Coastal Reserve Assessment Report

Dalmeny to North Narooma

Adopted at Ordinary Meeting of Eurobodalla Shire Council on 18 December 2007

Ref 06.0098.P

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1. Introduction: Why a Coastal Reserve Assessment Report

This report covers the coastal reserves between North Narooma, through Kianga to Dalmeny, on the South Coast of NSW. These coastal reserves are highly valued for their social, cultural, economic and environmental attractions. By their very nature, these areas are unique as they are transition zones between marine and terrestrial ecosystems.

The Coastal Reserve Assessment Report is a planning tool that allows for better understanding of the issues affecting the coastal reserves and provides a framework for decision making. The report will provide Council and the community goals to work towards in achieving agreed outcomes for the management of the coastal reserves and can be used to identify projects that could be achieved through community working groups as well as providing supporting documentation when applying for grants.

The goals of the Coastal Reserve Assessment Report include:

- To recognise, value, protect and enhance the coastal reserves between Dalmeny and North Narooma, which include grassy and wooded headlands, back beach areas and dune systems; and
- To ensure safe and convenient access for pedestrian and cyclists through a shared pathway while providing for vehicle traffic and parking.

Site Location

The coastal reserves are situated on the South Coast of NSW, approximately 5 hours drive south from Sydney, in the Eurobodalla Shire. The coastal reserves are located north of Narooma, on the northerly side of Wagonga Inlet and cover the coastal strip through Kianga to the village of Dalmeny. The reserves are narrow in width and cover a total area of approximately 54 hectares.

Climate

The climate of the coastal strip between Dalmeny and Narooma experiences with long mild summers between 16 °C to 24 °C and cool to cold winters between 6 °C and 16 °C. The average yearly rainfall is approximately 963mm.The prevailing winds for the reserves are from the northeast as onshore coastal breezes during summer and southerly winds during the winter.

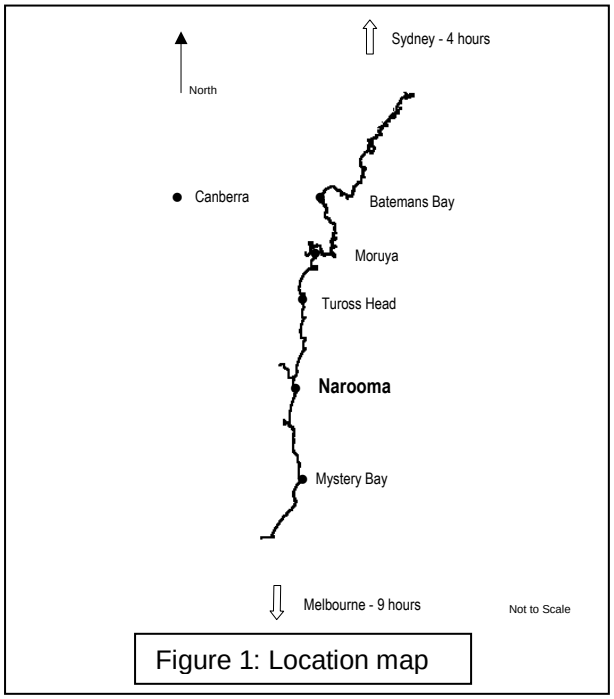

Figure 1: Location map

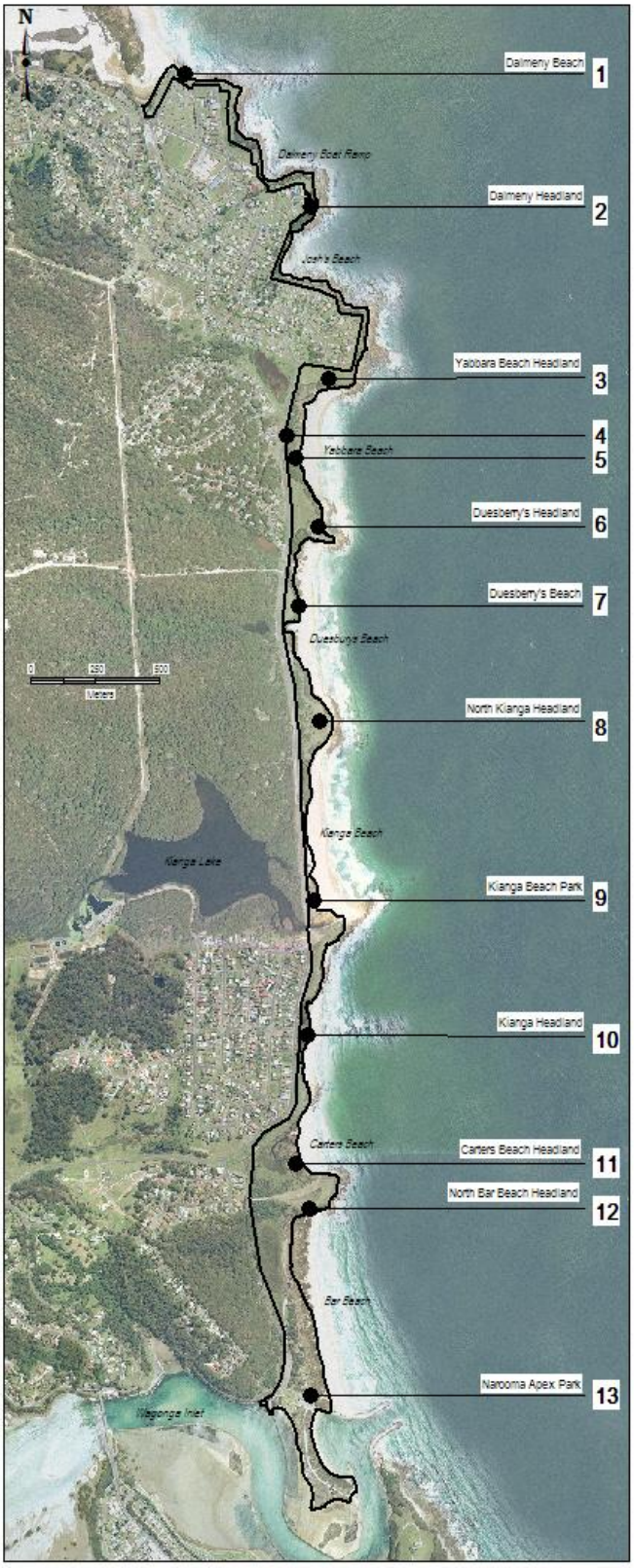

Figure 2: Map of the coastal reserves

2. Executive Summary

The coastal reserves encompass an area of approximately 54 hectares of crown and community land and are located between Dalmeny and North Narooma on the South Coast of NSW.

The coastal reserves are a popular destination for local residents and visitors to the area and have been utilized by the local Aboriginal community for thousands of years.

This Coastal Reserves Assessment Report and Landscape Masterplans – Dalmeny to North Narooma provide measures to improve the environmental management of the reserves by protecting sensitive headlands and dunes. Proposed tree plantings and rehabilitation areas have been identified for future projects and open grassy areas of the reserves will be maintained through slashing. The Eurobodalla Regional Botanic Gardens completed a vegetation survey of the reserves that has highlighted issues in regard to the condition of the vegetation including weeds and an endangered ecological grassland community.

The report provides for improved public access to the beaches and reserves through the construction of beach steps and walkways and picnic tables and viewing platforms to improve the public's enjoyment of the reserves. It is recommended that vehicular access should be restricted from sensitive headland areas through the installations of bollards and that an unformed Crown road be added to the adjacent Crown Reserve.

The coastal reserves between Dalmeny and North Narooma are an important community resource. The landscape masterplans outline a proposed route for the remaining sections of the shared pathway that are yet to be constructed for the length of the coastal reserves, however, the exact location will be determined through further site surveys.

Aboriginal sites are located in the coastal reserves and further archaeological surveys will be conducted before Council undertakes activities that may disturb these sensitive areas.

The assessment report and landscape masterplans have been developed in consultation with the community and propose a management regime for the future that aims to protect the values of the reserves for the local and wider community.

3. Consultation Process

Community consultation was an important part of the preparation of this assessment report. Involving the community in the development of the report and landscape masterplans has helped to identify issues, encourage a sense of ownership, and minimise potential conflicts in the future.

A communication strategy linked to key activities was designed to increase public awareness and involvement in the project. Media releases were produced and a community meeting was conducted at the beginning of the project. The meeting occurred on 8 March 2007 and was attended by approximately 40 people. The community meeting helped to identify community values, issues and priorities, establish objectives and communicate management options. Refer to Appendix 5 for a summary of issues raised in the meeting.

The draft assessment report and landscape masterplans were adopted for exhibition by Council at its Works and Services Committee meeting in August 2007 and submissions were accepted until 5 October 2007.

A public presentation of the draft assessment report and landscape masterplans was conducted on 13 September 2007 and was attended approximately 60 people.

During the submission period 25 written submissions were received. All comments were considered by Council and, where appropriate, the report and plans have been amended.

Figure 3: Aerial photograph of Dalmeny

4. Key Outcomes

The key outcomes of this assessment report are:

- To conserve biodiversity and maintain ecosystem function of the coastal reserves;
- To rehabilitate and maintain the land to its natural state and setting;
- To ensure that the use and management of the reserve is in keeping with the Crown Lands Act 1989, NSW Coastal Policy 1997, The guiding Principles of Ecologically Sustainable Development and other relevant legislation and policies;
- To provide for community use of and access to the land in such a manner that will facilitate the ecological sustainable use of the foreshore and to minimise and mitigate any disturbance on the reserves caused by community use; and
- To ensure the principal values of the reserve are protected and enhanced.

Figure 4: Aerial Photograph of Kianga

5. Relevant Legislation and Policies

The management of public land requires compliance with a suite of Commonwealth and State government legislation and policy. The following legislation and policy are the main planning instruments that apply to the land included in this assessment report. There are many other Acts, regulations and policies that also apply, however this section provides an overview of those that have the most direct application.

The Crown Lands Act 1989

Council is appointed Trustee for certain Crown Lands under this Act and manger of all Crown Reserves that do not have an appointed Trustee. In managing this land Council must observe environmental protection principles; conserve natural resources (including water, soil, flora, fauna and scenic quality) wherever possible; encourage where appropriate multiple use, including public use and enjoyment; and where appropriate, sustain in perpetuity, the land and its resources. Council must manage the land in the best interests of the people of New South Wales.

Division 6 of the Crown Lands Act, 1989. Principles for Crown Land Management

- Environmental protection principles be observed in relation to the management and administration of Crown Lands;
- The natural resources of Crown Lands (including water, soils, flora, fauna and scenic quality) be conserved where ever possible;
- Where appropriate, multiple use of Crown lands should be encouraged;
- Where appropriate, Crown land should be used and managed in such a way that both the land and it's resources be sustained in perpetuity, and
- Crown land be occupied, used, sold, leased or otherwise dealt with in the best interest of the State consistent with the above principles.

National Parks and Wildlife Act 1974

Aboriginal sites and artifacts in NSW are protected by the National Parks and Wildlife Act 1974.

The National Parks and Wildlife Act 1974 applies to all land tenure across NSW and provides that it is illegal to disturb, damage, deface or destroy an Aboriginal site or relic without the prior written consent of the Director of the Department of Environment and Climate Change.

The coastal reserves between Dalmeny and North Narooma include a number of Aboriginal sites that have been identified and recorded by NSW National Parks. However, it is likely that there are more unrecorded significant sites within the coastal reserves.

NSW Environmental Planning and Assessment Act 1979

The *NSW Environmental Planning and Assessment Act* (EP&A) has the following objectives:

- To encourage the proper management, development and conservation of natural….resources…for the purpose of promoting the social and economic welfare of the community and a better environment.
- The protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities and their habitats.

Environmental Assessment
Environmental assessment must be carried out for any proposed activity or development. Any change in the use of a reserve area requires a development application (DA) and environmental assessment of the proposed activity under Part 4 of the EP&A Act forms part of the DA. A Review of Environmental Factors (REF) under Part 5 of the EP&A Act must also be written for those proposed activities that do not require development consent.

Protection of Environment Operations Act 1997
The Protection of the Environment Operations Act replaces the Clean Air Act 1961, Clean Waters Act 1970, Pollution Control Act 1970, Noise Control Act 1975, and the Environmental Offences and Penalties Act 1989. It is an offence for a person to discharge pollutants to waters unless they hold an environmental protection license.

Eurobodalla Urban Local Environment Plan 1999
Part of the coastal reserves between North Narooma and Dalmeny are zoned 6a1 (Public Open Space) under the Eurobodalla Urban Local Environment Plan. The objectives of the 6a1 Public Open Space zone are:

- To recognise the importance of land in the zone as open space and allow a limited range of uses compatible with keeping the land as open space and in public ownership;
- To permit a range of uses, especially recreational uses, where those uses comply with the assessment report for the land;
- To ensure that development in areas of the environmental significance does not reduce that significance.

Eurobodalla Rural Local Environment Plan 1987
Part of the coastal reserves between North Narooma and Dalmeny are zoned 6a (Public Open Space) under the Eurobodalla Rural Local Environment Plan. The objectives of the 6a Public Open Space zone are:

- To identify land which is owned by Council or the Crown and which has been set aside for use by the public as open space or land in private ownership which is to be acquired for public open space;
- To permit a range of uses on land within this zone normally associated with public recreation; and
- To ensure that a range of recreational opportunities is provided that is compatible with the natural environment.

Rural Fire Act 1997
Section 63(1) of the *Rural Fire Act* states:
"it is the duty of a Public Authority to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bush fires on, and to minimise the spread of bush fires on or from:
(a) any land vested in or under its control or management; or
(b) Any highway, road, street, land or thoroughfare, the maintenance of which is charges to the authority."

One of the objectives of the *Rural Fire Act* is to "provide for the environment by requiring certain activities to be carried out having regard to the priorities of ecological sustainable development described in Section 6(2) of the Protect of the Environment Administration Act 1991".

NSW State Rivers and Estuary Policy 1996
The objectives and principles of the *State Rivers and Estuary Policy* stem from the need to achieve sustainable management of the State's rivers and estuaries. The policy is based on the fact that aquatic and semi aquatic ecosystems fulfill crucial ecological, geomorphic and chemical functions within a catchment. These functions are essential for the maintenance of both human and natural systems and therefore the long term viability of all the uses and values of the estuarine environment.

Eurobodalla Shire Council Public Art Policy
In the development of all reserve plans of management and major urban streetscape projects, active consideration will be given to the integration of public art opportunities.

The Coastline Hazard Policy 1988
The primary objective of the Policy is to reduce the impact of coastline hazards on the individual owners and occupiers of land, and to reduce private and public losses resulting from such hazards. The policy was released with the NSW Government's Coastline Management manual (1990).

Coastal Protection Act 1979
The NSW Coastal Protection Act (1979) was amended in 2002 to better implement the intent of the NSW Coastal Policy 1997. The amendments preserve the principles of ecological sustainable development.

The NSW Coastal Policy 1997
The NSW Government adopted the Coastal Policy in 1997. The policy has its central focus on the ecologically sustainable development of the NSW coast. This is in recognition that the coast is a unique environment to be conserved and enhanced for its natural and cultural values while also providing for the economic, social and spiritual well-being of the community.

The Coastal policy has nine goals, each underpinned by objectives that are to be achieved by strategic actions.

The coastal policy is concerned with the effective management of resources in the coastal zone. It recognises there is a need to establish an adequate, comprehensive and representative system of protected areas and reserves in the coastal zone including terrestrial reserves.

The coastal zone represents the interface between marine and terrestrial environments and therefore is vulnerable. The coast is the focus of intense pressures from human activity and there is a large range of competing interests for its resources.

The 1997 Coastal policy is based on the four principles of ESD:
- Conservation of biological diversity and ecological integrity.
- Inter-generational equity
- Improved valuation, pricing and incentives mechanisms
- The precautionary principle. A risk averse approach to decision making

Dedication of Public Lands, Crown Lands Act 1989
Under the NSW Coasts: Government Policy, the NSW Government will ensure that:
- Beaches remain in public ownership and that the public has access to them;
- Claims to the private or exclusive use of beaches will not be permitted.

- Legal title to all NSW beaches will be registered and beaches will be formally dedicated as Crown land, for public use.

Marine Parks Act 1997
The Batemans Marine Park was declared in April 2006 and will come into effect in July 2007. The Marine Park extends from the mean high water mark offshore to the three nautical mile limit for the entire length of the Eurobodalla Shire, in which the coastal reserves are located. Marine Parks are designed to protect marine animals and plant life along the NSW coastline but also allow many recreational and commercial uses. The Marine Parks Act 1997 establishes the legal basis for creating a system of marine parks in NSW. A zoning plan divides the total park area into separate zones. The zones offer different levels of protection for marine life and allow different mixes of commercial and recreational uses.

NSW Wetland Management Policy 1996
Wetlands are areas inundated with water on a temporary or permanent basis.
The goal of this policy is the ecologically sustainable use, management and conservation of wetlands in NSW for the benefit of present and future generations.

State Environmental Planning Policy No 71 – Coastal Protection (SEPP 71)
This Policy aims to protect and manage the natural, cultural, recreational and economic attributes of the New South Wales coast and to manage the coastal zone in accordance with the principles of ecological sustainable development.

State Environmental Planning Policy No 14 – Coastal Wetlands (SEPP 14)
The aim of the State Environmental Planning Policy No 14 is to ensure that coastal wetlands are preserved and protected in the environmental and economic interests of the State.

Eurobodalla Companion Animals Management Plan, Amended 2001
This plan describes area where and times when and where dogs are permitted with and without a leash. For the beaches adjacent to these coastal reserves, the following conditions apply:

<u>Off-leash areas 24 hours</u>
Kianga Reef Beach
Duesbury Beach
Northern Bar Beach

<u>Prohibited areas</u>
Yabarra Beach
Netted section of Bar Beach
Carters Beach, Kianga

Recreational Horse Riding on Beaches
This policy regulates the use of beaches by recreational hose riders. Recreational horse riding is not allowed on any of the beaches adjacent to the coastal reserves between Dalmeny and North Narooma. Horses tethered on council land such as reserves can be impounded.

Eurobodalla Public Toilet Strategy 2002
The strategy recommends that no further Council owned and maintained toilet blocks be considered for Kianga Apex Park under current circumstances.

6. Land Description and Analysis

The land included in this plan consists of public reserves, crown paper roads, Council paper roads and crown reserves of which Eurobodalla Shire Council is the trust manager. The reserves are part zoned 6a1 (Public Open Space) under Council's Urban Local Environment Plan (LEP) and part zoned 6 (a) Public Open Space as per Council's Rural Environmental Plan.

Community Land Categorisation

Community Land is one type of Council public land. Council owned land must be classified as either Community Land or Operational Land under the Local Government Act. This classification identifies which land should be kept for the use of the general public (Community Land) and land which need not (Operational Land).

Community Land is reserved for community use and ordinarily comprises of land such as public parks and reserves. It cannot be sold, except when it is to become or be added to a Crown Reserve or National Park or Reserve. Community Land can be re-classified as Operational Land in which case that land can be sold. Public notice must be given when Council proposes to re-classify land.

The Local Government Act 1993 requires that Community Land be categorised as one or more of the following:

- General Community Use
- Natural Area (bushland; wetland; escarpment; foreshore or other category prescribed by the Regulation)
- Sportsground
- Park
- Area of Cultural Significance

The Community Land included in this report is categorised as General Community Use. This Assessment Report recommends that the community land categorisation be reconsidered at the next review of the relevant Plan of Management. Refer to the Land Status Table for more information.

Crown Reserve Purpose

Crown Reserves are land set aside on the behalf of the community for a wide range of public purposes including environmental and heritage protection, recreation and sport, open space, community halls and special events. The Crown Reserve system promotes the cooperative care, control and management of Crown Reserves by the community with the assistance from the Department of Lands, other government agencies and reserve users. Council is the Trust Manager for all Crown Reserves covered in this Assessment Report.

The use of a Crown Reserves must be consistent with its Crown Reserve Purpose and with the zoning for the Reserve under the Council's Local Environment Plan.
The Crown Reserves covered in this report have the purpose of Public Recreation, Access and Coastal Environment Protection in different areas. This Assessment Report recommends that the Department of Lands be requested to review the Crown Reserve Purpose as per the Land Status Table.

Land Status Table

Figure 2 Map Ref	Tag Key	Lot and DP	Description	Crown Reserve Purpose Or Community Land Categorisation	Proposed Crown Reserve Purpose or Community Land Categorisation as at adoption of this Report	Location	Approx. Area	Notes
1	22378	DP 1006874 Lot 7030	Crown Reserve Eurobodalla (South) Reserve Trust 86046 (part)	Public recreation	Public recreation Coastal environment protection Access	Dalmeny Beach Reserve	9271m	
1	24867	DP 729197 Lot 234	Crown Reserve Eurobodalla (South) Trust 86046 (part)	Public recreation	Public recreation Coastal environment protection Access	Dalmeny camping ground (part)	3978m	
1	24868	DP 729197 Lot 235	Crown Reserve Eurobodalla (South) Trust 86046 (part)	Public recreation	Public recreation Coastal environment protection Access	Eastern end of Dalmeny camping ground	1329m	
1	12280 part	DP 125441 Lot 3	Council Community Land	General Community Use	Part General Community Use Part Natural Area Foreshore & Part Park	Dalmeny camping ground (part) Noble Parade Dalmeny	2662m	Dalmeny Camping Ground Plan of Management
1	12274	DP 125441 Part Lot 4	Council Community Land	General Community Use	Part General Community Use & Part Natural Area Foreshore	McMillian Crescent Dalmeny	6247m	
2	30161	42865 Lot 5	Crown Reserve Eurobodalla (South) Reserve Trust 1011288	Public recreation Coastal environment protection	Public recreation Coastal environment protection Access	Ocean Parade Dalmeny Headland	6.584 ha	Includes Boat Ramp (Cresswick Cove)

Figure 2 Map Ref	Tag Key	Lot and DP	Description	Crown Reserve Purpose Or Community Land Categorisation	Proposed Crown Reserve Purpose or Community Land Categorisation as at adoption of this Report	Location	Approx. Area	Notes
3	12318	DP 255138 Lot 1	Council Community Land	General Community Use	Part General Community Use & Part Natural Area Foreshore	Yabarra Beach Headland Dalmeny	1.249 ha	
4	No Tag		Crown Road NOT under Council control		Public recreation Coastal environment protection Access	Yabarra Beach , Duesbury Beach and North Kianga Beach	6.49ha	Recommend that this land be added to the adjacent Crown Reserve 12318
5	12317	DP 255138 Lot 2	Council Community Land	General Community Use	Part General Community Use & Part Natural Area Foreshore	Between Dalmeny Drive and Yabarra Beach	372.6 m	
6	12316	DP 255138 Lot 3	Council Community Land	General Community Use	Part General Community Use & Part Natural Area Foreshore	Opposite and South of Barkala street, Dalmeny,	1.507 ha	
7	23462	DP 605187 Lot 1	Crown Reserve Eurobodalla (South) Reserve Trust 79308	Public Recreation	Public recreation Coastal environment protection Access	South Duesbury Headland Kianga	2735 m	
7	28823	DP 244103 Lot 4	Crown Reserve Eurobodalla (South) Reserve Trust 79308	Public Recreation	Public recreation Coastal environment protection Access	South Duesbury Headland Kianga	142.3 m	
8	23461	DP 605187 Lot 2	Crown Reserve Eurobodalla (South) Reserve Trust 79308	Public Recreation	Public recreation Coastal environment protection	North Kianga Headland	1.937 ha	

Figure 2 Map Ref	Tag Key	Lot and DP	Description	Crown Reserve Purpose Or Community Land Categorisation	Proposed Crown Reserve Purpose or Community Land Categorisation as at adoption of this Report	Location	Approx. Area	Notes
					Access			
8	28824	DP 244103 Lot 6	Crown Reserve Eurobodalla (South) Reserve Trust 79308	Public Recreation	Public recreation Coastal environment protection Access	Apex Park (part) Dalmeny Drive Kianga	862.5 m	
9	28755	DP 1024286 Lot 7019	Crown Reserve Eurobodalla (South) Reserve Trust 90979 (part)	Public recreation	Public recreation Coastal environment protection Access	Lions Park , Kianga Dalmeny Drive Kianga	7150m	
10	2377	DP 31234 Lot 429	Council Community Land	General Community Use	Part General Community Use & Part Natural Area Foreshore	Foreshore Reserve (between Lakeside and Centenary drive), Kianga	5.442 ha	
11	17916	DP 605186 Lot 1	Crown Reserve Eurobodalla (South) Reserve Trust 79308	Public recreation	Public recreation Coastal environment protection Access	Carters Headland, North Narooma	8.119 ha	
12	8285	DP 1073302 Lot 7034	Crown Reserve Eurobodalla (South) Reserve Trust 79308	Public Recreation	Public recreation Coastal environment protection Access	Bar Beach, North Narooma	15.5 ha	
13	29035	DP 1029451 Lot 7001	Crown Reserve Eurobodalla (South) Reserve Trust 52679	Public Recreation Access	Public recreation Coastal environment protection Access	Western part of Apex Park, Centenary Drive North Narooma	3.1 ha	
13	17917	DP 1020244 Lot 7029	Crown Reserve Eurobodalla (South) Reserve Trust 52679	Public Recreation Access	Public recreation Coastal environment protection Access	Apex Park Centenary Drive North Narooma	4465 m	Includes Boat Ramp

7. Proposed Addition to Coastal Reserves

During the compilation of this Coastal Reserve Assessment Report, it is recommended that the unformed Crown road that runs behind Yabarra, Duesbury and Kianga Beaches be added to the adjacent Crown Reserve.

This unformed Crown road is not in Council control and is approximately 6.5 ha in area. The road has in most parts never been formed or utilised for vehicle access and no improvement have been made by Council. Parts of the crown road on Duesbury and North Kianga headlands are used as rough access track, however, the Operational Plan in this report recommends closing this road to vehicle access, leaving the track for walkers and emergency vehicle access. It would be appropriate for the above crown paper road be added to the Eurobodalla South Crown Reserve Trust 79308 key tag 12318.

8. Adjacent Land Uses

The Batemans Marine Park

The Batemans Marine Park came into effect in July 2007 and extends from the mean high water mark offshore to the three nautical mile limit for the entire length of the Eurobodalla Shire, incorporating the study area. NSW Marine Parks are multiple uses and allow for a range of activities, including fishing, tourism, swimming, diving and boating within different zones. The coastal waters adjacent to the reserves are zoned habitat protection from North Narooma to Kianga Lake and general use zone from Kianga Lake Mummuga Head. Kianga Lake itself is a sanctuary zone.

Roads and Adjoining Residential Properties

There are sealed two lane roads that bound the entire length of the coastal reserves and mark the western boundary, except for a small section where the reserves are bounded by private residences between the Dalmeny boat ramp and southward to Ocean Parade. Car parks are located at Mummuga Headland, Yabarra Beach, Duesbury Beach, Kianga Beach, Kianga Headland, Carters Beach and Bar Beach.

ICOLLs and SEPP 14 Wetlands

A SEPP 14 wetland is located near Bar Beach in North Narooma. The wetland is permanently separated from the ocean by a well-vegetated dune barrier and the water body is not tidal. The wetland has a small catchment of about 0.18 km and although fed predominantly by fresh water, close proximity to the ocean has resulted in the water being slightly brackish.

Four small ICOLLs (Intermittently Closed and Open Lake and Lagoon) are located within the study area, one near Yabarra Beach, two near Duesbury Beach, and one where Kianga Lake enters the ocean. All of these ICOLLs are separated from a larger body of water by the road and are only intermittently filled with water, flowing into the ocean after large rainfall events and drying up completely in periods of dry weather. The hind dune area of Carters beach also contains a wetland area that is not connected to an ICOLL.

Dalmeny Camping Ground

The Dalmeny Camping Ground is located adjacent to the coastal reserves, on Mummuga Head, opposite Brou Beach. The camping ground covers 2.5 hectares of mainly grass with a sloping northerly aspect and has approval for 100 camping sites. The camping ground has been a popular tourist destination since the early 1950's and has been maintained by Eurobodalla Shire Council for over 50 years (Dalmeny Camping Ground Plan of Management, 2003).

9. Cultural Values

Aboriginal Heritage

The coastal reserves lie within the territory of the Yuin [Djuwin] people, of which there are several clans. The study area is located within the Wagonga Local Aboriginal Land Council area.

Coastal and marine areas are of great significance to Indigenous people. The coastline between Dalmeny and Narooma, particularly the area around Mummuga Lake and the entrance to Wagonga Inlet have a long history of Aboriginal use and association (Eurobodalla Cultural Heritage Study, Stage 2, 2006).

The connection of Aboriginal people to the coast is a continuing one as communities still gather coastal resources such as fish and shell fish. Some of the dunes in the coastal reserves between Dalmeny and North Narooma are important burial or sacred sites and need to be protected and respected.

Travelling routes exist along the entire length of the Eurobodalla coastline (Eurobodalla Cultural Heritage Study, Stage 2, 2006). The entrance to Wagonga Inlet was much shallower prior to the construction of the training walls and Aboriginal people were able to cross at low tide and travel between camping areas at Wagonga Heads in Narooma to Mummuga Lake in Dalmeny along the coast through what are now the coastal reserves. An Aboriginal reserve of 180 acres, situated between Kianga and Dalmeny was gazetted in 1861 (Eurobodalla Cultural Heritage Study, Stage 1, 2005). Both Wagonga Inlet and Mummuga Lake are still important areas to the local Aboriginal people as they contain an abundance of wild resources and are culturally significant places.

Many places within the study area are steeped in cultural identity and belief (Eurobodalla Cultural Heritage Study, Stage 1, 2005). In recent times, Mummuga Lake was a place where Aboriginal people would bring the younger generation to teach them about bush foods and medicines, boating, and fishing. Margaret Harris recalls a chair moulded into the rocks at Mummuga head, Dalmeny. Margaret heard that an old Koori lady use to sit amidst the rocks and call in the dolphins. The dolphins would then bring in fish and the men would catch them (Eurobodalla Aboriginal Cultural Heritage Study, Stage Two, 2006).

The Wagonga Local Aboriginal Lands Council recommends that prior to works requiring ground disturbance that the Wagonga Local Aboriginal Land Council be notified of any such works. The local Aboriginal Land Council may then seek to be further involved in the assessment of the proposed activity by conducting a site assessment of the activity on any Aboriginal site.

Consent to Destroy from the Department of Environment and Climate Change may then be required to undertake the works. The conditions of the Consent to Destroy may require that an Aboriginal Site Officer, appointed by the relevant Local Aboriginal Land Council/s, must be on site to monitor the works and to salvage/collect artifacts as appropriate.

Wagonga Local Aboriginal Lands Council highly recommend that a comprehensive Aboriginal Cultural Heritage Assessment be completed for the entire coastal reserve system included in this assessment report to identify and record all Aboriginal sites.

European Heritage
In the late 1800's Dalmeny was owned by Mr. William Mort, a land-owner from Bodalla. William Mort named his estate 'Dalmeny' after Lord Dalmeny with whom he attended Eton college in England (Dalmeny, the History of Settlement). The estate ran a dairy herd and produced cheese that was shipped to Sydney. In 1903, the farm was extended over the headlands to Yabarra Point and further south. The area through to Kianga also supported pigs, vegetables, corn, sorghum and sheep.

Camping has continued to occur at Dalmeny from the 1800's until present day, firstly as part of the Dalmeny Estate. In 1976, the Minister for Lands and Environment provided funds to survey the camping area, erect camping facilities and establish a formal camping ground.

In 1930 Dalmeny was first subdivided and houses were built. In 1937 Dalmeny was described in a tourist brochure as Australia's Tourist Paradise. Holiday cottages were built on Dalmeny headland and private dwellings were rented during the holidays.

In the early days of European settlement, small boats were used for fishing. With the advance of larger boats, a concrete boat ramp was constructed in Dalmeny at Cresswick Cove in 1961 (Dalmeny, the History of Settlement, 1987). Boats regularly took visitors to Montague Island from the Dalmeny boat ramp as it was safer than crossing the Bar at Narooma.

The road between Kianga and Dalmeny was completed in 1968. In October 1971 a donation was made to Council for the Golden Cypress Pines to be planted along the Dalmeny-Narooma Memorial Drive as an ANZAC memorial.

During the development of this Assessment Report Ms Laurelle Pacey was engaged by Council to provide a historical review of the reserves. This report provides a summary of historical issues documenting the development of the coastal reserves between Dalmeny and North Narooma.

A copy of this report is included in Appendix 7.

Community Values of the Coastal Reserves
The basis for management of the coastal reserves between Dalmeny and North Narooma is founded on a set of values of the study area identified by the community. These values are the qualities of the reserves that are significant, special or important, and that the community desires to protect or enhance.

Ascertaining the community values of land means identifying what the community finds important and special about it. These values also identify what people most enjoy or appreciate about a place.

Land management issues change over time, depending on the needs of the community and what may be important today may be more or less important in the future. Values, however tend to go beyond the every day issues of land management and set a more strategic land management vision.

The community has identified the following values:
- The open informal character of the reserves;
- The 'Nature Coast" feel;
- Unique, hardy and resilient environment;
- Views of ocean and surf;

- Open space with public access for recreational activities including picnicing, ball games, walking, whale watching, and beach access; and
- The ability to walk, drive, and cycle along the coast while viewing the ocean.

Current Users of the Reserves
The predominant users of the coastal reserves are the local community and tourists who visit the area for their natural attractions on a seasonal basis.

Within the reserves, the most common current uses include:
- Picnicing
- Walking/ jogging
- Sightseeing
- Whale, dolphin and seal watching
- Boat launching
- Pedestrian and vehicular access to beaches for swimming, surfing, fishing etc.

Recreational Values
Tourists and day visitors to the Narooma area often visit the coastal reserves between Dalmeny and North Narooma. Commonly camper vans use the reserves are as they can be parked close the shore and on headlands. Visitors often only stay for the day but illegal overnight camping is known to occur.

Increasing population and pressure from tourism at peak times may impact on the coastal reserves, however, sustainable tourism with a focus on experiencing natural areas is possible. Tourists visit the reserves where they can view seals, dolphins and migrating whales from the headland and reserves.

Recreational Fishing
Recreational fishing in Australia is an important leisure activity and is a valuable industry that provides a significant economic benefit to the South Coast. Recreational fishing is very common on the beaches that are accessed by the coastal reserves between North Narooma and Dalmeny as well as from the boats launched from the ramps at Dalmeny and North Narooma. The environmental issues associated with recreational fishing include the loss of hooks, sinkers, lines and plastic packaging which can be dangerous to people and wildlife.

10. Facilities and Assets

The coastal reserves play an important role in meeting the recreational needs of residents and visitors.

Shared Pathway

A sealed concrete pathway is being constructed for the entire length of the coastal reserves. The objectives of the project is to extend the existing path and board walk at Mill Bay to provide a safe shared bike and pedestrian path between Narooma, through Kianga to Dalmeny. There are sections of this path that have already been accomplished, largely due to the work of volunteers, and other stages are yet to be completed.

For sections of the shared pathway yet to be constructed, a proposed location is illustrated on the landscape masterplans. The exact location will be determined following further archaeological, vegetation and engineering surveys.

Aims of the shared pathway include:

- To enhance the recreational, employment, tourism, business and cultural opportunities in the Narooma area;
- To provide an alternate means of transport within and between Dalmeny, Kianga and Narooma;
- To provide a catalyst for the development of related foreshore projects; and
- To protect and enhance the environmental and scenic values of the coastal area.

Shared access with vehicles will occur from the pathway to headlands and existing roads will be used in some areas that are away from main roads.

Figure 5: Shared Pathway in Dalmeny

Boat Ramps

Boating is a significant recreational activity of the South Coast and the boat ramps at North Narooma and Dalmeny are well-used points for access to the water. The Eurobodalla Waterways Infrastructure Strategy, 2002 found that the Dalmeny boat ramp is in average condition and the boat ramp at Apex Park is in good condition. Fish cleaning tables are provided at both of these boat ramps and car and boat trailer parking is available at Apex Park.

Toilets
Public toilets are located at Lions Park in Kianga and Apex Park in North Narooma (Eurobodalla Public Toilet Strategy, 2002).

Play Equipment
Play equipment is available at Mummuga Head in Dalmeny, Lions Park in Kianga and Apex Park in North Narooma.

Open Passive Recreational Areas
The open grassy areas of the coastal reserves are ideal for recreational activities such as ball games. One particularly suitable area is the reserves opposite McMillan Crescent as there is a wide open space and the ground is level.

Barbecues and Picnic Facilities
Barbecue and picnic facilities are located at Dalmeny, Kianga Lions Park and Apex Park in North Narooma. Picnic tables are also located at Yabarra Beach, Duesbury Headland, Kianga Headland, and opposite the Kianga shop.

Figure 6: Picnic table on Duesbury Headland

Car Parks
The coastal reserves between Dalmeny and North Narooma contain numerous car parks located on headlands and behind the dune systems. Some of these car parks are in good condition and many have been upgraded recently, however others are in poor condition.

Some of the problems facing the degraded headland car parks include insufficient size resulting in overflow parking on grass, poor drainage, compaction and erosion of soil, pot holes and grass disturbance. This coastal reserves assessment report recommends the upgrading and improvement of car parks on Duesbury, and Carters beach Headlands to decrease erosion and siltation from poor drainage, and the damage to vegetation from unrestricted vehicle access.

Figure 7: Poor drainage at Duesbury Car Park

Visual Amenity

The coastal landscapes between Dalmeny and North Narooma are both popular and highly visible. Extensive vistas of the ocean and coastline can be seen from the coastal reserves and sections of the coastal roads. Council recognises that it is important to identify and protect features and views that are valued by the community and tourists through maintaining the natural character of the Dalmeny to Narooma coastline.

Figure 8: Coastal vista at Dalmeny

Healthy coastal vegetation communities and views in coastal areas are recognised as creating a degree of conflict. It is important to ensure that the existing coastal attributes are considered when development or revegetation of the reserves is proposed. Where Council is required to revegetate coastal reserves following the unauthorised removal of vegetation, such revegetation will aim to restore the former quality of the reserve. Where coastal reserves are required to be revegetated in response to erosion or other identified environmental threats, and where such action may remove views previously enjoyed by residents, revegetation shall occur with a mix of low growing plants in an attempt to preserve the visual amenity for residents potentially affected.

Council will endeavor to:

- retain open views to, from and along the coast, rather than obscuring important views with poorly located amenity planting, signs, car parks etc.

- retain the natural character of the coast by keeping structures and development to a minimum, siting them unobtrusively and designing them to fit into the landscape.

11. The Physical Environment

Headlands

The exposed headlands of the coastal reserves are predominantly steep rocky cliffs of tertiary sandstone. The headlands have an underlying geology of metamorphic rock with a basement of Ordovician sediments covered by a residual capping of tertiary basalt. Geology mapping indicates that the headlands are classified as KPZ 'Kangartha point', which is characterised by volcanics, metasediments, and sediments. There are small areas of tertiary basalt and quartz sand behind coastal headlands. The surrounding regional terrain is located in the southeastern part of the Lachlan Fold Belt.

Open Space on Headlands

The coastal reserves include elevated areas gently sloping to undulating open spaces on the headlands of Dalmeny, Yabbara, Duesbury, Kianga and Carters Beaches.

Dunes

Coastal dune systems provide protection from severe storms by absorbing energy from storm surges. The dunes of the coastal reserves vary in their height, width and occurrence. The dune systems of Yabarra and Duesbury beaches are relatively undisturbed and well developed. With widespread acceptance among the community of the reality of global warming and the threat of sea level rise, the significance of the role of these important areas as buffers for private property and infrastructure is growing.

Figure 9: Dune system at Yabbara Beach

The incipient dune is the most seaward and immature dune of the dune system where vegetation is characterised by grasses. On an accreting coastline, the incipient dune will develop into a foredune, which is located behind the incipient dune. The incipient and frontal dunes on Yabbara, Duesbury and Bar beaches are covered in native vegetation of spinnafex, and coastal wattle (*Acacia sophorae*). Coastal banksia (*Banksia integrifolia*) and larger coastal wattles can be found on the hind dune. Kianga beach dune system is fairly low, narrow and close to the road, while Carters and Bar beach have dune systems that are wider and higher.

Beach and Dune Erosion

Beach erosion is a natural response to changing wave and water level conditions and generally, the eroded sand is returned to shore and the beach is rebuilt during calmer wave swell periods. The lack of a healthy store of sand in a dune system can exacerbate erosion at the shoreline and increases the distance inland that waves can penetrate. The extent of beach erosion during storm events can also be affected by the amount of rebuilding that has occurred since the last erosive event.

The Dalmeny coast is considered to be an open coastline, as there is no offshore sand bar or spit creating a sub environment. However, Montague Island, approximately 9 kilometers offshore influences coastal swell and direction of waves. Montague Island reduces swell and waves of this section of the coast by reducing the area where winds can generate waves.

The most susceptible coastlines to erosion are those with little protection offered by rocky headlands, or those with direct exposure to strong wave energy or longshore currents. Some of the beaches between Dalmeny and North Narooma are pocket beaches, including Joshes Cove, Yabarra and Carters beach. Pocket beaches typically experience little net loss of sand as their bounding headlands tend to protect them from wave attack and longshore transport (NSW Coastline Management Manual, 1990). Under storm conditions, the sand stored in dune system of Duesbury, Kianga and Bar beaches may be transported offshore and erosion of the dune system can result.

Although the headlands of the coastal reserves are predominately subjected to concentrated wave attack, and many of the beaches are sheltered and moderately protected, the dune and back beach areas of the coastal reserves between Dalmeny and Narooma may at some stage be affected by coastal hazards. The main coastal hazards relevant to the Dalmeny – Narooma coast include:

- Short term coastal erosion including that resulting from severe storms, the behavior of estuary entrances and slope instability;
- Long term coastline recession including that resulting from any imbalance in the sediment budget, such as aeolian (wind blown) sand losses, eustatic sea level rise resulting from climate change; and
- Ocean inundation of low lying areas.

Sound planning and physical management is vital in protecting dunes systems as erosion may be accelerated by:

- Loss of dune vegetation caused by rabbits, fire, vehicular and pedestrian tracks;
- Rising sea-level and increase in frequency of major coastal storms;
- Urban development on dunes, clearing, decreased sand circulation;
- Exotic plants

Wagonga Inlet Training Walls

The mouth of an estuary, Wagonga Inlet, is located at the southern end of the study area. The estuary is classified as a drowned river valley and experiences a full tidal range. The sheltered small beach at the entrance to Wagonga Inlet is called Shark Net beach.

The entrance of the estuary has a naturally occurring sand bar that led to the training of the entrance channel in the 1920's and the construction of twin entrance breakwaters in 1977 to improve navigability (Wagonga Inlet Flooding Investigation, 2002).

Prior to the breakwall construction, Shark Net Beach was essentially a continuation of Bar Beach which extends to the north. At this time the untrained entrance was relatively free from unstable entrance shoals and the only near shore feature was a large unaffected beach bar. There are no accounts of Wagonga Inlet ever being completely closed off to the ocean, however, during severe storm events, the southern end of Bar beach could be completely washed out, leaving a broad and shallow connection between the Inlet and the Ocean.

The entrance of Wagonga Inlet was realigned to face incoming swells through the creation of the training walls. By concentrating tidal currents, the breakwalls have caused the bar to move seaward and has deepened water level over the crossing and reduced sediment in feeding.

The breakwalls stabilised the location of the entrance to Wagonga Inlet, maintains its depth and modifies the hydraulic behavior and sedimentation process along the coastline. The breakwalls projects seaward and may be interfering with the littoral transport along the coastline. The southern end of Bar Beach exhibits progradation attributed to the construction of the entrance breakwaters (Wagonga Inlet Flooding Investigation) and there may be some corresponding degradation of the northern end of Bar Beach.

The Spit that separates Shark Net Beach from the Inlet channel was analysed in the Wagonga Inlet Flooding Investigation, 2002. The report found that recent air photography indicates that the width of the spit is presently smaller than before the entrance improvement works. As the entrance is now both deeper and aligned to the dominant wave approach direction, it is expected that higher wave energy is directed onto the spit shoreline. The crest of the spit is presently about 4 m above mean high tide.

12. The Ecological Environment

Vegetation

Vegetated coastal areas help reduce erosion through soil stabilisation and reduction in the erosional effects of rainfall. Leaf litter, fallen branches and dead standing trees provide food and habitat for coastal birds and other animals. Coastal vegetation also provides windbreaks, bank stabilisation and shade.

A vegetation survey of the coastal reserves found that different communities of native plant species grew on parts of the coastal reserves with different aspects. The north facing aspect of North Kianga Headland contained typically exposed headland species, while elements of moist woodland were found on the south facing aspect. In general east and south aspects of headlands supported a greater variety of species than the north. The ecosystems of the reserves can be classified as:

Southern Hind Dune/Heathland Scrub (Forest Ecosystem 22)

This occurs on Duesbury headland woodland and the woodlands at Apex Park where dominant species are *Banksia integrifolia* and a sparse shrub layer of *Lomandra longifolia.*

Southern Coastal Dune Scrub Complex (Forest Ecosystem 23)

This community has a shrub layer made up of *Acacia sophorae* and *Banksia integrifolia* with *Spinifex sericeus*. It is located in the hind dune sections of Yabarra, Duesbury and Bar Beach.

South Coast Swamp Forest Complex (Forest Ecosystem 25)

This community occurs on the western edge of the SEPP 14 wetland near Bar beach. The dominant tree species is swamp oak (*Causarina glauca*) with occasional southern mahogany (*Eucalyptus botryoides*). The shrub layer includes *Pittosporum undulatum* and the ground cover in some places includes a carpet of the native violet *Viola banksii.* These native violet forms a dense stand and may be at its Southern limit at this site and is therefore of possible regional significance (EIS Proposed shared pathway through SEPP wetland, ngh environmental).

Headland Vegetation

Themeda grassland dominated by the kangaroo grass *Themeda australis* has been identified on some of the grassy coastal headlands in the reserves between Dalmeny and North Narooma (EEC survey and mapping 2007). Although kangaroo grass is sparsely scattered on headlands throughout the NSW coastline, the small patches of sufficient indicator species found on minor headlands between Dalmeny and Narooma fall within the definition of the Themeda headland grassland Endangered Ecological Community. It is likely that these headlands were historically kept in their open, grassy state by Aboriginal burning practices, since in the absence of active management they tend to become shrubby quite rapidly. Council's policy of slashing headlands has helped to prevent shrub invasion in some instances, however, herb diversity seems to be affected as the mulching of cut grass suppresses herb growth.

Threats to the headland grassland communities includes invasion by shrubs, both exotic such as bitou bush and natives such as coast wattle, coast banksia and she oaks from adjacent headland scrub. Misguided planting efforts by community groups can accelerate the change from grassland to shrub. Recreational pressure resulting from increased population can cause problems for Themeda Grasslands, especially in the vicinity of car parking and turning areas.

This assessment report recommends that vegetation surveys be conducted to determine the extent and location of the Themeda grassland community on the coastal reserves and that the grassland to continue to be slashed to prevent displacement with shrubs and trees.

Golden Cypress Pines

Golden cypress has been widely planted in Australia as a coastal tree as it tolerates exposed conditions. There are over 100 golden cypress pines planted along Dalmeny Drive with another 19 along Ocean Parade. The trees form a long row on the coastal side of the road and have strikingly contrasting foliage to the native vegetation. Some of these Cypress Pines will be removed for the construction of the shared pathway.

The Golden Cypress Pines are a hybrid between the Monterey cypress *Cuppressus macrocarpa,* and the Mexican cypress, *Cuppressus lusitanica*. The pines were planted in 1971 as part of an ANZAC memorial.

Figure 10: Cypress Pine along Dalmeny Drive

An Arborist report in 2005 outlined that the cypress pines in Dalmeny are suffering from a number of conditions including coastal exposure, soil compaction (from vehicles), drought and low soil fertility. Some of the cypress pines are also infected with the cypress canker. This disease is caused by several species of fungi whose spores enter the plants through natural fissures in the bark or through injuries caused by maintenance activities. Trees are more susceptible if they are stressed. Branches can die rapidly as foliage is starved of sap and eventually the whole tree can die.

This assessment report recommends that control measures be undertaken that include the removal of cypress pines with a large amount of the canker and the pruning of wind damaged pines, and care be taking to prevent the transmission of the disease between trees. The report recommends that cypress pines be removed for the construction of the shared pathway if no alternative route is available and that no new plantings of cypress pines will occur.

Invasive Weeds

The vegetation survey found that the coastal reserves that adjoin residential properties have the greatest number of introduced species. Many of these plants are

species commonly grown in domestic gardens. These plants may have grown from dumped garden waste, deliberate plantings or escaped garden plants. Where houses are separated from the reserve system by distance, such as on Yabarra Headland, there are less introduced species and more native plants. The control of introduced plants in these coastal reserves is a significant issue, given the high ratio of reserve boundary to reserve area and the semi-urban nature of sections of free-hold land adjoining the reserves.

Figure 11: Introduced plants on headland reserve, Dalmeny

Coastal weeds occupy a unique niche in a harsh environment with a limited number of competitors. They have developed survival mechanisms that allow them to cope with extreme coastal elements such as wind, low nutrients and salt. Weeds impact the coast by reducing biodiversity, disrupting ecosystem processes and requiring resources for their control. A description of some of the most significant weeds of the coastal reserves can be found in Appendix 2b.

This assessment report recommends that weed surveys be conducted to determine the extent and distribution of weed species and that it is a high priority to eradicate weeds from the coastal reserves using environmentally sensitive methods.

Fauna

Native fauna that has been observed in and from the coastal reserves is included in Appendix 1a. Please note that this list is indicative only.

Birds that are commonly sighted on the coastal reserves and beaches include two listed threatened species; the Pied Oystercatcher and the Sooty Oystercatcher. The White-Bellied sea eagle is often seen in the sky over the reserves and the internationally listed Great Egret has been noted in the wetland near Bar Beach.

Hooded Plovers and Pied and Sooty Oystercatchers regularly forage and roost at the southern end of Kianga Beach, near the entrance to Kianga Lake and at Bar Beach. Shorebirds generally nest above the mean high tide mark and juveniles of these species have also been recorded on Kianga and Bar beaches. This assessment report recommends that key roosting, breeding and foraging sites of threatened shorebirds be monitored and protected from disturbance from people and pets. Refer to the Operational Plan for management guidelines.

The Australian Fur Seal is often seen in the near shore areas below the cliffs of the coastal reserves and occasionally haul themselves onto the beaches. Humpback whales are regularly observed from the coastal reserves in June and July as the whales migrate north to winter breeding grounds and between October and November when the whales return to feed in the colder waters of the Antarctic.

Refer to Appendix 1b for a full description of the significant fauna of the coastal reserves.

Feral Animals
Introduced fauna known to occur in the reserves includes the European Rabbit and the Red Fox.

The European Wild Rabbit (*Oryctolagus cuniculus)*
The feral European rabbit is one of the most widely distributed and abundant mammals in Australia. It causes serve damage to the natural environment including coastal areas and headlands where soils are soft and sandy. Rabbits dig below grasses to reach roots and seeds and compete with native wildlife, damage vegetation and degrade the land.

Control is complicated because both native and introduced predators feed on feral rabbits. Foxes prey on rabbits, so removing rabbits can increase the number of native animals eaten by foxes. The white bellied sea eagle also feeds on rabbits.

The European Red Fox (*Vulpes vulpes*)
Since introduction to Australia for domestic hunting in the mid-1800s, foxes have spread across most of Australia and have played a major role in the decline a number of species of native animals. Foxes pose a significant threat to small mammals and shore birds roosting and feeding in coastal areas, including the coastal reserves between Dalmeny and Narooma. Foxes are known to be present in remote parts of the reserves, between Dalmeny and Kianga.

The control of foxes using poison baits must take into account possible effects on non-target animals. Burying baits reduces the likelihood of them being taken by native animals and foxes can still find them. Fox control programs also need to be coordinated with other activities such as the control of other invasive species such as feral rabbits.

13. Management Issues

Vegetation Issues

The community has raised a number of issues regarding the management of the vegetation of the coastal reserves. Issues include: the frequency and area of slashing of the grass undertaken by Council, the selection of plant species, trees that block views of the beach and ocean, the regeneration of native plant species to create native bushland and trees to create shade for users of the reserves.

Slashing and Revegetation

Council slashes the grassy areas of the coastal reserves on average every six weeks over the eight month growing season. This slashing frequency may vary as it takes into consideration the growth rate of the grass and so is reduced during periods of drought. Slashing may also be undertaken after the request of local residents.

Natural regeneration has created a problem with some members of the community that are concerned with trees blocking their views. The slashing of the coastal reserves will continue in areas where views are an issue and to maintain the open grassland areas present on most of the headlands. Tree planting has been proposed at strategic points to provide shade and improve the amenity of the reserves.

Plant Selection

Plants for the coastal reserves will be chosen based on the following criteria:

- Native species adapted to the coastal environment;
- Amenity species that will provide shade or shelter in exposed coastal recreation locations;
- Low growing coastal plants that will not block views. Coastal plants such as shrubs and grasses will prevent erosion of steep headland escarpments and beach areas and improve the appearance of infrastructure such as the shared pathway through landscaping.

Refer to Appendix 6 for the full list of recommended plants for the coastal reserves.

Dead Vegetation

A number of dead and dying trees are present in certain areas of the coastal reserves such as behind the dunes of Yabarra Beach.

Figure 12: Dead trees on coastal reserve behind Yabarra Beach

The cause of death appears in some areas to be natural and possibly due to periods of dry weather, however, other dead trees may have been subject to vandalism as people attempt to increase their views and vistas.

Council does not endorse the willful destruction of vegetation on the coastal reserves. Where there is irrefutable evidence of tree destruction by poisoning, cutting or other means, Council will take steps to raise awareness of the specific act of vandalism.

In most situations Council will not remove dead trees from the reserves unless they are dangerous. Dead trees and branches are important places for birds and other animals to roost and nest and contribute to erosion control. Fallen timber in low use coastal reserve areas shall be made safe by Council and remain on site to provide habitat, shelter and food to animals.

Native Bushland Regeneration
Areas that are not slashed will naturally regenerate with larger coastal shrubs and trees. This has occurred in sections of Duesbury, North Kianga and Carters headlands. The assessment report and landscape masterplans recommends the planting of native plant species near Joshes beach and on North Kianga and Carters Headlands, as outlined on the landscape masterplans, to enhance biodiversity and provide habitat for native fauna.

Escarpment Regeneration Areas
The headlands of the coastal reserves contain many exposed and steeply sloped escarpments. These areas are sensitive to erosion and this assessment report recommends that the slashing of grass should be restricted to three metres from the cliff edge to allow for natural regeneration. The planting of low growing native shrubs and grasses is proposed for some cliff top areas, as indicated on the landscape masterplans, to minimise erosion while maintaining views and increasing habitat areas for birds and other native fauna.

Rehabilitation of Hind Dune Wetland Areas
There are five sections of the coastal reserves where small lakes or creeks intermittently overflow onto the hind dune areas of the coastal reserves beaches. This occurs at Yabarra beach, two places on Duesbury beach, and the entrance to Kianga Lake and at Carters beach. Refer to the Landscape Masterplans for locations.

These ephemeral wetland areas contain low growing shrubs, grasses and sedges that are adapted to intermittent inundations of water. These areas are highly productive ecosystems and provide habitat for invertebrates and feeding and roosting sites for a range of bird species. The Eastern long-necked turtle has also been sighted in some of these hind dune areas. Currently, these areas are subjected to invasion by weeds, especially kikuyu, which native birds and other small fauna are not adapted to. This assessment report proposes to rehabilitate these areas by weed removal and by planting native grasses, sedges and low growing native shrubs to minimise dune erosion and to reinstate native vegetation. Refer to the Operational Plan for details.

Kianga Lake Entrance
The entrance to Kianga Lake is situated within the coastal reserve system and is periodically artificially opened by Council to alleviate flooding. Excavation of the entrance may have a direct impact upon ground nesting birds by disrupting breeding activity and nesting sites as well as the disturbance of vegetation. This assessment

report recommends that Council takes into consideration the breeding season and location of nesting sites of shorebirds when making decisions about mechanical entrance opening regimes and completes a Review of Environmental Factors and an Entrance Opening Policy for Kianga Lake.

Access Issues

Vehicle Access

The community has expressed concern with vehicle access on the headlands, safety issues with vehicle entry to the reserves and the design and location of car parks. Erosion is occurring on some headlands as vehicles create tracks in the sensitive grassland areas.

Figure 13: Damage caused by vehicles on North Kianga Headland

The coastal reserves assessment report recommends the installation of bollards to prevent vehicles from accessing sensitive headlands, such as North Kianga, to prevent soil erosions and allow for rehabilitation of native species. The landscape masterplans also provides recommendations for designated areas for car parking.

Pedestrian Access

The community values the freedom to access all areas of the coastal reserves for recreational activities. Fences that have been constructed to prevent people from accessing steep escarpments for safety reasons and to encourage regeneration have created some animosity.

Figure 14: Steps at Yabarra Beach

Erosion of access tracks and steps to beaches has occurred in some areas due to age, poor maintenance and design and drainage of the surrounding area. It is predicted that with increases in the population of the Narooma, Kianga, Dalmeny areas, increases in tourism and the construction of the shared pathway that the coastal reserves will experience more people visiting them. In order to compensate for this increase in usage, this assessment report recommends the installation of access ways, fences and steps to beaches from the reserves at strategic points outlined on the landscape masterplans.

Illegal Dumping

Coastal reserves are often used as a place to dump garden clippings, other rubbish and shells of illegally obtained abalone. The dumping of green rubbish causes a variety if environmental problems including the growth of weed species and the reduction of the aesthetic attraction of the reserves. Generally, weeds out-compete and often smoother native vegetation and destroy habitat for native fauna.

Fire Management

Coastal areas are particularly vulnerable to degradation following fires. Vegetation cover is the primary means of stabilising coastal environments and creating a protective barrier from strong winds and damage from vehicles, people and animals. The typically sparse nature of coastal vegetation, negligible nutrient storage in the soil, the low moisture content of coastal sands and strong on-shore winds can make plant establishment following fires very difficult.

The vegetation of the reserves is not considered a bush fire hazard given its narrow width in most places and the fact that roads bound it to the west and the ocean to the east. The bushfire risk to community assets of the coastal reserves is mapped as insignificant in most places ranging through to minor and moderate in others.

Strategies used to reduce the risk of bush fires in the coastal reserves include continuing Councils slashing practices to provide adequate firebreaks and buffers between forested sections and residential areas.

Fires are banned in the coastal reserves and all open fireplaces have been removed. There are electric barbecues located at Dalmeny, Lions Park Kianga and Apex Park in North Narooma. No new electric BBQ's are recommended in this assessment report.

14. Operational Plan

The Operational Plan identifies the principal land management issues of the coastal reserves. A set of management strategies and actions accompany each issue to provide an ongoing framework for the management of the reserves. These management issues relate to the values of the reserve and are reflected in the Landscape Masterplans. Each action is given an implementation category.

The following terminology is used in the Operational Plan

Management issue	The issue that requires a detailed approach to future management
Strategy	The broad management strategies required to address management issues of concern
Action	Specific actions that address the strategies
Implementation Priority	Category 1 actions are those that can be implemented immediately or very soon after the adoption of the assessment report. They are policy or procedural matters and require minimal or no funding. Category 2 actions are those that require some funding and are principally concerned with protecting or conserving the values of the reserves, improving public safety or minor maintenance and improvement matters. Category 3 actions are capital improvement items or items requiring a significant injection of funds. The timing of their implementation would be dependent on the availability of funds from Council or external sources such as government grants

Note: The scheme does not propose one action to be more important than the next, but presents categories of timing for implementation.

Management Issue	Strategy	Action	Implementation Category
Aboriginal Heritage	Preserve and protect items of Aboriginal heritage and association with the land	1. Confirm the location of Registered Aboriginal sites before undertaking activities that may have an adverse impact on them.	1
		2. Complete Aboriginal Heritage Assessment for the whole of the coastal reserves	1
		3. Encourage Indigenous Green Teams to undertake rehabilitation activities in the coastal reserves	2
	Enhance the recognition of the Aboriginal cultural significance of the reserves	1. In consultation with the local Aboriginal community, provide interpretive information/art work on the Aboriginal heritage of the coastal reserves	2
		2. Provide for the recognition of the coastal reserves as an important Aboriginal area and travelling route through the use of Aboriginal place names	2
Pedestrian Access	Provide for pedestrian access with minimal impact on the environment.	1. Construct pedestrian tracks in locations as indicated on the Landscape Masterplan to minimise the impact of pedestrian activity in the dunal and headland environments and to provide connection to the shared pathway, car parks and residences. Note: the exact location of pedestrian tracks may vary (to that illustrated on the Landscape Masterplans) to allow for site specific conditions e.g., topography, vegetation, existing tracks and other constraints.	2
		2. Where erosion has occurred as a result of pedestrian activity, implement measures to rehabilitate the landscape. This may require the construction of beach stairs, fencing, bank stabilisation and revegetation.	2

Management Issue	Strategy	Action	Implementation Category
		3. Monitor and maintain existing tracks to ensure stability and ensure that no erosion is occurring	2
		4. Rehabilitate vegetation adjacent to pedestrian and shared pathways as required.	2
Vehicular Access	Prevent erosion and damage to headlands by restricting vehicle access to sensitive headland locations	1. Install vehicle barriers (bollards) in appropriate locations as indicated on the Landscape Masterplans	2
		2. Restrict vehicular access to sensitive headland reserves with appropriate planting as indicated on Landscape Masterplans.	3
	Provide safe entrance to and from coastal reserves	1. Consult with Council's Traffic Engineer to determine appropriate methods to improve vehicle access safety	3
Vehicular Parking	Provide adequate car parking with minimal impact on pedestrian, shared pathway user's movement and the environment.	1. Construct car parking areas as indicated on the Landscape Masterplans.	3
		2. Install vehicle barriers (bollards) to prevent over flow parking in sensitive headland environments as indicated on Landscape Masterplans.	3
		3. Align car parks so that they are visible from the beach and surf as indicated on Landscape Masterplans.	3
		4. Provide parking areas to ensure that there is sufficient space and to minimise erosion and vegetation disturbance	3
		5. Identify designated temporary grassed overflow parking areas	3
		6. Ensure that plantings maintain visual access of beach and surf from car parks.	2

Management Issue	Strategy	Action	Implementation Category
Shared pathway	Continue to construct the shared pathway	1. Council to source funding for remaining sections of shared pathway	1
		2. Council to work with volunteer groups to implement the remaining sections of the shared pathway	1
Scooter parking	Provide adequate parking space for motorized scooters along shared pathway	1. Construct level parking areas for motorised scooters that will not obstruct shared pathway users movements.	2
Bicycle parking	Provide adequate bicycle racks along shared pathway.	2. Install bicycle racks for people to safely and securely store bicycles at main points along the shared pathway	2
Addition to reserve system	Review the current status of the Crown Paper road at Yabarra and Duesberry beaches	1. Request that Department of Lands add the Crown paper road to the adjacent Crown Reserve 79308 key tag 12318 which has the purpose of general community use.	3
Visual Amenity	Minimise the visual impact of the shared pathway and recreational facilities	1. Council is to consult with residents and adjacent land owners on the location of the shared pathway and recreational facilities such as picnic tables	2
Environment - Vegetation Management	Protect and manage the vegetation of the coastal reserves	1. Permit no further planting of exotic species in the reserves	1
		2. Ensure that plant regeneration is in character with the reserves coastal setting	2

Management Issue	Strategy	Action	Implementation Category
		3. Encourage regeneration and revegetation of native species in designated areas that will not interrupt coastal views from residences	2
		4. Plant native groundcovers and grasses along escarpment as indicated on Landscape Masterplans	2
		5. Inspect trees as required to assess removal or pruning to ensure public safety	1
		6. Retain dead standing and fallen vegetation (if safe) for habitat for birds and animals where possible	1
		7. Plant tree at strategic positions on the coastal reserves as indicated on the landscape masterplans	2
Escarpment vegetation management	Rehabilitate escarpment areas to prevent erosion	1. Plant low growing grasses and shrubs on exposed escarpment areas to prevent erosion and to provide fauna habitat, while maintaining views.	2
Ephemeral hind dune wetland management	Rehabilitate ephemeral wetland areas	2. Weed removal and planting of native grasses, sedges and shrubs in ephemeral wetland areas as indicated on Landscape Masterplans	1
Management of the opening regime of Kianga Lake Entrance	To consider environmental and social issues for the artificial opening of Kianga Lake	1 .Complete a Review of Environmental Factors and Entrance Opening Policy for Kianga Lake.	1
Endangered ecological community management	Protect and restore rare and endangered grassland communities on headlands	3. Survey for the location and extent of the rare and endangered *Themeda australis* grassland	2
		4. Continue open slashing of grassland to prevent replacement of rare grassland with shrubs and trees as indicated on Landscape Masterplans	1

Management Issue	Strategy	Action	Implementation Category
Threatened Species Management	Protection of key roosting, foraging and breeding sites adjacent to coastal reserves	1. Liaise with Department of Environment and Climate Change on the South Coast Shorebird Recovery Program for the coastal reserves	1
		2. Consider threatened shorebird sites when designing beach access locations	1
		3. Consider threatened shorebird sites when reviewing dog exercise areas	2
Weed Management	Improve knowledge of weeds present in the coastal reserves	1. Conduct weed surveys to determine the extent and distribution of weed species	3
	Undertake weed control programs for the coastal reserves	2. Eradicate weeds in coastal reserves by using environmentally sensitive methods. Landcare activities encouraged and supported to progressively remove these noxious weeds: • Blackberry – *Rubus fructicosus* • Bitou Bush – *Chysanthemoides monilifera* • Lantana – *Lantana camara*	1

Management Issue	Strategy	Action	Implementation Category
		Weed control program to eradicate the following weeds: • Sea spurge – *Euphorbia paralias* • Cape Ivy – *Delairea odorata* • Asparagus fern - *Protosparagus aethiopicus* • Agapanthus – *Agapanthus campanlatus* • Mirror Bush - *Coprosma repens* • Tree aloe – Aloe arborescens	3
		3. Ensure that weed removal does not contribute to erosion by replacing weeds with native species where necessary.	2
		4. Reduce the spread of non-natives from private gardens to reserves by encouraging the use of native plants in private gardens.	2
Dune Management	Restore appropriate native groundcovers to enhance dune stability	1. Support the involvement of community groups and local residents in planting and dune restoration programs	2
Open space	Maintain and enhance the open, informal character of reserves	1. Council slashing activities to continue in reserves to maintain open space as indicated on the Landscape Masterplans	1
Facility Management	Provide facilities to meet the needs of visitors to the coastal reserves	1. Maintain toilets at Kianga and North Narooma in good working order	1

Management Issue	Strategy	Action	Implementation Category
Recreational Facilities	Provide park furniture for users of the reserves	1. Install picnic tables, benches, picnic shelters and viewing platforms as indicated on the Landscape Masterplans.	3
	Provide shade for users of the reserves	2. Plant local native species in coastal reserves as indicated on Landscape Masterplans to provide shade. Determination of the location of new trees must consider view corridors of residents.	2
	Provide play equipment in areas of the reserves categorised as park	3. Maintain existing play equipment at Dalmeny, Kianga and North Narooma to the requirements of Australian Standards.	1
	Facilitate access to the Dalmeny Boat Ramp	4. Maintain access to the boat ramp in accordance with Council's Eurobodalla Waterways Infrastructure Strategy (June 2002).	1
	Provide for public art in prominent areas of the coastal reserves	5. Work with the Public Arts Advisory Panel to engage an artist/ sculptor to develop public art that reflects the Aboriginal heritage and /or environment. The locations of the public art to be determined in consultation with the local Aboriginal and wider community.	3
Signage	Provide low key interpretive signage to increase public appreciation of the values, limitations and opportunities of the coastal reserves	1. Install interpretive signage at locations indicated on the Landscape Masterplan	3

15. Landscape Masterplans

The Landscape Masterplans for the coastal reserves between North Narooma and Dalmeny provides the conceptual framework for the future development and management of the land. The plans have been developed to provide for environmental protection and sustainable public use of the reserves.

Most of the actions in the Operational Plan are illustrated in the Landscape Masterplans.

All proposals are subject to the relevant planning approval process including the Development Assessment process and requirements of other State Government agencies.

What is a Landscape Masterplan?
A Landscape Masterplan is a conceptual diagram of an area that is developed as part of the design process. The procedure involves considering the site's features and adjacent uses, vegetation, existing uses, identification of opportunities and constraints and any other issues pertaining to the future development or protection of the site. Many of these issues have been discussed throughout this assessment report.

The Landscape Masterplan then draws on what the community has said they would like for the reserves, what is possible and permissible under the relevant legislation and professional advice. The plans determine spatially how development factors may be accompanied considering the issues, opportunities and constraints that were identified during the site analysis phase.

Landscape Masterplans are guides to the future development and improvement of the coastal reserves but are still subject to change. Construction documentation that examines the details of the design processes will still be needed to finalise the development process. When it comes to constructing elements proposed in the Landscape Masterplans there may be changes to layout, material and details to better accommodate the site's unique attributes. As a result, items illustrated on the Landscape Masterplans may be amended.

There are twelve Landscape Masterplans for the land included in appendix 7 of this Report.

Appendices
Appendix 1 (a): Fauna List

Known to occur		
	Eastern long necked turtle	*Chelodina longicollis*
	Red bellied black snake	*Pseudechis porphyriacus*
	Carpet Python	*Morelia imbricata*
	Australian fur seal	*Arctocephalus pusillus*
	Black swan	*Cygnus atratus*
	Pacific gull	*Larus pacificus*
	Little Pied Cormorant	*Phalocrocorax melanoleucos*
	Masked lapwing	*Vanellus miles*
	Sooty Oyster catcher	*Haematopus fuliginosus*
	Pied Oyster Catcher	*Haematopus longirostris*
	White Faced-Heron	*Egretta novaehollandiae*
	Great Egret	*Egretta alba*
	Australian White Ibis	*Threskiornis molucca*
	Red Wattle bird	*Anthochaera carunculata*
	Kookaburra	*Dacelo novaeguinea*
	Pacific Black duck	*Anas supercillosa*
	Superb blue wren	*Malurus cyaneus*
	Crested pigeon	*Ocyphaps lopholes*
	Australian Magpie	*Gymnorhina tibicens*
	Silver gull	*Larus novaehollandiae*
	Australian pelican	*Pelecanus conspicillatus*
	New holland honey eater	*Phylidonyris novaehollandiae*
	Purple swamp hen	*Porphyrio porphyrio*
	Common moor hen	*Gallinula chloropus*
	White bellied sea eagle	*Haliaeetus leucogaster*
	Whistling kite	*Haliastur spenurus*
	Welcome swallow	*Hirundo neoxena*
	White cheeked honey eater	*Phylidonyris nigra*
	Great cormorant	*Phalacrocorax carbo*
	Crested Tern	*Sterna bergii*
	Hooded Plover	*Thinornis rubricollis*
	Red-capped Plover	*Charadrius ruficapillus*
Likely to occur	Australian Gannet	*Morus serrator*
	White faced storm petrel	*Pelagoroma marina*
	Short-tailed Shearwater	*Puffinus tenuirostris*
	Eastern grey kangaroo	*Macropus giganteus*
	Swamp Wallaby	*Wallabia bicolour*
	Brush tailed possum	*Trichosurus vulpecula*
	Common ring tailed Possum	*Pseudocheirus peregrinus*
	Common eastern froglet	*Crinia signifera*
	Striped marsh frog	*Limnodynastes peronii*
	Tylers toadlet	*Uperoleira tyleri*
	Peron's tree frog	*Litoria peronii*
	Verreaux's tree frog	*Litoria verreauxii*
	Brown Antechinus	*Antechinus stuartii*

Appendix 1 (b): Fauna of Significance

White- bellied sea eagle *(Haliaeetus leucogaster)*
White - bellied sea eagles are commonly sighted in the coastal reserves around Yabbara and Duesberry beaches. Sea eagles feed on birds, mammals, fish, reptiles and carrion and may be an indicator of the abundance of this type of prey in an area.

Sea eagles require large live or dead trees and nest sites may be found in a range of habitats and tree types. A breeding pair may select from a range of nests due to food availability and breeding areas and nest sites should be identified and protected. The protection of remnant vegetation near wetlands and ICOLLs where white-bellied sea-eagles occur is important.

Pied Oystercatcher (*Haematopus longiristris*)
The Pied Oystercatcher is listed as vulnerable on the schedule of the NSW Threatened Species Conservation Act. The species is listed because:

- Its distribution is limited
- It population has been severely reduced
- It is an ecological specialist and depends on a particular type of habitat and food
- It has poor recovery potential

The Pied Oystercatcher is found in coastal areas, preferring mudflats, sandbanks and sandy beaches. They feed on bivalve molluscs, worms, crustaceans and insects. The molluscs are prised apart with their specially adapted long chisel-shaped bills.

The Pied Oystercatcher breeds in pairs from October to January and has a breeding territory of about 200 m which is formed and defended by both birds. Nesting takes place on the sand just above the high water mark on beaches, sand bars and margins of estuaries.

Sooty Oyster Catcher (*Haematopus fuliginosus*)
The Sooty Oystercatcher is about 50 cm long and has black plumage, red eyes and beak and long, dark pink legs. Their preferred habitats are rocky headlands, shelves and beaches and occasionally estuarine mudflats. They feed on mussels and limpets at low tide and breed in spring and summer in isolated spots above the high tide, laying two to four eggs in a shallow depression. Sooty Oystercatchers nest on rocky substrates generally on offshore islands

These birds are under pressure from human disturbance and damage to their roosting, feeding and breeding sites. Adult birds are often killed by cats, dogs, foxes and eggs and chicks can fall prey to rats.

Hooded Plover *(Thinornis rubricollis)*
The Hooded plover is a medium sized wading bird endemic to southern Australia. It is has a black head, red eye ring and white nape and underparts. Hooded plovers live on sandy surf beaches and prefer beaches backed by dunes rather than by cliffs.

Great Egret (*Ardea alba*)
The Great Egret at about 40 to 49 cm long is the largest Australian egret. The overall plumage of the bird is white and the bill and facial skin is yellow. Feet are green or black. Great Egrets prefer shallow water and damp grass land where they feed on molluscs, amphibians, aquatic insects and fish. The Great Egret is listed on the

Environmental Protection and Biodiversity Conservation Act list of Migratory Species and internationally under the CAMBA and JAMBA agreements.

Australian Fur Seal (*Artocephalus pusillus*)
Sighting of the Australian Fur Seal are often occur in the near shore areas below the cliffs of the coastal reserves and occasionally haul themselves onto the beaches. The Australian fur seal is protected by national legislation and their status is secure. Montague Island, which can be sighted from the reserves, is the most northerly and only remaining haulout site in Australia for the Australian Fur Seal. The number of seals on the island ranges from around 25 to 700 and numbers appear to be increasing. It is thought the island is not a breeding colony.

Humpback Whale (*Megaptera novaeangliae)*
Humpback whales are regularly observed from the coastal reserves in June and July as the whales migrate north to winter breeding grounds and between October and November when the whales return to feed in the colder waters of the Antarctic. These whales are often seen close to the shore as they travel between the coast and Montague Island. Mother whales are thought to spend time with their calves, teaching them about the location of shallow areas and submerged reefs.

Bottlenose Dolphin (*Tursiops truncatus*)
Bottlenose dolphins are commonly seen in coastal waters and Wagonga Inlet from the coastal reserves throughout the year. These dolphins feed on a variety of school fish and can be varying shades of grey and white on the belly.

Local Aboriginal Animal Names

The Aboriginal people of the Eurobodalla Shire are associated primarily with the Dhurga language. Following is a list of some of the animals found in the coastal reserves and surrounding waters and their Dhurga names.

Common Name	**Scientific name**	**Dhurga Name**
Pacific Black Duck	*Anas superciliosa*	Umbarra
Australian Magpie	*Gymnorhina tibicen*	Dirirwun
Crow	*Corvus coronoides*	Waagura
Black Swan	*Cygnus atratus*	Gunyung
Laughing Kookaburra	*Dacelo novaeguineae*	Gugara
Eastern Grey Kangaroo	*Macropus giganteus*	Buru
Brush Tail Possum	*Trichosurus vulpecular*	Gumara
Sydney Cockles	*Anadara trapezia*	Bimbulla
Oysters	*Ostrea angasi*	Bidhingga
Lobster	*Cherax sp.*	Yangga

Appendix 2 (a): Flora List

Trees
Swamp she-oak *Casuarina glauca*
Drooping she-oak *Allocauarina verticillata*
Coast banksia *Banksia integrifolia*
Bleeding heart *Omalanthus populifolius*
Rough fruit pittosporum *Pittosporum revolutum*
Sweet pittosporum *Pittosporum undulatum*
Swamp mahogany *Eucalyptus botryoides*
Native cherry *Exocarpus cupressiformis*
Forest red gum *Eucalyptus tereticornis*
Muttonwood *Rapanea howittiana*

Shrubs
Hickory Wattle *Acacia implexa*
Golden wattle *Acacia longifolia*
Dune wattle *Acacia sophorae*
Black wattle *Acacia mearnsii*
Boobialla *Myoporum acuminatum*
Myoporum boninense
Coffee bush *Breynia longifolia*
Bleeding heart *Omalanthus populifolius*
Native geranium *Pelargonium australae*
Coast rosemary *Westringia fruticosa*
Coast correa *Correa alba*
Bidgee-widgee *Acaena novae-zelandiae*
Dusky coral pea *Kennedia rubicunda*
Beard heath *Leucoogon parviflorus*
Bracken *Pteridium esculentum*

Grasses groundcovers and vines
Sea berry saltbush *Rhagodia candlleana*
Climbing saltbush *Einadia nutans*
Common silkpod Parsonsia straminea
Warrigal spinach *Tetragonia tetragonioides*
Sea rocket *Cakile maritima*
Pigsface *Carpobrotus glaucescens*
Club rush *Isolepis nodosa*
Spinifex *Spenifex sericeus*
Sand Couch *Spororbolus virginicus*
Wallaby Grass *Austrodanthona longifolia*
Bergalia tussock *Carex appressa*
Water vine *Cissus hypoglauca*
Cocksfoot *Dactylis glomerata*
Dianella revolutum
Dianella longifolia
Plume grass *Dichelachne crinita*
Ruby saltbush *Echylaena tomentosa*
Love grass *Eragostis Sp.*
Blady grass *Imperata cylindrica*
Spiky mat rush *Lomandra longifolia*
Native raspberry *Rubus parvifolius*
Fan flower *Scaaevola aemula*

Rough senecio *Senecio hispidulus*
Kangaroo grass *Themeda australis*
Sea box *Alyxia buxifolia*
Devils twine *Cassytha sp*.
Kidney weed *Dichondra repens*
Trailing speedwell *Veronica plebiea*
Dune thistle *Actites megalocarpa*
Beach saltbush *Atriplex cinerea*
Beach wheat grass *Austrofestuca littoralis*
Prickly couch *Zoysia macrantha*
Native flax *Linum marginale*
Rough senecio *Senecio hispidulus*
Senecio linearifolia
Hop goonenia *Goodenia ovata*
Guinea vine *Hibbertia scandens*
Milk vine *Marsdenia rostrata*
Happy wanderer *Clematis glycinoides*
Beach convolvolus *Calystegia solanella*
Creeping brookweed *Samolus repens*
Snake vine *Stephania japonica*

Exotic trees
Norfolk Island Pine Araucaria heterophylla
Golden Cypress Cupressus 'aureus'
Norfolk Island hibiscus Lagunaria patersonii
Honey myrtle Melaleuca armillaris

Non natives
Agapanthus *Agapanthus campanulatus*
Tree aloe *Aloe arborescens*
Cape ivy *Delairea odorata*
Formosa lily *Lillium formosum*
NZ Christmas bush *Metrosideros excelsa*
Pelargonium
Kikuyu *Pennisetum clandestinum*
Couch *Cynodon dactylon*
Nightshade *Solanum nigrum*
Cape marigold *Dimorphotheca pluvialis*
Pennywort *Hydrocotyle bonariensis*
Turkey rhubarb *Acetosa sagitatta*
Carpet grass *Axonopus affinis*
Mirror bush *Coprosma repens*
Bridal veil creeper *Myrsiphyllum asparagoides*
Cape gooseberry *Physalis peruviana*
Lantana *Lantana camara*
Asparagus fern *Protosparagus aethiopicus*
Castor oil plant *Ricinus communis*
Blackberry *Rubus discolour*
Cassia bush *Senna septemtrionalis*
Purple top *Verbena bonariensis*
African scurf pea *Psoralea pinnata*
Fireweed *Senecio*
Sea Spurge *Euphobia paralias*
Pennywort *Hydrocotyle bonarienses*
Parramatta grass *Sporobolus virginicus*

Beach daisy *Arctotheca populifolia*
Bitou bush *Chysanthemoides monilifera*
Cobblers pegs *Bidens pilosa*
Willow bottlebrush *Callistemon salignus*
Bizzie lizzie *Impatiens walleriana*
Soursob Oxalis *pres-caprae*
Plantain *Plantago lanceolata*
Large plantain *Plantain major*
Buckshorm plantain *Plantago coronorpus*
Ribbon grass *Chlorophytum comosum*
Fleabane *Conyza albida*
Gladioli *Gladiolus Sp.*
Guinea flower *Hibbertia scandens*
Honeysuckle *Lonicera japonica*
Polygala virgata
Clover *Trifolium sp.*
Nasturtium *Tropaeolum majus*
Sheep sorrel *Acetosella vulgaris*
Pimpernel *Anagallis stipoides*
Dandelion *Hypochoeris bonariensis*
Oxalis corniculata
Grass daisy *Brachyscome graminea*
Freesia hybrid
Lined tritonia *Tritonia lineata*
Capeweed daisy *Arctotheca calendula*

Appendix 2 (b): Weeds of the Coastal Reserves

Bitou bush
Bitou bush is a South African plant and is a noxious weed in NSW. It was planted widely along the NSW Coast between the 1940's and the 1960's to reduce dune erosion, but it has since spread rapidly. Bitou bush can invade coastal heath, grassland, woodland and forests. It grows quickly and forms dense stands, replacing native plants and destroying the habitat of native animals. Bitou bush is not wide spread in the coastal reserves as Council have been undertaking an eradication program, but it is still located in some small patches.

Mirror bush
Native to New Zealand, mirror bush is an environmental weed found in many locations along the coastal reserves. The leaves are broad, green and glossy and the orange seeds are dispersed by birds. Mirror bush tolerates drought, sea spray and different soil types and is able to smother native plants.

Succulents
The term succulent is broadly used to define a group of plants with thick fleshy leaves that can store water. Invasive succulent plants found in the coastal reserves in tree aloe and red hot pokers (Kniphofia spp.) Succulents reproduce vegetatively when segments of stem break off and take root.
Succulents have a negative effect on coastal environments as they lead to an increase in soil nutrients and subsequent invasion by other weeds. The visual amenity of an area is also significantly decreased.

Sea Spurge
Sea Spurge is an invasive beach weed that originated from Europe. Sea Spurge has colonised beaches along the NSW South Coast, including the study zone, and is moving North. A large colony of sea spurge will create a dense mat from the high tide zone to the dunal fringe.

Control of sea spurge should be carried out during autumn/winter in conjunction with Councils bitou bush control program. Care must be taken in hand removal as sea spurge has a toxic sap that can irritate the skin and is painful if brought in contact with the eyes.

Asparagus fern
Asparagus fern is among the most difficult and labour intensive weeds to remove. It has long, arching, light green stems to 2m.

Agapanthus
Agapanthus is a hardy perennial lily that grows in thick clumps with dark green strap like leaves and large blue or white flowers. The weed is a native of South Africa and can spread by seed and vegetatively by seeds and runners. Agapanthus can be controlled by pruning the flower head and disposing responsibly.

Appendix 3: Coastal Reserve Management Techniques

Dune management

Dunes are held together by plants and damage to these by excess traffic can cause destruction of stable areas and increase the mobility of unstable dunes. Effective dune management is based on maintenance of satisfactory vegetative cover and both public access paths and vehicle tracks need to be carefully sited and controlled. Beach vegetation such as Spinifex provides some resistance to the removal of sand during storm events and will stabilise sand as it returns after a storm event.

Access control

Managing human use and access to the coastal reserves must be designed to link with the way the site is used and the area's sensitivity to degradation. Access control should be accompanied by fences and signage where relevant.

Formalising and upgrading access can sometimes attract increased use of the site. While access improvements can increase the carrying capacity of some locations, these implications should be considered at the project planning stage to insure improved access does not contribute to overall site degradation. Access through reserves to beaches should be via a properly constructed walkway if traffic is moderately high.

Signage

Well planned signs can enhance user experiences and raise awareness of particular issues. Signage can be a useful way to advertise stewardship of an area and to guide behavior. It can also be useful to raise awareness of issues and to interpret interesting natural features and historical information.

Signs should be durable and aesthetically in keeping with their surrounds. It is recommended that signage convey a simple but effective point. Messages should be positive and ideally give reasons why an activity is undesirable. Messages need to be carefully thought out and avoid technical terms or jargon.

Too many signs can detract from the message – only use signs where they are serving an express purpose. Signs should be located where they are clearly visible, near pathways, car parks, and beach entry points.

Pedestrian paths

Generally, pedestrian paths should be wide enough for comfortable movement, but not wide enough for vehicle use. Paths should allow for the natural profile of sand dunes. If sloped, they may require steps. It is important to ensure that access ways to sandy sites are not aligned directly into prevailing winds, to reduce the likelihood of erosion.

Paths that link facilities and attractions, such as car parks and toilets to the beach, should be convenient to use and provide the shortest safe distance from point to point.

Considerations should be given to:

- Whether the path needs to be surfaced
- Whether the sides should be confined with fencing or hand rails
- Whether lookout points or interpretive signage may be useful
- The impacts on the aesthetics of the site
- The opportunities to accommodate disabled access

Vehicle access
Formalising vehicle access to and along the coast involves:

- Identifying where and why vehicle access is required
- Identifying appropriate alignments, design and construction materials to accommodate vehicle use without causing further degradation
- Blocking off unwanted or illegal tracks

Identifying the nature and frequency of use will assist with determining suitable access way alignment and materials. Existing tracks that are no longer needed should be blocked off by bollards, fencing, rock, or earth bunds. Blocked off tracks should be supported by planting and signage to redirect traffic movements and allow degraded areas to recover.

Fencing/barriers
The location of fences should consider the landform, existing vegetation and surrounding developments such as car parks. All access control fencing in coastal areas should have a low wind resistance to avoid the accumulation of sand. Typical fence types used in coastal locations include:

Post and plain wire
This type of fencing is useful as a physical barrier for pedestrians although it may not totally prohibit access as people (especially children) can easily slip between the wires. The wire should ideally be galvanized or PVC coated for endurance in salt air.

Post and rail
Post and rail fences are aesthetically pleasing in coastal locations. However, their high cost often restricts their use to amenity areas such as paths around car parks or facility areas.

Wire mesh
Wire mesh fencing works as a more physical barrier, and is useful in keeping away traffic from sensitive or rehabilitating areas. In sandy areas, fencing can become buried and should be lifted regularly.

Horizontal pine post
Low horizontal pine posts are typically used to direct and guide vehicle movement in coastal areas. The cost of these barriers can be high and they are typically used to block vehicles from continuing onto the beach.

Bollards
Similar in function to horizontal pine posts, bollards serve as a guide for directing vehicle and pedestrian traffic in and around a coastal site. In many instances this may be all that is required to stop people wandering into sensitive areas.

Appendix 4: Glossary of Terms

Coastal inundation: the flooding of beach and backshore areas by elevated ocean levels can occur as result of storm conditions and high tides. Elevated ocean levels are mainly caused by wind and wave action pushing water on to the coast and low barometric effects.

Deposition: the dropping of material which has been picked up and transported by wind, water or other processes.

Ecological community: A naturally occurring biological assemblage that occurs in a particular type of habitat.

Erosion: the breakdown of material or landforms due to chemical, physical or biological processes.

Geomorphology: the study of the nature and history of landforms and the processes which create them.

Habitat: The area in which an organism or assemblage of organisms lives.

ICOLL: Acronym- Intermittently Closed and Open Lakes and Lagoons, referring to coastal lagoon and some wave dominated estuaries under low runoff conditions.

Intertidal: The environment between the level of the high tide and low tide.

Mouth: The entrance of a coastal waterway, or place where the sea meets or enters a coastal waterway.

Shoreline recession
Shoreline recession is the progressive loss of beach sands over time due to sand movement off the beach and out of the beach embayment. These sands are not replaced over time. Shoreline recession associated with climate change related to sea level rise is usually considered part of this hazard.

Sediment accretion
Sediment accretion is the accumulation of sediment caused by wind or water movement and can result in the covering of valuable habitat areas and can damage infrastructure or blocks access ways

SEPP 14 WETLAND: Acronym – State Environment Planning Policy number 14 – Significant Coastal Wetlands that are protected and preserved in the environmental and economic interests of the State of NSW.

Appendix 5: Comments from Public Meeting held on 8 March 2007

The public meeting generated a lot of discussing relating to the coastal reserves. The general feel from the meeting was that people do not want to see significant changes to the reserves.

The public would like the following features maintained:

- The open informal character of the reserves;
- Beautiful and unique environment and the 'Nature Coast" feel;
- Visual access with views of the ocean, surf and surrounds;
- Public access for recreational activities including picnicing, ball games, walking, whale watching, and beach access; and
- The ability to walk, drive, and cycle along the coast while viewing the ocean.

What public dislikes about reserves:

- Trees blocking views;
- Traffic issues;
- Cars driving on headlands;
- Dangerous vehicle access from road;
- Car park position and design;
- Campervans parking for extended periods;
- Bollards – some would like them removed;
- Lack of pedestrian access to some headland areas (fences constructed by Council);
- Erosion; and
- Vandalism of toilets.

What the public would like improved:

- Enhance the informal character of the reserves;
- Plant shade trees but keep visual access to beach;
- The planting of vegetation that will maintain views and the amenity of the area;
- Improve access to beach;
- Install more rubbish bins and picnic tables (some with roofs);
- Control people driving on headlands;
- Better designed car parks, aligned to be able to see the surf from car and not hidden from the beach for safety;
- Ability to park on grass;
- Weed removal;
- Mow closer to use areas to prevent the creation of degraded grass;
- Ensure that bike path is safe ; and
- Improve liaison within Council and between Council and public.

Appendix 6: Recommended Plants for the Coastal Reserves

Bangalay *Eucalyptus botryoides*

Swamp She-oak *Casuarina glauca*

Drooping She-oak *Allocauarina verticillata*

Coast Banksia *Banksia integrifolia*

Saw Banksia *Banksia serrata*

Hairpin Banksia *Banksia spinulosa*

Heath leaved Banksia *Banksia ericifolia*

Crimson Bottlebrush *Callistemon citritus*

Coastal Wattle *Acacia longifolia*

Dune Wattle *Acacia sophorae*

Hickory Wattle *Acacia implexa*

Creeping Boobialla *Myoporum parvifolium*

Coastal Boobialla *Myoporum insulare*

Coastal Rosemary *Westringia fructicosa*

Kangaroo Grass *Themeda australis*

Flax Lilly *Dianella longifolia*

White Correa *Correa alba*

Guinea Flower *Hibbertia scandens*

Snake vine *Stephania japonica*

Coastal Pigface *Carpobrotus glaucescens*

Beach Spinefex *Spinefex sericeus*

Mat Rush *Lomandra longifolia*

Coastal rush *Juncus sp.*

Club rush *Isolepis nodosa*

Coastal beard heath *Leucopogon parviflorus*

Prostrate Grevillea *Grevillea* species and cultivars

Plants for park area of the coastal reserves

Cabbage Tree Palms *Livingstonia australis*

Tilba Fig *Ficus rubiginosa* (only at Bar Beach for shade)

Broad Leaved Paperbark *Melaleuca quinquenervia*

Appendix 7 Historical Review

Coastal Reserves Dalmeny – North Narooma

By LAURELLE PACEY

Appendix 8 Landscape Master Plans Dalmeny to North Narooma

Scenic Landscape Architecture

Appendix 9 Summary of Submissions and Comments from 13 September 2007 Public Presentation

Environmental Management

- Would like to have area regenerated with native plants and weed removal to occur after shared pathway is built
- Significance of Themeda Grassland endangered ecological community needs to be recognised
- Cypress pines should be retained within the village confines of Dalmeny and Kianga only
- Exotic plantings should be removed along the roadside between the two villages and replaced with native plantings.
- Cypress Pines were planted as an Anzac memorial and should be retained
- Reinstate the original native vegetation on the eastern side of the road between the two villages. Sufficient patches of casuarinas and banksias communities survive on this side of the road to allow informed revegetation to occur
- Casuarinas at Josh's beach need urgent removal as possible safety hazards exists. Some have already fallen over, these trees are scrappy and look ugly and many appear to be in decline.
- Retain flowers and other garden plants on Dalmeny Headland
- Provide a description of trees to be planted
- Nesting sites for shore birds need to be recognised
- Replace unsightly trees with less visually obstructive native vegetation
- Careful review of additional requests to slash headlands are needed so that the ecological integrity of remnant coastal vegetation is not detrimentally impacted on

Vegetation Management and Tree Plantings

- Rather than recommending the planting of additional Norfolk pines on the headland, the plan should recommend their removal and replacement with banksias, casuarinas and other native species
- Do not plant any view obscuring trees
- No new large tree plantings on Dalmeny Headland or in Kianga
- Proposed tree plantings are too close together
- No non native species should be planted
- Trees will cost council to maintain and roots will damage paths
- Need for planting opposite Kianga shops
- Local schools, environment groups, church leaders, friends of Eurobodalla Botanical Gardens etc could be involved with tree planting
- Where possible encourage nearby residents to clear undergrowth between existing trees

Access – pedestrian

- Replace steps at Joshes beach
- Have a raised wooden path behind dunes at Bar Beach
- Where pathway crosses roads a raised speed bump should be constructed

- Beach access should be informal and not substantial structures
- Steps to the beach are needed in Kianga

Access – vehicular

- Vehicle access within the reserves should be restricted to the formal road and car park network only
- Bollards or other forms of vehicle control to constrain off-road vehicle use across these grasslands
- Vehicles should not be visible from beaches or the coastal fringe so as to provide visitors with a more natural experience devoid of visual intrusions. Car parks should be designed and screening vegetation should be used so as to camouflage or hide vehicles from the view of people on beaches
- In relation to the Carter's beach headland a continuous one way loop road would fit the current use and be the most practical, as the dirt road already exists showing its current usage
- Do not allow overflow onto grassed areas
- Consult surfers with design of car parks as they are main users

Shared Pathway

- The installation of bicycle racks should be limited to sites within the confines of Dalmeny and Kianga villages only
- Pathway should wherever possible follow most scenic route, not by the road if there is a scenic option
- Shared pathway needs to be accessible to all including wheelchairs, prams and scooters
- Location of shared pathway near boat ramp needs to take into consideration issues discussed at street meets
- Culverts and bridges are required for shared pathway
- Shared pathway should not be located near busy roads

Aboriginal Heritage

- Legislation section needs to contain National Parks and Wildlife Act 1974
- Complete an Aboriginal Heritage Assessment for whole of reserves and any proposed work such as pathway and steps
- Expand section on Aboriginal history. Include references to reserve at Dalmeny camp ground, walking track between Wagonga Inlet and Mummuga Lake as an historic travelling route
- Pathway behind dunes is appropriate and the edges of the path should be fenced (planted with coast wattles) to prevent people from walking over the dunes. There is a known burial site between wetland and beach at Bar beach. Paths down to the beach could be narrow and winding to prevent erosion of sand
- Formal acknowledgement of ancient coastal travelling route
- Include Aboriginal names of native animals and plants

Open Grassed Area

- Grassy areas can be used for recreational activities such as ball games and kite flying
- Remove existing fences which prevent residents mowing foreshore

Facilities

- Lots more seating needed at strategic points along pathway route
- More toilets, picnic tables with shade covers and BBQ's
- Whale watching platforms will benefit the community, especially aged and disabled
- Construct viewing platform t point beyond Joshes beach as it is most easterly location, elevated and has very good views including migrating whales
- Do not remove the shelter at Kianga
- Covered seating areas for wildlife observation

Waste

- Rubbish bins should be removed from all sites along the coastal reserves as they are unsightly, and discourage people from taking their rubbish home with them
- Metal bins should be used as plastic ones can catch fire

Signage

- Environmental educational signage required
- Notices for dog owners need to be placed along the pathway and near wetland areas.
- Signage for dangerous snakes is needed
- Signage should be minimised
- Provide for Public and Aboriginal art
- Proposed signage to direct people to toilets in camp ground is incorrect. These toilets are not public

Values

- People can sit in their cars and view beach and ocean
- Keep reserves in natural state
- Leave area as it is
- Preserve our natural assets

References

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