

**PLANS OF MANAGEMENT
FOR
NORFOLK ISLAND PUBLIC RESERVES**

PART A

**THE NORFOLK ISLAND
PUBLIC RESERVE SYSTEM**

APPLIES TO ALL PUBLIC RESERVES



2003



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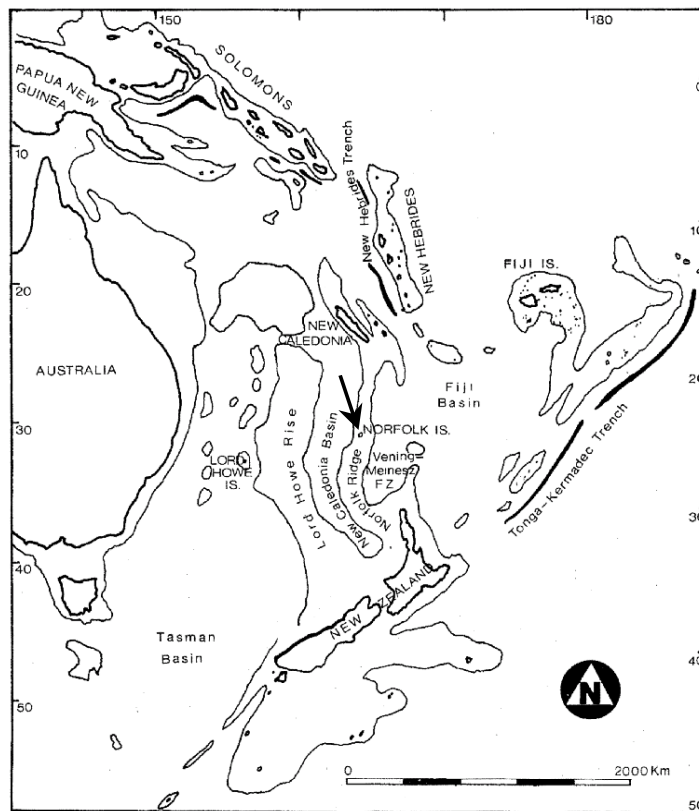
Part A: The Norfolk Island Public Reserve System

1 Regional Context

1.1 Introduction

This Part A Plan of Management applies to all public reserves.

Norfolk Island lies in the south-west Pacific Ocean (29° 04'S, 167° 56'E), approximately 1,676 km from Sydney and at a latitude approximately level with Brisbane, 1,100 km north-west of Auckland and 965 km south of Noumea, New Caledonia (Map 1). Norfolk Island has an area of approximately 35 square kilometres (3,529 ha) and is the largest and only inhabited island in a group of three (Norfolk Island, Nepean Island and Phillip Island). The maritime warm temperate to subtropical climate is generally mild with little variation in diurnal and annual temperatures. Rainfall is generally highest in the winter months (May to August) and the mean annual rainfall is approximately 1,324 mm¹. High rainfall also occurs in the summer months in association with cyclonic storms and prolonged periods of low rainfall appear to coincide with El-Niño² events.



Map 1: Regional Context of Norfolk Island

¹ Abell, R.S., (1993), Aquifer vulnerability on small volcanic islands in the southwest Pacific region: an example from Norfolk Island. *AGSO Journal of Australian Geology & Geophysics*, 14 (2/3), 123-133.

² During an El-Niño event the central and eastern surface waters of the Pacific Ocean warm. As an El-Niño event develops, the Southern Oscillation Index becomes increasingly negative, and drought conditions are likely to be experienced in eastern Australia.

Tourism is the mainstay of the Norfolk Island economy. In the year ending 30 June 1999 there were 36,514 tourist visitors to the Island³. Most tourists are Australians, with approximately 20% from New Zealand. Primary production is generally limited to supplying the local and tourist market, with the exception of the export of Norfolk pine and *Kentia* palm seeds.

Norfolk Island is a Territory under the authority of the Commonwealth of Australia. The *Norfolk Island Act (1979)* provides for government of the Territory by a nine-member Legislative Assembly that may enact legislation in respect of any matters except for those matters outlined in section 19 of that Act. The Assembly elects four of its members as Executive Members (Ministers) to form the Executive Council, which advises the Administrator of Norfolk Island. The Administrator of Norfolk Island represents the Commonwealth of Australia on Norfolk Island and has some reserved powers in respect of legislation relating to certain matters. The Norfolk Island Government is responsible for delivery and maintenance of the types of services and infrastructure usually provided by Federal, State and local government in Australia.

Wherever possible, species will be referred to in the Plans of Management by their common names. Appendix 1 lists the common and scientific names of all species referred to in the Part A and Part B Plans of Management.

2 Norfolk Island's System of Protected Areas

Norfolk Island comprises of approximately 3,529 hectares⁴ in the following proportions:

| | | |
|----------------------------------|-------|-------------------------------------|
| Freehold | 1700 | hectares |
| Crown Leasehold | 1006 | hectares |
| 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. |

Just under one-fifth (19.55%) of Norfolk Island (about 689.9 hectares) is in the National Park and Botanic Garden or 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. Map 2 shows the location of Norfolk Island Public Reserves and a list with further details is provided in Appendix 2.

2.1 Evolution of the Reserve System

During the last two centuries, areas of land have been set aside for public use, the common good and or protection of the environment of Norfolk Island⁵. Between the arrival of the Pitcairners in 1856 and 1896, laws were made by order of the Governor or at the request of the people. Administrative decisions were made by a majority vote in 'the House', a meeting of all adult members of the community and enforced by magistrates elected from the community⁶. In 1896, a new system was established that placed all authority in a resident non-islander Chief Magistrate appointed by the Governor and advised by twelve elders elected by the community (the "Council of Elders"). The Council of Elders was given the care and management of commons and public reserves on Norfolk Island⁷.

³ Administration of Norfolk Island *Norfolk Island Annual Report 1998-1999*.

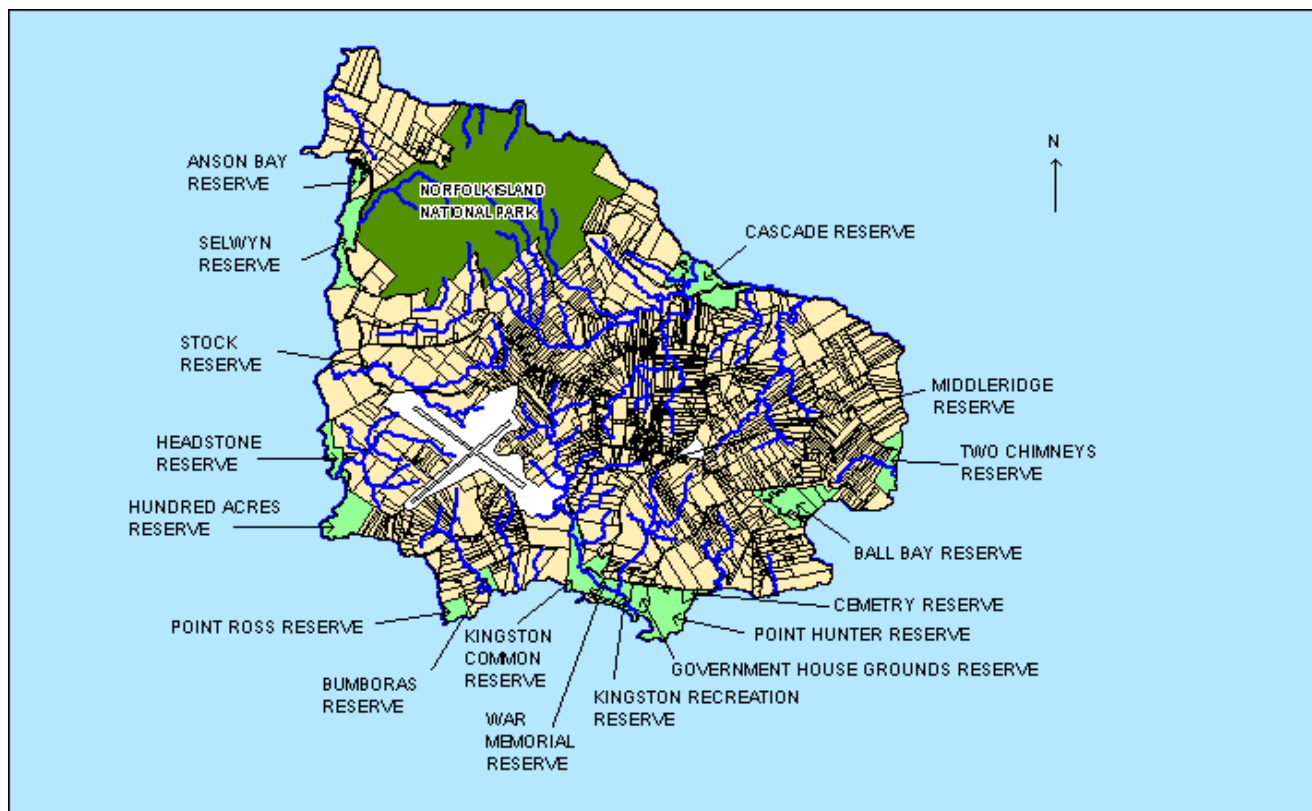
⁴ Norfolk Island Report 1995-1996: p17.

⁵ The designation of a reserve for a particular purpose has no legal standing as all areas proclaimed to be reserves have equal status. However, the dedication of a reserve for a particular use or uses indicates the intended use of the reserve at the time.

⁶ Hoare, M. (1988), *Norfolk Island: an outline of its history, 1774-1987*. University of Queensland Press, St Lucia.

⁷ "Law 9" proclaimed on 14 November 1896, provided that all Commons and Public Reserves were under the "care and management" of the Norfolk Island Council of Elders, which had power to make, amend and repeal by-laws for that purpose. This

The only reserves shown on the 1887 map of Norfolk Island⁸ were at Ball Bay, Cascade, Kingston (then called “Government Reserve”), Longridge and Rocky Point (named “Hundred Acres Reserve” in 1896). Later, other areas already recognised as commons or reserves were formally protected under the *Commons and Public Reserves Law 1913*⁹ and or its successor, the *Commons and Public Reserves Ordinance 1936*¹⁰.



Map 2: Norfolk Island Reserves

Two former reserves, Mt Pitt Reserve and Phillip Island, together form the Norfolk Island National Park, which was established under the *Norfolk Island National Park and Norfolk Island Botanic Garden Act 1984* on 21 February 1984 and proclaimed under the *Commonwealth National Parks and Wildlife Conservation Act 1975* on 30 January 1986. The Norfolk Island National Park and Botanic Garden is presently managed by the Australian National Parks and Wildlife Service (Parks Australia) under the *Norfolk Island National Park and Norfolk Island Botanic Garden Regulations 1988*, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and regulations and the *Norfolk Island National Park and Botanic Garden Plans of Management 2000*. The Commonwealth’s *National Parks and Wildlife Regulations* were disapplied with respect to the Norfolk Island National Park and Norfolk Island Botanic Garden on 16 October 1992, however introduction of the EPBC Act in 2000 has resulted in Commonwealth national parks regulations again applying to the Norfolk Island National Park.

authority was, by a proclamation dated 25 September 1899 by Lord Beauchamp, Governor of Norfolk Island, restricted to those Commons and Public Reserves specifically proclaimed to be under the care and management of the Council of Elders and subject to such conditions as that proclamation may contain.

⁸ *Plan of Norfolk Island Shewing Grants and Subdivisions*. Signed by Walter Harper, Licensed Surveyor, and sent by him to the Surveyor General on 20 October 1887. Printed at the Surveyor General’s Office, Sydney, April 1888.

⁹ Now repealed.

¹⁰ Now repealed.

2.2 *Public Reserves Act 1997*

The *Commons and Public Reserves Act 1936* was replaced by the *Public Reserves Act 1997*, which commenced on 23 June 1997. Existing public reserves continued to be protected under that new Act. The Norfolk Island Legislative Assembly enacted the *Public Reserves Act 1997*, to ensure that the public reserves on Norfolk Island and Nepean Island, are managed to:

- promote the conservation of the natural environment and landscape beauty of Norfolk Island;
- promote the conservation of the heritage of Norfolk Island; and
- preserve the way of life and the quality of life of the people of Norfolk Island.

The Legislative Assembly recognised that the management of public reserves must involve the community. The *Public Reserves Act 1997* therefore requires that each reserve be managed in accordance with a plan of management that has been subjected to community consultation and comment and then accepted by the Assembly and the Administrator.

Public reserves are vacant crown land and under the care and control of the Administrator, who is appointed under Section 5 of the *Norfolk Island Act 1979*. The Administrator exercises his responsibilities under the *Public Reserves Act 1997* as part of the Government of Norfolk Island.

The *Public Reserves Act 1997* requires the appointment of a Conservator of Public Reserves, which office is responsible for the management of all public reserves, in accordance with the plan of management for each reserve. The Administrator has no authority under the *Public Reserves Act 1997* to issue permits or grant approvals, as such powers are vested only in the Conservator of Public Reserves. However, the Administrator may give written directions to the Conservator of Public Reserves, provided such directions are not inconsistent with a plan of management.

The *Public Reserves Act 1997* does not bind the Crown, but does bind the Administration of Norfolk Island.

2.3 *Previous Plans*

This is the first Plan of Management prepared for the following public reserves:

| | | |
|---------------------|----------------------|----------------------------------|
| Anson Bay Reserve | Nepean Island | Cemetery Reserve |
| Ball Bay Reserve | Point Ross Reserve | Government House Grounds Reserve |
| Bumbora Reserve | Selwyn Reserve | Kingston Common Reserve |
| Cascade Reserve | Stock Reserve | Kingston Recreational Reserve |
| Headstone Reserve | Two Chimneys Reserve | Point Hunter Reserve |
| Middleridge Reserve | | War Memorial Reserve |

The Plan of Management for Hundred Acres Reserve was made by the Administrator on 13 August 1999. The revised plan for that reserve reflects the changed format of plans of management for the public reserves (each Plan consisting of Parts A and B) and includes a new section on IUCN¹¹.

2.4 *Register of the National Estate*

All public reserves apart from Ball Bay, Headstone, Stock Reserve and Middleridge were listed on the Register of the National Estate on 21 October 1980. Section 30 of the *Australian Heritage Commission Act 1975* requires the Administrator to inform the Australian Heritage Commission of any action that might have a significant adverse effect on heritage values in a reserve that is listed on the Register of the National Estate and give the Commission a reasonable opportunity to consider and comment on that action.

¹¹ International Union for the Conservation of Nature.

The reserves will be managed to promote their heritage values in accordance with the objects of the *Public Reserves Act 1997*. The Administrator will be advised of any actions that are necessary in managing a reserve in accordance with this plan of management but which are likely to have a significant adverse effect on the heritage values of a reserve.

2.5 *Kingston and Arthur's Vale Historic Area (KAVHA)*

The Kingston and Arthur's Vale Historic Area was established in 1980 when it was entered in the Register of the National Estate. The KAVHA was officially established by agreement between the governments of Norfolk Island and Commonwealth of Australia in 1989¹². The agreement established a board to coordinate funding and recommend management policies to ensure the conservation and restoration of the heritage fabric in the Kingston area. The KAVHA Board has played an invaluable role in conserving Kingston as a living monument.

The Kingston and Arthur's Vale Historic Area Conservation Management Plan (CMP), agreed to by the KAVHA Board and the Legislative Assembly of Norfolk Island in 1988, is the guiding document for heritage preservation, conservation, and management of reserves within KHAVHA.

Adoption of any part of the CMP into these Plans of Management shall be in accordance with section 16 of the *Public Reserves Act 1997*, but shall in each case be subject to public consultation in accordance with section 11 of the Act.

Where there is any inconsistency between the intent of these plans of management and the intent of the approved KHAVHA CMP, the intent of the approved KAVHA CMP shall prevail.

2.6 *IUCN Categories*

All of Norfolk Island has been significantly modified by human activities. The small size of the public reserves, their modified condition and current uses make them difficult to classify into IUCN categories¹³. Definitions of IUCN protected areas categories are provided at Appendix 4. Table 1 summarises the IUCN categories that might best suit each reserve.

Table 1: Approximate IUCN Categories for Norfolk Island Public Reserves

| Reserve | Best-fit IUCN category | Special management areas |
|---------------|------------------------------------|------------------------------------|
| Anson Bay | V Protected Landscape/seascape | IV Habitat Species Management Area |
| Ball Bay | V Protected Landscape/seascape | IV Habitat Species Management Area |
| Bumbora | IV Habitat Species Management Area | VI Managed Resource Protected Area |
| Cascade | V Protected Landscape/seascape | |
| Headstone | V Protected Landscape/seascape | |
| Hundred Acres | IV Habitat Species Management Area | VI Managed Resource Protected Area |
| Middleridge | III Natural Monument | |
| Nepean Island | IV Habitat Species Management Area | V Protected Landscape/seascape |
| Point Ross | V Protected Landscape/seascape | III Natural Monument |
| Selwyn | V Protected Landscape/seascape | |
| Stock | None – stock water reserve/common | |
| Two Chimneys | V Protected Landscape/seascape | |

¹² Memorandum of Understanding between Norfolk Island and Commonwealth governments: 1989, revised 1994.

¹³ International Union for the Conservation of Nature (IUCN) Protected Area categories as modified in IUCN (1994) *Guidelines for Protected Area Management Categories*, IUCN, Gland, Switzerland.

3 Management Context

3.1 *Norfolk Island Parks and Forestry Service*

The Norfolk Island Parks and Forestry Service (NIPFS) is the management authority responsible for the implementation of plans of management in public reserves. It also undertakes forestry operations in the Forestry Zone of the National Park and in some public reserves, and is responsible for the control of noxious weeds on all public lands. As the Director of the Norfolk Island Parks and Forestry Service, the Conservator of Public Reserves coordinates policy, develops management programs and provides advice to the Administrator and the Minister for Health and Environment on matters relating to public reserves and wildlife management and conservation issues on and around Norfolk Island.

The Norfolk Island Parks and Forestry Service is responsible for the management of 224.4 hectares of public reserves, approximately 133.8 hectares of public roadsides and vacant Crown land, and approximately 130 hectares in the Forestry Zone of the National Park, a total of about 488 hectares.

Public reserves will be managed by the Conservator of Public Reserves and Norfolk Island Parks and Forestry Service in accordance with the Plan of Management for each reserve.

3.2 *Parks Australia on Norfolk Island*

Norfolk Island ceased being viewed by Environment Australia as a “Conservancy” following the enactment of the *Public Reserves Act 1997*, the appointment of the Conservator of Public Reserves, and formation of the Norfolk Island Parks and Forestry Service. The Parks Australia¹⁴ presence on the island is now focussed on managing the National Park and Botanic Garden.

The senior Parks Australia officer on Norfolk Island is appointed as Park Superintendent under the *Norfolk Island National Park and Norfolk Island Botanic Garden Act 1984* by the Executive Member of the Norfolk Island Government with responsibility for the environment. The Park Superintendent manages the Norfolk Island National Park and Botanic Garden under that Act and regulations on behalf of the Norfolk Island government and on behalf of the Director, Parks Australia, under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and regulations. Those laws and regulations provide that the Norfolk Island National Park and Botanic Garden shall be managed only in accordance with the Plan of Management for the Norfolk Island National Park and Botanic Garden. The Park Superintendent must also take account of the advice provided by the Norfolk Island National Park Advisory Committee.

The Norfolk Island National Park Advisory Committee, an advisory body that includes members of the community, has been formally created to advise on the management of the National Park and Botanic Garden. The committee meets approximately twice each year.

3.3 *Social Context*

In recent decades, a new philosophy is emerging in protected area management, with an increased recognition of the role of human society in shaping the environment on local, regional and global scales. International conventions and inter-governmental agreements now focus on integrating the social perspectives of natural resource use with the physical and biological requirements of the ecosystems that provide them. Economic principles underlying our traditional resource allocation are being adjusted to account for ecological costs and sustainability and to revisit concepts of equity and ethical responsibility. Heightened community awareness of local values and quality of life issues are reflected in the perception that ‘progress’ is not necessarily synonymous with economic development and a redefinition of the role of governments and communities in sustainable resource management.

¹⁴ Formerly ANPWS (Australian National Parks and Wildlife Service).

These values are reflected in the objectives for the public reserves set by the Norfolk Island Legislative Assembly. To fulfil these objectives requires a sound understanding of the ecological processes that maintain environmental integrity in these reserves and of the full range of human values associated with them.

3.4 *Community Involvement*

The importance of community involvement in public reserve management has been recognised by the Legislative Assembly, by setting down a process of community consultation in the development of plans of management. To provide further opportunities for public consultation, the Norfolk Island Parks and Forestry Service has evolved a Public Participation Program that consists of a preliminary pre-drafting program and an ongoing consultation process involving interested individuals prior to publishing the Draft Plans of Management and formal public submissions. The preliminary program followed a general invitation to the community to become involved in gathering information and identifying issues and options to be addressed in the plans for each reserve. Public meetings and focus group meetings were held to promote debate and improve understanding of the issues, values and management options.

The small size of the Norfolk Island community allows a high degree of participation by individuals in planning processes. Interested community members can directly participate in the ongoing development of these plans, their implementation and review in an informal advisory capacity. This process will be facilitated through a number of strategies. The major initiative will be through promoting partnership approaches to program planning and implementation. Focus groups comprised of community members and stakeholders will be convened to address specific issues as they arise. These groups will be facilitated by Norfolk Island Parks and Forestry Service and participation will be invited from community members by an open invitation in "The Norfolk Islander" and Norfolk Radio. Reports of outcomes from planning workshops will be published in the Norfolk Islander to inform the wider public and promote support and participation in the implementation of programs. A Norfolk Island Parks and Forestry Service web site is being developed to provide information and facilitate public comment and participation.

A formal advisory group (or series of groups) is not advocated. A system of formal community advisory bodies similar to the Norfolk Island National Park Advisory Committee is not considered an appropriate mechanism for involvement of the Norfolk Island community in the management of the public reserves. A single advisory committee would not reflect the full range of different community interests in each of the reserves, while a separate formal advisory committee to advise on the management of each of the public reserves would be unworkable. An informal participatory process will be more inclusive of potentially marginalised groups and promote more equitable representation. Small community advisory groups or individual focus groups will be encouraged to represent the views of interest groups and to assist management in decision-making processes. However, wherever possible the whole community will be consulted on specific issues as they occur.

Individuals in the community often make direct representations to the Administrator, Executive Member, and Members of the Legislative Assembly. Comments and ideas from individuals on the management of the public reserves will continue to be welcomed by the Conservator of Public Reserves. The Conservator of Public Reserves will take account of the views provided by members of the community; however planning decisions must be based on the full range of scientific advice, best practice management procedures, community values, and available resources.

4 Conservation Significance

4.1 *Natural Heritage*

Norfolk Island is a relatively young isolated volcanic oceanic island. The predecessors of its present unique flora and fauna arrived on the island over the past 3 million years, many evolving sufficiently distinct characteristics to be considered separate species endemic¹⁵ to Norfolk Island. Such features include normally small plants or herbaceous shrubs assuming tree form as in the endangered Chafftree. During this process of evolution these species have interacted with other arrivals and the physical environment, resulting in a unique island ecosystem. Of the 171 plants indigenous to Norfolk Island, 47 or 27.5% have evolved to be recognised as endemic species and two as endemic genera (*Ungeria* and *Streblorrhiza*)¹⁶. Such a high degree of endemism is a common feature of isolated oceanic islands. Studies of the biogeography of islands provide important insights into the processes of evolution and biodiversity conservation and management.

The natural colonisers of Norfolk Island originated from Australia, New Zealand, or New Caledonia. The relatively recent human colonisations changed natural habitat structures on a broad scale and introduced a whole suite of new plant and animal species, resulting in significant modification of the Island's ecosystems. Small islands like Norfolk Island can only support small populations of wild plants and animals. They are therefore highly vulnerable to decline and extinction as a result of natural or human disturbance. On Norfolk Island a high proportion of native or endemic vertebrates (2 out of 2 species of lizard, 6 out of 15 birds and both species of bat, the only native terrestrial mammals) have become extinct since European settlement in 1788. Today, almost one-third of the remaining native plants are vulnerable or threatened, while the populations of at least six of the remaining nine endemic species or sub-species of birds have declined to the extent that they are endangered or on the brink of extinction.

The conservation of Norfolk Island's natural heritage presents a special challenge: a challenge to provide for the needs of human residents and visitors, while ensuring human impacts do not further degrade the environment.

4.1.1 *Geology and Landform*

Norfolk and Phillip Islands are remnants of a volcanic island on the Norfolk Ridge. The Norfolk Ridge (which extends nearly 2000 km from New Caledonia to New Zealand) and the Lord Howe Rise are part of the Australian continental plate that separated from the Australian mainland early in the Tertiary period¹⁷.

Norfolk Island is made up almost entirely of nearly horizontal layers of basaltic lava and inter-bedded tuff from three eruptive episodes between 3.05 and 2.3 million years ago¹⁸. The pillow lavas and flow-foot breccias¹⁹, along Norfolk Island's northern coastline indicate that at the time of these eruptions, sea level was within 10m of the present level.

Nepean Island and the fringing reef and coastal rocks at Kingston, including Point Hunter and the Lime Kiln, are not volcanic in origin but are composed of cross-bedded aeolianitic calcarenite²⁰. This sandstone was formed either in shallow water, below the water table, or when calcite-rich water percolated down

¹⁵ Endemic: not occurring naturally anywhere else.

¹⁶ Green, P.S. (1994), *Flora of Australia*, Volume 49, Oceanic Islands 1, Ed. A.J.G Wilson, Australian Government Publishing Service, Canberra.

¹⁷ Green, T.H. (1973), Petrology and Geochemistry of Basalts from Norfolk Island, *Journal of the Geological Society of Australia*, Vol. 20, Pt.3, pp. 259-272, September 1973.

¹⁸ The information on Norfolk Island geological history follows Jones and McDougall (1973). See Jones, J.G., and McDougall I., (1973), *Geological history of Norfolk and Phillip Islands, Southwest Pacific Ocean*, J.Geol. Soc. Aust. 20 (3), 239-57.

¹⁹ Lava that flows into large bodies of water, such as the sea, typically result in pillow lava formations and flow foot breccia.

²⁰ Aeolianite is rock formed from particles deposited by wind action; calcarenite refers to the chemical make up of the fragments of shell and coral from which this rock is composed: calcite (calcium carbonate CaCO₃). Because the sand grains are themselves composed of calcite, this sandstone is also a limestone.

through the sand dunes, cementing the sand grains together. Extensive glaciation during the last two ice ages significantly lowered sea levels²¹ and exposed large areas of sandy sea bed and coral reefs between and around Norfolk and Phillip islands. It is presumed that erosion of these reefs and sand beds and subsequent wind deposition formed massive dune systems composed largely of coral and sea shell sands and that Nepean Island and the rocky outcrop formations at Kingston are remnants of those Ice Age dunes.

If the initial symmetry typical of volcanic islands is assumed for Norfolk and Phillip Islands then at least two-thirds of the original landmass has been eroded away. The volcanic deposits on the surfaces of both Norfolk and Phillip Islands have been deeply weathered, in many places to a depth of 45 or 50m. Subsequent erosion of this weathered material has formed the Island's undulating hillsides and deeply dissected valleys. The drainage pattern consists of a dendritic network of largely dry valleys. Except in the lower reaches of the more extensive catchments, surface water is generally limited to short periods following prolonged or intense rainfall. Groundwater recharge is facilitated by the deeply weathered sub-soil and more than 450 bores have been drilled to exploit this natural supply of fresh water.

Norfolk's steep but relatively stable hillsides reflect an equilibrium between rainfall, surface and sub-surface soil porosity and structure, and natural vegetative cover. The Island's soils are relatively fertile, but highly erodible aggregated clay loams or ferrosols²². 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. Terracettes are common on steep hillsides that are grazed by cattle. Clearing native vegetation on steeper slopes together with 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, such as along the coast and above streams and road cuttings.

4.1.2 Native Vegetation

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 cliffs²³.

Norfolk's subtropical forest has more recently been classified into four major plant communities²⁴. Palm and tree fern forest in the gullies dominated by Norfolk Island Palm, Rough Tree Fern, and Smooth Tree Fern. A mixed hardwood forest dominated by Ironwood and Norfolk Island Oleander. Hardwood vine forest with a diverse understorey of dense, tangled vines such as Mountain Rush, Jasmine, Samson's Sinews, and Native Cucumber, some of which are equipped with thorns such as Devils Guts. Drier forest on the more exposed lowland ridges dominated by Norfolk Island Pine, sometimes with an understorey of mixed hardwood species, including White Oak and Maple.

Other native vegetation includes sandy beach habitat and dune communities dominated by Strand Morning Glory, Norfolk Island Bean, Mile-a-minute and Native Vigna. Rocky coastal cliffs are dominated by wind-pruned White Oak, Native Flax, Moo-oo, and Native Coastal Lily.

There are significant native vegetation remnants in the public reserves, including vegetation associations that are not protected elsewhere on the island.

²¹ Sea levels have been estimated at about 109m lower than present at the height of the last Ice Age that ended approximately 12 - 15,000 years ago.

²² Previously known as krasnozem soils, being Russian for *red land*, because of their red colouration due to a relatively high free iron oxide content.

²³ Green, P.S. (1994), *Flora of Australia*, Volume 49, Oceanic Islands 1. Ed. A.J.G Wilson, Australian Government Publishing Service, Canberra.

²⁴ Gilmore, P. and Helman, C. (1989), *A survey of Quality Plant Communities on Norfolk Island outside the National Park*, Unpublished ANPWS report.

4.1.3 Native Fauna

4.1.3.1 Marine Ecosystems

Norfolk's marine ecosystems are largely unstudied, however a variety of reports, almost entirely based on brief periods of field work, are available on marine organisms ranging from marine algae (seaweeds) and nudibranchs to corals and fish.

Most of Norfolk Island's coast is exposed to the open ocean, with waves and swells frequently creating high energy conditions along most of the shoreline. Part of the southern coast has been protected to some extent from the heavier southerly and south-easterly storms by Nepean and Phillip Islands, as evidenced by lower cliffs and the remnant foreshore calcarenite reefs at Kingston.

Marine algae dominate most of the substrate of these high-energy habitats with sponges, molluscs, echinoids (sea urchins) and the colonial ascidian *Lissoclinum bistratum* is also common. Small colonies of hard and soft corals occur on the inshore side of larger boulders and rocks forming reefs where sheltered conditions are found.

Inshore reefs form an intertidal barrier protecting a small bay and narrow lagoon at Emily and Slaughter bays and a small lagoon at Cemetery Bay. These are the world's second-most southerly coral reefs, with a unique assemblage of sub-tropical fauna. All of the 32 species of reef-building corals found at Norfolk Island by Hughes are a sub-set of the species on Lord Howe Island, indicating episodic recruitment apparently via surface currents from the southern Great Barrier Reef and Lord Howe Island²⁵.

Both islands lie between tropical regions dominated by corals and cool temperate regions dominated by algae. Small changes in water temperature, nutrient levels, and grazing fauna (such as sea urchins and damselfish) can have a marked effect on the relative abundance of marine algae and corals on Norfolk's reefs.

Higher levels of nutrients promote algae growth that quickly smothers damaged corals and reduces the amount of bare substrate available to be colonised by corals. Human exploitation of herbivorous sea urchins and larger carnivorous fish, together with fish feeding by glass bottom boat tour operators can all have a significant impact on the algae/coral ratio of Norfolk's inshore reefs. 'Artooti' (the local name for two species of Pomacentrid damselfish) are unusually abundant in Slaughter Bay, apparently due to fish feeding. Both species of Artooti aggressively defend their territory against other fish, and snorkelling humans. By doing so they restrict grazing by other herbivorous fish and sea urchins and may therefore promote the growth of algae²⁶. The reefs also support a diverse invertebrate fauna including sponges, flatworms, anemones, nudibranchs, molluscs, sea urchins, sea stars and shrimps.

Recent studies have reported a total of 218 coastal fish species in Norfolk Island waters. Of these, 58% are tropical, 33% are subtropical and fewer than 8% are temperate species (distributions confined to the Tasman Sea region)²⁷. There are only four coastal fish endemic to Norfolk Island: a Blenny, a Gobie, a Puffer Fish, and a Cardinal Fish²⁸. Importantly, about 85% of the lagoon fishes in the Kingston area are strongly associated with reef habitat and a large proportion of species rely on coral polyps, algae and detritus from the reef platform for food²⁹.

²⁵ Hughes, T.P., (1997), Natural resources of Emily Bay and Slaughter Bay, Norfolk Island: Current Status and Management Options. In: *Kingston and Arthurs Vale Historic Area Water Quality Management Plan*. Report to Works Australia on behalf of the KAVHA Management Board, Peter Davidson Pty Ltd, Norfolk Island.

²⁶ Hughes, T.P., (1997), Natural resources of Emily Bay and Slaughter Bay, Norfolk Island: Current Status and Management Options. In: *Kingston and Arthurs Vale Historic Area Water Quality Management Plan*. February 1997. Report to Works Australia on behalf of the KAVHA Management Board, Peter Davidson Pty Ltd, Norfolk Island. p. 31.

²⁷ Norfolk Island Fish Survey, (1990), 11 - 26 Nov - 1989, Unpublished Report to ANPWS.

²⁸ Ivanovici, A.M. (1988), *Emily Bay and Slaughter Bay, Norfolk Island: Resources and Options for Management*. Australian National Parks and Wildlife Service. Canberra.

²⁹ Watkins Consulting Ltd. (NZ). (1999), *Australian Coastal Vulnerability Assessment Case Studies: Norfolk Island Case Study*, Climate Change Program, Commonwealth Coastal Action Program.

Trumpeter is the major commercial fish in Norfolk waters³⁰. Larger fish commonly occurring include Kingfish, Snapper, Trevally, Tuna, Mahi Mahi, Wahoo, Bonito, Rock Cod (or Grouper), stingrays and a variety of sharks including Reef, Tiger and Bronze Whaler.

Green Turtles, which were plentiful during the early first settlement and bred on sandy beaches on both Norfolk and Nepean Islands, still occur in waters around the Norfolk Island group.

A number of species of whale that migrate seasonally between Antarctic and tropical waters via New Zealand pass close to Norfolk Island. Cook noted the exceptional abundance of whales in the region in 1774 and whales were taken from Norfolk waters intermittently during the nineteenth and twentieth centuries. Whaling on Norfolk culminated with a modern whaling station at Cascade from 1956 to 1962, by which time whale numbers had declined to the extent that whaling was no longer profitable. The principal species taken were Sperm Whale, Right Whale, and Humpback Whale³¹. Recent reports include sightings of Humpback Whale, Pilot Whale, Killer Whale and dolphins³².

4.1.3.2 *Freshwater Aquatic Ecosystems*

Unfortunately very little is known or recorded about the few permanent natural freshwater ecosystems on Norfolk Island. All of the permanent streams and ponds have been significantly modified³³ directly or indirectly by extensive clearing of native vegetation and by withdrawal of groundwater. Increased runoff results in more rapid peaking of stream flows, increased flooding, and sedimentation. A generally lower water table also results in reduced streamflow. The lower reaches of many streams have been modified by channelling, dam construction, cattle grazing and trampling, and introduced water plants. Removal of stream bank vegetation has increased available light and water temperatures, promoting introduced species better adapted to these conditions than native species.

Prior to European settlement, small wetland habitats may have occurred in the lower reaches of some of the more extensive catchments, including Broken Bridge Creek, Cascade Creek and Mission Creek. A relatively extensive and heavily-vegetated swamp covered the whole of what is now Kingston Common. A channel to drain this wetland was cut through the calcarenite barrier near the Lime Kiln in 1789 to provide land for agriculture. Today, both Watermill and Town creeks run in channels through the Common and the wetland is limited to a series of small swamps. The native swamp vegetation was poorly recorded but may have been dominated by River Clubrush. Today Native Rush and Drain Flags largely dominate these habitats, but they may have been early introductions like the Taro, which today lines the channels³⁴.

Native freshwater invertebrates and fish on Norfolk are largely unknown. Species include the endemic Norfolk Island Freshwater Shrimp and native crustaceans including the Common Freshwater Shrimp, a freshwater crab and a terrestrial crab, the Little Nipper Landcrab. Two species of eel, the Short-finned Eel and the Long-finned Eel are the only known native fish occurring in freshwater habitats on the Island.

Two resident wetland birds, the Tarler Bird (Purple Swamphen) and White-faced Heron, are common. However, the Buff-banded Rail, last recorded at Mission swamp in 1975 and the Spotless Crake which was

³⁰ Hermes, N. (ed.) (1985), *An annotated checklist of vascular plants and vertebrate animals of Norfolk Island*. Flora and Fauna Society of Norfolk Island.

³¹ Langdon, R. (1978), *American Whalers and Traders in the Pacific: a guide to records on Microfiche*, Pacific Manuscripts Bureau, Research School of Pacific Studies, ANU Canberra.

³² Hermes, N. (ed.) (1985), *An annotated checklist of vascular plants and vertebrate animals of Norfolk Island*. Flora and Fauna Society of Norfolk Island.

³³ *Flora of Australia* Volume 49, Oceanic Islands 1, AGPS, Canberra (1994); Schodde, R., P. Fullagar and N. Hermes, 1983, *A Review of Norfolk Island Birds: Past and Present*. Australian National Parks and Wildlife Service: Special Publication No. 8; Turner, J.S., C.N. Smithers and R.D. Hoogland, 1968, *The Conservation of Norfolk Island*. Australian Conservation Foundation Inc., Special Publication No.1.

³⁴ Green, P.S. (1994), "Norfolk Island and Lord Howe," *Flora of Australia*, Volume 49, Oceanic Islands 1, Ed. A.J.G Wilson, Australian Government Publishing Service, Canberra.

recorded nesting in the “100 acre Reserve” in 1909 and was last observed at Cascade Creek in 1980, may no longer be present on Norfolk Island, primarily due to loss of wetland habitat. The Pacific Black Duck now rarely occurs on Norfolk Island, as a result of competition from the introduced Mallard with which it interbreeds. Conversion of formerly heavily vegetated wetlands to wet grasslands, grazing land and public open space, such as the golf course, has provided 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.

4.1.3.3 Terrestrial Invertebrates

Norfolk Island’s terrestrial invertebrate fauna is poorly understood. Most scientific research on Norfolk’s invertebrates has focused upon minimising impacts to crops or horticultural species. Little is known about the effects of the disruption of natural ecosystems through habitat destruction, establishment of agricultural landscapes and the introduction of exotic invertebrate species (of which the ‘Army grub’ and Asian Paper Wasp are but two obvious examples).

Two species of moth larvae are responsible for ‘Army grub’ outbreaks, *Spodoptera mauritia*, which favours wetter, warmer conditions and *Leucania loreyimima*, which operates in drier periods³⁵. ‘Army grub’ outbreaks are a major pasture management problem on Norfolk Island causing loss of condition and starvation in cattle. Severe infestations of the Kikuyu pastures occur after dry periods of long duration followed by high rainfall periods. The devastation of edible pasture grasses increases foraging of native vegetation by cattle and may lead to stock poisoning as a result of ingesting toxic species such as Lantana that would not normally be grazed.

Changes in vegetation structure and replacement of native plants by introduced species have significantly altered the species composition and abundance of the native invertebrate fauna. Such changes could have dramatic effects on ecosystems if, for instance, invertebrates that are necessary for pollination or seed dispersal are displaced. Declining populations of invertebrate prey could be an important factor in the decline of insectivorous birds such as the Scarlet Robin.

Thirty-three species of terrestrial molluscs (land snails) still occur in the Norfolk Island group³⁶. Because each species of land snail has specific environmental requirements, the presence of a species of land snail reflects a particular habitat and microclimate and thus is an indicator of past and present climate and environments. Land snail shells found in different strata in archaeological palaeontological excavations on Norfolk Island have been used to help determine the relative ages of different sites and of levels within sites. A number of species of terrestrial snail have become extinct or have declined significantly since European settlement.

4.1.3.4 Terrestrial Vertebrates

4.1.3.4.1 Reptiles

Sub-fossils found at Kingston show that two species of lizard were native to Norfolk Island, the Greater Marbled Gecko and the Phillip Island Skink prior to European settlement. These species only occur on Lord Howe Island and in the Norfolk Island group. Although there have been no confirmed records of either lizard on Norfolk Island since 1788, both still occur on Phillip Island. In November 1978 the gecko was found to be “extremely abundant” on Nepean Island and was also present on other offshore islets, such as Bird Rock where cats and rats have not been introduced. This species of gecko feeds on a variety of spiders, insects and other invertebrates, but also feeds on the nectar of White Oak flowers and other plants,

³⁵ ANPWS, (1989), *The Norfolk Island Environment Book*, Commonwealth of Australia, Canberra.

³⁶ Varman, R.V.J.P (1998) Norfolk Island Snail Species List <http://www.geocities.com/Paris/Left Bank/6559/scc38.html>

which is unusual among geckos. Skinks were not found on Nepean Island, Bird Rock or Moo'oo Rock by Cogger and his research team in 1978³⁷.

4.1.3.4.2 Seabirds

It may be postulated that the displacement of significant areas of native forest by pasture and woody weeds has reduced seabird nesting habitat on Norfolk Island. However, the distribution and success of the island's present seabird colonies indicate that seabird populations may be limited by factors other than suitable nesting sites, such as the availability of prey and predation by rats and cats. During the summer months, the aerobic White Tern usually breeds in coastal trees (especially pines and white oaks) where they lay their single egg directly onto a branch without constructing a nest. The Wedge-tailed Shearwater (known locally as Ghostbird or Muttonbird), and the Little Shearwater ('Laro') breed in burrows along the coastal cliffs, often under wind-pruned white oaks. Nestlings remain in the burrow while the adults catch small fish at sea during the day. They can be seen rafting together near the shore while waiting for dusk when they return to feed their young. Ghostbirds are present on Norfolk between October and May, while Little Shearwaters breed from July to December. Red-tailed Tropicbirds can also be found nesting during summer on or near the cliffs around the Island. Large numbers of Masked Booby and Sooty Tern breed on Phillip and Nepean islands, free from predation by rats and cats.

4.1.3.4.3 Terrestrial birds

The displacement of forest habitat by open pastures and woody weeds, the introduction of predators and the introduction (including self-introduction) of a number of exotic bird species since European settlement have seriously affected Norfolk's terrestrial birds. Six species or sub-species of bird native to Norfolk Island have become extinct since 1788: Norfolk Island Pigeon, Norfolk Island Ground Dove, Norfolk Island Kaka, Long-tailed Triller or Black and White Sparrow, Norfolk Island Starling and more recently the Grey-headed Blackbird (also called Guavabird or Sunna). One sub-species, the Norfolk Island Morepork or Boobook Owl, declined to a single individual, which following the introduction of two individuals of the New Zealand sub-species, has now grown to a population of about 15. One species, the White-breasted White-eye (one of three species of "Grinnel") is presently on the brink of extinction. The formerly abundant endemic sub-species of the Red-fronted Parakeet or Norfolk Island Green Parrot had declined to about thirty individuals by 1980. The wild population of this sub-species is now thought to be over 100, as a result of intensive management in the National Park.

There are now thirty-five species of terrestrial birds resident on Norfolk Island including exotic species³⁸. Endemic and native terrestrial birds on Norfolk evolved and survived in the predominantly forested habitats. Prior to human settlement and the widespread replacement of forests with more open habitats, there would have been little chance that new bird species arriving on the island would have survived unless they were forest birds. Birds of the open plains and woodlands of Australia, such as the Nankeen Kestrel and the Masked Woodswallow and White-browed Woodswallow that are now established on the island, no doubt have arrived on Norfolk before from time to time during the past two million years, but failed to establish populations because of they were unsuited to the island's forest habitats.

Any new species that is able to establish itself on a small island like Norfolk is likely to affect the species that are already present to some extent. Usually those effects will be subtle and not discernible for decades. In some cases, the effects of competition with or predation on native species will be significant enough to threaten the survival of the native species. On Norfolk it is likely that the demise and final extinction of the Grey-headed Blackbird was at least to some extent caused by competition from the closely related European Blackbird, which appears to have been introduced by people at the Melanesian Mission sometime in the early 1920's³⁹. Perhaps the decline of the White-Breasted White-eye (which is now virtually extinct) has

³⁷ Cogger, H., Sadler, R. & Cameron, E. (1983), *The Terrestrial Reptiles of Australia's Island Territories*, Australian National Parks and Wildlife Service, Commonwealth of Australia.

³⁸ Including the Masked Woodswallow and the White-browed Woodswallow that self-introduced to Norfolk during the mid 1990's and remain possibly as non-breeding populations, particularly in the Steels Point area.

³⁹ Schodde, R., P. Fullagar and N. Hermes, (1983). *A Review of Norfolk Island Birds: Past and Present*. Australian National Parks and Wildlife Service: Special Publication No. 8.

been least partly the result of competition with the self-introduced Silvereye. The decline of the Green Parrot may in part be due to competition for nesting hollows with the more aggressive exotic Crimson Rosella. Feral Fowl, European Blackbird and European Songthrush compete to some extent with the Scarlet Robin for soil invertebrates and could be a significant factor in that species decline.

4.1.3.4.4 Mammals

There were only two terrestrial mammal species known to be native to Norfolk Island, the Gould's Wattled Bat and the Norfolk Island Free-tail Bat. Both are now believed to be extinct.

4.2 Cultural Heritage

Norfolk Island has a rich and fascinatingly varied cultural heritage that began during the early thirteenth century A.D. with the little known occupation at Emily Bay by early Polynesian people⁴⁰. Polynesian settlement was followed by the establishment of a British colonial outpost and penal settlement in the late 18th and early 19th centuries. A third phase of its history began when Britain transferred the community comprised mainly of the descendants of *HMAV Bounty*⁴¹ mutineers from Pitcairn Island to Norfolk in June 1856. This community with its unique culture and traditions and identity forms the heart of the modern Norfolk Island community of today.

4.2.1 Polynesian Settlement and Visits

During the past 200 years, Polynesian stone artefacts including adzes have been found in a number of locations on the island indicating that Polynesians had visited and used the island in the past. Plantains or bananas found by the first European colonisers in 1788 were also evidence of a prior Polynesian presence. On 14 December 1995, archaeological excavations revealed evidence of a Polynesian prehistoric settlement⁴². Later excavations produced further evidence indicating that Polynesian people had probably occupied the settlement at Emily Bay for two hundred years or so, from the early 13th century until sometime in the early 15th century.

4.2.2 European Discovery and Settlement

Captain James Cook discovered and claimed Norfolk Island on the 10th October 1774, during his second voyage of discovery aboard *HMS Resolution* accompanied by the naturalists, Johannes and George Forster. He noted and described the tall Pines and abundant "New Zealand flax", observing their possible value for providing masts and sailcloth for naval ships. Cook's glowing report of the potential strategic value of the Norfolk Island pine motivated the British government to establish a colony on the Island under the leadership of Lieutenant Philip Gidley King, just six weeks after the arrival of the First Fleet at Botany Bay⁴³. The original objectives of the settlement were to prevent the island's strategic resources falling into French hands and to provide masts, spars and sailcloth for repairing British ships in the region and provisions and cloth for the new colony at Port Jackson (later Sydney).

Lieutenant Governor King and his party of 22 convicts and marines arrived at Norfolk Island on *HMS Supply* from Botany Bay on 29 February 1788. *HMS Supply* anchored at Cascade, but a safe landing was not found until 6 March at Kingston⁴⁴. The British colonial history on Norfolk spanned two discontinuous periods of settlement that produced a rich legacy of elegant stone buildings and picturesque ruins that are a major attraction for visitors to the Island today.

⁴⁰ Anderson, A., T. Higham and R. Wallace, (2001). The Radiocarbon Chronology of the Norfolk Island Archaeological Sites. In *The Prehistoric Archaeology of Norfolk Island, Southwest Pacific*. ed. A. Anderson and P. White, pp33 – 42. *Records of the Australian Museum, Supplement 27*. Sydney: Australian Museum.

⁴¹ His Majesty's Armed Vessel.

⁴² Anderson, A., (undated), *Prehistoric Human Colonisation of Norfolk Island*. First Interim Report to Australian Heritage Commission. Unpublished report, Division of Archaeology and Natural History, Research School of Pacific Studies, Australian National University.

⁴³ Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra.

⁴⁴ Originally named Sydney and later changed to King's Town and then to Kingston.

4.2.3 First Settlement 1788 - 1814

King's small band of men and women cleared the trees and understorey next to the landing place at Kingston and established a small village. In March 1789, a drain was dug through the swamp to the north of the village and parts of the former swamp were cultivated. During the first year, crops suffered significant losses from bad weather and, more seriously, from rats⁴⁵, caterpillars and birds. However, in the second year, the crops were successful and further expansion of land under cultivation was constrained only by a lack of labour. The population of the Island increased to 160 by January 1790 with the transport of convicts and marines from Port Jackson to establish a flax industry.

Crop failures at Port Jackson, combined with a lack of storeships from England brought the fledgling Australian colony to the brink of starvation. In order to provide some relief from famine, two shiploads of marines and convicts were sent from Port Jackson to Norfolk in March 1790 to reduce the number of hungry mouths in Sydney Town and to return with provisions from Norfolk. Unfortunately, one of these ships, *HMS Sirius* (flagship of the First Fleet) wrecked on Kingston reef on 19 March 1790, stranding her crew on Norfolk Island for eleven months.

The subsequent food shortages on the Island caused the colony to exploit wild sources of food, leading to the almost immediate extinction on Norfolk Island of the Providence Petrel or Bird of Providence, so named because its demise averted starvation and consequent abandonment of the colony. Victualling records show that over 172,000 Providence Petrels nesting on the slopes of Mt Pitt and Mt Bates were taken and salted down between April and July 1790. The depredations at this time is likely to have led to the ultimate extinction of other species, including the Norfolk Island Ground Dove and Norfolk Island Kaka and near extinction of others, including the Green Turtle.

By 1792, the human population had reached 1100. Generous grants of land for full-time farming were given to free settlers and their families, mostly ex-marines, ex-seaman and marines from *HMS Sirius* and some ex-convicts. This private sector was to prove more successful at establishing economic self-sufficiency than public sector enterprises using convict labour. The Norfolk Island pine proved to be unsuitable for masts and flax manufacturing was abandoned because of a lack of technical knowledge and equipment and the establishment of a fledgling textile industry in Australia⁴⁶.

Other agricultural ventures by the private sector were more successful. In 1794, following a bumper crop, King estimated that over 20,000 bushels of surplus maize were available for export to Port Jackson. However, none was to be sent because of an abundant harvest in the Australian colony and the final arrival of two storeships from England. The subsequent glut on Norfolk and loss of profits depressed local grain production but stimulated pork production for export to New South Wales. King, by then Governor of New South Wales, reported in 1803 that 18,535 lbs of salted pork had been supplied to Sydney from Norfolk Island. This increased the following year to 55,055 lbs⁴⁷. A successful export industry had been established despite difficulties obtaining reliable transport and a supply of salt. By 1804, the settlement's population had increased to 1,084, over 75% (833) of whom were free settlers.

During the next decade, concerned to secure Tasmania against claims by the French and to control Bass Strait, some of Norfolk's population was transferred to Port Dalrymple, Van Dieman's Land. Colonial authorities were also concerned with the difficult communications between Norfolk and Sydney, the lack of a safe harbour, an apparently growing disregard for self-sufficiency and increasing prosperity of private individuals on the island. The transfers were unsuccessfully opposed by Norfolk's settlers and enforced removals of a large proportion of the population significantly reduced the Island's pork and grain

⁴⁵ The Polynesian Rat *Rattus exulans* was introduced to the island by Polynesian settlers as early as the twelfth century AD. The Ship's Rat *R. rattus* may not have arrived on Norfolk until 1943.

⁴⁶ Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra. p. 21.

⁴⁷ Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra.

production. The resultant reduction in the island's agricultural exports further reduced the island's viability. In 1814 the settlement was abandoned, the stock slaughtered and all buildings destroyed to prevent their possible occupation by the French or Russians.

4.2.4 *Second Settlement 1825 - 1855*

In 1825, the British government commenced the construction of a penal colony on Norfolk Island to which the most hardened convicts would be sent. The "Second Settlement" was notorious for its brutal treatment of the several thousand convicts who during their incarceration constructed the elegant Georgian buildings, many of which can still be seen at Kingston. These substantial buildings were built from calcarenite quarried from outcrops along the foreshore at Slaughter Bay, Point Hunter and on Nepean Island. The buildings remaining intact today are used as a church, government offices, residences or museums. One of the finest examples, Government House, was constructed in 1829 on "Dove Plot" upon the stone foundations of its First Settlement predecessor⁴⁸.

Convict work parties felled trees for timber and cleared land for grazing and agriculture over much of the island. "Outstations" with substantial stone buildings were established at Longridge and Cascade. These and other public works, such as roadworks across the island and construction of the New Gaol and crank mill at Kingston were designed to provide the convict population with unremitting hard labour.

The maximum population of the Island during this period was estimated to be in excess of 3,000⁴⁹. The large convict population required the development of extensive infrastructure with most labour dedicated in the early years to public works programs including the building of housing, bridges and roads. The remains of sawpits on every acre evidenced extensive exploitation of the island's timber resources (predominantly pine)⁵⁰. Agriculture was established in Watermill Valley and at Longridge. The philosophy of creating a harsh prison environment restricted the development of an efficient agricultural industry. In contrast to the First Settlement, free settlers were not permitted and private farming was restricted to civilian staff and ticket-of-leave holders. A deliberate policy was enforced until 1839 of a strict reliance on convict labour using hoe and spades without the assistance of labour saving implements such as ploughs or draught animals. Nevertheless by that year over 818 acres were under cultivation mostly of maize with some wheat and other grains⁵¹. Extensive tracts of land were also fenced and stocked with up to 6,166 head of sheep, 787 cattle and 475 swine⁵²) to provide wool, meat and dairy products for the colony and to export.

This period of penal settlement gained the island an infamous place in history for the harsh conditions and treatment that cowed even the most hardened convicts. The penal settlement on Norfolk Island was abandoned in 1855 when the remaining convicts were transferred to Port Arthur, Tasmania.

4.2.5 *Third settlement 1856 -*

In 1790, following the mutiny on *HMAV Bounty*, nine mutineers led by Fletcher Christian sought to escape British justice by hiding on Pitcairn Island, together with twelve Polynesian women and six Polynesian men they had kidnapped at Tahiti. Only one mutineer, John Adams, still survived when the community was discovered in 1808.

With an area of 4.5 km², a limited water supply and a rocky terrain that limits cultivation, Pitcairn soon became overpopulated and in March 1831 following a severe drought and crop failure, the entire community was relocated to Tahiti. By September, decimated by influenza and disappointed in the land they were allocated on Tahiti, the remnants of the community returned to Pitcairn. In 1853, with the

⁴⁸ Wesley, J., (1995), *Government House, Norfolk Island*. Office of Administrator, Norfolk Island

⁴⁹ Turner, J.S., Smithers, C.N. & Hoogland, R.D, (1968), *The conservation of Norfolk Island*, Australian Conservation Foundation, Melbourne.

⁵⁰ Lane-Poole, C.E. (1926), *Report on the forests of Norfolk Island*. Commonwealth of Australia. c 1460.

⁵¹ Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra. p. 45.

⁵² Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra. p. 57.

population almost twice the level it had been prior to the 1831 move to Tahiti, the Pitcairn community agreed to an offer by the British Governments to transfer the whole community of 193⁵³ persons to Norfolk Island.

On 8 June 1856, the arrival of the independent, self-governing community of the descendants of the famed 1789 mutiny on *HMAV Bounty*, who unanimously had agreed to leave Pitcairn and make Norfolk Island their home, heralded what is now referred to as the third settlement of Norfolk Island.

The blending of Polynesian and English languages, skills and traditions in this isolated community on Pitcairn and later Norfolk, developed into a unique culture strongly influenced by dependence on the produce of the sea and the land. On Pitcairn, buildings were roughly constructed from timber, the largest being a relatively small two-storey cottage. The extensive constructions and massive stone buildings on Norfolk were beyond their experience, as was the concept of a penal settlement. On Norfolk, new skills such as ploughing and the operation of mills augmented traditional methods producing most of the community's requirements and a standard of living well in excess of that on Pitcairn. Much of the land that had been cleared during the First and Second settlements was not needed and previously cultivated land and pastures became heavily infested with invasive exotic plants.

The second half of the nineteenth century saw slow but steady development of Norfolk Island, with increasing timber-felling and agriculture. The community on Norfolk, although isolated, was not as cut off from the rest of the world as they had been on Pitcairn, with ships frequently calling at Norfolk, bringing news of the world as well as goods. In the 1880's and 90's, the establishment of a small whaling industry and close association with visiting American whaling vessels influenced the Pitcairner community in a number of ways, including the celebration of Thanksgiving Day on Norfolk and during the later half of the nineteenth century, played a role in the economic and cultural development of the settlement⁵⁴. Opportunistic whaling using traditional methods continued through the first half of the twentieth century, but did not have a significant impact on the island's economy until the whaling station at Cascade was established in 1956.

In 1866 the Church of England relocated the headquarters of the Bishop of Melanesia from New Zealand and established the Melanesian Mission Station on Norfolk. The initial grant of 99 acres on the west of the island was increased by the purchase of a further 933 acres, making the Mission the Island's major landowner. The capital from this sale of land was invested as the Norfolk Island Trust Fund, along with the funds remaining from a private charity established earlier in England to benefit the Pitcairners. Interest from this Fund formed an income base to pay the salary of the medical officer, Chaplain and the costs of a mail service. Between 1856 and 1896, the Mission immigrants increased the Island's population more than twofold. The Mission's activities stimulated the development of a cash economy by providing a secure market for local produce and a limited amount of paid employment in lighterage for the Mission ship 'Southern Cross'⁵⁵. A great variety of exotic trees was introduced to the Island and planted on Mission land, especially near St Barnabas Chapel at the centre of the Mission's lands. The general community also benefited from the agricultural skills developed at the Mission.

The late 1890's and early 1900's saw attempts at establishing various primary industries that might generate income for the islanders. These included the export of bananas, bean seeds, pine seeds, lemon peel and juice and passionfruit pulp. While many of these efforts were short-lived, or ended in failure (often due to high freight costs and the difficulties associated with transporting perishable goods), some enjoyed short periods of success, including the commencement of a passionfruit drink 'factory' by the Cottee family (later

⁵³ Reuben Denison Christian was born during the voyage to from Pitcairn to Norfolk on the *Morayshire*, bringing the number that landed at Kingston on 8 June 1856 to 194.

⁵⁴ Treadgold, M.L., (1988), *Bounteous Bestowal: The Economic History of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra.

⁵⁵ Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra. p. 92.

to develop into one of Australia's best known drink companies). The export of Kentia Palm seeds, which started in the early 1900's, remains the island's major export commodity.

Norfolk Island became an important international telecommunications link in 1902 when the Pacific Cable Board cable station opened at Anson Bay and provided the first telegraphic contact between Norfolk Island and the outside world through a direct cable linking Australia with New Zealand⁵⁶. The current ANZCAN cable system has operated on the same site since 1982.

One primary industry venture that had a lasting effect on the Island's environment was the 'banana boom' of the 1930's. As a consequence of "bunchy top" blight destroying a high proportion of the banana plantations in Australia, a number of banana growers (predominantly from Queensland) moved to Norfolk Island and established large areas of banana plantations, especially on the northern slopes of Mt Pitt. The island's population was thus much greater in that period before the war than it is now. Most of the banana growers and their families left Norfolk around the beginning of the war, leaving the land they had cleared to become overrun with introduced woody weeds.

As a proportion of the population, more Norfolk Islanders (80% of all men of fighting age) volunteered for active service in both world wars than from any other part of the British Empire (later Commonwealth). In WWI, 14 Norfolk Islanders were killed out of 77 enlisted: almost 1 in 5, compared with Australia's high toll of about 1 in 9. This reduction in available manpower on the island had an important impact on Norfolk's environment. WWII interrupted the implementation of an Australian forestry plan to clear the native mixed hardwood and pine forest on Mt Pitt and replace it with eucalypt plantations. At the same time, lack of manpower resulted in inadequate maintenance of fences, allowing cattle to wander the island, spreading seeds of cherry guava and other noxious weeds into the Mt Pitt Reserve and other areas which had previously been relatively weed free.

The construction of the airport during WWII brought reliable and increasingly frequent civil air services and tourism increased slowly during the 1950's and 60's, as infrastructure on the island and transport to and from the island improved. From the early 1970's, visitor numbers increased more rapidly, as did the number of people from Australia, New Zealand and other countries who arrived to set up businesses to service this growing industry. Upgrading the island's airport to medium jet standard in the early 1980's brought Norfolk within 2 hours flying time of Sydney and even closer to Auckland, making travel to the island much more attractive to tourists. This period of development and changing local population is sometimes referred to as the fourth settlement. Agriculture, which had consistently failed to provide long-term economic security for the community diminished and many areas formerly cleared for pasture fell into disrepair and have been overrun with invasive woody weeds.

Traditional cultural links with the land and sea may not be as strong as they once were, but are still significant elements in today's Norfolk Island. The largely self-reliant Norfolk Islander community has maintained many traditional customs, including weaving of hats, baskets and other items from native flax, Moo-oo and Bulrush ('drain flags'). Since the late 1990's, there has been a marked increase in community awareness and concern at the need to protect and conserve Norfolk Island's natural and cultural resources. This concern is partly founded in a recognition that Norfolk's natural environment and cultural charm are increasingly valuable commodities that must be actively conserved in the face of increasing tourism and development pressure.

Today, there are approximately 1,350 people living permanently on Norfolk Island, about half of whom are Pitcairner descendants. Just under 80% of the permanent population are Australian citizens. In addition to the permanent residents, about 700 temporary and general entry permit holders provide a skilled labour force that supports the tourist industry and many other aspects of the economy and community, including health and education services. Approximately 40,000 tourists visit each year, making tourism the island's

⁵⁶ Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra.

chief industry and most important source of income. The total number of persons (including tourists) living on Norfolk Island at any time is thus around 3,150.

5 Threatening processes

All of Norfolk Island's public reserves are small and thus particularly susceptible to disturbance from processes that could directly or indirectly threaten the continued viability of native flora and fauna. Some processes, such as erosion resulting from land clearing and grazing, may be internal to the reserve, however many are closely related to the management practices on surrounding land, such as invasion by woody weeds or predators such as cats and rats.

5.1 *Competition with Invasive Introduced Weeds*

Introduced weeds are a major environmental threat to Norfolk's native flora and fauna. Plants that are not native to the Island degrade native habitats, compete with native species, are a source of weed seeds and shelter weed seedlings (that may then go unnoticed until they are too large to remove easily), and usually are aesthetically unappealing. There are also significant direct and indirect economic costs of ongoing weed control. It is conservatively estimated that the Norfolk Island Parks and Forestry Service, Parks Australia and the community together expend in the order of \$450,000 each year on weed control. The loss of natural ecosystems, agricultural and horticultural productivity has not been estimated, but would be substantial.

Historical clearing of such a large proportion of native habitat has made the protection of remnant areas and the restoration of habitats that once occurred critical. Unfortunately, these remnants have been severely degraded by changes in physical structure and the replacement of native species by exotic weeds.

The Island has had a history of episodic rural development with native forests being cleared for agriculture and then abandoned: closure of the penal settlements; unprofitable agricultural enterprises; decline in population during the World wars and periods of economic recession. In many areas, native forests have been replaced by extensive areas of scrubby trees consisting almost entirely of introduced woody weeds.

Many of these weed species, particularly the invasive woody weeds such as African Olive, Porpieh or Red Guava, Hawaiian Holly and Hakea often grow in dense, virtually impenetrable stands, excluding other plants. These stands provide a source of seed, which are then widely dispersed by both native and introduced birds, rats and cattle making their control difficult and expensive. Most of these weeds are escapees from cultivation like the African olive, which was originally grown for hardwood fence posts⁵⁷. Much of the land invaded by woody weeds is too steep for agriculture and is difficult to manage.

Many forest plants require low light, minimal wind, stable temperatures and high humidities. These conditions occur in a forest with an understorey and deep ground litter. In weedy forests, removal of mature weed species disturbs the canopy, altering the microclimate by increasing light levels, temperature and wind and reducing humidity. This favours further weed invasion: the fast-growing weeds usually out-competing the often less vigorous native plants. Many successful weed species exude chemicals through their roots or leaves that inhibit the germination and growth of other plants^{58,59}. Other species however, such as Lantana and Tobacco can provide protection for many native species seedlings.

Weed control in public reserves would be assisted by an integrated Island-wide strategy aimed at reducing the overall population of weed species in the landscape and minimising dispersal of weed seeds. Within

⁵⁷ Wiseman, B. (1977), Living on Norfolk Island. Ruth Christa-Lamm, Norfolk Island

⁵⁸ Christian, N.E., (1999), A Study of the Determinants of Invasive Success and Management Options for the Weed Species *Psidium cattleianum* Sabine var. *cattleianum* (Strawberry guava) in Norfolk Island. B.App.Sc Honours Thesis, Southern Cross University.

⁵⁹ Gogue, G.L., Hurst, C.L. & Bancroft, L. (1974). Growth inhibition by *Schinus trebinthefolius*. Amer. Soc. Hort. Sci. 9:45

individual reserves, management will aim to reduce the variety and extent of weed species, enabling natural habitats to be restored.

5.2 *Predation and Competition by Introduced Vertebrates*

Predation by introduced animals is a major factor in the extinction of many native plant and vertebrate species. Norfolk Island's native species are particularly at risk from predation because their populations have been significantly reduced by habitat destruction and degradation.

Two species of rat, the Polynesian Rat and the Ships or Black Rat have been introduced to Norfolk Island: the Polynesian rat by Polynesian settlers approximately 800 years ago and the ships rat by Europeans, reportedly the result of the wreck of the *MV Ronaki* on Kingston reef during World War II.⁶⁰ Rats feed on the seeds and fruits of a variety of native and introduced plants and predate a variety of terrestrial fauna, including snails, land crabs, bird eggs and nestlings. The post-war extinction of a number of fauna species, most notably birds and bats are likely to have been at least in part the result of depredations by rats. Feral domestic cats are established and breeding in remnant forest and weed scrub throughout the Island. Cats feed mainly on vertebrate prey.

Birds in fragmented habitats and ground nesting seabirds are particularly vulnerable⁶¹. In contrast to other native species, the smallest of Norfolk's birds, the Grey Gerygone or 'Hummingbird' is perhaps the most common native bird on the island. This may be due mainly to its feeding in higher outer foliage, out of the reach of cats and suspending its side-entry nest high in the outer branches of a tree or thick shrub, making access by rats difficult, if not impossible. That the Gerygone's survival (and the Grey Fantail) is not restricted to native forest habitats has also probably been an important factor in their continued survival⁶².

Changes in vegetation structure from forest to pasture, whilst disadvantaging most native species, has favoured a wide range of exotic birds. These include birds of prey such as the recently self-introduced Australian Kestrel, which benefits from new open spaces allowing it to hunt. Although its diet consists largely of insects and small mammals, such as mice and rats, it may be having a significant impact on native bird populations (particularly the Grey Ternlet on Phillip Island).

Introduced or self-introduced exotic birds have successfully established populations on Norfolk Island because they are able to exploit open grassland and mixed vegetation habitats. Some, such as the Feral Fowl, Crimson Rosella, Silvereeye and Blackbird are also at home in the forest. The European Goldfinch whilst having limited impact upon native bird species plays a role in the dispersal of introduced thistles and other agricultural weeds⁶³. The Silvereeye is a pest in gardens and orchards and spreads the seeds of plant pests such as privet, lantana and Hawaiian holly. Most exotic birds are generalists readily moving between gardens, open pasture, weed thickets and native forest dispersing seeds such as Hawaiian holly, guava and olives deep into forest habitat.

Norfolk Island does not have large native herbivores and its native plants have not developed defence strategies such as spines or unpalatable foliage. Stock selectively graze on native trees and shrubs in preference to unpalatable exotics with chemical defences such as African Olive, Hawaiian Holly or Lantana. Cattle graze and trample native vegetation, creating the disturbed, sun-lit conditions in which weeds thrive. They also widely disperse the weed fruits they consume. In time, grazing reduces the distribution and regeneration of natives and increases areas of unpalatable weeds.

Grazing cattle on commons and roadsides has cultural and aesthetic appeal and promotes the quaint and rustic image of the Island. It also provides some income for a number of local families. However, there are

⁶⁰ Mr Owen Evans OAM, Personal communication.

⁶¹ Caughley, G. & Sinclair, A.R.E. (1994), *Wildlife Ecology and Management*. Blackwell Science, Cambridge.

⁶² Schodde, R., P. Fullagar and N. Hermes, (1983), *A Review of Norfolk Island Birds: Past and Present*. Australian National Parks and Wildlife Service: Special Publication No. 8.

⁶³ Hermes, N., (1985), *Birds of Norfolk Island*, Wonderland Publications, Norfolk Island.

significant ecological (and economic) costs resulting from spreading weeds, preventing the regeneration of native vegetation, accelerating erosion by destabilising stream and roadside banks and, in areas close to creeks such as on the Kingston Common and at Cascade, the nutrient enrichment of surface and ground waters. The lack of fencing in sensitive areas such as creeks and ponds, steep slopes and along cliff edges in particular is having severe impacts.

5.3 *Changes to Hydrology and Drainage System*

Land clearing in conjunction with groundwater use has changed the hydrology of the Island. Large quantities of are lost through transpiration⁶⁴, which is usually much greater from forests and woodlands than from grasslands⁶⁵. However, it is possible that on Norfolk Island interception of atmospheric moisture by large pines could counter balance a large proportion of transpiration losses. In such circumstances, the loss of forest vegetation (particularly tall pines) would be likely to reduce groundwater recharge. Land clearing can significantly increase overland flows and surface runoff, resulting in erosion and sedimentation. Clearing along streams has affected stream flow, turbidity and water temperatures, with significant impacts on aquatic ecosystems.

Changes in the Island's hydrological cycle are most evident in the lower reaches of catchments where many once perennial streams now flow intermittently. Exotic weeds thrive in the warm, high nutrient, high light and turbid water of many streams. Channelling and bank erosion, together with high turbidity and sediment deposition indicate active stream change, reflecting increased stream velocity and high-energy peak flows that has followed deforestation in many catchments.

The Norfolk Island pine's leaves ('needles') and geometry of its branches appear to be highly efficient at collecting water from the low clouds and mists that can form over the island at times. During extended dry periods in the early 1990's, the ground under large pines on Mt Pitt was saturated (even to the extent of puddles) during periods of low cloud, while immediately adjacent soil that did not receive water dripping from the pine was bone dry and cracked.⁶⁶

The tall forest may also have augmented rainfall by increasing surface roughness, thus slowing the movement of low, saturated air masses, increasing cooling and rainfall⁶⁷. Forest vegetation would also have moderated surface water flows by intercepting rainfall and slowing overland flows, reducing flooding and increasing soil infiltration and groundwater recharge, resulting in a relatively stable water table and extended stream flows during dry periods. Dense foliage also moderates wind velocity, humidity, and temperature fluctuations, and reduces water loss through evaporation.

Re-forestation in public reserves could also ameliorate the effects of high intensity rainfall events, which are forecast in a recent study of the possible effects on the Island of global climate change⁶⁸.

5.4 *Economic and Historical Constraints*

The history of the Island has been characterised by episodes of rapid growth in population and rural activity followed by decline leaving cleared lands to revert to weed. Distance from markets and lack of a safe harbour makes transport costly and unreliable and constrains the successful export of agricultural produce. The isolating effect of the lack of regular shipping was reinforced by an early land policy, which restricted ownership largely to the descendants of Pitcairners. The traditional Pitcairner community happily survived

⁶⁴ Loss of water to the atmosphere through the leaves and stems of live plants.

⁶⁵ As is evidenced by shallower water tables because of land clearing in low rainfall areas in Australia, with subsequent high soil salinities.

⁶⁶ P. Davidson, personal observations.

⁶⁷ Shiklomanov, I.A. & Krestovsky, (1988), Chapter 5, The influence of forests and forest reclamation practice on streamflow and water balance. In. E.R.C. Reynolds & F.B. Thompson, eds. (1988), *Forests, Climate, and Hydrology: Regional impacts*. United Nations University Press, Tokyo.

⁶⁸ Commonwealth Coastal Action Program (1999), *Australian Coastal Vulnerability Assessment Case Studies: Norfolk Island Case Study*, Climate Change Program, Watkins Consulting Ltd (NZ).

in a subsistence economy that did not alter substantially until after WWII⁶⁹. Improved communications (particularly the construction of an airfield) reduced the community's isolation and ushered in an era of increasing economic dependence on tourism.

The demand for timber for construction on the Island exploded during WWII and production increased to 65,000 superficial feet of timber per month⁷⁰. The Island's natural timber reserves were severely depleted with the remaining forests being almost entirely denuded of accessible hardwood and heavy inroads were made into stocks of Norfolk Island pine⁷¹.

A critical shortage of labour during the war led to neglected farms, broken fences and the spread of weeds, pests and diseases that further reduced productivity, profits and the incentive to farm.

5.5 *Tourism*

Tourism is the Island's major industry. It has provided the Island with its most stable period of economic growth but brings a challenge to preserve the character and environment of the Island, its landscape quality and the Norfolk Island way of life.

The number of tourists visiting the island has grown from around 30,000 annually in the late 1990's to almost 40,000 in 2001. Pressure on the Island's environment to provide water and cope with waste disposal increases with growing tourist numbers. These planning issues are being addressed by the community through a review of the Norfolk Island Plan and Planning Act and development of associated health, building and environmental codes. Increasing visitor use of particular areas in public reserves (demand for public toilets; wear and tear on vehicle and walking tracks; need to provide car parks and so on) presents management challenges that must be addressed within the context of community expectations and use of the reserves.

The importance of tourism to the Island's economy places a particular responsibility to provide visitors to the public reserves with a high quality, satisfying and safe experience. This imperative must be balanced, however, with the over-riding requirement to conserve the natural environment and landscape beauty of the reserves, conserve the island's heritage and preserve the way of life and quality of life of the people of Norfolk Island⁷².

Community involvement is particularly important in identifying acceptable change and appropriate management strategies. During the preliminary public participation process to develop these plans of management, members of the community were concerned about excessive levels of visitor use impacting upon environmental and community values. These concerns mainly focused on specific places where increasing tourist use had adversely affected the fabric of the reserve and traditional recreational activities.

6 Management Policies and Strategies

As Norfolk Island's primary public land management agency, a major function of the Norfolk Island Parks and Forestry Service (NIPFS) is to provide community leadership in its approach to environmental issues.

⁶⁹ Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra.

⁷⁰ Treadgold, M.L., (1988), *Bounteous bestowal: The economic history of Norfolk Island*, National Centre for Developmental Studies, Pacific Research Monograph No. 18. The Australian National University, Canberra.

⁷¹ Norman, H.B., 1952-53, *An outline of the Agricultural History of Norfolk Island since 1921, with some observations on existing and potential agriculture*. Commonwealth of Australia, Territory of Norfolk Island: Annual Report for the year Ended 30th June, 1953, GPO, Canberra. See also Cromer D.A.N., 1947-48. Report on forestry on Norfolk Island, Appendix B of Commonwealth of Australia, Territory of Norfolk Island: Annual Report for the year ended 30th June, 1948, Commonwealth Government Printer, Canberra.

⁷² *Public Reserves Act 1997*, section 3: Objects.

The NIPFS will demonstrate responsible stewardship through using best-practice management techniques that are culturally and environmentally appropriate in the island's public reserves.

An integrated strategic approach to the managing the public reserves is promoted in these Plans of Management. The Part B Plan of Management for each reserve identifies the resources and significant values of each reserve, current use and facilities and the threats and issues to be addressed.

Conservation management is not only about managing physical resources. It is also essential to manage the impacts of human activity by providing recreational and educational opportunities appropriate to the culture of the community and the physical constraints of the environment. Recreation and interpretation strategies are important management tools.

By managing all the public reserves as one system, resources can be allocated to protect, promote and enhance the individual character and values of each reserve, address priority issues, avoid duplication of recreational and other facilities and improve overall habitat diversity. A systems approach will also promote the development and conservation of a range of native habitats for the survival of the widest possible diversity of Norfolk's native species.

Above all, these plans of management aim to provide direction for the development and implementation of environment management policy in public reserves on Norfolk Island. While necessarily prescriptive in relation to some issues, it is intended that these plans provide an adaptive management framework that guides management in its responses to a wide range of issues as they occur.

6.1 Management Policies

To provide transparency in public reserve management, policy statements have been developed on a number of major issues. Annual review of these plans of management will provide an opportunity for policies to be discussed and refined by the community.

6.1.1 Public Safety

The nature of the topography on Norfolk Island with its high cliffs and steep slopes can present significant risk to public safety within some public reserves. These risks must be managed in the light of community attitudes as well as in the Australian legal/insurance context. Appropriate steps to maximise opportunities and minimise risks will be developed through community consultation.

Activities that are likely to be a significant hazard to human safety will not be permitted in any public reserve.

Ropes, cables and ladders providing access down cliffs to traditional fishing spots have been placed in some public reserves by private persons during the past century. These are not inspected or maintained by the Norfolk Island Parks and Forestry Service, as it does not have the specialist skills or resources to do so. In any case, the Norfolk Island Parks and Forestry Service recognises the inherent dangers in using these devices to scale the cliffs and does not encourage or advocate their use. However, it is likely that if the existing aids were removed, persons wanting to fish would find ways of scaling the cliff, perhaps placing them in greater danger. Local fishermen have used these ropes, cables and ladders at their own risk for generations. Neither they nor the Pitcairner community would tolerate their removal by the Norfolk Island Parks and Forestry Service. The location of these traditional rock fishing paths, cables, ropes and ladders are not obvious to persons who are not living on the island and who have not been shown them by an experienced fisherman. The risk that a visitor might attempt to scale the cliffs using these aids without an experienced local is believed to be very low.

Consideration will be given to placing signs to warn that using these ropes, cables and ladders is dangerous and at the users own risk. A brochure that includes a warning of the dangers associated with the cliffs along our coast will be developed for distribution to visitors in tourist information packages.

A risk management plan will be prepared for each reserve.

6.1.2 Traditional Use

Weaving the leaves of native plants such as Drain Flags Native Flax and Moo-oo to make items such as hats and carry bags is an important part of the Pitcairner community's cultural heritage. Many consider unfettered access to and use of these plants is a traditional right. Unfortunately, because most of the creeks and cliff slopes have been grazed by stock, these plants are not as abundant as they were formerly.

Picking plants in or removing plants from public reserves are controlled activities under section 43 of the *Public Reserves Act 1997*. However, because of its importance to the cultural traditions of the Island, the collection of plant foliage in a number of reserves for making traditional handicrafts has been approved by the Conservator of Public Reserves⁷³.

The collection of plant foliage from public reserves for making traditional handicrafts will be monitored to ensure that adequate quantities are available and can be safely accessed in a variety of locations in public reserves. Individuals and groups involved in collecting plant material for traditional purposes will be encouraged to participate in the establishment and management of these plants, as appropriate, in selected reserves.

6.1.3 Commercial Use

The Public Reserves are primarily for the conservation of the Island's natural environment, landscape and heritage. Their management must also preserve the way and quality of life of the people of Norfolk Island.

Public reserves enable visitors to the Island to access and enjoy the island's scenic beauty, natural environment and cultural heritage. Many visitors visit and enjoy the Island's public reserves through the commercial tours.

Some forms of commercial activity (such as walking tours and picnics) may have little, if any adverse impact on the conservation and heritage values of a public reserve. However, if their use is intense, even those activities can have detrimental effects on the reserve and on the enjoyment of the reserve by Norfolk Island people. Many commercial activities are incompatible with the objects of the *Public Reserves Act 1997*.

Commercial activities other than bus tours, off-road vehicle tours, walking tours, horse rides or picnics will not be permitted in any reserve unless the proposed commercial activity is in the interests of the conservation and management of the reserve, or are essential to the interpretive and education aims outlined in a plan of management.

In some circumstances, various commercial activities may not be compatible with the enjoyment of the reserve by the people of Norfolk Island, or may damage the reserve's environment. Restrictions on commercial activities, including tour operations, may therefore be necessary in particular reserves.

So as to minimise the competition that might arise between commercial tours and Norfolk Island people or individual visitors wishing to use facilities in reserves, commercial tour operators will in all cases be required to provide sufficient cooking equipment, tables and seating to cater for all of the persons on their tour. They will also be required to remove all rubbish and other wastes generated by their activities.

6.1.4 Indemnity

A person who is granted a permit to undertake an activity in a public reserve shall sign an indemnity as a condition of being granted that permit. The form of indemnity shall be in accordance with Appendix 3. It

⁷³ 5 November 1997: Norfolk Island Government Gazette No.57.

is recognised that there may be situations in which an indemnity is not appropriate, such as where a permit is granted to a minor or for low impact activities.

In cases where an indemnity is unsuitable a disclaimer stating that “*The Administration expressly denies any liability for any injury occurring to any person who may conduct the activities pursuant to this permit*” should appear at the foot of the permit.

6.1.5 Access to Biological Resources

The development of commercial products (such as new pharmaceutical drugs) based on the properties of biological resources, can lead to significant economic returns. Investment in research and development needs to be recovered from such returns, but benefits should also flow to the community that has original ownership of the biological resource.

The Commonwealth of Australia is developing Environment Protection and Biodiversity Conservation Regulations that aim to control commercial research and development of biological resources in Commonwealth areas and ensure that the original owners share in any benefits that might flow from that work.

The Administration of Norfolk Island will be developing legislation, policies and procedures that regulate access to biological resources on Norfolk Island. In the meantime, any permits for scientific research, including for educational purposes, issued by the Conservator of Public Reserves will include a condition relating to access to biological resources.

6.1.6 Cultural Heritage

Likely and confirmed archaeological sites within each reserve will be mapped and described on the Geographic Information System. These maps will enable the development of archaeological sensitivity zones that will ensure minimal disturbance to significant cultural heritage structures and artefacts.

6.1.7 Monuments and Memorials

Occasionally there are requests by descendants of the First, Second or Third Settlement persons to erect memorials of various kinds to their forebears. There is also a general desire to recognise significant events in an official or semi-official manner. The recently discovered Polynesian settlement on the island, the arrival of the Pitcairners, and the lives and activities of Norfolk Islanders over the past one hundred and fifty years, are all worthy of celebration and recognition.

A number of special memorials in the form of timber seats, brass plaques, and tree plantings have been placed in the reserves during the past twenty years. The potential demand for more is great. Each request to erect a memorial or plaque or plant a tree has been considered on an *ad hoc* basis, without the benefit of an overall strategy or plan. The number of seats, plaques, trees, and other memorials or monuments are starting to detract from the landscape and setting of the reserves.

The most appropriate way to commemorate people and events in a reserve is through interpretation in the museums, by walking tours, through documents, and on site signs that have been developed as part of an integrated interpretation strategy. It is important that the community, including private individuals, historical interest groups, corporations, and benefactors, contribute to and participate in the development of the interpretation strategy and material.

6.1.8 Habitat Development and Rehabilitation

The development and rehabilitation of native vegetation to create habitat is essential to maintaining biodiversity on Norfolk and shall be given the highest priority in the planning and management of the island's public reserves.

Native vegetation communities occurring naturally in reserves will be encouraged to regenerate naturally wherever possible. Links between currently disjunct habitats will be developed to facilitate the dispersal of native flora and fauna. In many instances, this can be achieved by excluding cattle from key areas and implementing ongoing weed and rat control programs. In severely degraded areas, or where there are significant species or communities, it may also be necessary to clear weed communities and plant native trees.

A long term view must be taken in re-establishing native habitats in the most heavily weed-infested areas. Broadscale mechanical clearing is often the most practical and effective way to prepare for planting with native species. In many cases, it is necessary to plant predominantly Norfolk Island Pine and White Oak to establish a native tree cover as quickly as possible.

On the larger cleared slopes, Green Panic grass will be used to stabilise the soil and suppress weed invasion. Where appropriate, trees will be planted in rows to allow mechanised weed control. This is the most cost-effective method of maintaining these areas and promoting tree growth to obtain canopy closure as soon as possible. Once canopy closure occurs, mechanised weed control can be discontinued. Trees will be spaced 3 – 4m apart to maximise their survival and growth: closely planted trees compete for water and nutrients, resulting in slow growth rates, weaker spindly specimens and higher mortality.

Once a reasonable forest cover has been established, other less hardy native species, such as Ironwood, Maple, Bloodwood, and Whitewood will start to regenerate naturally. If that process is not as successful as desired in some areas, supplementary planting of appropriate species can be undertaken.

Wherever possible, native species that originally occurred in the area will be propagated from seeds sourced from locally-growing specimens, to minimise mixing of genetic provenances.

6.1.9 Weed Management

In addition to broadscale mechanical weed control that may be appropriate in some parts of some reserves, there is also a need to remove weeds by hand and by direct herbicide application. In lightly weed infested areas, or in heavily weed infested areas that are not extensive, hand clearing, poisoning and planting may be most appropriate.

Limited resources dictate a long-term, strategic approach to weed control in the Island's public reserves. Dividing the available resources between all of the public reserves would not produce a significant decrease in weed infestations. Weed control resources will therefore be directed to achieve specific outcomes in particular reserves. This strategic approach will enable resources to be concentrated and applied to the eradication of specific weed problems or substantially or completely remove weed infestations in particular reserves. Inevitably, this approach means that weed control will not be undertaken on weed infestations in reserves that have not been assigned sufficient priority in the weed control strategy. It is envisaged that such lower priority weed infestations will achieve higher priority as the priority weed infestations are eradicated. The number of years it will take before some weed infestations in some reserves are addressed will depend on the resources available for this work.

In principle, weed infestations that directly threaten rare or endangered species or the integrity of existing native habitat, or habitat development and rehabilitation will be assigned the highest priority.

In addition to a strategic approach to weed control, particular techniques will be employed to maximise the effect of available weed control resources. To this end, native trees will be planted within areas of weeds such as lantana where it is appropriate to retain the weeds for shelter. Further, resources will not be applied

to keep plantings of native trees completely free of weeds where there is a good likelihood that the native plants will out-compete and eventually smother the weeds⁷⁴.

Herbicides will be applied directly to stems (basal bark spraying) and cut stumps in preference to foliar spraying. Spraying (using a stripper dome) will only be carried out in conditions that minimise wind drift.

All opportunities to supplement Norfolk Island Parks and Forestry Service weed control resources through Commonwealth environmental grants and programs, private sector donations, community service clubs, environmental groups, volunteers and other sources will be pursued.

6.1.10 Rat Control

Rats will be controlled by baiting. A rat control program has been established in Hundred Acres Reserve and rat control programs will be developed and implemented in key habitat areas in other reserves, dependent on resources. Priority will be given firstly to controlling rats at breeding seabird colonies during the breeding season and secondly to native habitat, particularly where threatened plant species occur, especially during flowering and seed development. Consideration will be given to removing prolific food sources, such as guavas, that are present in intensive rat control areas.

Appropriately spaced and located stations will be baited with ‘Racumin’⁷⁵, as it is relatively safe to handle and is formulated to reduce the likelihood of secondary poisoning of non-target species.

Where appropriate rat control programs will be coordinated with neighbouring property owners. Island-wide eradication of both species of rat will be investigated.

6.1.11 Cat Control

Feral cats will be controlled by live trapping. Initially cat control programs will be limited to those reserves that support significant populations of breeding seabirds. Cat control will be extended to areas of native habitat in other reserves as resources permit.

6.1.12 Visual Landscape

The visual quality of landscapes and vistas in the public reserves will be assessed. Consideration will be given to assigning a high weed control priority to degraded landscapes that would benefit significantly from specific weed control.

Important visual landscapes will be conserved through ensuring that planting programs are designed to preserve important views and maintain open vistas from strategic locations such as lookouts and picnic areas. Plans for recreational facilities and amenities will aim to minimise visual intrusion and include appropriate natural landscaping to integrate built structures with the setting.

Signs will be used judiciously and designed and placed to minimise visual impact.

6.1.13 Fencing, Gates and Stiles

Because public roadsides and some areas of public reserves are used as commons for grazing cattle, various forms of fencing are required in all public reserves.

Rustic timber post and rail style fencing will be used along the public boundaries of all public reserves, with appropriately designed gates or stiles strategically placed for pedestrian access. Aluminium wire electric stock fencing will be preferred to barbed wire, where that option is practical. Stiles will be

⁷⁴ Pines and white oaks planted along the creek in Bumbora Reserve have outgrown lantana and olives that could not be removed from among the rocks. The native plants have shaded out most weeds and depressed germination of weed seeds. The few remaining large olives and lantana will now be able to be removed with minimal effort and little likelihood that weeds will re-invade this area.

⁷⁵ If necessary, ‘Racumin’ will be replaced or alternated with a similar safe, low non-target species toxicity rodenticide.

provided in appropriate locations to enable pedestrian access. It may be appropriate to provide turnstiles rather than stiles to enable pedestrian access for less agile people to flat or gently-sloping public use areas.

6.1.14 Vehicle Management

The number of vehicles in the public reserves has increased dramatically during the last few years. In most reserves there are no formal arrangements restricting vehicle movements, resulting in significant damage in parts of some reserves.

Vehicles using and parking on grassed areas compact the soil and damage grass cover and tree roots. Extensive dusty areas (muddy when wet) reduce the amenity of recreation areas for most people and compacted soils result in greater storm runoff and erosion. Damaged tree roots may reduce tree vigour and contribute to the spread of the root rot fungus, *Phellinus noxius*.

Increasing deliberate use of motor vehicles on steep hillsides and banks is resulting in significant stripping of the grass cover and subsequent soil erosion. In some cases, it has been necessary to fence off areas to enable damaged grass slopes to recover. Joy riding in vehicles ('wheelies' and 'donuts') is damaging the ground surface in most recreation areas, reducing their general amenity and in some cases cutting up the ground to the extent that walkers could sustain ankle or other leg injuries.

The risk of injury to pedestrians (particularly children and older persons) from manoeuvring vehicles is likely to be greater than if there were formal arrangements that clearly differentiated between car parking areas and picnic/BBQ/playing areas.

The open, informal nature of the recreation areas in most of the public reserves is considered by some in the community to reflect the underlying nature of Norfolk. Providing formalised vehicle parking areas and sealing access tracks would, in the opinion of at least part of the community, be another unacceptable change to the essential character of the island.

There is, however, an overriding responsibility to protect the environment of the reserves and ensure public safety as far as practical. It is noted that vehicle access and parking are defined at most of the popular recreation areas in public reserves and the National Park.

It is necessary to install vehicle controls, including vehicle parking areas and to formalise and perhaps seal access tracks in a number of reserves. All vehicle control barriers, signs (if required) and other structures or works that are necessary to manage vehicles in public reserves will be designed and installed to minimise adverse environmental and aesthetic impact.

6.1.15 Water Management/Drainage

Water (both surface run off and groundwater) is a vital resource. It is vital to the development, rehabilitation and maintenance of habitats, to human health and to the Island's economy. However, if inappropriately managed, or of poor quality, water can also be an environmentally destructive force.

The public has free access in a number of reserves to dams or water standpipes to obtain water for stock and gardens (both domestic and commercial). This facility is particularly important to the community in extended dry periods. Stock also freely access creeks and dams in a number of reserves.

In dry times, the Administration of Norfolk Island and some members of the community pump directly from creeks or dams into water tanks on trucks. Pumping water from creeks or dams in public reserves directly to private land is not permitted.

Permits are not required to take water from a public reserve for normal domestic purposes or for stock. As is the case with any commercial activity in a public reserve, water may only be taken from a public reserve for commercial purposes with a permit from the Conservator of Public Reserves.

Priority will be given to maintaining the highest levels of water quality in public reserves. If necessary, stock will be excluded from natural watercourses. In such cases alternative stock watering facilities will be provided if practical and economic to do so.

In many reserves, natural surface drainage has been modified significantly by road construction. Many roads are incised below natural ground level and during intense rainfall become watercourses. Roadside drains and culverts installed to reduce saturation of the road pavement often deliver large quantities of water onto adjacent lands and natural watercourses with minimal velocity dissipation and thus significant downstream erosion.

The Administration of Norfolk Island and the Norfolk Island Parks and Forestry Service will review roadside drains and culverts in public reserves or that direct water into public reserves. A program of works to rectify existing problems will be developed and future roadside drainage will be designed to ensure that water from such drains and culverts does not erode or otherwise degrade any public reserve. The Conservator of Public Reserves is to be consulted prior to the installation of roadside culverts or drains that might affect public reserves and has the authority to veto any such works if he considers that unacceptable damage or degradation is likely to be caused to a public reserve by such works.

All roadside drains and culverts in public reserves or that direct water into public reserves shall be properly maintained at all times to the satisfaction of the Conservator of Public Reserves.

The installation, reconstruction and maintenance of all roadside drains and culverts in public reserves or that direct water into public reserves shall be funded from the Administration of Norfolk Island works program.

Every effort will be made to ensure that water flowing from a public reserve onto adjoining land as a result of any works or structures in the reserve is managed so as to minimise degradation to the adjoining land or to the quality of waters on that land.

Constructing dams, or increasing the height of dams in public reserves has been proposed from time to time to detain surface run off for longer periods and thus increase groundwater recharge. During drier periods, streams that are still flowing are maintained by groundwater inflow. Generally, it is only during and immediately after a large storm that water might flow from flooded streams and ponds into the groundwater, however this effect is usually minor compared with general infiltration to the water table across the catchment⁷⁶. Evaporation from water surfaces such as ponds or dams is usually a significant cause of water loss and on Norfolk usually exceeds precipitation. Furthermore, because the streams that could be dammed in public reserves are relatively close to the island's coast it would seem most likely that any ponded water that did enter the groundwater would discharge at springs at the coastal cliffs.

Dams, however, can increase the interception and temporary storage of groundwater-fed stream flows that would otherwise discharge to the sea. Taking water for stock and gardens from such storages can thus increase the opportunity to exploit groundwater resources, albeit with increased losses to evaporation.

In general, unless there is good evidence that increased water storages in public reserves would contribute significantly to water quality and the sustainable utilisation of the Island's freshwater resources, further dams will not be constructed in public reserves, nor will the height of existing dam walls be increased. The probable effects of any proposal to carry out such works on the environment of the reserve and on water resources will also be considered.

⁷⁶ See for instance: Davis, S.N. and R.J.M. DeWiest, (1966), *Hydrogeology*. John Wiley & Sons, New York.

6.1.16 Erosion

Soil erosion is a major cause of environmental degradation. The deeply weathered basaltic soils of Norfolk and Phillip Islands, are particularly prone to erosion by both water and wind. The colourful sub-soils and deep gullies of Phillip Island are clear testimony to the effects of erosion.

A number of public reserves contain areas of active soil erosion. In many cases, these are along the coastal cliffs. Some, however, are not associated with coastal erosion, but are a direct result of over-grazing on sensitive slopes or of excessively concentrated stock movement.

Wherever practical, soil erosion in the public reserves will be arrested and works will be undertaken to rehabilitate eroded areas. Soil erosion control and remediation work carried out by the Norfolk Island Parks and Forestry Service has demonstrated that a number of techniques can be successfully used on Norfolk. These range from re-shaping eroded land with a bulldozer and covering with suitable material on which a vegetative cover can be established, to placing erosion bags filled with soil and Kikuyu grass runners and dumping and spreading Kikuyu cuttings and soil. Native trees such as white oak and pine have been successfully established on formerly eroded slopes that have been rehabilitated using these techniques.

Erosion is often associated with changed surface water flow, especially where increased volumes of water are directed down steep, bare slopes. Managing water flows causing the erosion is therefore essential to long-term control. Generally, this may best be achieved by diverting and spreading the flow and taking measures to reduce flow velocity. Using grassed banks and erosion bags in smaller erosion runnels is likely to be more effective than placing boards, rocks or other hard material in water courses as these tend to cause undercutting and often exacerbate rather than reduce the erosion problem.

In most cases, a variety of techniques needs to be employed. Often erosion control work requires a sequence of works over a period, modifying and building upon earlier work to completion.

6.1.17 Grazing

Cattle grazing in parts of some public reserves is a long-established “traditional use” of the commons. However, in some reserves, long-term cattle grazing has been associated with increased erosion and weed infestation. Selective grazing of palatable native vegetation and seedlings significantly decreases numbers 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 promotes invasion by exotic weeds. In some reserves, cattle grazing is an important feature of the landscape and cultural heritage.

It is important to ensure that cattle grazing in public reserves does not cause significant, long-term deterioration of conservation and heritage values. In some reserves, cattle management fences have been erected to reduce over-grazing and erosion. Cattle grazing will continue in selected areas of some public reserves provided adverse impacts on vegetation, soil stability and water quality can be appropriately managed. Stock control fences will be erected to protect areas in reserves as necessary. The community will be consulted on all proposals to permanently exclude of stock from common grazing areas in public reserves.

The installation and maintenance of fences to control stock, together with removing stock that have strayed into fenced-off parts of public reserves, places a significant burden on Norfolk Island Parks and Forestry Service resources. Steel wire fences (and in particular barbed wire) quickly deteriorate in exposed locations. The Norfolk Island Parks and Forestry Service therefore uses aluminium wire electric fences wherever practical, although there is an increased cost in ensuring the fence is operating properly. Once erected, timber post and rail fences provide the longest-lasting, minimum maintenance solution to preventing stock access to public reserves.

6.1.18 Fire

Forest fire risk on Norfolk Island is significantly less than on the Australian mainland due to the milder maritime climate. The risk of uncontrolled forest fire in reserves will be minimised by maintaining short grass in public picnic/barbecue areas, car parks and along walking tracks. No special fire control measures are warranted.

6.1.19 Sand Mining

Quarrying and mining in a public reserve is not within the objects of the *Public Reserves Act 1997*. However, it is necessary to replace sand within the cemetery in order to provide firmer ground in which future graves may be dug.

No other quarrying or mining will be permitted in any public reserve.

6.1.20 Stockpiling

The use of public reserves to stockpile soil, spoil, fill or other material is not within the objects of the *Public Reserves Act 1997*.

However, it is recognised that there may be occasions when it is necessary to stockpile soil, spoil, fill or other material in a reserve to undertake or complete works in a public reserve to:

- ensure public safety; and or
- conserve the environment.

6.2 Forestry Management Strategy

Public reserves have been traditionally managed as multiple use areas. Significant uses have included the provision of timber resources through informal agro-forestry and pasture for grazing cattle. Historical removal of timber resources was unsustainable and has significantly changed the structure of the vegetation and reduced its value as native forest habitat. The sustainable use of timber resources is not incompatible with conservation objectives and can provide enhanced recreational opportunities.

Increasing numbers of Norfolk Island pines are being planted on public and private land, to some extent relieving pressure on natural forest trees in public reserves as the primary source of locally-grown timber. However, there will continue to be considerable demand for older stock over the next few decades, because of the considerable gap in age between the existing mature trees on the Island and more recently planted stock.

Native trees, especially Norfolk Island pine, have provided much of the island's building and construction timber needs over the past 200 years. Today, most locally milled timber comes from dead or dying mature pines on private land. During the first six months of 2001, 24 dead or dying pines were removed from readily accessible forestry areas in public reserves.

During the 1890's, Hundred Acres Reserve was extensively planted with Norfolk Island pine to provide future forestry timber. Since the late 1950's pine plantations have been established in a number of public reserves, primarily to provide timber, but also to re-establish native habitat. In many places, other native trees such as White Oak, Ironwood, Beech, Bloodwood, Whitewood and Ti (Cordyline), as well as shrubs and ferns establish under the growing pines. If left (apart from some initial weed control), these areas would develop into native forest habitat. Felling and removing trees causes significant damage on steeper slopes. Introduced weeds quickly germinate and thrive in the sunlit gaps in the forest canopy that result from tree removal. Introduced weeds proliferate in larger cleared areas and, if not managed, can become virtually impenetrable weed thickets, as occurred on the slopes of Mt Pitt and Mt Bates following the banana boom of the 1930's.

Forestry plantations and harvesting will be limited to the areas defined in the Part B Plan of Management for each reserve. In general, forestry areas in public reserves will not be established or harvested on slopes greater than 20°. New forestry plantings will only be established on grassland or on areas infested with introduced weeds.

Consistent with the objects of the *Public Reserves Act 1997*, only native species will be planted for forestry purposes in public reserves.

Native trees, whether planted as part of a forestry plantation or not, will not be harvested by clear felling, but by removing selected individuals, unless to do so is in the interests of the conservation and management of the reserve.

Native trees, whether alive or dead, and whether planted or not, will not be felled outside designated forestry areas, unless to do so is in the interests of the conservation and management of the reserve, or public safety.

The Conservator of Public Reserves will determine the fee that shall be paid to the Administration of Norfolk Island for trees that are removed from public reserves for commercial milling. That fee may be similar to but need not be equivalent to the royalty specified in the *Trees Act 1997*. That fee shall be notified in the Gazette.

To encourage the establishment of timber plantations on private lands, the Norfolk Island Parks and Forestry Service will continue to produce native tree seedlings for sale to the public at minimal cost. Norfolk Island Parks and Forestry Service staff will also provide advice on the establishment of forestry plantations to members of the community free of charge.

6.2.1 Root Rot Fungus Control

The root rot fungus *Phellinus noxius*, which is thought to be native to Norfolk, can invade damaged roots and the roots of trees in poor health. *Phellinus* infestation results in progressive root death and eventually death of the tree. Trees that are stressed, or lacking vigour because of age, are particularly prone to this root rot fungus. Affected trees usually show signs of debility such as gum weeping through the bark (in the case of pines) and yellowing/dying foliage before the tree becomes unstable and likely to fall.

Methods of control have included:

- removal of infected tree stumps and roots, and
- inoculation of tree stumps with a competing, non-pathogenic fungus (*Tyromyces sp.*).

In a diverse, healthy native forest, *P. noxius* may occur as a natural part of the forest ecosystem and is not likely to cause undue damage to the forest. The incidence and effect of *P. noxius* in public reserves will continue to be monitored. Infestations may best be contained by maximising forest diversity and minimising disturbance and damage to tree butts and roots. Special care will be taken to ensure that vehicles and machinery are operated so as to minimise such disturbance and damage.

6.3 Interpretation Strategy

Public reserves provide an important opportunity not just for recreation, but also as a community educational resource. The reserves reflect a variety of stories about Norfolk's natural and cultural history, many with relevance to wider cultural and conservation issues.

Some reserves provide excellent opportunities to see and experience natural processes, such as the White-capped Noddies and White Terns nesting in Hundred Acres Reserve and the columnar basalt lava flows at Anson Bay. Some reserves contain interesting experimental plantings of exotic trees. The reserves at

Kingston conserve a mix of natural and cultural heritage values and items, reflecting the settlement history and present uses of that unique setting.

An interpretation plan will be developed and implemented for each reserve. Each plan will be developed with the assistance of members of the community and will determine the interpretive themes for each reserve. The interpretive plan will describe the plantings, signs and other media to be used and outline how the development of interpretive displays is to be staged and coordinated. A consistent style and format will be used for all signs in public reserves. Regular media releases will be used to keep the community informed about programs and activities in the reserves.

Where practical, interpretive themes and media will complement those in the National Park and Botanic Garden and in the Kingston and Arthurs Vale Historic Area.

6.3.1 Norfolk Island Parks and Forestry Service Web Site

A Norfolk Island Parks and Forestry Service web site will be established to facilitate comprehensive community access to information relating to Norfolk's public reserves, including these Plans of Management, images, species lists and administrative requirements, such as permit applications.

It is intended that the site be developed in partnership with the community, perhaps with the assistance of students from the Norfolk Island Central School.

The Norfolk Island Parks and Forestry Service web site will aim to:

- inform about the natural and cultural heritage of Norfolk Island;
- facilitate access to other web sites with information on Norfolk's environment;
- promote and facilitate community involvement in reserves management and conservation issues on Norfolk Island.

The Norfolk Island Parks and Forestry Service home page will include links to photo galleries and information pages on flora and fauna and individual reserves. Other pages will provide links to Plans of Management and information pages on current management issues and programs being implemented. Information pages and photos will assist in the identification and treatment of major environmental weeds and promote community awareness of the aims and objectives of weed management strategies. A public forum page will allow community members the opportunity to directly make comments or provide information.

Public access to regularly updated information and reports relating to public reserves management and the environment will promote a greater community understanding of issues and management strategies. Proposals by the Conservator of Public Reserves or members of the community to modify management strategies and plans of management could be posted on the site for public consideration and comment. The site will also provide an opportunity for members of the community to comment on the effectiveness of public reserves management.

The Norfolk Island Parks and Forestry Service web site will also provide links to other relevant sites within the Administration of Norfolk Island and to a variety of environmental conservation sites.

The Norfolk Island Parks and Forestry Service web site will also provide an avenue for community involvement in the development of island-wide environmental issues and management programs, such as a forestry industry strategy, weeds strategy and pest control strategy.

The Norfolk Island Environment and Heritage Trust will be accessible to the community through the Norfolk Island Parks and Forestry Service web site.

6.4 *Community Involvement*

Conservation of the environment, whether it be viewed as ‘sustainable use’ or in terms of ‘biodiversity conservation’, can only be achieved with community understanding, support and involvement.

Over the past four decades, individuals and small groups of people from the Norfolk Island community have been involved in tree planting, weed control and other conservation works in public reserves. Generally this work has not been supported in kind or with funds by government and has been somewhat sporadic, necessarily depending on the enthusiasm and resources of particular individuals. A number of trees in the public reserves are living monuments to the private individuals who planted them and their life-long commitment to conservation works on Norfolk. Many trees were planted by the owners of cattle grazing in the reserves.

In recent years, community-based conservation supported by the Commonwealth and or Norfolk Island governments have included:

- Norfolk Island Landcare (Cascade and Quarantine Reserves);
- Norfolk Island Central School Environment Club (Bumbora and Anson Bay reserves);
- National Tree Day 2000 (Headstone Reserve);
- Westpac Banking Corporation Millennium project (Anson Bay);
- Bushcare (Ball Bay Reserve); and
- Green Corps (Hundred Acres, Ball Bay, Cascade and Anson Bay reserves).

The Norfolk Island Youth Assembly has expressed a keen interest in developing further opportunities for young people to play an active role in conservation programs on the Island.

The capacity and capability of the Norfolk Island Parks and Forestry Service is significantly strengthened by community involvement in the development and implementation of public reserve management strategies. The Norfolk Island Parks and Forestry Service will promote community interest and involvement in the conservation and management of public reserves.

Volunteers will be encouraged to participate in appropriate management activities in the reserves and the Norfolk Island Parks and Forestry Service will continue to provide work experience opportunities for Norfolk Island Central School students.

The public consultation process will be implemented within 12 months of the making of the plans of management. The effectiveness of this process will be reviewed after a further 12 month period.

7 Research and Monitoring

The Conservator of Public Reserves will develop strategies for conducting appropriate research and for the collection of data to monitor the effectiveness of management programs in public reserves. Key indicators will be developed by which progress towards implementing the actions outlined in plans of management may be monitored.

The monitoring strategy may include:

- permit conditions may that require permit holders to provide data on their activities in public reserves;
- visitor surveys to obtain feedback on visitor experiences in public reserves from various user groups;
- community surveys;
- photo monitoring points;
- photographic records of project implementation; and
- biological population censuses and surveys.

Where appropriate, the Conservator of Public Reserves will liaise with the Park Superintendent, Norfolk Island National Park, on research and monitoring programs proposed in public reserves.

8 Implementation, Staffing and Resources

An Implementation Plan for each Part B Plan of Management will be developed within 3 years of the making of the Plan.

The plans of management for reserves outside KAVHA will be implemented by the Norfolk Island Parks and Forestry Service, under the direction of the Conservator of Public Reserves in accordance with the Implementation Plan for each reserve. The plans of management for reserves within KAVHA will be implemented in accordance with the Implementation Plan for each reserve and the KAVHA CMP.

Staffing and resources to implement the plans of management for the reserves outside KAVHA will be allocated in accordance with Norfolk Island Parks and Forestry Service budget provision and priorities. These in turn will be determined by and within the framework of the policies and priorities set from time to time by the Norfolk Island Legislative Assembly and the annual budget of the Administration of Norfolk Island.

Staffing and resources to implement the plans of management for the reserves within KAVHA will be provided in accordance with the arrangements in place between the Commonwealth and Norfolk Island governments and in the light of recommendations made by the KAVHA Management Board.

The Forester/Chief Ranger, Norfolk Island Parks and Forestry Service, has been appointed as a ranger under *Public Reserves Act 1997*. Other selected Norfolk Island Parks and Forestry Service personnel will be appropriately trained before being appointed rangers. Inspecting and maintaining reserve facilities, undertaking weed control, establishing and rehabilitating habitat and interpreting aspects of the reserves and their management to the public will be the primary roles for Norfolk Island Parks and Forestry Service rangers.

The Conservator of Public Reserves will develop a program for the ongoing training and accreditation of Norfolk Island Parks and Forestry Service personnel. Enhanced training opportunities will be explored through liaison with State and Territory forestry, conservation and land management agencies and the Park Superintendent of the Norfolk Island National Park.

9 Evaluation and Review

These plans of management have been developed in the light of current use of the reserves, knowledge of their natural and cultural resources and the resources that may be available for reserve management.

It is recognised that expectations in respect of the conservation and use of a reserve's resources are likely to change over time. Increasing use of a reserve, unforeseen events and improvements in our knowledge and understanding of the resources and the processes that maintain them may necessitate adjustments to the management priorities and strategies outlined in this plan.

The Conservator of Public Reserves will annually review the implementation of the plans and will advise the Administrator and the Executive Member on the outcome of that review. A resume of that review will be presented to the public through the Annual Report of the Administration of Norfolk Island.

Key indicators against which progress in implementing the plans will be evaluated. Individuals and community groups that have assisted in the implementation of the plans (see Section 3.4) will be given an opportunity to become involved in and contribute to the annual review process. The review will also utilise information received through other forms of community consultation and involvement during the review period.

The adaptive format of this Plan of Management is designed to facilitate variations to the Plan in response to changes in conditions and trends. The need for and desirability of amending the Plan will be considered as part of the annual review, however it is unlikely that significant changes will be contemplated within five years of their adoption. Where a significant change is considered appropriate within that period, a draft variation will be prepared in accordance with section 16 of the *Public Reserves Act 1997*.

10 Closure of Reserves

Section 34 of the *Public Reserves Act 1997* provides that the Conservator of Public Reserves may close all or part of a reserve by notice in the Gazette.

When the Conservator considers it is necessary to do so, all or part of a reserve may be temporarily closed by erecting appropriate signs prior to publishing a notice declaring the closure in the Gazette.

All or part of a reserve may be temporarily closed to protect public safety; protect or conserve the reserve, including any of its flora or fauna; or to undertake works or other measures in accordance with a plan of management.

11 Controlled Activities

Part V of the *Public Reserves Act 1997* prescribes activities that are not permitted in a public reserve without an approval (“controlled activities”).

Approval to undertake a controlled activity in a public reserve may only be:

- specified by a plan of management,
- by notice published in the Gazette by the Conservator of Public Reserves, or
- by a permit granted to an individual by the Conservator of Public Reserves.

Further, section 47 of that Act provides that:

- a person shall not use an area of a reserve for an activity if to do so is inconsistent with the plan of management; and
- a plan of management may specify an activity that may not be undertaken without a permit granted to a person by the Conservator of Public Reserves.

A permit may only be granted in accordance with the plan of management for a reserve or in accordance with a notice published in the Gazette by the Conservator of Public Reserves.

That notice published in the Gazette by the Conservator of Public Reserves need not be consistent with a plan of management, but must be consistent with the objects of the *Public Reserves Act 1997*.

This section of the Plan of Management (Part A):

- approves specific controlled activities, with respect to all public reserves;
- provides general guidelines in respect of granting approvals and permits for controlled activities, with respect to all public reserves; and
- specifies activities⁷⁷ in accordance with section 47(2) of the *Public Reserves Act 1997* that shall not be undertaken in any public reserve without a permit, and
- provides general guidelines in respect of granting permits for activities specified in accordance with section 47(2) of the Act.

The Part B Plans of Management for each public reserve will specify any further restrictions on activities or areas within which specified activities will be restricted.

It will be a condition of every permit that the permit holder signs a Release and Indemnity Form (Appendix 3), indemnifying:

- the Administration of Norfolk Island, its officers, employees and agents;
- the Administrator of Norfolk Island, and
- the Commonwealth of Australia, its officers, employees and agents

against all legal liability, loss, claim or proceedings for personal injury to or death of any person or for injury or damage to property arising from any activity whatsoever (but excluding any and all such actions and claims arising out of the negligent acts, omissions or defaults of the Administration or any officer, servant or agent of the Administration) in the designated reserve pursuant to the permit.

⁷⁷ The activities specified are additional to the Controlled Activities prescribed in Part V of the *Public Reserves Act 1997*.

The holder of a permit who has contravened a condition to which that permit is subject but who seeks to renew that permit or have a new permit granted will be required by the Conservator of Public Reserves to show cause why such permit should be renewed or granted.

In so showing cause, the permit holder will have to:

- provide evidence that fully explains the circumstances surrounding the contravention of the permit condition; and
- demonstrate the measures that the permit holder will take to ensure that the conditions to which a future permit would be subject will be complied with.

The Conservator of Public Reserves may, by notice in the Gazette, revoke or amend in any manner the approval or other regulation of any activity approved or otherwise controlled in this Part or in any Part B Plan of Management.

The following activities are Controlled Activities in the reserves:

- 11.1 Hazardous Activities
- 11.2 Firearms, other Weapons, Traps and Snares
- 11.3 Explosive Devices
- 11.4 Artefacts
- 11.5 Metal Detecting
- 11.6 Native and Other Animals
- 11.7 Dogs
- 11.8 Plants
- 11.9 Exotic Fruit
- 11.10 Traditional Craft Materials
- 11.11 Pine Seed Collection
- 11.12 Firewood Collection
- 11.13 Research
- 11.14 Horse-riding
- 11.15 Motor Vehicles
- 11.16 Lighting Fires
- 11.17 Commercial Activities
- 11.18 Camping
- 11.19 Chemicals
- 11.20 Quarrying and Mining
- 11.21 Spoil Stockpiles

11.1 Hazardous Activities

No person shall undertake any activity within a reserve that may reasonably be expected to expose themselves or any other person to injury or death.

Any other activity that may reasonably be expected to pose some hazard or nuisance to any person may not be undertaken in a reserve without a permit.

“Nuisance” includes noise or environmental harm to the reserve or potentially to adjoining land.

The Conservator of Public Reserves may only grant such a permit if he or she is satisfied that reasonable measures can and will be taken by the person proposing the activity to ensure that the hazard or nuisance is minimised and likely to be reduced to an acceptable level.

11.2 Firearms, other Weapons, Traps and Snares

No member of the public shall possess, carry or use within a reserve any form of:

- firearm, hunting bow, spear, slingshot, or any other weapon;
- any type of trap, net, or snare, other than would reasonably be used and is intended to be used in rock fishing

without a permit.

The Conservator of Public Reserves may only grant such a permit if it is in the interests of the conservation and management of the reserve to do so.

11.3 Explosive Devices

No person shall possess, carry or use within a reserve any form of explosive device, including pyrotechnic devices such as fireworks of any kind, without a permit.

Unless the proposed activity:

- is an integral and important part of a community celebration that has been agreed by the Norfolk Island Legislative Assembly;
- is to be conducted by a properly licensed person; and
- meets the safety standards for that activity that would have to be met in an Australian State or Territory

the Conservator of Public Reserves may only grant such a permit if it is in the interests of the conservation and management of the reserve to do so.

Any person proposing to possess, carry or use any explosive device within a reserve when applying for a permit shall provide the Conservator of Public Reserves with written details and plans of the proposed activity, proof of licences, a copy of appropriate standards and any other relevant technical details.

A permit to conduct these activities shall not be granted unless the applicant holds a valid public risk liability insurance policy for at least \$10 million and meets the requirements in relation to certificates of currency and indemnity forms set out in Section 11.17 (Commercial Activities) below.

11.4 Artefacts

A person shall not interfere with any artefact in a reserve without a permit.

“Interfere” has the same meaning as “interfere” in section 42 of the *Public Reserves Act 1997*.

An “artefact” is any man-made object, thing or item and includes but is not restricted to any object, thing or item that in some way has been protected or that may be capable of being protected under any other legislation.

“Artefact” includes any man-made object, thing or item that can reasonably be construed to be or to have been the property of a person or persons unknown.

The Conservator of Public Reserves may only grant such a permit if it is in the interests of the conservation and management of the reserve to do so.

11.5 Metal Detecting

No person shall use a metal detecting device in any public reserve without a permit.

The Conservator of Public Reserves may only grant such a permit if it is in the interests of the conservation and management of the reserve to do so.

11.6 Native and Other Animals

No member of the public shall:

- have in their possession, interfere with, damage, injure or destroy an animal whether alive or dead in a reserve;
- feed any animal in a reserve; or
- take an animal into, or knowingly permit an animal to enter a reserve

without a permit.

“Interfere” has the same meaning as “interfere” in section 42 of the *Public Reserves Act 1997*.

“Animal” includes all invertebrate and vertebrate animals except dogs, cattle and horses.

The Conservator of Public Reserves may only grant such a permit if it is in the interests of the conservation and management of the reserve to do so, or essential to the interpretive and education aims of the plan of management.

11.7 Dogs

Except as otherwise provided below or provided in the *Dogs Registration Act 1936* and the *Dogs Registration Regulations 1994*, a person shall not take a dog into a reserve unless that dog is kept under restraint by means of a lead and is in the company of that person.

A dog that is accompanied by and is under the control of a person is permitted in:

- those areas in public reserves to which cattle normally have access for grazing;
- all of Point Hunter, Kingston Common and Kingston Recreation Reserves except for those parts of those reserves between the seaward side of Bay Street and high water mark and between the seaward side of the road around Emily Bay and high water mark; and
- those parts of Government House Grounds Reserve generally to the south of the wall on the south and south east of Government House grounds and driveway to which the public normally have access.

A person shall not permit any dog over which they could reasonably be expected to exercise control to go onto a tee, green, or a bunker that is part of Point Hunter Reserve that is maintained and used by the Norfolk Island Golf Club as part of the golf course.

A person shall not permit any dog over which they could reasonably be expected to exercise control to enter the graveyard in Cemetery Reserve.

A person shall not permit any dog over which they could reasonably be expected to exercise control to interfere with any native animal or the habitat of any native animal.

Any person accompanied by a dog in any part of a reserve that has been developed for picnicking and/or barbecuing, and any beach, must carry an instrument suitable for removing and disposing of faeces. In the interests of public health and for the comfort of all, if a dog defecates in a public place the dog owner must remove the faeces and dispose of in a proper manner.

“Interfere” has the same meaning as “interfere” in section 42 of the *Public Reserves Act 1997*.

“Animal” includes all invertebrates and vertebrates.

11.8 Plants

A person shall not interfere with any plant in a reserve without a permit.

“Interfere” has the same meaning as “interfere” in section 42 of the *Public Reserves Act 1997*.

Despite anything in this paragraph, plants or parts of plants may be picked or removed in accordance with paragraphs 11.9, 11.10, 11.11 and 11.12.

11.9 Exotic Fruit

Hand picking of fruits from exotic plants, such as guava and lemon, for personal consumption is permitted in all public reserves.

11.10 Traditional Craft Materials

Picking and removing by hand of foliage of *Typha orientalis* (Flags, Drain Flags, Bulrush) within Headstone Reserve, Kingston Recreation Reserve, Kingston Common Reserve and Bumbora Reserve for making traditional handicrafts is permitted.

Picking and removing by hand of foliage of *Cyperus lucidus* (Moo-oo) and *Phormium tenax* (Flax) within all public reserves for making traditional handicrafts is permitted.

Persons must ensure that they do not cause damage to any other plants when picking and removing the foliage of *Typha orientalis* (Flags, Drain Flags, Bulrush), *Cyperus lucidus* (Moo-oo) and *Phormium tenax* (Flax).

“Traditional handicrafts” does not include items made for sale.

11.11 Pine Seed Collection

The Conservator of Public Reserves may grant permits for the collection of pine seed or cones from:

- unfenced areas in public reserves to which cattle normally have access; and
- picnic areas in public reserves.

11.12 Firewood Collection

The Conservator of Public Reserves may permit the collection of firewood only if it is in the interests of the conservation and management of a public reserve to do so.

11.13 Research

A person shall not undertake any research for an archaeological, scientific or any other purpose or take, measure or in any other way mark or tag any samples of air, water, soil, rock or take, measure or in any other way mark or tag any biological item, organism or material within a reserve without a permit.

The Conservator of Public Reserves may only grant such a permit if it is in the interests of the conservation and management of the reserve to do so, or essential to the interpretive and education aims of the plan of management.

Permits issued for scientific research and educational purposes do not convey to the permit holder or any other person, institution or corporation any rights whatsoever to any benefits that may flow from intellectual property obtained by the permit holder as a result of the permit holder's activities pursuant to this permit, such intellectual property and benefits remaining vested in the Administration of Norfolk Island and or the Commonwealth of Australia as the case may be.

11.14 Horse-riding

Horses may be ridden in those areas in public reserves to which cattle normally have access for grazing.

11.15 Motor Vehicles

Motorised wheelchairs or mobility aids may be used to convey disabled persons in public reserves.

Motor vehicles required for emergency services response purposes, or for conservation and management will be permitted in a reserve.

The Emergency Services Coordinator must inform the Conservator of Public Reserves as soon as practicable of any entry of an emergency service response vehicle to a reserve.

The Conservator of Public Reserves may permit commercial plant and equipment in a reserve only if it is in the interests of the conservation and management of the reserve.

11.16 Lighting Fires

The Conservator of Public Reserves may approve the lighting of a fire or fires in a reserve by Norfolk Island Parks and Forestry Service staff if it is in the interests of the conservation and management of the reserve to do so.

11.17 Commercial Activities

A permit to conduct a commercial activity in a reserve shall not be granted unless the applicant provides a certificate of currency showing that he or she holds a valid public risk liability insurance policy for at least \$5 million. The certificate shall have endorsed upon it the Administration's interest in granting the permit and shall specifically refer to the activities intended to be conducted pursuant to the permit. It will be presumed that in issuing the certificate of currency the insurer has been advised of the activities to be conducted and that those activities are not the subject of any exclusion under the policy held.

In addition, each application for a permit must be accompanied by an approved Indemnity form executed by the Applicant or an appropriate agent.

The permit to conduct these activities will cease to be valid immediately if the permit holder's public risk liability insurance lapses for any reason during the period for which the permit has been issued or if a certificate of currency appears to be defective in any manner.

A permit shall not be granted for commercial activities, other than bus tours, off-road vehicle tours, walking tours, horse rides or picnics in a reserve unless the Conservator of Public Reserves is satisfied that such activities are in the interests of the conservation and management of the reserve, or are essential to the interpretive and education aims outlined in a plan of management.

Commercial tour operators shall in all cases:

- provide sufficient cooking equipment, tables and seating to cater for all of the persons on their tour; and
 - remove all rubbish and other wastes generated by their activities.
-

A permit shall not be granted for any commercial activity unless the Conservator of Public Reserves is satisfied that such activity will not adversely affect the amenity of the reserve for other users and will not cause unacceptable damage to the reserve.

Filming and photography of any kind other than for private purposes and the use of any part of a public reserve for promotions of any kind are considered to be commercial activities.

“Commercial activity” has the same meaning as “commercial activity” in section 46 of the *Public Reserves Act 1997*.

11.18 *Camping*

Camping will not be permitted in any reserve except Government House Grounds Reserve and Point Hunter Reserve unless the Conservator of Public Reserves is satisfied that it is in the interests of the conservation and management of the reserve, or essential to the interpretive and education aims of the management plan to do so.

Camping shall be permitted at times specified in the Gazette in Government House Grounds Reserve and Point Hunter Reserve between November and February.

Camping in Government House Grounds Reserve and Point Hunter Reserve at other times may be permitted only if the Conservator of Public Reserves is satisfied that it is in the interests of the conservation and management of the reserve, or essential to the interpretive and education aims of the management plan to do so.

11.19 *Chemicals*

No chemical pesticide, herbicide or toxic or noxious substance shall be used, left or deposited in a reserve without a permit from the Conservator of Public Reserves.

The Conservator of Public Reserves may only grant such a permit if it is in the interests of the conservation and management of the reserve to do so.

11.20 *Quarrying and Mining*

In any case, sand mining in Cemetery Reserve and in Point Hunter Reserve will only be permitted provided:

- it is in the interests of the conservation and management of the reserve;
- it is for the purpose of an interment;
- the sand is used for an essential building or construction purpose;
- each removal of sand is from within an area specified by the Conservator of Public Reserves, and in accordance with any conditions that the Conservator of Public Reserves may set from time to time; and
- an appropriate fee is paid.

In granting each permit for the removal of sand, the Conservator of Public Reserves shall have regard to archaeological advice, the advice of the Project Manager (KAVHA), the KAVHA Conservation Management Plan and, in the case of requests for significant amounts of sand, any recommendation of the Norfolk Island Government.

The Conservator of Public Reserves shall compile a list of essential building or construction purposes that can only be undertaken using sand, in consultation with the building industry, the Administration of Norfolk Island and the Norfolk Island Government. The Conservator of Public Reserves shall publish that list in the Gazette.

Any request for sand for other than an essential building or construction purpose shall be referred to the Minister for Land and the Environment for Norfolk Island Government advice. A permit for the removal of sand for other than an essential building or construction purpose shall only be granted if it is in the overriding public interest to do so.

Sand may not be removed from within any other public reserve.

Quarrying and or mining in any form, other than for sand, shall not be permitted in any reserve.

11.21 Spoil Stockpiles

The dumping and or stockpiling of soil, spoil or fill shall not be permitted in a reserve unless that stockpile is in accordance with a plan of management, or in the opinion of the Conservator of Public Reserves, is essential to undertaking or completing works in a public reserve to:

- ensure public safety; and or
 - conserve the environment.
-

APPENDIX 1: SPECIES COMMON AND SCIENTIFIC NAMES

| PLANTS | | |
|------------------------|-------------|--|
| | | <i>Carex neesiana</i> |
| | | <i>Dicranopteris linearis</i> |
| | | <i>Euchiton involucratus</i> |
| | | <i>Euphorbia obliqua</i> |
| | | <i>Hypolepis tenuifolia</i> |
| | | <i>Juncus continuus</i> |
| | | <i>Oplismenus hirtellus</i> |
| | | <i>Samolus repens</i> var. <i>stricta</i> |
| | | <i>Sporobolus virginicus</i> |
| Acacia | Cassia | <i>Senna septemtrionalis</i> |
| African Boxthorn | | <i>Lycium ferocissimum</i> |
| African Olive | | <i>Olea europea</i> |
| Aloe Vera | | <i>Aloe vera</i> |
| Asparagus Fern | | <i>Asparagus plumosus</i> |
| Avocado | | <i>Persea americana</i> |
| Bamboo | | <i>Bambusa</i> sp. |
| Beech | | <i>Rapanea ralstoniae</i> |
| Binung Fern | | <i>Christella</i> spp |
| Birdcatcher | Wai Wai | <i>Pisonia brunoniana</i> |
| Blackberry | | <i>Rubus fruticosus</i> |
| Blackbutt | | <i>Eucalyptus pilularis</i> |
| Bloodwood | | <i>Baloghia inophylla</i> |
| Brakeferns | | <i>Pteris</i> spp |
| Broad-leaved Meryta | Shade Tree | <i>Meryta latifolia</i> |
| Broomrape | | <i>Orobanche minor</i> |
| Buffalo Grass | | <i>Stenotaphrum secundatum</i> |
| Cape Honeysuckle | | <i>Tecomaria capensis</i> |
| Cascade Onion | | <i>Homeria flaccida</i> |
| Castor Oil Plant | | <i>Ricinus communis</i> |
| Chaff Flower | | <i>Achyranthes aspera</i> |
| Chaff Tree | Soft-wood | <i>Achyranthes arborescens</i> |
| Cherry Guava | Porpieh | <i>Psidium cattleianum</i> var. <i>cattleianum</i> |
| China Wood-oil Tree | Tung Oil | <i>Aleurites fordii</i> |
| Coastal Coprosma | | <i>Coprosma baueri</i> |
| Coastal Fern | | <i>Asplenium difforme</i> |
| Coastal Lily | | <i>Dianella intermedia</i> |
| Coastal Lobelia | | <i>Lobelia anceps</i> |
| Coastal Native Spinach | | <i>Tetragonia tetragonioides</i> |
| Coffee | | <i>Coffea arabica</i> |
| Coral Berry | | <i>Rivina humilis</i> |
| Cork Oak | | <i>Quercus suber</i> |
| Couch Grass | | <i>Cynodon dactylon</i> |
| Cranky | | <i>Datura stramonium</i> |
| Devils Guts | | <i>Capparis nobilis</i> |
| Drain Flags | Bulrush | <i>Typha orientalis</i> |
| English Oak | | <i>Quercus robur</i> |
| Evergreen | Alyxia | <i>Alyxia gynopogon</i> |
| Fishbone Fern | | <i>Nephrolepis cordifolia</i> |
| Flax | Native Flax | <i>Phormium tenax</i> |
| Flooded Gum | | <i>Eucalyptus grandis</i> |
| Green Panic Grass | | <i>Panicum maximum</i> |
| Hawaiian Holly | | <i>Schinus terebinthefolius</i> |

| | | |
|----------------------------|---------------------|---|
| Hibiscus | | <i>Hibiscus diversifolius</i> |
| Hopwood | Tea-tree | <i>Dodonaea viscosa</i> subsp. <i>Viscosa</i> |
| Illawarra Flame tree | | <i>Brachychiton acerifolius</i> |
| Ink Weed | | <i>Phytolacca octandra</i> |
| Ironwood | | <i>Nestegis apetala</i> |
| Isaac Wood | | <i>Exocarpos phyllanthoides</i> var. <i>phyllanthoides</i> |
| Jacaranda | | <i>Jacaranda mimosaeifolia</i> |
| Japanese Honeysuckle | | <i>Lonicera japonica</i> |
| Jasmine | | <i>Jasminum simplicifolium</i> subsp. <i>australiense</i> |
| Jersey Cudweed | | <i>Pseudognaphalium luteoalbum</i> |
| Kikuyu Grass | | <i>Pennisetum clandestinum</i> |
| Lantana | | <i>Lantana camara</i> |
| Lemon | | <i>Citrus jambhiri</i> |
| Lombardy Poplar | | <i>Populus nigra italica</i> |
| Lord Howe Island Blackbutt | | <i>Cryptocarya triplinervis</i> |
| Madeira Vine | | <i>Anredera cordifolia</i> |
| Maple | | <i>Elaeodendron curtispiculum</i> |
| Marram Grass | | <i>Ammophila arenaria</i> |
| Melky Tree | | <i>Excoecaria agallocha</i> |
| Mexican Poppy | | <i>Argemone subfusiformis</i> |
| Mile-a-Minute | | <i>Wollastonia biflora</i> |
| Monstera | | <i>Monstera deliciosa</i> |
| Moo-oo | | <i>Cyperus lucidus</i> |
| Moreton Bay Fig | Banyan Tree | <i>Ficus macrophylla</i> subsp. <i>macrophylla</i> |
| Morning Glory | | <i>Ipomoea</i> spp. |
| Mountain Rush | Freycinetia | <i>Freycinetia baueriana</i> subsp. <i>baueriana</i> |
| Narrow-leaved Meryta | | <i>Meryta angustifolia</i> |
| Nasturtium | | <i>Rorippa nasturtium-aquaticum</i> |
| Native Cucumber | | <i>Zehneria baueriana</i> |
| Native Rush | | <i>Juncus continuus</i> |
| Native Spinach | New Zealand Spinach | <i>Tetragonia implexicoma</i> |
| | Native Vigna | <i>Vigna marina</i> |
| New Zealand Christmas Bush | Pohutakawa | <i>Metrosideros excelsa</i> |
| New Zealand Pittosporum | | <i>Pittosporum crassifolium</i> |
| Norfolk Island Bean | | <i>Canavalia rosea</i> |
| Norfolk Island Euphorbia | | <i>Euphorbia norfolkiana</i> |
| Norfolk Island Hibiscus | Puhau | <i>Hibiscus tiliaceus</i> |
| Norfolk Island Palm | Broom | <i>Rhopalostylis baueri</i> var. <i>baueri</i> |
| Norfolk Island Pine | | <i>Araucaria heterophylla</i> |
| Norfolk Tree Fern | Farn | <i>Cyathea brownii</i> |
| Oleander | Pittosporum | <i>Pittosporum bracteolatum</i> |
| One-leaf Orchid | | <i>Bulbophyllum argyropus</i> |
| Oxygen Weed | | <i>Egeria densa</i> |
| Pellitory | | <i>Parietaria debilis</i> |
| Pencil Pine | | <i>Cupressus lusitanica</i> |
| Pepper Tree | | <i>Macropiper excelsum</i> subsp. <i>psittacorum</i> |
| Pigface | | <i>Carpobrotus glaucescens</i> |
| Poison Weed | Poison Bush | <i>Solanum linnaeanum</i> |
| Popwood | Bastard Ironwood | <i>Myoporum obscurum</i> |
| Prickly Shieldfern | | <i>Arachniodes aristata</i> |
| Privet Tree | | <i>Ligustrum lucidum</i> |

| | | |
|--------------------------|---------------|---|
| Queensland Black Bean | | <i>Castanospermum australe</i> |
| Queensland Umbrella Tree | | <i>Schefflera actinophylla</i> |
| Red Cedar | | <i>Toona ciliata</i> |
| River Clubbrush | | <i>Schoenoplectus validus</i> |
| Rough Tree Fern | Farn | <i>Cyathea australis</i> subsp. <i>norfolkensis</i> |
| Rush | | <i>Juncus articulatis</i> |
| Samson's Sinews | Wild Wisteria | <i>Millettia australis</i> |
| Senecio | | <i>Senecio australis</i> |
| Senecio | | <i>Senecio evansianus</i> |
| Senecio | | <i>Senecio hooglandii</i> |
| Sharkwood | | <i>Dysoxylum bijugum</i> |
| Sia's Backbone | Isaac Wood | <i>Streblus pendulinus</i> |
| Silky Oak | | <i>Grevillea robusta</i> |
| Silver Poplar | | <i>Populus alba</i> |
| Skeleton Forkfern | | <i>Psilotum nudum</i> |
| Sow Thistle | Milk Weed | <i>Sonchus oleraceus</i> |
| Strand Morning Glory | | <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i> |
| Sweet Alyssum | | <i>Lobularia maritima</i> |
| Tallowwood | | <i>Eucalyptus microcorys</i> |
| Taro | | <i>Colocasia esculenta</i> |
| Ti | Cordyline | <i>Cordyline obtecta</i> |
| Two-frond Fern | Lace Fern | <i>Asplenium dimorphum</i> |
| Wandering Jew | | <i>Commelina cyanea</i> |
| Water Hyacinth | | <i>Eichhornia crassipes</i> |
| White Cedar | Lilac | <i>Melia azedarach</i> |
| White Oak | | <i>Lagunaria patersonia</i> subsp. <i>Patersonia</i> |
| Whitewood | | <i>Celtis paniculata</i> |
| Wild Tobacco | | <i>Solanum mauritianum</i> |
| William Taylor | | <i>Ageratina riparia</i> |
| Wisteria | | <i>Wisteria sinensis</i> |
| Yellow Guava | | <i>Psidium guajava</i> |
| Yellow Wood | | <i>Zanthoxylum pinnatum</i> |

INVERTEBRATES

| | | |
|----------------------------------|------------|------------------------------|
| Centipede | | <i>Cormocephalus coynei</i> |
| Common Freshwater Shrimp | | <i>Paratya australiensis</i> |
| Freshwater Crab | | <i>Amarinus lacustris</i> |
| Hi-hi | Periwinkle | <i>Nerrita albicilla</i> |
| Land Snail | | <i>Mathewsoconcha belli</i> |
| Little Nipper Landcrab | | <i>Geograpsus grayi</i> |
| Norfolk Island Freshwater Shrimp | | <i>Paratya norfolcensis</i> |

FISH

| | | |
|------------------|------------------------|---|
| Dasmselfish | Artooti, Nuisance fish | <i>Neoglyphidodon oligolepis</i> |
| Damselfish | Artooti, Nuisance fish | <i>Parma polylepis</i> |
| Blenny | | <i>Parablennius serratolineatus</i> |
| Bonito | | |
| Bronze Whaler | | <i>Carcharhinus brachyurus</i> |
| Cardinal Fish | Big eye | <i>Archamia leai</i> |
| Gobie | | <i>Eviota sp.</i> |
| Kingfish | | <i>Seriola lalandi</i> |
| Long-finned Eel | | <i>Anguilla reinhardtii</i> |
| Mahi Mahi | Dolphin Fish | <i>Coryphaena hippurus</i> |
| Puffer Fish | Swell doodle | Tetraodontidae N.genus.n.sp [AMS I.15601-001]) |
| Reef Shark | | <i>Carcharhinus sp.</i> |
| Rock Cod | Grouper | Serranidae |
| Short-finned Eel | | <i>Anguilla australis</i> |
| Snapper | | <i>Pargus auratus</i> |
| Stingray | Eagle ray, skate | <i>Myliobatis sp.</i> |
| Tiger Shark | | <i>Galeocerdo cuvieri</i> |
| Trevally | Oafie | <i>Pseudocaranx dentex</i> |
| Trumpeter | | <i>Lethrinus chrysostomus</i> |
| Tuna | | <i>Thunnus albacares</i> |
| Wahoo | | <i>Acanthocybium solandri</i> |

REPTILES

| | | |
|------------------------|----------------------|-------------------------------|
| Green Turtle | | <i>Chelonia mydas</i> |
| Lord Howe Island Gecko | Gecko | <i>Christinus guentheri</i> |
| Lord Howe Island Skink | Phillip Island Skink | <i>Pseudemoia lichenigera</i> |

BIRDS

| | | |
|---------------------|------------------------------|--|
| Australian Kestrel | | <i>Falco cenchroides</i> |
| Bar-tailed Godwit | | <i>Limosa laponica</i> |
| Black Noddy | White-capped Noddy, Titerack | <i>Anous minutus minutus</i> |
| Brown Noddy | Grey-headed Noddy | <i>Anous stolidus pileatus</i> |
| Buff-banded Rail | Little Tarler Bird | <i>Rallus philippensis australis</i> |
| Cattle Egret | | <i>Ardea ibis</i> |
| Common Starling | | <i>Sturnus vulgaris</i> |
| Crimson Rosella | Red Parrot | <i>Platycercus elegans</i> |
| Curlew Sandpiper | | <i>Calidris ferruginea</i> |
| Domestic Goose | | <i>Anser domesticus</i> |
| Emerald Dove | | <i>Chalcophaps indica chrysochlora</i> |
| European Blackbird | | <i>Turdus merula</i> |
| European Goldfinch | | <i>Carduelis carduelis</i> |
| European Songthrush | | <i>Turdus philomelos</i> |
| Feral Fowl | | <i>Gallus gallus</i> |
| Feral Pigeon | | <i>Columba livia</i> |

| | | |
|---------------------------------|-------------------------|---|
| Ghostbird | Wedge-tailed Shearwater | <i>Puffinus pacificus</i> |
| Golden Whistler | Tamey | <i>Pachycephala pectoralis xanthoprocta</i> |
| Great Cormorant | | <i>Phalacrocorax carbo</i> |
| Greenshank | | <i>Tringa nebularia</i> |
| Grey-breasted Silvereye | Grinnell | <i>Zosterops lateralis</i> |
| Grey-tailed Tattler | | <i>Tringa brevipes</i> |
| Grey Fantail | | <i>Rhipidura fuliginosa pelzelni</i> |
| Grey-headed Blackbird | Guavabird or Sunna | <i>Turdus poliocephalus poliocephalus</i> |
| Grey Ternlet | | <i>Procelsterna albivittata albivittata</i> |
| Grey Warbler | | <i>Gerygone igata</i> |
| House Sparrow | | <i>Passer domesticus</i> |
| Little Black Cormorant | | <i>Phalacrocorax sulcirostris</i> |
| Little Shearwater | Laro | <i>Puffinus assimilis assimilis</i> |
| Long-billed White-eye | Grinnell | <i>Zosterops tenuirostris</i> |
| Long-tailed Triller | Black and White Sparrow | <i>Lalage leucopyga</i> |
| Mallard | | <i>Anas platyrhynchos platyrhynchos</i> |
| Masked Booby | Gahnet | <i>Sula dactylatra fullagari</i> |
| Masked Lapwing | | <i>Vanellus miles noveahollandiae</i> |
| Masked Woodswallow | | <i>Artamus personatus</i> |
| Norfolk Island Boobook Owl | Morepork | <i>Ninox novaeseelandiae undulata</i> |
| Norfolk Island Green Parrot | Green Parrot | <i>Cyanoramphus novaeseelandiae cookii</i> |
| Norfolk Island Ground Dove | | <i>Gallicolumba norfolciensis</i> |
| Norfolk Island Kaka | | <i>Nestor productus</i> |
| Norfolk Island Pigeon | | <i>Hemiphaga novaeseelandiae spadicea</i> |
| Norfolk Island Starling | | <i>Aplonis fusca</i> |
| Pacific Black Duck | | <i>Anas superciliosa</i> |
| Pacific Golden Plover | | <i>Pluvialis fulva</i> |
| Pectoral Sandpiper | | <i>Calidris melanotos</i> |
| Providence Petrel | Bird of Providence | <i>Pterodroma solandri</i> |
| Purple Swamphen | Tarler Bird | <i>Porphyrio porphyrio melanotos</i> |
| Red-necked Stint | | <i>Calidris ruficollis</i> |
| Red Knot | | <i>Calidris canutus</i> |
| Red-tailed Tropicbird | | <i>Phaethon rubricauda roseotincta</i> |
| Royal Spoonbill | | <i>Platalea regia</i> |
| Ruddy Turnstone | | <i>Arenaria interpres</i> |
| Sacred Kingfisher | Nufka | <i>Halcyon sancta vagans</i> |
| Scarlet Robin | Robin | <i>Petroica multicolor multicolor</i> |
| Sharp-tailed Sandpiper | | <i>Calidris acuminata</i> |
| Silver Gull | Seagull | <i>Larus noveahollandiae</i> |
| Sooty Tern | Whale Bird | <i>Sterna fuscata serrata</i> |
| South Island Pied Oystercatcher | | <i>Haematopus longirostris</i> |
| Spotless Crake | Little Tarler Bird | <i>Porzana tabuensis</i> |
| Swamp Harrier | Marsh Harrier | <i>Circus aeruginosus</i> |
| Terek Sandpiper | | <i>Xenus cinereus</i> |
| Wandering Tattler | | <i>Tringa incana</i> |
| Welcome Swallow | | <i>Hirundo neoxena</i> |
| Whimbrel | | <i>Numenius phaeopus</i> |
| White Ibis | | <i>Threskiornis molucca</i> |
| White Tern | White Bird | <i>Gygis alba royana</i> |
| White-breasted White-eye | Grinnell | <i>Zosterops albogularis</i> |
| White-browed Woodswallow | | <i>Artamus superciliosus</i> |
| White-faced Heron | Crane | <i>Egretta novaehollandiae</i> |
| Yellow-billed Spoonbill | | <i>Platalea flavipes</i> |



MAMMALS

| | | |
|------------------------------|--|--|
| Black Rat | | <i>Rattus rattus</i> |
| Bottle-nosed Dolphin | | <i>Tursiops truncatus</i> |
| Feral cat | | <i>Felis domesticus</i> |
| Gould's Wattled Bat | | <i>Chalinolobus gouldii</i> |
| House Mouse | | <i>Mus musculus</i> |
| Humpback Whale | | <i>Megaptera novaeangliae</i> |
| Killer Whale | | <i>Orcinus orca</i> |
| Norfolk Island Free-tail Bat | | <i>Mormopterus [Tadarida] norfolkensis</i> |
| Pilot Whale | | <i>Globicephala meleana</i> |
| Polynesian Rat | | <i>Rattus exulans</i> |
| Right Whale | | <i>Balaena gracialis</i> |
| Sperm Whale | | <i>Physeter macrocephalus</i> |

APPENDIX 2: LIST OF PUBLIC RESERVES

| Reserve | Purpose when first Gazetted | Area (ha) | Original Gazettal Date | National Estate Gazettal Date |
|--|--------------------------------------|-----------|---|-------------------------------|
| Anson Bay Reserve | Cable, landing, shipping, recreation | 5.45 | 4 February 1937 | 21 October 1980 |
| Ball Bay Reserve including (Bucks Point Reserve) | Recreation, landing, shipping | 28.72 | 4 February 1937 | |
| | Conservation of flora and fauna | (3.41) | 18 May 1971 | 21 October 1980 |
| Bumbora Reserve | No designated purpose | 5.50 | Declared under Commons and Public Reserves Law 1913 | 21 October 1980 |
| Cascade Reserve including (Quarantine Reserve) | Shipping, recreation | 22.58 | 4 February 1937 | 21 October 1980 |
| | Quarantine | 9.87 | 4 February 1937 | 21 October 1980 |
| Headstone Reserve | Landing, shipping, forestry | 11.37 | 4 February 1937 | |
| Hundred Acres Reserve (re-named 28/8/98) | Forestry | 22.24 | 4 February 1937 (as Rocky Point Reserve) | 21 October 1980 |
| Middleridge Reserve | Recreation | 0.20 | 21 October 1976 | |
| Nepean Island | Conservation of flora and fauna | 10 | 2 May 1968 | 21 October 1980 |
| Point Ross Reserve | Forestry, recreation | 7.95 | 6 May 1971 | 21 October 1980 |
| Selwyn Reserve | Recreation | 21.21 | 4 February 1937 (as Selwyn Reserve) | 21 October 1980 |
| Stock Reserve | Watering stock | 0.65 | 4 February 1937 | |
| Two Chimneys Reserve | Common | 14.03 | 12 January 1961 | 21 October 1980 |
| Public Reserves in the Kingston and Arthurs Vale Historic Area⁷⁸ | | | | |
| Cemetery Reserve | Burial purposes | 2.18 | 4 February 1937 | 21 October 1980 |
| Government House Grounds Reserve | Administrator's residence | 7.35 | 17 October 1940 | 21 October 1980 |
| Kingston Common Reserve | Pasturage and other purposes | 29.57 | 17 October 1940 | 21 October 1980 |
| Kingston Recreation Reserve | Recreation purposes | 4.57 | 17 October 1940 | 21 October 1980 |
| Point Hunter Reserve | Recreation purposes | 30.91 | 17 October 1940 | 21 October 1980 |
| War Memorial Reserve | Erection of a war memorial | 0.008 | 24 March 1927 | 21 October 1980 |

⁷⁸ The Kingston and Arthur's Vale Historic Area was established by Memorandum of Understanding between the Norfolk Island and Commonwealth governments in 1989 and revised in 1994. Part B Plans of Management under the *Public Reserves Act 1997* have been developed for each of the public reserves in KAVHA in conjunction with the KAVHA Management Board.

APPENDIX 3A: RELEASE AND INDEMNITY FORM (INDIVIDUALS)

ATTACHMENT TO PERMIT No.

RELEASE AND INDEMNITY



I, _____ of PO Box _____ NORFOLK ISLAND

IN CONSIDERATION of the grant of the above permit(s) under Section 26 of the *Public Reserves Act 1997* to conduct the activities specified therein

HEREBY release, indemnify and undertake to keep indemnified:

- the Administration of Norfolk Island, its officers, employees and agents;
- the Administrator of Norfolk Island; and
- the Commonwealth of Australia, its officers, employees and agents

against all legal liability (including costs) for any loss, claim or proceedings arising from any personal injury to, or death of, any person or for any injury or damage to property arising from any activity whatsoever in a Public Reserve pursuant to the relevant permit granted.

PROVIDED HOWEVER the within release and indemnity shall not apply in relation to any and all such actions and claims arising out of the negligent acts, omissions or defaults of the Administration or any officer, servant or agent of the Administration.

Dated this _____ day of _____ 2002

SIGNED

.....

WITNESSED

.....

APPENDIX 3B: RELEASE AND INDEMNITY FORM (CORPORATIONS)



**ATTACHMENT TO PERMIT No.
RELEASE AND INDEMNITY**

Pty Ltd of , NORFOLK ISLAND

IN CONSIDERATION of the grant of a permit under Section 26 of the *Public Reserves Act 1997* to conduct the activities specified therein

HEREBY releases, indemnifies and undertakes to keep indemnified:

- the Administration of Norfolk Island, its officers, employees and agents;
- the Administrator of Norfolk Island; and
- the Commonwealth of Australia, its officers, employees and agents

against all legal liability (including costs) for any loss, claim or proceedings arising from any personal injury to, or death of, any person or for any injury or damage to property arising from any activity whatsoever in a Public Reserve pursuant to the relevant permit granted.

PROVIDED HOWEVER the within release and indemnity shall not apply in relation to any and all such actions and claims arising out of the negligent acts, omissions or defaults of the Administration or any officer, servant or agent of the Administration.

Dated this _____ day of _____ 2002

THE COMMON SEAL OF _____ PTY LTD)

was duly affixed in accordance with its Constitution)

By)
(full name)) (signature)

a Director and)

by)
(full name)) (signature)

a Director/Secretary)

in the presence of:)

.....)
(witness)) (signature)

APPENDIX 4: CURRENT IUCN PROTECTED AREA CATEGORIES

Current IUCN World Commission on Protected Areas (WCPA) categories⁷⁹

- I. Strict protection
 - a. Strict Nature Reserve
 - b. Wilderness Area
- II. Ecosystem conservation and recreation (National Park)
- III. Conservation of natural features (Natural Monument)
- IV. Conservation through active management (Habitat/Species Management Area)
- V. Landscape/seascape conservation and recreation (Protected Landscape/seascape)
- VI. Sustainable use of natural ecosystems (Managed Resource Protected Area)

IUCN Category III – Natural Monument: protected area managed mainly for conservation of specific natural feature

Definition: Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance.

Objectives of management:

- To protect or preserve in perpetuity specific outstanding natural features because of their natural significance, unique or representational quality, and/or spiritual connotations.
- To an extent consistent with the foregoing objective, to provide opportunities for research, education, interpretation and public appreciation.
- To eliminate and thereafter prevent exploitation or occupation inimical to the purpose of designation.
- To deliver to any resident population such benefits as are consistent with the other objectives of management.

Guidance for selection:

- The area should contain one or more features of outstanding significance. (Appropriate natural features include spectacular waterfalls, caves, craters, fossil beds, sand dunes and marine features, along with unique or representative fauna and flora; associated cultural features might include cave dwellings, cliff-top forts, archaeological sites, or natural sites which have heritage significance to indigenous peoples).
- The area should be large enough to protect the integrity of the feature and its immediately related surroundings.

Equivalent category in IUCN (1978): Natural Monument/Natural Landmark.

⁷⁹ Davey, A.G., (1998), *National System Planning for Protected Areas*. IUCN, Gland, Switzerland and Cambridge, UK. Appendix 2.

Category IV - Habitat/Species Management Area: protected area managed mainly for conservation through management intervention

Definition: Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

Objectives of management:

- To secure and maintain the habitat conditions necessary to protect significant species, groups of species, biotic communities or physical features of the environment where these require specific human manipulation for optimum management.
- To facilitate scientific research and environmental monitoring as primary activities associated with sustainable resource management.
- To develop limited areas for public education and appreciation of the characteristics of the habitats concerned and of the work of wildlife management.
- To eliminate and thereafter prevent exploitation or occupation inimical to the purpose of designation.
- To deliver such benefits to people living within the designated area as are consistent with the other objectives of management.

Guidance for selection:

- The area should play an important role in the protection of nature and the survival of species (incorporating, as appropriate, breeding areas, wetlands, coral reefs, estuaries, grasslands, forests or spawning areas, including marine feeding beds).
- The area should be one where the protection of the habitat is essential to the well being of nationally or locally important flora, or to resident or migratory fauna.
- Conservation of these habitats and species should depend upon active intervention of the management authority, if necessary through habitat manipulation.
- The size of the area should depend on the habitat requirements of the species to be protected and may range from relatively small to very extensive.

Equivalent category in IUCN (1978): Nature Conservation Reserve/Managed Nature Reserve/Wildlife Sanctuary.

Category V – Protected Landscape/seascape: protected area managed mainly for landscape/seascape conservation and recreation

Definition: Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinctive character with significant aesthetic, ecological and/or cultural value, often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

Objectives of management:

- To maintain the harmonious interaction of nature and culture through the protection of landscape and/or seascape and the continuation of traditional land uses, building practices and social and cultural manifestations.
- To support lifestyles and economic activities which are in harmony with nature and the preservation of the social and cultural fabric of the communities concerned.
- To maintain the diversity of landscape and habitat, and associated species and ecosystems.
- To eliminate where necessary, and thereafter prevent, land uses and activities which are inappropriate in scale and/or character.
- To provide opportunities for public enjoyment through recreation and tourism appropriate in type and scale to the essential qualities of the areas.
- To encourage scientific and educational activities which will contribute to the long term well-being of resident populations and to the development of public support for the environmental protection of such areas.
- To bring benefits to, and to contribute to the welfare of, the local community through the provision of natural products (such as forest and fisheries products) and services (such as clean water or income derived from sustainable forms of tourism).

Guidance for selection:

- The area should possess a landscape and/or coastal and island seascape of high scenic quality, with diverse associated habitats, flora and fauna along with manifestations of unique or traditional land-use patterns and social organisations as evidenced in human settlements and local customs, livelihoods and beliefs.
- The area should provide opportunities for public enjoyment through recreation and tourism within its normal lifestyle and economic activities.

Equivalent category in IUCN (1978): Protected Landscape.

Category VI - Managed Resource Protected Areas: Protected Area managed mainly for the sustainable use of natural ecosystems.

Definition: Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs. The area must also fit the overall definition of a protected area.

Objectives of management:

- To protect and maintain the biological diversity and other natural values of the area in the long term.
 - To promote sound management practices for sustainable production purposes.
 - To protect the natural resource base from being alienated for other land use purposes that would be detrimental to the area's biological diversity.
 - To contribute to regional and national development.
-

Guidance for selection:

- At least two-thirds of the area should be in, and is planned to remain in, a natural condition, although it may also contain limited areas of modified ecosystems; large commercial plantations are not to be included.
- The area should be large enough to absorb sustainable resource uses without detriment to its overall long-term natural values.
- A management authority must be in place.

Equivalent category in IUCN (1978): no direct equivalent.