH                  |
| Management Activity |                                                   | Number | Unit    | Rate/unit        | Total               |
| 1.                  | Riparian fencing – private land                   | 2500   | Metres  | \$35.00          | \$87,500.00         |
| 2.                  | Riparian fencing – public land                    | 2000   | Metres  | \$35.00          | \$70,000.00         |
| 3.                  | Establishment of management agreements            | 20     | Number  | \$2,000.00       | \$40,000.00         |
| 4.                  | Provision of off-stream watering points           | 10     | Number  | \$7,500          | \$75,000.00         |
| 5.                  | Establishment of native vegetation – private land | 2.5    | Hectare | \$7,500          | \$18,750.00         |
| 6.                  | Establishment of native vegetation – public land  | 3      | Hectare | \$7,500          | \$15,000.00         |
| 7.                  | Woody weed control – private land                 | 2.5    | Hectare | \$10,000         | \$25,000.00         |
| 8.                  | Non-woody weed control – private land             | 2.5    | Hectare | \$1,500          | \$3,750.00          |
| 9.                  | Woody and non-woody weed control – public land    | 3      | Hectare | \$11,500         | \$34,500.00         |
| 10.                 | Maintenance of revegetation and weed control      | 4.9    | Hectare | \$10,000         | \$49,000.00         |
|                     |                                                   |        |         | <b>Sub-total</b> | <b>\$418,500.00</b> |
| 7.2                 | Town Creek + tributaries/wetlands                 |        |         |                  | VH                  |
| Management Activity |                                                   | Number | Unit    | Rate/unit        | Total               |
| 1.                  | Riparian fencing – private land                   | 1,000  | Metres  | \$35.00          | \$35,000.00         |
| 2.                  | Riparian fencing – public land                    |        | Metres  | \$35.00          | \$0.00              |
| 3.                  | Establishment of management agreements            | 10     | Number  | \$2,000.00       | \$20,000.00         |
| 4.                  | Provision of off-stream watering points           | 5      | Number  | \$7,500          | \$37,500.00         |
| 5.                  | Establishment of native vegetation – private land | 1      | Hectare | \$7,500          | \$7,500.00          |
| 6.                  | Establishment of native vegetation – public land  |        | Hectare | \$7,500          | \$0.00              |
| 7.                  | Woody weed control – private land                 | 1      | Hectare | \$10,000         | \$10,000.00         |
| 8.                  | Non-woody weed control – private land             | 1      | Hectare | \$1,500          | \$1,500.00          |
| 9.                  | Woody and non-woody weed control – public land    |        | Hectare | \$11,500         | \$0.00              |
| 10.                 | Maintenance of revegetation and weed control      | 1      | Hectare | \$10,000         | \$10,000.00         |
|                     |                                                   |        |         | <b>Sub-total</b> | <b>\$121,500.00</b> |
| 7.3                 | Cascade Creek + tributaries/wetlands              |        |         |                  | VH                  |
| Management Activity |                                                   | Number | Unit    | Rate/unit        | Total               |
| 1.                  | Riparian fencing – private land                   | 1900   | Metres  | \$35.00          | \$66,500.00         |
| 2.                  | Riparian fencing – public land                    | 600    | Metres  | \$35.00          | \$21,000.00         |
| 3.                  | Establishment of management agreements            | 15     | Number  | \$2,000.00       | \$30,000.00         |
| 4.                  | Provision of off-stream watering points           | 10     | Number  | \$7,500          | \$75,000.00         |
| 5.                  | Establishment of native vegetation – private land | 1.9    | Hectare | \$7,500          | \$14,250.00         |
| 6.                  | Establishment of native vegetation – public land  | 1.2    | Hectare | \$7,500          | \$6,000.00          |
| 7.                  | Woody weed control – private land                 | 1.9    | Hectare | \$10,000         | \$19,000.00         |
| 8.                  | Non-woody weed control – private land             | 1.9    | Hectare | \$1,500          | \$2,850.00          |
| 9.                  | Woody and non-woody weed control – public land    | 1.2    | Hectare | \$11,500         | \$13,800.00         |
| 10.                 | Maintenance of revegetation and weed control      | 2.5    | Hectare | \$10,000         | \$25,000.00         |
|                     |                                                   |        |         | <b>Sub-total</b> | <b>\$273,400.00</b> |
| 7.4                 | Rocky Point Creek + tributaries/wetlands          |        |         |                  | VH                  |
| Management Activity |                                                   | Number | Unit    | Rate/unit        | Total               |
| 1.                  | Riparian fencing – private land                   | 1200   | Metres  | \$35.00          | \$42,000.00         |
| 2.                  | Riparian fencing – public land                    |        | Metres  | \$35.00          | \$0.00              |
| 3.                  | Establishment of management agreements            | 10     | Number  | \$2,000.00       | \$20,000.00         |
| 4.                  | Provision of off-stream watering points           | 5      | Number  | \$7,500          | \$37,500.00         |
| 5.                  | Establishment of native vegetation – private land | 1.2    | Hectare | \$7,500          | \$9,000.00          |
| 6.                  | Establishment of native vegetation – public land  | 1      | Hectare | \$7,500          | \$5,000.00          |
| 7.                  | Woody weed control – private land                 | 1.2    | Hectare | \$10,000         | \$12,000.00         |
| 8.                  | Non-woody weed control – private land             | 1.2    | Hectare | \$1,500          | \$1,800.00          |
| 9.                  | Woody and non-woody weed control – public land    | 1      | Hectare | \$11,500         | \$11,500.00         |
| 10.                 | Maintenance of revegetation and weed control      | 2.8    | Hectare | \$10,000         | \$28,000.00         |
|                     |                                                   |        |         | <b>Sub-total</b> | <b>\$166,800.00</b> |

| Waterway name | Priority |
|---------------|----------|
|---------------|----------|

| 7.5                                                  | Un-named 15 (Mission Pool/Mission Road area) + tributaries/wetlands |         |            |  | VH           |
|------------------------------------------------------|---------------------------------------------------------------------|---------|------------|--|--------------|
| Management Activity                                  | Number                                                              | Unit    | Rate/unit  |  |              |
| 1. Riparian fencing – private land                   | 1500                                                                | Metres  | \$35.00    |  | \$52,500.00  |
| 2. Riparian fencing – public land                    | 400                                                                 | Metres  | \$35.00    |  | \$14,000.00  |
| 3. Establishment of management agreements            | 10                                                                  | Number  | \$2,000.00 |  | \$20,000.00  |
| 4. Provision of off-stream watering points           | 5                                                                   | Number  | \$7,500    |  | \$37,500.00  |
| 5. Establishment of native vegetation – private land | 1.5                                                                 | Hectare | \$7,500    |  | \$11,250.00  |
| 6. Establishment of native vegetation – public land  | 0.4                                                                 | Hectare | \$7,500    |  | \$2,000.00   |
| 7. Woody weed control – private land                 | 1.5                                                                 | Hectare | \$10,000   |  | \$15,000.00  |
| 8. Non-woody weed control – private land             | 1.5                                                                 | Hectare | \$1,500    |  | \$2,250.00   |
| 9. Woody and non-woody weed control – public land    | 0.1                                                                 | Hectare | \$11,500   |  | \$1,150.00   |
| 10. Maintenance of revegetation and weed control     | 1.5                                                                 | Hectare | \$10,000   |  | \$15,000.00  |
|                                                      |                                                                     |         |            |  |              |
|                                                      |                                                                     |         | Sub-total  |  | \$170,650.00 |

|                                    |             |
|------------------------------------|-------------|
| Total Very High Priority Waterways | \$1,150,850 |
|------------------------------------|-------------|

## 8.4.2 High Priority Waterways

**Table 44. Cost of proposed on-ground riparian management activities – High Priority Waterways**

| Waterway name                        |                                                            |        |         |                  | Priority            |
|--------------------------------------|------------------------------------------------------------|--------|---------|------------------|---------------------|
| <b>7.6</b>                           | <b>Stockyard Creek + tributaries/wetlands</b>              |        |         |                  | <b>H</b>            |
| Management Activity                  |                                                            | Number | Unit    | Rate/unit        | Total               |
| 1.                                   | Riparian fencing – private land                            | 1,000  | Metres  | \$35.00          | \$35,000.00         |
| 2.                                   | Riparian fencing – public land                             |        | Metres  | \$35.00          | \$0.00              |
| 3.                                   | Establishment of management agreements                     | 10     | Number  | \$2,000.00       | \$20,000.00         |
| 4.                                   | Provision of off-stream watering points                    | 5      | Number  | \$7,500          | \$37,500.00         |
| 5.                                   | Establishment of native vegetation – private land          | 1      | Hectare | \$7,500          | \$7,500.00          |
| 6.                                   | Establishment of native vegetation – public land           |        | Hectare | \$5,000          | \$0.00              |
| 7.                                   | Woody weed control – private land                          | 1      | Hectare | \$10,000         | \$10,000.00         |
| 8.                                   | Non-woody weed control – private land                      | 1      | Hectare | \$1,500          | \$1,500.00          |
| 9.                                   | Woody and non-woody weed control – public land             |        | Hectare | \$11,500         | \$0.00              |
| 10.                                  | Maintenance of revegetation and weed control               | 1      | Hectare | \$10,000         | \$10,000.00         |
|                                      |                                                            |        |         | <b>Sub-total</b> | <b>\$121,500.00</b> |
| <b>7.7</b>                           | <b>Broken Bridge Creek + tributaries/wetlands</b>          |        |         |                  | <b>H</b>            |
| Management Activity                  |                                                            | Number | Unit    | Rate/unit        | Total               |
| 1.                                   | Riparian fencing – private land                            | 800    | Metres  | \$35.00          | \$28,000.00         |
| 2.                                   | Riparian fencing – public land                             | 500    | Metres  | \$35.00          | \$17,500.00         |
| 3.                                   | Establishment of management agreements                     | 10     | Number  | \$2,000.00       | \$20,000.00         |
| 4.                                   | Provision of off-stream watering points                    | 5      | Number  | \$7,500          | \$37,500.00         |
| 5.                                   | Establishment of native vegetation – private land          | 0.8    | Hectare | \$7,500          | \$6,000.00          |
| 6.                                   | Establishment of native vegetation – public land           | 0.2    | Hectare | \$5,000          | \$1,000.00          |
| 7.                                   | Woody weed control – private land                          | 0.8    | Hectare | \$10,000         | \$8,000.00          |
| 8.                                   | Non-woody weed control – private land                      | 0.8    | Hectare | \$1,500          | \$1,200.00          |
| 9.                                   | Woody and non-woody weed control – public land             | 0.8    | Hectare | \$11,500         | \$9,200.00          |
| 10.                                  | Maintenance of revegetation and weed control               | 1      | Hectare | \$10,000         | \$10,000.00         |
|                                      |                                                            |        |         | <b>Sub-total</b> | <b>\$138,400.00</b> |
| <b>7.8</b>                           | <b>Un-named 14 (Headstone area) + tributaries/wetlands</b> |        |         |                  | <b>H</b>            |
| Management Activity                  |                                                            | Number | Unit    | Rate/unit        | Total               |
| 1.                                   | Riparian fencing – private land                            | 700    | Metres  | \$35.00          | \$24,500.00         |
| 2.                                   | Riparian fencing – public land                             | 500    | Metres  | \$35.00          | \$17,500.00         |
| 3.                                   | Establishment of management agreements                     | 5      | Number  | \$2,000.00       | \$10,000.00         |
| 4.                                   | Provision of off-stream watering points                    | 4      | Number  | \$7,500          | \$30,000.00         |
| 5.                                   | Establishment of native vegetation – private land          | 0.7    | Hectare | \$7,500          | \$5,250.00          |
| 6.                                   | Establishment of native vegetation – public land           | 0.5    | Hectare | \$5,000          | \$2,500.00          |
| 7.                                   | Woody weed control – private land                          | 0.7    | Hectare | \$10,000         | \$7,000.00          |
| 8.                                   | Non-woody weed control – private land                      | 0.7    | Hectare | \$1,500          | \$1,050.00          |
| 9.                                   | Woody and non-woody weed control – public land             | 0.5    | Hectare | \$11,500         | \$5,750.00          |
| 10.                                  | Maintenance of revegetation and weed control               | 1.2    | Hectare | \$10,000         | \$12,000.00         |
|                                      |                                                            |        |         | <b>Sub-total</b> | <b>\$115,550.00</b> |
|                                      |                                                            |        |         |                  |                     |
| <b>Total High Priority Waterways</b> |                                                            |        |         |                  | <b>\$375,450.00</b> |

## 8.4.3 Medium Priority Waterways

**Table 45. Cost of proposed on-ground riparian management activities – Medium Priority Waterways**

| Waterway name       |                                                                                              |        |         |                  | Priority           |
|---------------------|----------------------------------------------------------------------------------------------|--------|---------|------------------|--------------------|
| <b>7.9</b>          | <b>Un-named 11 (Burnt Pine/Centre) + tributaries/wetlands</b>                                |        |         |                  | <b>M</b>           |
| Management Activity |                                                                                              | Number | Unit    | Rate/unit        | Total              |
| 1.                  | Riparian fencing – private land                                                              | 600    | Metres  | \$35.00          | \$21,000.00        |
| 2.                  | Riparian fencing – public land                                                               |        | Metres  | \$35.00          | \$0.00             |
| 3.                  | Establishment of management agreements                                                       | 5      | Number  | \$2,000.00       | \$10,000.00        |
| 4.                  | Provision of off-stream watering points                                                      | 5      | Number  | \$7,500          | \$37,500.00        |
| 5.                  | Establishment of native vegetation – private land                                            | 0.6    | Hectare | \$7,500          | \$4,500.00         |
| 6.                  | Establishment of native vegetation – public land                                             |        | Hectare | \$5,000          | \$0.00             |
| 7.                  | Woody weed control – private land                                                            | 0.6    | Hectare | \$10,000         | \$6,000.00         |
| 8.                  | Non-woody weed control – private land                                                        | 0.6    | Hectare | \$1,500          | \$900.00           |
| 9.                  | Woody and non-woody weed control – public land                                               |        | Hectare | \$11,500         | \$0.00             |
| 10.                 | Maintenance of revegetation and weed control                                                 | 0.6    | Hectare | \$10,000         | \$6,000.00         |
|                     |                                                                                              |        |         | <b>Sub-total</b> | <b>\$85,900.00</b> |
| <b>7.10</b>         | <b>Un-named 10 (Music Valley) + tributaries/wetlands</b>                                     |        |         |                  | <b>M</b>           |
| Management Activity |                                                                                              | Number | Unit    | Rate/unit        | Total              |
| 1.                  | Riparian fencing – private land                                                              | 200    | Metres  | \$35.00          | \$7,000.00         |
| 2.                  | Riparian fencing – public land                                                               |        | Metres  | \$35.00          | \$0.00             |
| 3.                  | Establishment of management agreements                                                       | 2      | Number  | \$2,000.00       | \$4,000.00         |
| 4.                  | Provision of off-stream watering points                                                      | 2      | Number  | \$7,500          | \$15,000.00        |
| 5.                  | Establishment of native vegetation – private land                                            | 0.2    | Hectare | \$7,500          | \$1,500.00         |
| 6.                  | Establishment of native vegetation – public land                                             |        | Hectare | \$5,000          | \$0.00             |
| 7.                  | Woody weed control – private land                                                            | 0.2    | Hectare | \$10,000         | \$2,000.00         |
| 8.                  | Non-woody weed control – private land                                                        | 0.2    | Hectare | \$1,500          | \$300.00           |
| 9.                  | Woody and non-woody weed control – public land                                               |        | Hectare | \$11,500         | \$0.00             |
| 10.                 | Maintenance of revegetation and weed control                                                 | 0.2    | Hectare | \$10,000         | \$2,000.00         |
|                     |                                                                                              |        |         | <b>Sub-total</b> | <b>\$31,800.00</b> |
| <b>7.11</b>         | <b>Northern Creeks (4) + tributaries/wetlands</b>                                            |        |         |                  | <b>M</b>           |
| Management Activity |                                                                                              | Number | Unit    | Rate/unit        | Total              |
| 1.                  | Riparian fencing – private land                                                              | 200    | Metres  | \$35.00          | \$7,000.00         |
| 2.                  | Riparian fencing – public land                                                               |        | Metres  | \$35.00          | \$0.00             |
| 3.                  | Establishment of management agreements                                                       | 2      | Number  | \$2,000.00       | \$4,000.00         |
| 4.                  | Provision of off-stream watering points                                                      | 1      | Number  | \$7,500          | \$7,500.00         |
| 5.                  | Establishment of native vegetation – private land                                            | 0.2    | Hectare | \$7,500          | \$1,500.00         |
| 6.                  | Establishment of native vegetation – public land                                             |        | Hectare | \$5,000          | \$0.00             |
| 7.                  | Woody weed control – private land                                                            | 0.2    | Hectare | \$10,000         | \$2,000.00         |
| 8.                  | Non-woody weed control – private land                                                        | 0.2    | Hectare | \$1,500          | \$300.00           |
| 9.                  | Woody and non-woody weed control – public land                                               |        | Hectare | \$11,500         | \$0.00             |
| 10.                 | Maintenance of revegetation and weed control                                                 | 0.2    | Hectare | \$10,000         | \$2,000.00         |
|                     |                                                                                              |        |         | <b>Sub-total</b> | <b>\$24,300.00</b> |
| <b>7.12</b>         | <b>Unnamed 1, 2, 16, 17, 18, 19, 20, 21, 22 (Selwyn Reserve area) + tributaries/wetlands</b> |        |         |                  | <b>M</b>           |
| Management Activity |                                                                                              | Number | Unit    | Rate/unit        | Total              |
| 1.                  | Riparian fencing – private land                                                              | 400    | Metres  | \$35.00          | \$14,000.00        |
| 2.                  | Riparian fencing – public land                                                               | 1      | Metres  | \$35.00          | \$35,000.00        |
| 3.                  | Establishment of management agreements                                                       | 2      | Number  | \$2,000.00       | \$4,000.00         |
| 4.                  | Provision of off-stream watering points                                                      | 2      | Number  | \$7,500          | \$15,000.00        |
| 5.                  | Establishment of native vegetation – private land                                            | 0.4    | Hectare | \$7,500          | \$3,000.00         |
| 6.                  | Establishment of native vegetation – public land                                             | 2      | Hectare | \$5,000          | \$10,000.00        |
| 7.                  | Woody weed control – private land                                                            | 0.4    | Hectare | \$10,000         | \$4,000.00         |
| 8.                  | Non-woody weed control – private land                                                        | 0.4    | Hectare | \$1,500          | \$600.00           |
| 9.                  | Woody and non-woody weed control – public land                                               |        | Hectare | \$11,500         | \$0.00             |
| 10.                 | Maintenance of revegetation and weed control                                                 | 0.4    | Hectare | \$10,000         | \$4,000.00         |
|                     |                                                                                              |        |         | <b>Sub-total</b> | <b>\$69,600.00</b> |



## 8.4.4 Low Priority Waterways

**Table 46. Cost of proposed on-ground riparian management activities – Low Priority Waterways**

| Waterway name                                        |                                                           |         |            |             | Priority    |
|------------------------------------------------------|-----------------------------------------------------------|---------|------------|-------------|-------------|
| 7.15                                                 | Un-named 12 (Quarry area) + tributaries/wetlands          |         |            |             |             |
| Management Activity                                  | Number                                                    | Unit    | Rate/unit  | Total       |             |
| 1. Riparian fencing – private land                   | 0.2                                                       | Metres  | \$35.00    | \$7,000.00  |             |
| 2. Riparian fencing – public land                    |                                                           | Metres  | \$35.00    | \$0.00      |             |
| 3. Establishment of management agreements            | 1                                                         | Number  | \$2,000.00 | \$2,000.00  |             |
| 4. Provision of off-stream watering points           | 1                                                         | Number  | \$7,500    | \$7,500.00  |             |
| 5. Establishment of native vegetation – private land | 0.2                                                       | Hectare | \$7,500    | \$1,500.00  |             |
| 6. Establishment of native vegetation – public land  |                                                           | Hectare | \$5,000    | \$0.00      |             |
| 7. Woody weed control – private land                 | 0.2                                                       | Hectare | \$10,000   | \$2,000.00  |             |
| 8. Non-woody weed control – private land             | 0.2                                                       | Hectare | \$1,500    | \$300.00    |             |
| 9. Woody and non-woody weed control – public land    |                                                           | Hectare | \$11,500   | \$0.00      |             |
| 10. Maintenance of revegetation and weed control     | 0.2                                                       | Hectare | \$10,000   | \$2,000.00  |             |
|                                                      |                                                           |         | Sub-total  | \$22,300.00 |             |
| 7.16                                                 | Un-named 8 and 13 (Beefsteak area) + tributaries/wetlands |         |            |             |             |
| Management Activity                                  | Number                                                    | Unit    | Rate/unit  | Total       |             |
| 1. Riparian fencing – private land                   | 0.2                                                       | Metres  | \$35.00    | \$7,000.00  |             |
| 2. Riparian fencing – public land                    |                                                           | Metres  | \$35.00    | \$0.00      |             |
| 3. Establishment of management agreements            | 2                                                         | Number  | \$2,000.00 | \$4,000.00  |             |
| 4. Provision of off-stream watering points           | 2                                                         | Number  | \$7,500    | \$15,000.00 |             |
| 5. Establishment of native vegetation – private land | 0.2                                                       | Hectare | \$7,500    | \$1,500.00  |             |
| 6. Establishment of native vegetation – public land  |                                                           | Hectare | \$5,000    | \$0.00      |             |
| 7. Woody weed control – private land                 | 0.2                                                       | Hectare | \$10,000   | \$2,000.00  |             |
| 8. Non-woody weed control – private land             | 0.2                                                       | Hectare | \$1,500    | \$300.00    |             |
| 9. Woody and non-woody weed control – public land    |                                                           | Hectare | \$11,500   | \$0.00      |             |
| 10. Maintenance of revegetation and weed control     | 0.2                                                       | Hectare | \$10,000   | \$2,000.00  |             |
|                                                      |                                                           |         | Sub-total  | \$31,800.00 |             |
| 7.17                                                 | Un-named 9 (south-east point) + tributaries/wetlands      |         |            |             |             |
| Management Activity                                  | Number                                                    | Unit    | Rate/unit  | Total       |             |
| 1. Riparian fencing – private land                   | 0.1                                                       | Metres  | \$35.00    | \$3,500.00  |             |
| 2. Riparian fencing – public land                    |                                                           | Metres  | \$35.00    | \$0.00      |             |
| 3. Establishment of management agreements            | 1                                                         | Number  | \$2,000.00 | \$2,000.00  |             |
| 4. Provision of off-stream watering points           | 1                                                         | Number  | \$7,500    | \$7,500.00  |             |
| 5. Establishment of native vegetation – private land | 0.1                                                       | Hectare | \$7,500    | \$750.00    |             |
| 6. Establishment of native vegetation – public land  |                                                           | Hectare | \$5,000    | \$0.00      |             |
| 7. Woody weed control – private land                 | 0.1                                                       | Hectare | \$10,000   | \$1,000.00  |             |
| 8. Non-woody weed control – private land             | 0.1                                                       | Hectare | \$1,500    | \$150.00    |             |
| 9. Woody and non-woody weed control – public land    |                                                           | Hectare | \$11,500   | \$0.00      |             |
| 10. Maintenance of revegetation and weed control     | 0.1                                                       | Hectare | \$10,000   | \$1,000.00  |             |
|                                                      |                                                           |         | Sub-total  | \$15,900.00 |             |
| Total Low Priority Waterways                         |                                                           |         |            |             | \$70,000.00 |

## 8.2 Breakdown and costs of other Recommended Management Actions

Table 47 provides details and costs associated with other recommended Management Actions.

**Table 47. Details and costs associated with other Recommended Management Actions**

| Action number | Management action                                                                               | Management action focus                                           | Management activities                                           | Notes                                                                                                                                       | Priority (H, M, L) | Responsibility                                        | Estimated costs (10 years) |
|---------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------|----------------------------|
| 2.7.1         | <b>Management Actions to protect and improve knowledge about freshwater aquatic species</b>     | (a) Assessment and Monitoring                                     | Freshwater survey program                                       | University project?                                                                                                                         | L                  | NIRC Waterway Project Officer, Universities           | \$50,000                   |
|               |                                                                                                 |                                                                   | Habitat Condition Monitoring                                    | University project?                                                                                                                         | L                  | NIRC Waterway Project Officer, Universities           | \$50,000                   |
|               |                                                                                                 | (b) Protection and Restoration of Freshwater Habitats             | Riparian and Wetland Restoration                                | On-ground actions costed in on-ground works plans (Section 7) - delivery of actions part of dedicated NIRC waterway project officer role    | H                  | NIRC Senior Management, NIRC Waterway Project Officer |                            |
|               |                                                                                                 |                                                                   | Stock Exclusion from Freshwater Habitats                        |                                                                                                                                             |                    |                                                       |                            |
|               |                                                                                                 |                                                                   | Erosion and Sediment Control                                    |                                                                                                                                             |                    |                                                       |                            |
|               |                                                                                                 | (c) Research and Knowledge Gaps                                   | Land Crab Rediscovery and Ecology                               | University project?                                                                                                                         | M                  | NIRC Waterway Project Officer, Universities           | \$20,000                   |
|               |                                                                                                 |                                                                   | Eel Migration Pathways                                          | University project?                                                                                                                         | M                  | NIRC Waterway Project Officer, Universities           | \$20,000                   |
| 2.10.1        | <b>Management Actions to support community participation in waterway and wetland management</b> | (a) Establish a Dedicated Waterway Protection Incentive Scheme    | Develop a Funding Proposal Based on the Strategy                | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                               | H                  | NIRC Senior Management, NIRC Waterway Project Officer | -                          |
|               |                                                                                                 |                                                                   | Provide financial support for waterway protection actions       | Costed in on-ground works plans (Section 7)                                                                                                 | H                  | NIRC Senior Management, NIRC Waterway Project Officer | -                          |
|               |                                                                                                 | (b) Strengthen and Expand the Toon Trust Environmental Trust Fund | Review and Enhance Funding Capacity                             | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                               | H                  | NIRC Senior Management, NIRC Waterway Project Officer | -                          |
|               |                                                                                                 |                                                                   | Align Toon Trust Priorities with the Strategy where appropriate |                                                                                                                                             |                    |                                                       |                            |
|               |                                                                                                 | (c) Support Landholders to Participate                            | Provide Technical Assistance                                    |                                                                                                                                             |                    |                                                       |                            |
|               |                                                                                                 |                                                                   | Reduce Barriers to Participation                                |                                                                                                                                             |                    |                                                       |                            |
|               |                                                                                                 |                                                                   | Recognise and Celebrate Stewardship                             |                                                                                                                                             |                    |                                                       |                            |
|               |                                                                                                 | (d) Target Priority waterways and wetlands and High Impact Areas  | Focus Incentives where they deliver the greatest benefit        | Covered in Section 5.5 and 5.6 (Priority setting and Strategy Priorities) and 8 (Proposed targeted waterway and wetland management actions) | H                  | NIRC Waterway Project Officer                         | -                          |
|               |                                                                                                 |                                                                   | Integrate Incentives with Other Programs                        | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                               | H                  | NIRC Senior Management, NIRC Waterway Project Officer | -                          |

| Action number | Management action                                                  | Management action focus                                               | Management activities                                            | Notes                                                                                                                                    | Priority (H, M, L) | Responsibility                                        | Estimated costs (10 years) |
|---------------|--------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------|----------------------------|
| 2.13.1        | Management Actions to protect social, economic and cultural values | (a) Protect Water Quality to Support Tourism and Community Recreation | Reduce Nutrient and Sediment Inputs to Reef Connected Catchments | On-ground actions costed in on-ground works plans (Section 7) - delivery of actions part of dedicated NIRC waterway project officer role | H                  | NIRC Senior Management, NIRC Waterway Project Officer | -                          |
|               |                                                                    |                                                                       | Maintain Safe and High Quality Recreational Waters               | Costed in on-ground works plans (Section 7)                                                                                              |                    |                                                       |                            |
|               |                                                                    | (b) Preserve Scenic and Aesthetic Values                              | Integrate Scenic Values into Riparian Restoration                | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                            | H                  | NIRC Waterway Project Officer                         | -                          |
|               |                                                                    |                                                                       | Engage Tourism Operators in Landscape Stewardship                |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    | (c) Protect and Promote Cultural Heritage Values                      | Support Cultural Use of Native Riparian Plants                   | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                            | H                  | NIRC Waterway Project Officer                         | -                          |
|               |                                                                    |                                                                       | Collaborate with the Norfolk Island Council of Elders            |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    |                                                                       | Protect Culturally Significant Waterway Sites                    |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    | (d) Strengthen Community and Economic Benefits                        | Support Nature Based Tourism                                     | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                            | H                  | NIRC Waterway Project Officer                         | -                          |
|               |                                                                    |                                                                       | Enhance Community Access and Enjoyment                           |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    |                                                                       | Build Local Capacity and Employment                              |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    | (e) Integrate Cultural, Social and Economic Values into Planning      | Multi Value Assessment for All Projects                          | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                            | H                  | NIRC Waterway Project Officer                         | -                          |
|               |                                                                    |                                                                       | Ongoing Engagement with Community and Cultural Groups            |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    |                                                                       | Monitoring of Social and Cultural Outcomes                       |                                                                                                                                          |                    |                                                       |                            |
| 3.3.1         | Management Actions to support and engage with the community        | (a) Strengthen Awareness and Understanding                            | Community Education Campaigns                                    | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                            | H                  | NIRC Waterway Project Officer                         | \$70,000                   |
|               |                                                                    |                                                                       | School and Youth Engagement                                      |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    |                                                                       | Visitor and Tourism Engagement                                   |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    | (b) Support Landholders and Graziers                                  | Practical Support Programs                                       | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                            | H                  | NIRC Waterway Project Officer                         |                            |
|               |                                                                    |                                                                       | Stewardship and Incentive Programs                               |                                                                                                                                          |                    |                                                       |                            |
|               |                                                                    |                                                                       | Co design of Grazing Solutions                                   |                                                                                                                                          |                    |                                                       |                            |

| Action number                 | Management action                                                                                | Management action focus                               | Management activities                                  | Notes                                                                                                                                                    | Priority (H, M, L) | Responsibility                | Estimated costs (10 years) |                                   |
|-------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------|----------------------------|-----------------------------------|
| 3.3.1 (cont.)                 | Management Actions to support and engage with the community                                      | (a) Foster Community Participation in on Ground Works | Community Restoration Days                             | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                                            | H                  | NIRC Waterway Project Officer |                            |                                   |
|                               |                                                                                                  |                                                       | Citizen Science Programs                               |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Partnerships with Local Groups                         |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  | (b) Strengthen Communication and Transparency         | Regular Reporting to the Community                     | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                                            | H                  | NIRC Waterway Project Officer |                            |                                   |
|                               |                                                                                                  |                                                       | Feedback and Dialogue Mechanisms                       |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Recognition of Cultural Values                         |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  | (c) Build Long Term Stewardship and Capacity          | Training and Skills Development                        | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                                            | H                  | NIRC Waterway Project Officer |                            |                                   |
|                               |                                                                                                  |                                                       | Support for Local Employment and Contractors           |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Celebrate Success                                      |                                                                                                                                                          |                    |                               |                            |                                   |
| 4.1.2                         | Management Actions to reduce impacts of unrestricted stock access to waterways on Norfolk Island | (a) Assessment and Prioritisation                     | Map Current Grazing Areas and Sensitive Zones          | Part of planning for costed on ground works (Section 7)                                                                                                  | H                  | NIRC Waterway Project Officer | -                          |                                   |
|                               |                                                                                                  |                                                       | Condition Assessment of Grazed Reserves                |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Water Quality and Soil Monitoring                      |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  | (b) Design and Planning                               | Develop Grazing Exclusion Zones                        | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)<br>Part of planning for costed on ground works (Section 7) |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Design Stock Exclusion Fencing                         |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Identify and Plan New Low Impact Grazing Areas         |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Develop Alternative Management Options for Public Land |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  | (c) On Ground Works                                   | Install Fencing in Priority Areas                      |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Restore Degraded Riparian and Wetland Areas            |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Implement Controlled Grazing in Designated Areas       |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  |                                                       | Protect Historic and Cultural Infrastructure           |                                                                                                                                                          |                    |                               |                            |                                   |
|                               |                                                                                                  | 4.3.1                                                 | Management Actions to reduce impacts of erosion        |                                                                                                                                                          |                    |                               |                            | (a) Assessment and Prioritisation |
| Waterway Condition Assessment | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)    |                                                       |                                                        |                                                                                                                                                          |                    |                               |                            |                                   |

| Action number | Management action                                                            | Management action focus                                  | Management activities                                                             | Notes                                                                                                                                                        | Priority (H, M, L) | Responsibility                                            | Estimated costs (10 years) |
|---------------|------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------|----------------------------|
| 4.3.1 (cont.) | Management Actions to reduce impacts of erosion                              | (a) Assessment and Prioritisation                        | Water Quality Baseline Monitoring                                                 | Part of planning for costed on ground works (Section 7)<br><br>Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1) | M                  | NIRC Waterway Project Officer                             | -                          |
|               |                                                                              | (b) Design and Planning                                  | Erosion Control Plans for Priority Catchments                                     | Medium priority in year 1 – 10, though likely to be some sites where works would benefit, revisit during updated of waterway and wetland strategy            | M                  | NIRC Waterway Project Officer                             | -                          |
|               |                                                                              |                                                          | Bed Deepening Mitigation Designs                                                  |                                                                                                                                                              |                    |                                                           |                            |
|               |                                                                              |                                                          | Bank Stabilisation Designs                                                        |                                                                                                                                                              |                    |                                                           |                            |
|               |                                                                              |                                                          | Stormwater and Runoff Management                                                  | Part of planning for costed on ground works (Section 7) and Action 4.4.1                                                                                     | H                  | NIRC Waterway Project Officer                             | -                          |
|               |                                                                              |                                                          | Stock Exclusion and Grazing Management                                            | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                                                |                    |                                                           |                            |
|               |                                                                              | (c) On Ground Works                                      | Stabilise Eroding Waterway Beds                                                   | Possible medium priority in year 1 – 10, though likely to be some sites where works would benefit, revisit during updated of waterway and wetland strategy   | M                  | NIRC Waterway Project Officer                             | -                          |
|               |                                                                              |                                                          | Stabilise Eroding Banks                                                           |                                                                                                                                                              |                    |                                                           |                            |
|               |                                                                              |                                                          | Gully and Tunnel Erosion Remediation                                              |                                                                                                                                                              |                    |                                                           |                            |
|               |                                                                              |                                                          | Reduce Sediment Delivery to Wetlands and Marine Areas                             | Part of planning for costed on ground works (Section 7)                                                                                                      | H                  | NIRC Waterway Project Officer                             | -                          |
|               |                                                                              |                                                          | Restore Vegetation Cover                                                          | Delivery of activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                                    |                    |                                                           |                            |
| 4.4.1         | Management Actions to reduce impacts of runoff from roads and built-up areas | (a) Undertake Catchment and Runoff Source Assessments    | Conduct a Catchment-Wide Runoff Survey                                            | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1), with engagement of consultants/contractors                    | H                  | NIRC Waterway Project Officer and consultants/contractors | \$100,000                  |
|               |                                                                              |                                                          | Roadside Drainage Condition Assessment                                            |                                                                                                                                                              |                    |                                                           |                            |
|               |                                                                              |                                                          | Wetland and Waterway Vulnerability Assessment                                     |                                                                                                                                                              |                    |                                                           |                            |
|               |                                                                              | (b) Design and Plan Water Quality Improvement Structures | Develop Concept and Detailed Designs for appropriate Stormwater Treatment Systems |                                                                                                                                                              |                    |                                                           |                            |
|               |                                                                              |                                                          | Designs for Runoff Diversion and Infiltration                                     |                                                                                                                                                              |                    |                                                           |                            |

| Action number | Management action                                                            | Management action focus                                  | Management activities                                | Notes                                                                                                                                     | Priority (H, M, L) | Responsibility                                            | Estimated costs (10 years) |
|---------------|------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------|----------------------------|
| 4.4.1 (cont.) | Management Actions to reduce impacts of runoff from roads and built-up areas | (c) Design and Plan Water Quality Improvement Structures | Cattle Exclusion and Drain Stabilisation Designs     | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1), with engagement of consultants/contractors | H                  | NIRC Waterway Project Officer and consultants/contractors |                            |
|               |                                                                              | (d) On-Ground Works                                      | Install Priority Stormwater Treatment Infrastructure | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                             | H                  | NIRC Waterway Project Officer and consultants/contractors | \$250,000                  |
|               |                                                                              |                                                          | Stabilise Eroding Drains and Roadside Channels       |                                                                                                                                           |                    |                                                           |                            |
|               |                                                                              |                                                          | Enhance Riparian and Wetland Buffers                 | Part of planning for costed on ground works (Section 7)                                                                                   | H                  | NIRC Waterway Project Officer                             | -                          |
|               |                                                                              |                                                          | Reduce Nutrient Inputs from Roadside Grazing         | Delivery of activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                 |                    |                                                           |                            |
| 4.5.1         | Management Actions for Acid Sulfate Soils                                    | (a) Assessment and Prioritisation                        | Island Wide ASS Risk Mapping                         | Mapping and assessments carried out through past CSIRO projects.                                                                          | H                  | Department of Infrastructure                              | -                          |
|               |                                                                              |                                                          | Soil and Water Chemistry Baseline                    |                                                                                                                                           |                    |                                                           |                            |
|               |                                                                              |                                                          | Infrastructure and Earthworks Risk Assessment        | Unsure if further mapping and assessments are required.                                                                                   |                    |                                                           |                            |
|               |                                                                              | (b) Design and Planning                                  | ASS Management Plans for Priority Sites              | Activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1), with engagement of consultants/contractors | H                  | NIRC Waterway Project Officer and consultants/contractors | \$100,000                  |
|               |                                                                              |                                                          | Hydrological Protection and Water Level Management   |                                                                                                                                           |                    |                                                           |                            |
|               |                                                                              |                                                          | Erosion and Disturbance Prevention Designs           |                                                                                                                                           |                    |                                                           |                            |
|               |                                                                              | (c) On Ground Works                                      | Protect and Rehydrate ASS Prone Wetlands             | Part of planning for costed on ground works (Section 7)                                                                                   | H                  | NIRC Waterway Project Officer                             | -                          |
|               |                                                                              |                                                          | Stabilise Eroding Drains and Gullies                 | Delivery of activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                 |                    |                                                           |                            |
|               |                                                                              |                                                          | Manage Cattle Access                                 |                                                                                                                                           |                    |                                                           |                            |
|               |                                                                              |                                                          | Neutralisation and Treatment (Where Necessary)       | Unlikely to be required on private land, may be beneficial within KAVHA                                                                   | L                  | TBC                                                       | -                          |

| Action number | Management action                                       | Management action focus                | Management activities                                                      | Notes                                                                                                                                                                    | Priority (H, M, L) | Responsibility                             | Estimated costs (10 years) |
|---------------|---------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------|----------------------------|
| 4.6.1         | Management Actions to reduce impacts of climate change  | (a) Assessment and Planning            | Climate Vulnerability Assessment for Waterways and Wetlands                | Some of this work has been completed through past CSIRO assessments                                                                                                      | L                  | Department of Infrastructure through CSIRO | -                          |
|               |                                                         |                                        | Hydrological Modelling Under Future Climate Scenarios                      |                                                                                                                                                                          |                    |                                            |                            |
|               |                                                         |                                        | Water Security Risk Assessment                                             |                                                                                                                                                                          |                    |                                            |                            |
|               |                                                         | (b) Design and Adaptation Measures     | Wetland Rehydration and Water Retention Designs                            | CSIRO assessments may help with some design work.                                                                                                                        | M                  | Department of Infrastructure through CSIRO | -                          |
|               |                                                         |                                        | Climate Resilient Stormwater and Drainage Designs                          |                                                                                                                                                                          |                    |                                            |                            |
|               |                                                         |                                        | Drought Resilient Vegetation and Riparian Planting                         | Part of planning for costed on ground works (Section 7)<br><br>Delivery of activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1) | H                  | NIRC Waterway Project Officer              | -                          |
|               |                                                         | (c) On Ground Works                    | Wetland and Waterway Rehydration                                           | Unlikely to be a priority in the short term                                                                                                                              | L                  | ?                                          | -                          |
|               |                                                         |                                        | Erosion and Sediment Control                                               | Part of planning for costed on ground works (Section 7)                                                                                                                  | H                  | NIRC Waterway Project Officer              |                            |
|               |                                                         |                                        | Water Conservation and Storage Enhancements                                | Unlikely to be a high priority for waterway management in the short term                                                                                                 | M                  | Department of Infrastructure through CSIRO |                            |
|               |                                                         | (d) Monitoring and Adaptive Management | Climate Sensitive Water Quality Monitoring                                 | Some of this work has been completed through past CSIRO assessments, unlikely to be a high priority for waterway management in the short term                            | M                  | Department of Infrastructure through CSIRO | -                          |
|               |                                                         |                                        | Hydrological Monitoring                                                    |                                                                                                                                                                          |                    |                                            |                            |
|               |                                                         |                                        | Climate Trend Tracking                                                     |                                                                                                                                                                          |                    |                                            |                            |
| 4.7.1         | Management Actions to reduce the impacts of pest plants | (a) Assessment and Prioritisation      | Island Wide Weed Risk Mapping                                              | Some of this work has been completed through past CSIRO assessments, unlikely to be a high priority for waterway management in the short term                            | L                  | Department of Infrastructure through CSIRO | -                          |
|               |                                                         |                                        | Riparian Weed Impact Assessment                                            |                                                                                                                                                                          |                    |                                            |                            |
|               |                                                         |                                        | Fire Risk Assessment                                                       |                                                                                                                                                                          |                    |                                            |                            |
|               |                                                         | (b) Design and Planning                | Strategic Weed Control Plans                                               | Part of planning for delivery of costed on ground works (Section 7)                                                                                                      | H                  | NIRC Waterway Project Officer              | -                          |
|               |                                                         |                                        | Native Vegetation Recovery Plans<br>Soil and Hydrology Protection Measures | Delivery of activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                                                |                    |                                            |                            |

| Action number | Management action                                       | Management action focus                | Management activities                 | Notes                                                                                                                                                               | Priority (H, M, L) | Responsibility                                                     | Estimated costs (10 years) |
|---------------|---------------------------------------------------------|----------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|----------------------------|
| 4.7.1 (cont.) | Management Actions to reduce the impacts of pest plants | (c) On Ground Works                    | Targeted Weed Removal                 | Part of delivery of costed on ground works (Section 7)                                                                                                              | H                  | NIRC Waterway Project Officer                                      | -                          |
|               |                                                         |                                        | Riparian and Wetland Restoration      |                                                                                                                                                                     |                    |                                                                    |                            |
|               |                                                         |                                        | Aquatic Weed Control                  |                                                                                                                                                                     |                    |                                                                    |                            |
|               |                                                         |                                        | Cross Tenure Weed Control             | Delivery of activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                                           |                    |                                                                    |                            |
|               |                                                         | (d) Monitoring and Adaptive Management | Weed Regrowth Monitoring              | Refer to Section 9 – monitoring, evaluation and reporting.                                                                                                          | H                  | NIRC Waterway Project Officer                                      | -                          |
|               |                                                         |                                        | Water Quality Monitoring              |                                                                                                                                                                     |                    |                                                                    |                            |
| 4.7.2         | Management Actions to reduce the impact of Pest Animals | Feral Chickens                         | (a) Assessment and Planning           | Contractors to work in conjunction with Parks Australia and private landholders                                                                                     | H                  | NIRC Waterway Project Officer and private contractors/ consultants | \$100,000                  |
|               |                                                         |                                        | (b) On Ground Control                 |                                                                                                                                                                     |                    |                                                                    |                            |
|               |                                                         |                                        | (c) Monitoring                        | Refer to Section 9 – monitoring, evaluation and reporting.<br><br>MER activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1) | H                  | NIRC Waterway Project Officer                                      | -                          |
|               |                                                         | Tarlal Birds (Australasian Swamphen)   | (a) Assessment and Planning           | Contractors to work in conjunction with Parks Australia and private landholders                                                                                     | H                  | NIRC Waterway Project Officer and private contractors/ consultants | \$100,000                  |
|               |                                                         |                                        | (b) On Ground Control                 |                                                                                                                                                                     |                    |                                                                    |                            |
|               |                                                         |                                        | (c) Monitoring                        | Refer to Section 9 – monitoring, evaluation and reporting.<br><br>MER activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1) | H                  | NIRC Waterway Project Officer                                      | -                          |
|               |                                                         | Rats                                   | (a) Assessment and Planning           | Contractors to work in conjunction with Parks Australia and private landholders                                                                                     | H                  | NIRC Waterway Project Officer and private contractors/ consultants | \$100,000                  |
|               |                                                         |                                        | (b) On Ground Control                 |                                                                                                                                                                     |                    |                                                                    |                            |
|               |                                                         |                                        | (c) Long Term Eradication Feasibility | Unlikely to be driven through this strategy                                                                                                                         | L                  | Unsure                                                             | -                          |
|               |                                                         |                                        | (d) Monitoring                        | Refer to Section 9 – monitoring, evaluation and reporting.<br><br>MER activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1) | H                  | NIRC Waterway Project Officer                                      | -                          |

| Action number | Management action                                                    | Management action focus                                                                                                                                                                                                   | Management activities           | Notes                                                                                                                                               | Priority (H, M, L) | Responsibility                                              | Estimated costs (10 years) |
|---------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------|----------------------------|
| 4.7.2 (cont.) | Management Actions to reduce the impact of Pest Animals              | All pest species                                                                                                                                                                                                          | (a) Governance and Coordination | Pest control activities (including data management and research) to form part of dedicated NIRC waterway project officer role (Action number 6.2.1) | H                  | NIRC Waterway Project Officer                               | -                          |
|               |                                                                      |                                                                                                                                                                                                                           | (b) Data Management             |                                                                                                                                                     |                    |                                                             |                            |
|               |                                                                      |                                                                                                                                                                                                                           | (c) Community Engagement        |                                                                                                                                                     |                    |                                                             |                            |
|               |                                                                      |                                                                                                                                                                                                                           | (d) Research and Innovation     |                                                                                                                                                     |                    |                                                             |                            |
| 6.1.1         | Actions to ensure the resourcing and implementation of the strategy  | (a) Employment of a dedicated Waterway Project Officer responsible for coordinating on-ground works, supporting landholders, engaging with the community, managing partnerships, and overseeing monitoring and reporting. |                                 | 0.6 FTE at an average cost of \$75,000 /year over 10 years.                                                                                         | H                  | NIRC Senior Management                                      | \$750,000                  |
|               |                                                                      | (b) The Waterway Project Officer will coordinate annual work programs, community engagement, budgets and reporting to ensure efficient delivery of on-ground works.                                                       |                                 | Delivery of these activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                     | H                  | NIRC Senior Management<br><br>NIRC Waterway Project Officer | -                          |
|               |                                                                      | (c) Work with partner agencies, key stakeholders and the community to seek investment to implement the Norfolk Island Waterway and Wetland Management Strategy 2026–2036.                                                 |                                 |                                                                                                                                                     |                    |                                                             |                            |
|               |                                                                      | (d) Prepare funding proposals aligned with national and state environmental priorities, including water quality improvement, climate resilience, biodiversity protection and sustainable agriculture.                     |                                 |                                                                                                                                                     |                    |                                                             |                            |
|               |                                                                      | (e) Establish a transparent process for allocating funds to priority waterways, ensuring investment aligns with the Strategy’s priority ranking system.                                                                   |                                 |                                                                                                                                                     |                    |                                                             |                            |
|               |                                                                      | (f) Explore opportunities to expand the capacity of the Toon Trust Environmental Trust Fund to support private-land restoration. Consider using the Toon Trust “brand” for the waterways financial incentive scheme       |                                 |                                                                                                                                                     |                    |                                                             |                            |
| 6.2.1         | Actions to establish and maintain partnerships with key stakeholders | (a) Norfolk Island Regional Council (NIRC), public land managers and the community will work together to achieve the outcomes articulated in the Norfolk Island Waterway and Wetland Management Strategy 2026–2036.       |                                 | Delivery of these activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1)                                     | H                  | NIRC Senior Management<br><br>NIRC Waterway Project Officer | -                          |
|               |                                                                      | (b) NIRC will convene regular coordination meetings with partner agencies to align priorities, share data, and coordinate works across land tenures.                                                                      |                                 |                                                                                                                                                     |                    |                                                             |                            |
|               |                                                                      | (c) NIRC will support community involvement through volunteer programs, citizen-science initiatives, school engagement and landholder field days.                                                                         |                                 |                                                                                                                                                     |                    |                                                             |                            |

| Action number | Management action                                                    | Management activities                                                                                                                                                                                                                                                                    | Notes                                                                                                           | Priority (H, M, L) | Responsibility                               | Estimated costs (10 years) |
|---------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------|----------------------------|
| 6.2.1 (cont.) | Actions to establish and maintain partnerships with key stakeholders | (d) NIRC will develop clear communication materials (e.g., annual updates, project summaries, maps) to keep the community informed and engaged.                                                                                                                                          | Delivery of these activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1) | H                  | NIRC Senior Management                       | -                          |
|               |                                                                      | (e) NIRC will work with the Norfolk Island Environmental Sustainability Advisory Committee and the Water Quality Working Group (and future water quality related committees) to ensure technical oversight and adaptive management.                                                      |                                                                                                                 |                    | NIRC Waterway Project Officer                |                            |
| 6.3.1         | Actions for the development and establishment of maintenance program | (a) Seek appropriate funding for a maintenance program to ensure the success of on-ground works on public and private land across Norfolk Island.                                                                                                                                        | NIRC senior management and staff or contractors/consultants to deliver                                          | H                  | NIRC Senior Management                       | -                          |
|               |                                                                      | (b) Develop a structured inspection schedule for all completed works, including annual assessments.                                                                                                                                                                                      | Delivery of these activities to form part of dedicated NIRC waterway project officer role (Action number 6.2.1) | H                  | NIRC Senior Management                       |                            |
|               |                                                                      | (c) The Waterway Project Officer will provide ongoing technical support to landholders to help them meet their maintenance obligations under Voluntary Landholder Management Agreements.                                                                                                 |                                                                                                                 |                    | NIRC Waterway Project Officer                |                            |
|               |                                                                      | (d) NIRC Waterway Project Officer will deliver training and capacity-building activities (e.g., weed-control workshops, fencing maintenance demonstrations, grazing-management guidance).                                                                                                |                                                                                                                 |                    |                                              |                            |
|               |                                                                      | (e) NIRC will maintain a central database of completed works, maintenance requirements, inspection results and follow-up actions to support adaptive management.                                                                                                                         |                                                                                                                 |                    |                                              |                            |
| 8.1.3         | Management Actions for Implementing the Cost Share System            | (a) Develop a Formal Cost Share Matrix                                                                                                                                                                                                                                                   | NIRC senior management and staff or contractors/consultants to deliver                                          | H                  | NIRC Senior Management                       | \$40,000                   |
|               |                                                                      | Establish clear criteria for determining priority levels (e.g., proximity to waterways, erosion severity, ASS risk, contribution to reef water quality).<br>Define eligible activities such as fencing, erosion control, weed management, revegetation, and off stream watering systems. |                                                                                                                 |                    | NIRC Waterway Project Officer<br>Consultants |                            |

| Action number | Management action                                         | Management action focus                                 | Management activities                                                                                                                                        | Notes | Priority (H, M, L) | Responsibility | Estimated costs (10 years) |
|---------------|-----------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------|----------------|----------------------------|
| 8.1.3 (cont.) | Management Actions for Implementing the Cost Share System | (b) Develop a Formal Cost Share Matrix                  | Involve funding providers in the development of the Cost-Share matrix during year 1 of strategy implementation.                                              |       |                    |                |                            |
|               |                                                           | (c) Provide Transparent Guidance to Landholders         | Publish simple guidelines explaining how cost share percentages are calculated.                                                                              |       |                    |                |                            |
|               |                                                           |                                                         | Provide worked examples for common project types (fencing, gully stabilisation, riparian planting).                                                          |       |                    |                |                            |
|               |                                                           | (d) Prioritise Funding for High Impact Areas            | Allocate the highest incentives to Very High and High Priority sites where works will significantly improve water quality or protect sensitive environments. |       |                    |                |                            |
|               |                                                           |                                                         | Consider full (100%) funding for critical protection works in priority catchments.                                                                           |       |                    |                |                            |
|               |                                                           | (e) Support Landholders Through the Application Process | Offer site assessments and technical advice to help landholders design eligible projects.                                                                    |       |                    |                |                            |
|               |                                                           |                                                         | Provide assistance with cost estimates, materials lists, and project planning.                                                                               |       |                    |                |                            |
|               |                                                           | (f) Monitor and Review the Cost Share Framework         | Track uptake, environmental outcomes, and cost effectiveness of funded projects.                                                                             |       |                    |                |                            |
|               |                                                           |                                                         | Adjust cost share percentages over time to reflect funding availability, demand, and environmental priorities.                                               |       |                    |                |                            |
|               |                                                           |                                                         |                                                                                                                                                              |       |                    |                |                            |
| Total         |                                                           |                                                         |                                                                                                                                                              |       |                    |                | \$1,750,000                |

## 8.3 Proposed cost share matrix

A cost-share matrix will be established to guide how financial incentives are allocated to landholders undertaking waterway and wetland protection works on private land. The purpose of the cost-share system is to ensure that public investment is directed to the areas of greatest environmental benefit, while also encouraging landholder participation and shared responsibility for long-term stewardship.

Under this framework, the level of incentive provided will be linked to the priority of the site or action, with higher incentives offered for works that deliver the greatest improvements to water quality, riparian condition, wetland health, and protection of the Norfolk Marine Park. This approach ensures that limited funding is used efficiently and transparently, while still supporting landholders to undertake essential on-ground works.

A cost-share matrix will be developed to calculate both the incentive amount and the landholder contribution for each project. The example in Table 45 demonstrates how cost-share percentages may be applied to a typical fencing project.

**Table 48. Example Cost-Share Matrix – based on 200 metres of riparian fencing @ \$35/m = \$7,000 total project cost**

| Priority Level     | Incentive Contribution                                | Incentive Amount | Landholder Contribution | Landholder Amount |
|--------------------|-------------------------------------------------------|------------------|-------------------------|-------------------|
| Very High Priority | 90% (with option to consider 100% for critical sites) | \$6,300          | 10%                     | \$700             |
| High Priority      | 80%                                                   | \$5,600          | 20%                     | \$1,400           |
| Medium Priority    | 70%                                                   | \$4,900          | 30%                     | \$2,100           |
| Low Priority       | 50%                                                   | \$3,500          | 50%                     | \$3,500           |

### 8.3.1 Management Actions for Implementing the Cost-Share System

#### *a) Develop a Formal Cost-Share Matrix*

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- Establish clear criteria for determining priority levels (e.g., proximity to waterways, erosion severity, ASS risk, contribution to reef water quality).
- Define eligible activities such as fencing, erosion control, weed management, revegetation, and off-stream watering systems.
- Involve funding providers in the development and annual review of the Cost-Share matrix.

#### *b) Provide Transparent Guidance to Landholders*

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- Publish simple guidelines explaining how cost-share percentages are calculated.
- Provide worked examples for common project types (fencing, gully stabilisation, riparian planting).

### *c) Prioritise Funding for High-Impact Areas*

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- Allocate the highest incentives to Very High and High Priority sites where works will significantly improve water quality or protect sensitive environments.
- Consider full (100%) funding for critical protection works in priority catchments.

### *d) Support Landholders Through the Application Process*

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- Offer site assessments and technical advice to help landholders design eligible projects.
- Provide assistance with cost estimates, materials lists, and project planning.

### *e) Monitor and Review the Cost-Share Framework*

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- Track uptake, environmental outcomes, and cost-effectiveness of funded projects.
- Adjust cost-share percentages over time to reflect funding availability, demand, and environmental priorities.

## 8.4 Summary of Outcome Targets and Management Actions for on-ground works and Management Activities

Norfolk Island Waterway and Wetland Management Strategy Management Outcome Targets and Management Actions for each waterway or wetland (or group of waterways and wetlands) are listed in Table 49.

Table 49. A summary of Norfolk Island Waterway and Wetland Management Strategy Management Outcome Targets and Management Actions for each waterway or wetland (or group of waters and wetlands) are listed in Table 25.

| Management Outcome Targets                                                              | Management Actions                                                                                                 |                       |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                 |                              |                              |                         |                               |                          |       |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------|-------------|----------------|--------------------|-------------------------|------------------|---------------------------|----------------------|------------------------|-------------------------------|------------------------------|---------------------------------|------------------------------|------------------------------|-------------------------|-------------------------------|--------------------------|-------|
|                                                                                         |                                                                                                                    | 7.1 Watermill Ck      | 7.2 Town Ck | 7.3 Cascade Ck | 7.4 Rocky Point Ck | 7.5 un-named 15 Mission | 7.6 Stockyard Ck | 7.7 Un-named 14 Headstone | 7.8 Broken Bridge Ck | 7.9 un-named 11 centre | 7.10 Un-named 10 Music Valley | 7.11 un-named 3 – 6 Northern | 7.12 Un-named 1, 2 16-22 Selwyn | 7.13 Un-named 23-26 Ball Bay | 7.14 un-named 7 Two Chimneys | 7.15 Un-named 12 quarry | 7.16 Un-named 8, 13 Beefsteak | 7.17 Un-named 9 SE Point | Total |
| 1. Controlled livestock access or exclusion along 10% of waterway frontage (both banks) | 1.1 Construction of riparian fencing on private land to manage cattle grazing (km)                                 | 2.5                   | 1           | 1.9            | 1.2                | 1.5                     | 1                | 0.8                       | 0.7                  | 0.6                    | 0.2                           | 0.2                          | 0.4                             | -                            | 0.1                          | 0.2                     | 0.2                           | 0.1                      | 12.6  |
|                                                                                         | 1.2 Construction of riparian fencing on public land to manage cattle grazing (km)                                  | 2                     | -           | 0.6            | -                  | 0.4                     | -                | 0.5                       | 0.5                  | -                      | -                             | -                            | 1                               | 0.5                          | 0.5                          | -                       | -                             | -                        | 6     |
|                                                                                         | 1.3 Establish Management Agreements with private landowners participating in voluntary incentive programs (number) | 20                    | 10          | 15             | 10                 | 10                      | 10               | 10                        | 5                    | 5                      | 2                             | 2                            | 2                               | -                            | 2                            | 1                       | 2                             | 1                        | 107   |
|                                                                                         | 1.4 Provision of off-stream watering points (stock troughs) on private land (number)                               | 10                    | 5           | 10             | 5                  | 5                       | 5                | 5                         | 4                    | 5                      | 2                             | 1                            | 2                               | -                            | 2                            | 1                       | 2                             | 1                        | 65    |
| 2. Maintain or improve water quality                                                    | 2.1 Construction of riparian fencing on private land to manage cattle grazing                                      | Included in 1.1 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                 |                              |                              |                         |                               |                          |       |
|                                                                                         | 2.2 Construction of riparian fencing on private land to manage Acid Sulfate Soils                                  | Included in 1.1 above |             |                |                    |                         |                  |                           | n/a                  |                        |                               |                              |                                 |                              |                              |                         |                               |                          |       |
|                                                                                         | 2.3 Construction of riparian fencing on public land to manage Acid Sulfate Soils                                   | Included in 1.2 above |             |                |                    |                         |                  |                           | n/a                  |                        |                               |                              |                                 |                              |                              |                         |                               |                          |       |
|                                                                                         | 2.4 Provision of off-stream watering points (stock troughs) on private land                                        | Included in 1.4 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                 |                              |                              |                         |                               |                          |       |
|                                                                                         | 2.5 Undertake feral chicken control                                                                                | Ongoing               |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                 |                              |                              |                         |                               |                          |       |

| Management Outcome Targets                                                                                                                                           | Management Actions                                                                                                                                                                | 7.1 Watermill Ck      | 7.2 Town Ck | 7.3 Cascade Ck | 7.4 Rocky Point Ck | 7.5 un-named 15 Mission | 7.6 Stockyard Ck | 7.7 Un-named 14 Headstone | 7.8 Broken Bridge Ck | 7.9 un-named 11 centre | 7.10 Un-named 10 Music Valley | 7.11 un-named 3 – 6 Northern | 7.12 Un-named 1, 2 16 -22 Selwyn | 7.13 Un-named 23-26 Ball Bay | 7.14 un-named 7 Two Chimneys | 7.15 Un-named 12 quarry | 7.16 Un-named 8, 13 Beefsteak | 7.17 Un-named 9 SE Point | Total |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------|----------------|--------------------|-------------------------|------------------|---------------------------|----------------------|------------------------|-------------------------------|------------------------------|----------------------------------|------------------------------|------------------------------|-------------------------|-------------------------------|--------------------------|-------|
| 3. Improve vegetation structure and diversity through indigenous vegetation establishment along frontages. Assumes 10 metre setback on fenced waterways and wetlands | 3.1 Establish native vegetation on <b>private land</b> (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 10 metre setback on fenced areas (ha) | 2.5                   | 1           | 1.9            | 1.2                | 1.5                     | 1                | 0.8                       | 0.7                  | 0.6                    | 0.2                           | 0.2                          | 0.4                              | -                            | 0.1                          | 0.2                     | 0.2                           | 0.1                      | 12.6  |
|                                                                                                                                                                      | 3.2 Establish native vegetation on <b>public land</b> (select species according to vegetation mapping (Christian and Mills 2021)). Assumes 15 metre setback on fenced areas (ha)  | 3                     | -           | 1.2            | 1                  | 0.4                     | -                | 0.2                       | 0.5                  | -                      | -                             | -                            | 2                                | 1                            | 1                            | -                       | -                             | -                        | 10.3  |
|                                                                                                                                                                      | 3.3 Undertake woody weed control on private land waterway frontages Assumes 10 metre fencing setback (ha)                                                                         | 2.5                   | 1           | 1.9            | 1.2                | 1.5                     | 1                | 0.8                       | 0.7                  | 0.6                    | 0.2                           | 0.2                          | 0.4                              | -                            | 0.1                          | 0.2                     | 0.2                           | 0.1                      | 12.6  |
|                                                                                                                                                                      | 3.4 Undertake non-woody weed control on <b>private land</b> waterway frontages Assumes 10 metre fencing setback (ha)                                                              | 2.5                   | 1           | 1.9            | 0.1. 2             | 1.5                     | 1                | 0.8                       | 0.7                  | 0.6                    | 0.2                           | 0.2                          | 0.4                              | -                            | 0.1                          | 0.2                     | 0.2                           | 0.1                      | 12.6  |
|                                                                                                                                                                      | 3.5 Undertake non-woody weed control on <b>public land</b> waterway frontages. Assumes 15 metre fencing setback (ha)                                                              | 3                     | -           | 1.2            | 1                  | 0.1                     | -                | 0.8                       | 0.5                  | -                      | -                             | -                            | -                                | 1                            | 1                            | -                       | -                             | -                        | 8.6   |
| 4. Reduction of woody weeds along creek frontages                                                                                                                    | 4.1 Targeted control of high priority woody weeds including Hawaiian Holly, Olive, Guava.                                                                                         | Included in 3.3 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                  |                              |                              |                         |                               |                          |       |
|                                                                                                                                                                      | 4.2 Establish native vegetation (select species according to vegetation mapping (Christian and Mills 2021)).                                                                      | Included in 3.1 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                  |                              |                              |                         |                               |                          |       |
|                                                                                                                                                                      | 4.3 Maintain weed control and revegetation sites (ha)                                                                                                                             | 4.9                   | 1           | 2.5            | 2.8                | 1.5                     | 1                | 1                         | 1.2                  | 0.6                    | 0.2                           | 0.2                          | 0.4                              | 1                            | 1.1                          | 0.2                     | 0.2                           | 0.1                      | 19.9  |

| Management Outcome Targets                                                   | Management Actions                                                                                                                     | 7.1 Watermill Ck      | 7.2 Town Ck | 7.3 Cascade Ck | 7.4 Rocky Point Ck | 7.5 un-named 15 Mission | 7.6 Stockyard Ck | 7.7 Un-named 14 Headstone | 7.8 Broken Bridge Ck | 7.9 un-named 11 centre | 7.10 Un-named 10 Music Valley | 7.11 un-named 3 – 6 Northern | 7.12 Un-named 1, 2, 16 -22 Selwyn | 7.13 Un-named 23-26 Ball Bay | 7.14 un-named 7 Two Chimneys | 7.15 Un-named 12 quarry | 7.16 Un-named 8, 13 Beefsteak | 7.17 Un-named 9 SE Point | Total |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------|----------------|--------------------|-------------------------|------------------|---------------------------|----------------------|------------------------|-------------------------------|------------------------------|-----------------------------------|------------------------------|------------------------------|-------------------------|-------------------------------|--------------------------|-------|
| 5. Reduce pest animal populations to protect native flora and fauna species  | 5.1 Undertake coordinated feral and free-roaming cat trapping across public land and private land (with permission from landowners).   | Ongoing               |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |
|                                                                              | 5.2 Undertake coordinated rat control programs across public land and private land.                                                    | Ongoing               |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |
|                                                                              | 5.3 Coordinate and deliver feral animal related community engagement events                                                            | 5                     |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          | 5     |
|                                                                              | 5.4 Investigate incentive programs for the establishment of cat enclosures                                                             | 1                     |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          | 1     |
| 6. Increased landowner skills and awareness in riparian management practices | 6.1 Establish Management Agreements with landholders participating in voluntary private land incentive programs                        | Included in 1.3 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |
|                                                                              | 6.2 Coordinate and deliver waterway and wetland health related community engagement events                                             | 5                     |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          | 5     |
| 7. Strengthen community involvement in waterway management                   | 7.1 Support community groups and the Norfolk Island community in seeking funding for river health related activities                   | Ongoing               |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |
|                                                                              | 7.3 Work with and support local community groups (eg. Coral Berry Crusaders) to support the implementation and maintenance of projects | Ongoing               |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |

| Management Outcome Targets                                                                          | Management Actions                                                                                                             | 7.1 Watermill Ck      | 7.2 Town Ck | 7.3 Cascade Ck | 7.4 Rocky Point Ck | 7.5 un-named 15 Mission | 7.6 Stockyard Ck | 7.7 Un-named 14 Headstone | 7.8 Broken Bridge Ck | 7.9 un-named 11 centre | 7.10 Un-named 10 Music Valley | 7.11 un-named 3 – 6 Northern | 7.12 Un-named 1, 2, 16 -22 Selwyn | 7.13 Un-named 23-26 Ball Bay | 7.14 un-named 7 Two Chimneys | 7.15 Un-named 12 quarry | 7.16 Un-named 8, 13 Beefsteak | 7.17 Un-named 9 SE Point | Total |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------|----------------|--------------------|-------------------------|------------------|---------------------------|----------------------|------------------------|-------------------------------|------------------------------|-----------------------------------|------------------------------|------------------------------|-------------------------|-------------------------------|--------------------------|-------|
| 8. Improve bank stability                                                                           | 8.1 Construction of riparian fencing on private land to manage cattle grazing and allow the establishment of native vegetation | Included in 1.1 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |
|                                                                                                     | 8.2 Construction of riparian fencing on public land to manage cattle grazing and allow the establishment of native vegetation  | Included in 1.2 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |
|                                                                                                     | 8.3 Establish Management Agreements with private landowners participating in voluntary incentive programs                      | Included in 1.3 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |
|                                                                                                     | 8.4 Provision of off-stream watering points (stock troughs) on private land                                                    | Included in 1.4 above |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |
| 9. Increased knowledge of eel populations and other freshwater aquatic species (eg. endemic shrimp) | 9.1 Encourage research into eel populations and other freshwater aquatic species in Norfolk Island creeks and wetlands         | Ongoing               |             |                |                    |                         |                  |                           |                      |                        |                               |                              |                                   |                              |                              |                         |                               |                          |       |

## 9. Monitoring, evaluation and reporting

A detailed MER Plan will be developed in partnership with funding providers during the preparation of implementation guidelines in the early stages of the program, ensuring that monitoring requirements, reporting expectations and investment accountability are aligned from the outset.

Effective management of Norfolk Island's rivers, wetlands and catchments depends on timely, reliable and fit-for-purpose information. Monitoring, evaluation and reporting (MER) provide the evidence needed for sound decision-making, adaptive management, and transparent accountability to the community, landholders and partner agencies.

The MER framework must also be realistic and achievable within the existing capacity of the Norfolk Island Regional Council. Monitoring, evaluation and reporting activities will be designed to match the skills, staffing levels, equipment and operational resources currently available on-island, with external specialist support only used where essential. This will keep the MER program practical, affordable and sustainable over the long term, while still generating the information needed to guide adaptive management and meet funder expectations.

The MER framework for this Strategy follows the adaptive management cycle used in the Victorian Waterway Management Strategy, adapted to Norfolk Island's environmental and governance context. The cycle includes:

- Strategy and Planning - setting priorities, targets and investment focus
- Implementation and Monitoring - delivering actions and collecting data
- Evaluation and Reporting - assessing effectiveness, learning and improving future management

Community participation, research partnerships and innovation support all stages, ensuring that local knowledge and scientific evidence jointly inform management.

### 9.1 Purpose and Objectives of the MER Framework

The MER framework aims to:

- Track progress toward the Strategy's goals for waterway and wetland health
- Provide evidence for adaptive management and continuous improvement
- Assess the effectiveness of management actions (e.g., livestock management, runoff mitigation, ASS protection)
- Identify emerging risks and guide timely intervention
- Support transparent reporting to the community, landholders and government
- Build long-term datasets to understand climate, hydrological and ecological trends

## 9.2 Monitoring Framework

Monitoring is structured around four domains:

1. Condition,
2. Threats,
3. Implementation, and
4. Community engagement.

Each domain includes indicators, methods, frequency and responsibilities.

### 1. Condition Monitoring

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**Assesses ecological health.**

Key indicators will include some of the following: water quality, streamflow, wetland vegetation condition, macroinvertebrates and key fauna.

**Purpose:** detect long-term trends, assess impacts of runoff, erosion and ASS.

**Frequency:** quarterly (water quality), seasonal (vegetation/fauna), continuous where feasible.

### 2. Threat Monitoring

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**Tracks pressures affecting waterways and wetlands.**

Key Indicators will include some of the following: length of waterway where stock access has been excluded or managed, sediment loads, erosion rates, ASS exposure and stormwater runoff.

**Purpose:** identify emerging risks, support targeted interventions, understand climate-catchment interactions.

**Frequency:** Half-yearly

### 3. Implementation Monitoring

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**Tracks delivery of actions.**

Key Indicators will include some of the following: on-ground works, length of fencing installed, area of weed control, area revegetated or number of seedlings planted, participation in engagement events and maintenance activities.

**Purpose:** demonstrate progress, support investment accountability, identify delays.

**Frequency:** Half yearly, annual reporting.

## 4. Community and Stakeholder Monitoring

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**Tracks participation, awareness and satisfaction.**

Indicators include landholder engagement, citizen science participation, volunteer participation, community satisfaction and research partnerships.

**Purpose:** strengthen ownership, support co-management, ensure transparency.

**Frequency:** annual surveys, ongoing tracking.

## 9.3 Evaluation Framework

Evaluation assesses whether actions are effective, efficient and aligned with strategic goals.

### Annual Evaluation

**Focus:** delivery of actions, progress toward annual targets, emerging risks.

**Outputs:** Annual MER Report, updated priorities.

### Mid-Term Evaluation (3-5 years)

**Focus:** effectiveness of actions, condition trends, threat trends, climate implications.

**Outputs:** mid-term review, adjusted targets and investment priorities, updated risk assessments.

### End-of-Strategy Evaluation (8-10 years)

**Focus:** achievement of long-term outcomes, lessons learned, MER framework performance.

**Outputs:** final evaluation report, inputs to next Strategy.

## 9.4 Reporting Framework

Reporting ensures transparency, accountability and community confidence.

- Annual MER Report - condition and threat trends, implementation progress, key findings, recommendations
- Community Updates - plain-language summaries, infographics, maps, online updates
- Technical Reports - water quality datasets, ASS results, hydrological modelling
- State of Waterways and Wetlands Report (every 5 years) - comprehensive condition assessment, long-term trends, investment priorities

## 9.5 Adaptive Management

Monitoring and evaluation results are used to refine works, update designs, revise risk maps, reprioritise investment (including updates to the cost-share matrix where required), improve engagement and strengthen partnerships. This ensures the Strategy remains responsive to new knowledge, climate change and evolving community expectations.

## 9.6 Roles and Responsibilities

- Norfolk Island Regional Council - MER coordination, data management, reporting, evaluation oversight
- Partner Agencies/other public land managers - technical monitoring, implementation reporting, research partnerships
- Landholders and Community - participation in voluntary incentive scheme, citizen science, volunteering, reporting local issues, participation in planning and evaluation
- Researchers and Universities - specialist monitoring, modelling, innovation

## 9.7 Data Management and Quality Assurance

- Standardised field methods and QA/QC protocols
- Centralised data storage and metadata standards
- Open data principles where appropriate
- Regular data audits
- Long-term dataset preservation

## 9 Waterway and Wetland Management Strategy consultation

Development of the Draft Norfolk Island Waterway and Wetland Management Strategy 2026-2036 has been informed by early and targeted consultation with the Norfolk Island Environmental Sustainability Advisory Committee, whose input helped guide the initial prioritisation of waterways and wetlands across the island.

To ensure the Strategy reflects community values, local knowledge, and the perspectives of key stakeholders, the Draft Strategy has been placed on public exhibition for 28 days. During this period, feedback has been sought from a broad range of groups and individuals, including:

- The Norfolk Island community
- Private landholders
- Norfolk Island Cattle Association
- Norfolk Island Council of Elders
- Norfolk Island Flora and Fauna Society
- Norfolk Island Tourism Association / Norfolk Island Tourism
- Australian Marine Parks (Norfolk Marine Park)
- Parks Australia (Norfolk Island National Park)
- Department of Infrastructure, Transport, Regional Development and Communications
- Office of the Administrator
- Norfolk Island Environmental Sustainability Advisory Committee
- Norfolk Island Water Quality Working Group
- Norfolk Island Grazing Project Working Group

This consultation process will ensure that the Strategy is grounded in both scientific evidence and the lived experience of the Norfolk Island community.

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