

REPORT

Central Coast Council Coastal Management Program – Open Coast and Lagoons

Central Coast Open Coast and Lagoons
CMP Stage 1 Scoping Study

Client: Central Coast Council

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1 Central Coast Council Acknowledgement of Country

We acknowledge the traditional owners of the land on which we live, and pay our respects to elders past and present.

2 Executive Summary

The Central Coast Local Government Area contains a diverse natural waterway environment which includes rivers, creeks, wetlands, lakes, estuaries, lagoons and beaches. Collectively, the coastal catchments, estuaries and coastline areas are considered the Central Coast's greatest natural asset. Natural waterways and the coastal zone provide a multitude of values and uses, which contribute to the quality of life of the community (Council, 2020a).

Sustainable management of the Central Coast coastline is required to ensure the intrinsic environmental, social, economic and recreational qualities of the coast are maintained and enhanced in the present and retained for the use and enjoyment of the community into the future. However, the management of the coastal zone presents various and significant challenges. These challenges include increasing development pressure and use of the coastal zone, increased impacts from urban pollution on coastal and oceanic environments and the effects of a changing climate on both natural coastal & marine environments and adjoining urban areas (Council, 2020b).

Coastal processes have shaped the coastline over many thousands of years and will continue to do so. The coast is subject to risks from waves and rising sea levels that threaten recreational use and development along the coastline and surrounding the estuaries. Over recent decades, significant erosion has occurred on several occasions, resulting in the loss of several buildings and threats to beachfront development, public assets and beach amenity.

Council has a strong tradition of planning for natural hazards, with both former Gosford City Council and Wyong Shire Council having developed a range of strategic and management plans for the coastline, including the Gosford Lagoons Coastal Zone Management Plan (2015), Gosford Beaches Coastal Zone Management Plan (2017), Wyong Coastal Zone Management Plan (2011), and the Draft Wyong Coastal Zone Management Plan (2018). It is recognised that these four CZMPs were prepared in accordance with former legislation, reflecting the objects of the *NSW Coastal Protection Act (1979)* and associated policies and guidelines.

The statutory and policy framework for coastal and marine management was the subject of the New South Wales Coastal Reforms over several years, resulting in the passage of the *Marine Estate Management Act 2014* and the *Coastal Management Act 2016*, which has practical effect through the requirements of the State Environmental Planning Policy (Coastal Management) 2018. The savings, transitional and other provisions of the *Coastal Management Act 2016* state that a Coastal Zone Management Plan in force under the former Act ceases to have effect at the end of 31 December 2021.

Seeking to address the challenges of managing the coastal zone in a coordinated manner, and in accordance with the *Coastal Management Act 2016* (CM Act), Central Coast Council has initiated the first stage (Stage 1) of the new Coastal Management Program (CMP) process, which comprises the preparation of a CMP Scoping Study for the Open Coast and Lagoons of the Central Coast.

This project will run in parallel, and compliment, the development of CMPs for Tuggerah Lakes, the Hawkesbury-Nepean River system (including Brisbane Water and Broken Bay), and Lake Macquarie. The framework brings together the coastal management approaches of both former councils into a consistent

strategic direction, providing for the integrated management of the coastal environment, confirming and consolidating the delivery of priority management actions by Council and public authorities.

The geographical scope of the Open Coast and Lagoons CMP Scoping Study includes all Central Coast open coastline areas stretching north of Box Head (south of Kilcare beach) to Snapper Point (north of Budgewoi beach embayment) - including all sandy beach systems, sections of rocky coasts, coastal lagoons and associated coastal management areas. The CMP areas extend landwards to include the catchment of the four coastal lagoons (Cockrone, Avoca, Terrigal and Wamberal), however does not include The Entrance channel area and Tuggerah Lakes estuary, which is within the Tuggerah Lakes CMP Scoping Study.

Management of Broken Bay beaches will be covered in the Hawkesbury-Nepean River System CMP which encompasses Broken Bay, Brisbane Water, Pittwater and the Hawkesbury River Estuary. Notwithstanding, it is anticipated that any future hazard definition studies undertaken during Stages 2 and 3 of the CMP process will also include assessment of the Broken Bay beaches to ensure consistency across all beaches in the Central Coast Council local government area.

Management of the northern suburbs which are within the catchment of Lake Macquarie, such as Kingfisher Shores, Mannering Park, Gwandalan and Summerland Point, will be included within the Lake Macquarie CMP which is currently being developed by Lake Macquarie City Council.

Development of a comprehensive CMP will be consistent with the principles of ecologically sustainable development, for the social, cultural and economic wellbeing of current and future residents. Management actions will consider the benefits from economic growth, development and public access to the coastal zone along with the need for protecting and enhancing coastal environments and managing the risk to human life and property.

The CM SEPP streamlines coastal development assessment requirements, identifies development controls for consent authorities to apply to each coastal management area to achieve the objectives of the CM Act, and establishes the approval pathway for coastal protection works (DPIE, 2019a). Once a CMP is certified, Council as the consent authority can use the Local Environmental Plan and Development Control Plan land use planning controls for the coastal environment area to give effect to management objectives identified in the CMP for this area, and the requirements of the CM SEPP to minimise impacts on environmental systems and values.

The savings, transitional and other provisions of the *Coastal Management Act 2016* state that a Coastal Zone Management Plan in force under the former Act (such as the Gosford CZMP) ceases to have effect at the end of 31 December 2021. Actions contained within the certified Gosford CZMP will no longer be eligible for State Government funding after this date. In order to continue effective management of the coastline under current legislation, and with the financial and technical support of the State Government, it is important that Council seek to deliver updated CMP(s), in accordance with the CM Act, for part or all of the Central Coast LGA within reasonable timeframes.

Between 14 and 18 July 2020 an east coast low storm event affected a number of locations along the open coast of the study area, with notable impacts occurring at The Entrance North Beach and Wamberal Beach, leaving beachfront homes in a state of structural instability and at risk of collapse, resulting in evacuation orders being placed on 18 houses along Ocean View Drive. Implementation of actions within current Coastal Erosion Emergency Action Subplans for these locations were considered impractical and ineffective, resulting in orders being issued under the *State Emergency and Rescue Management Act 1989* to deliver alternative emergency coastal protection works.

Development of a CMP for the open coast and lagoons will necessitate a review of the adequacy of current emergency, short- medium- and long-term management actions, and provides an opportunity to implement a range of consistent, appropriate responses to identified issues.

As such, key recommendations of the Open Coast and Lagoons CMP Scoping Study are that Council:

- **progress with the preparation an Open Coast and Lagoons CMP**, including consideration of a planning proposal to amend Coastal Management Area maps in the CM SEPP (if a Gateway determination authorises it); and
- **consider preparation of a CMP** for appropriate location(s) via the fast track process prior to 31 December 2021.

3 Purpose, Vision and Objectives of the CMP

3.1 Purpose

Aligned with the purpose of CMPs as set out by the CM Act, the purpose of the Central Coast CMP for Open Coast and Lagoons will be to provide an integrated, adaptive and long-term strategy for the co-ordinated management of the of the open coastline and coastal lagoons of the Central Coast's coastal zone. The CMP will confirm the focus of coastal zone management by Council and by public authorities and co-ordinate the delivery of priority management actions.

The CMP will seek to assist the smart and coordinated management, and environmentally sustainable development, of the dynamic open coastline and coastal lagoons of the Central Coast's coastal zone in order to protect the social, cultural, economic and environmental values, and identity of the region against current and future coastal hazards.

3.2 Vision

While each of the existing CZMP's contain iterations of Vision statements such as "Continuing community enjoyment of resilient coastal landscapes in times of change" (Umwelt, 2011 and BMT WBM, 2018), the Vision created by Council and the community during development of "One – Central Coast, Community Strategic Plan 2018-2028" has strong relevance to this Scoping Study. It is recommended as a draft Vision to be further developed and refined in consultation with the local community and stakeholders during the preparation of the CMP:

We are ONE Central Coast - A smart, green and liveable region with a shared sense of belonging and responsibility.

3.3 Objectives

Consistent with the CM Act 2016, the objectives of the Central Coast CMP of Open Coasts and Lagoons are to manage the coastal environment in a manner that is consistent with the principles of ecologically sustainable development for the social, cultural and economic well-being of the people of the Central Coast.

As such, the objectives of the CMP are:

- to protect and enhance natural processes and environmental values of the Central Coast open coast and lagoons;
- to support the social and cultural values of the Central Coast and maintain public access, amenity, use and safety;
- to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the Central Coast;
- to recognise the subject area as a vital economic zone and to support sustainable coastal economies;
- to facilitate ecologically sustainable development in the Central Coast and promote sustainable land use planning decision-making;
- to mitigate current and future risks from coastal hazards, taking into account the effects of climate change;
- to recognise that the local and regional scale effects of coastal processes, and the inherently ambulatory and dynamic nature of the shoreline, may result in the loss of coastal land to the sea

(including estuaries and other arms of the sea), and to manage coastal use and development accordingly;

- to promote integrated and co-ordinated coastal planning, management and reporting;
- to encourage and promote plans and strategies to improve the resilience of coastal assets to the impacts of an uncertain climate future including impacts of extreme storm events;
- to ensure co-ordination of the policies and activities of government and public authorities relating to the coastal zone and to facilitate the proper integration of their management activities;
- to support public participation in coastal management and planning for the Central Coast and greater public awareness, education and understanding of coastal processes and management actions;
- to facilitate the identification of land in the coastal zone for acquisition by public or local authorities in order to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone; and
- to support the objects of the *Marine Estate Management Act 2014*.

Council's Community Strategic Plan (CSP) notes that "the Central Coast is known for its natural beauty; maintaining our natural assets is a critical component of what we value as a community. Ongoing education is key to our green approach, as is inviting the community to take a hands-on role in conservation, protection and remediation of our environment. Reducing litter, minimising waste and championing renewable energy in our future design and planning will minimise the impacts of climate change in our region and will enable the preservation of our beaches, waterways, wildlife corridors and inland areas for the variety of species that inhabit them" (Council, 2018).

Key issues and objectives within the CSP that relate to delivery of this statement and are relevant to this Scoping Study are described in **Section 6.5**. Consideration of these objectives will be required during development of the CMP.

4 Introduction

The Central Coast Council is a Local Government Area (LGA) serving the Central Coast region of New South Wales, Australia, established on 12 May 2016 following the amalgamation of Gosford City and Wyong Shire Councils. Central Coast Council is located on the coast of New South Wales, between 60 and 90 kilometres north of the Sydney CBD, about 80 kilometres south of the Newcastle CBD and has a population of 343,968 (2019 data; State of the Environment Report 2020).

The LGA comprises an area of approximately 1,681 km², including more than 80 kilometres of coastline. It is bordered by City of Cessnock, City of Lake Macquarie and Lake Macquarie in the north, the Tasman Sea in the east, the Hawkesbury River and Hornsby Shire in the south, and City of Hawkesbury in the west. It is bounded by the Tasman Sea to the east, Broken Bay and the Hawkesbury River to the south, Yengo National Park northwards to Bucketty in the west, and at its northern boundary, the LGA encompasses Olney State Forest, meets the southern end of Lake Macquarie and reaches the coastline south of Catherine Hill Bay as shown in **Figure 1**.



Figure 1: Central Coast Council and adjacent local government areas

European settlement of the Central Coast area dates from the 1820s, with development mainly along the coast, particularly around the waterways. Land was used mainly for farming and timber-getting, while ship building industries were also important. Growth was minimal until the 1860s, when it was aided by the establishment of several shipyards and citrus orchards, while additional expansion in the 1880s and 1890s was spurred by the opening of the railway line and the expansion of tourism. Growth continued in the early 1900s, with subdivision of land along the waterways and beaches for holiday villages and resorts. Significant development occurred in the post-war years, aided by improvements in access and the expansion of metropolitan Sydney. Agriculture and horticulture began to decline in importance as Gosford and Wyong developed as commuter, holiday and retirement centres (iD Community, 2020).

The LGA contains a mixture of rural and residential areas, with some commercial and industrial land use. Rural land is used mainly for farming, timber-getting and coal mining for electricity generation. More than half of the Council area is national parks, state forest, bushland, open space, nature reserves and aquatic environments (beaches and waterways). The population is dispersed across a variety of urban settings, including towns, villages and neighbourhoods. The largest centres are Gosford, Tuggerah-Wyong, Erina, Woy Woy, and The Entrance (Council, 2020).

Council's Community Strategic Plan "One – Central Coast 2018 – 2028" recognises the range of social, economic and environmental considerations facing the LGA, as well as identifying the values and aspirations of residents, and provides a range of objectives and strategies to address these in a sustainable manner through shared decision making and effective working partnerships with government agencies, non-government organisations, business and the local community (Council, 2018).

Key challenges and opportunities identified include:

- 41,500 new homes will be needed to accommodate projected growth
- Conserving the environment and keeping it free from pollution in light of an increasing population and urban development is vital
- A sustained effort must be made to consider how and where new development will occur
- Investing in infrastructure to meet the diverse needs of the growing community to ensure it will serve the next generations who live here
- Future prosperity as a region depends on industry diversity, business and employment growth
- The need to address climate change is imperative, as is implementing frameworks that address climate risks.

Sustainable management of the Central Coast coastline is required to ensure the intrinsic environmental, social, economic and recreational qualities of the coast are maintained and enhanced in the present and retained for the use and enjoyment of the community into the future. However, the management of the coastal zone presents various and significant challenges. These challenges include increasing development pressure and use of the coastal zone, increased impacts from urban pollution on coastal and oceanic environments and the effects of a changing climate on both coastal & marine environments and adjoining urban areas (Council, 2020).

Seeking to address these challenges in a coordinated manner, and in accordance with the NSW Coastal Management Framework, Central Coast Council (Council) has initiated the first stage (Stage 1) of the new Coastal Management Program (CMP) process, which comprises the preparation of a CMP Scoping Study for the Open Coast and Lagoons of the Central Coast local government area.

The purpose of the CMP Scoping Study is to compile existing knowledge contained within previous plans and studies, address lessons learnt from implementation of management actions, and reflect awareness

of current and future coastal management issues, constraints and opportunities, to enable the scope of subsequent CMP stages (i.e. Stages 2, 3 and 4) to be defined.

The Open Coast and Lagoons scoping study is designed to:

1. Fulfill the requirements of Stage 1 of the Coastal Management Program under the CM Act;
2. Provide an overview of the existing knowledge of coastal processes, coastal hazards and the use of the coastal zone within the Central Coast local government area (LGA);
3. Provide the strategic context for management of the coastal zone along the Central Coast;
4. Review existing management of coastal areas;
5. Identify knowledge gaps within existing studies or management plans and identify the focus of the new CMP;
6. Assist in satisfying the requirements of a potential planning proposal under the *Environmental Planning and Assessment Act 1979*; and,
7. Develop a forward program for subsequent stages of the coastal management program, including a fast-tracking pathway (if appropriate).

This Scoping Study was prepared by Royal HaskoningDHV under the ongoing guidance of Council's CMP Scoping Study Project Group, which included active representation from DPIE throughout development of this report.

Community consultation for all Central Coast CMPs was conducted from April to June 2021 with the launch of a dedicated online Our Coast, Our Waterways consultation hub and community survey, as part of awareness raising ahead of targeted community engagement to be undertaken during Stages 2-4 of the CMP process. Consultation activities included:

- 3,918 visits to the Your Voice Our Coast project page;
- 1,168 survey responses received;
- Over 350 respondents have entered the focus group candidate pool;
- Over 220 stakeholder emails sent;
- 3 focus groups hosted with over 20 participants;
- 403 community members reached at pop up events; and,
- Over 500 postcards distributed.

Ongoing site-specific community engagement is being undertaken to address coastal management actions at Wamberal Beach, in response to significant coastal erosion that occurred in July 2020 (please see **Section 6.3.2.2** for more detail). The New South Wales government established the Wamberal Seawall Advisory Taskforce on 31 July 2020 to provide Council with support to implement a sustainable long-term solution to the coastal erosion issues at Wamberal Beach. The composition of the Taskforce consists of representatives including:

- Independent Chair – Dr Phil Watson. (Although Dr Watson is a DPIE employee, he will chair the Advisory Taskforce in an independent capacity in recognition of his significant expertise and international reputation in coastal management. He is not a DPIE representative on the Advisory Taskforce.)
- Adam Crouch MP, Member for Terrigal and Parliamentary Secretary for the Central Coast
- The General Manager, or their representative from Central Coast Council
- Council's Project Manager for the Wamberal Seawall project
- A representative from the Department of Planning, Industry and Environment (Environment, Energy and Science)

- A representative from the Department of Planning, Industry and Environment (Planning and Assessment)
- A representative from Department of Planning, Industry and Environment (Crown Lands)
- Additional technical experts from the Department of Planning, Industry and Environment and Council may attend in an observer capacity as required.

5 Environmental Context

5.1 Geographical Scope of the CMP

The Open Coast and Lagoons CMP scoping study area, shown in **Figure 2**, includes approximately 80 kilometres of open coast along the Central Coast's coastline from the southern end of Box Head (Killcare beach) in Bouddi National Park to Snapper Point at the northern end of Budgewoi Beach embayment - including all sandy beach systems, sections of rocky coasts and coastal lagoons. The initial scoping study area extends in both seaward and landward directions from the shoreline to limits defined by the Coastal Management Areas identified and mapped by the CM SEPP, although consideration is given to many physical and social aspects of the wider LGA.

Other than the identified coastal management areas mapped under the CM SEPP, the study area is limited by the the scope of other CMPs that are being prepared in order to avoid the duplication of, or discrepancies between, management actions.

The southern extent of the Scoping Study area at Box Head is defined to meet the northern extent of Hawkesbury-Nepean River System Coastal Management Program. This CMP being prepared on behalf of Central Coast Council, Hornsby Shire Council, Hawkesbury City Council, Ku-ring-gai Council, The Hills Shire Council and Northern Beaches Council, which all border this estuarine location, and will encompass the Hawkesbury-Nepean River, Pittwater, Brisbane Water and Broken Bay and will span the Greater Sydney and Hunter - Central Coast regions. The northern extent of the Central Coast local government area is Snapper Point at the northern end of Budgewoi Beach embayment, adjoining the Munmorah State Conservation Area, the coastline of which is under the management of the NSW National Parks & Wildlife Service.

The Scoping Study area includes long sandy beaches, several barrier beaches, lagoon and lake entrances, numerous pocket beaches, intertidal rock platforms, high sandstone cliffs and rocky bluffs. The open coast holds significant social, cultural, economic and environmental value for residents and visitors of the Central Coast. The coastline provides many recreational and tourism opportunities, and forms part of the traditional country of the Darkinjung people, with many recognised Aboriginal sites throughout the study area.

The Scoping Study area includes the catchment and waterbodies of four of the five open coastal estuary/lagoon systems (Cockrone, Avoca, Terrigal and Wamberal), however does not include the Entrance Channel area and Tuggerah Lakes as noted previously, which will be covered by the Tuggerah Lakes CMP being prepared by Council. Within the open coast are two locations that have been recently impacted by significant coastal erosion, being The Entrance North Beach and Wamberal/Terrigal Beach, both of which were recognised as "hotspots" in the *Coastal Erosion in New South Wales Statewide Exposure Assessment* (DPIE, 2017) along with Hargraves Beach and Cabbage Tree Harbour, and require particular consideration.

Recognising that a significant body of knowledge of coastal issues and potential solutions had been developed by both former councils, this Scoping Study has been developed to consolidate, and integrate with, existing plans and strategies, technical studies and stakeholder input relevant to this stretch of coastline, notably being:

- Gosford Beaches Coastal Zone Management Plan (2017) - certified
- Gosford Lagoons Coastal Zone Management Plan (2015)
- Wyong Coastal Zone Management Plan (2011)
- Draft Wyong Coastal Zone Management Plan (2018).

Coastal management actions and activities contained within these plans, that meet the objectives and priorities established in Council's Community Strategic Plan (under Integrated Planning and Reporting requirements), continue to be implemented through Council's Delivery Program.

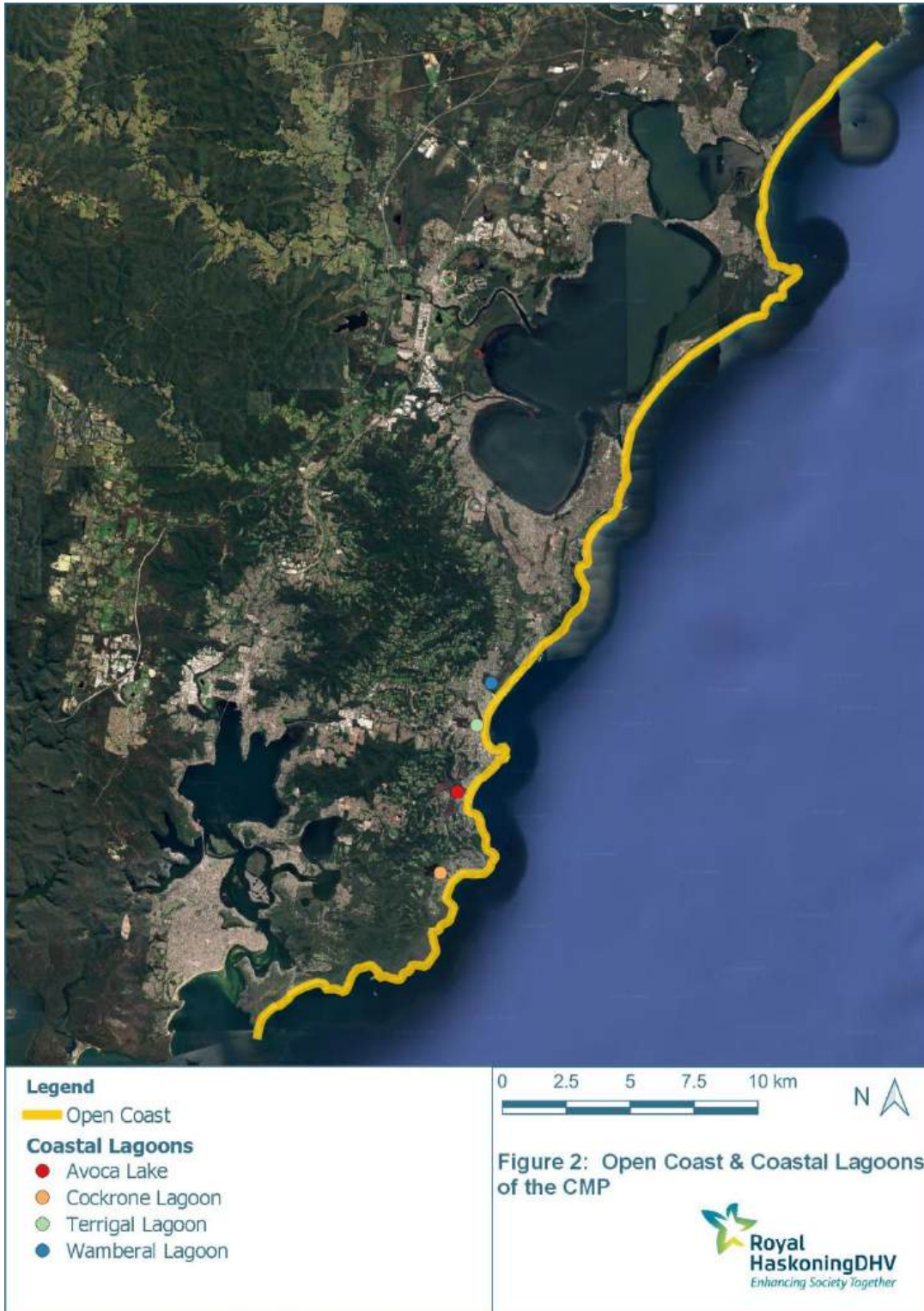


Figure 2: The Open Coast and Lagoons CMP Scoping Study area

The majority of the Central Coast is contained within the Central Coast coastal sediment compartment listed within Schedule 1 of the CM Act, however the northern extent of the LGA connects with the Newcastle coastal sediment compartment, as outlined in **Table 1** and shown in **Figure 3**. In accordance with Section 16 (1) (b) of the CM Act consultation with other local Councils within this sediment compartment (i.e. City of Newcastle and Lake Macquarie City Council) will be required during development of the Open Coast & Lagoons CMP.

Table 1: Coastal sediment compartments

Coastal sediment compartment	Extent of compartment (along coastline)	Local government areas* (with land in sediment compartment)	Geomorphology summary
Central Coast	Third Point to Norah Head	Central Coast Council	Generally characterised by geological features including sandstone, siltstone and conglomerate headlands, embayed beaches, pocket beaches, transgressive coastal dunes and backbarrier flats. Includes Tuggerah Lakes and all of the coastal lagoons with the exception of Pearl Beach Lagoon.
Newcastle Coast	Norah Head to Nobbys Head (south head of the Port of Newcastle)	Central Coast Council City of Newcastle Lake Macquarie City Council	Generally characterised by geological features including sandstone, siltstone and conglomerate headlands, embayed beaches, pocket beaches, transgressive coastal dunes and backbarrier swamps. Includes the large coastal lake, Lake Macquarie.

*Names of LGAs listed have been amended as per the *Local Government (Council Amalgamations) Proclamation 2016*.

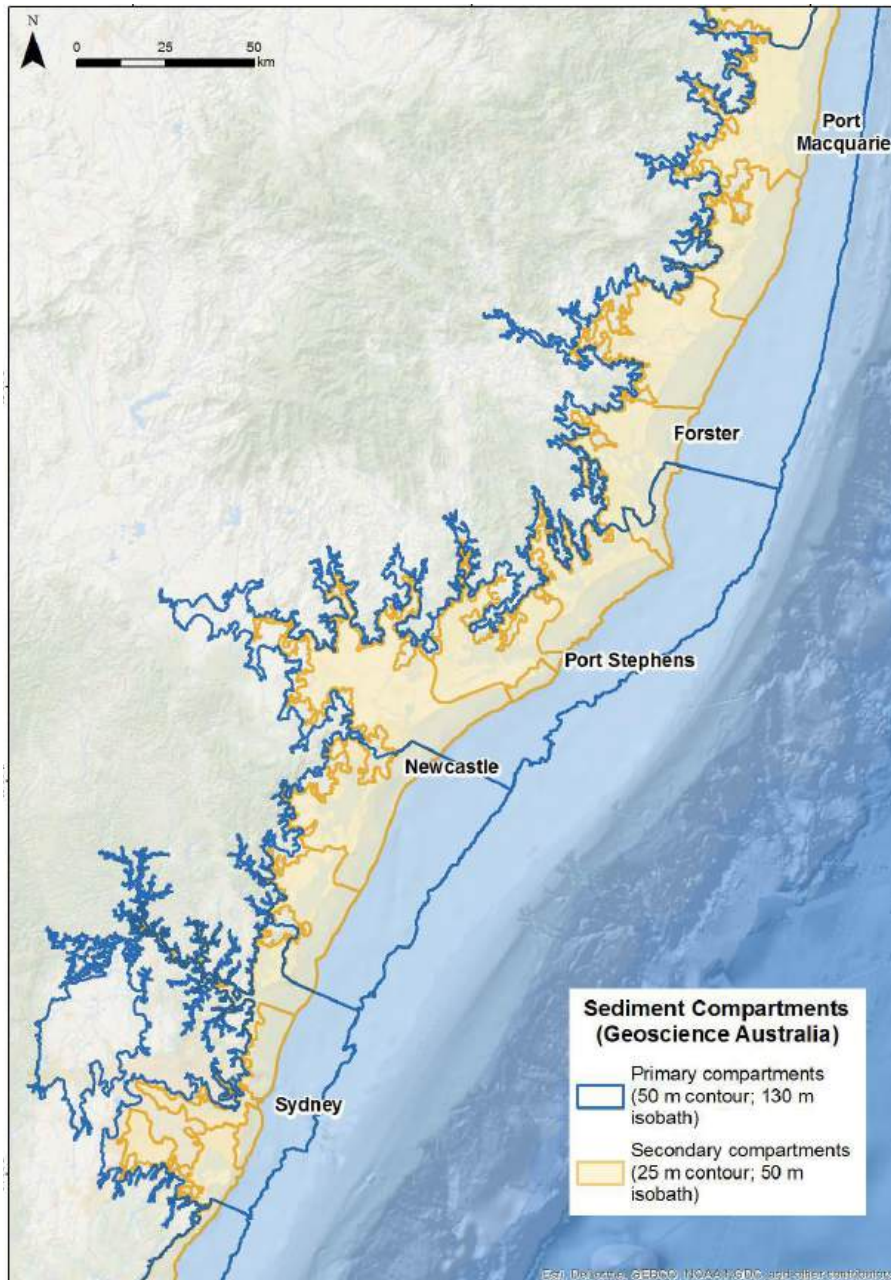


Figure 3: Coastal sediment compartments and local government area boundaries
(source: NSW Coastal Management Manual Part B: Stage 2)

5.2 Open Coast Location Descriptions

Historically, coastal processes and coastal hazards have threatened the open coast of the Central Coast, particularly with reference to the impacts of coastal erosion on some of the relatively more exposed beach and dune systems. Storm events in 1974, 1978, 1986, 2016 and 2020 have resulted in particularly severe coastal erosion at MacMasters and Copacabana, North Avoca, Terrigal and Wamberal, Forrester's, and The Entrance North beaches, with impacts including damage to public assets, loss of recreational amenity, dune instability, loss of buildings, and the damage and threat to beachfront development. With climate change, the risk of these issues is expected to intensify (Council, 2020).

A significant proportion of the southern central coast coastline is within the Bouddi National Park as shown in **Figure 4**, which is under the control by the NSW National Parks & Wildlife Service (NPWS), and managed in accordance with the Bouddi National Park Plan of Management (NPWS, 2020). Certain provisions of the CM SEPP do not apply to land reserved under the *National Parks and Wildlife Act 1974* if the proposed development is consistent with a plan of management prepared under that Act for the land concerned. The park includes 18.5 kilometres of coastline and estuarine foreshore, including the intertidal zone down to mean low water mark. The terrestrial portion of the park is in the Sydney Basin Bioregion on the coastal fall of the Hornsby Plateau, while the Bouddi Marine Extension lies in the Hawkesbury Shelf Bioregion (NPWS, 2020).

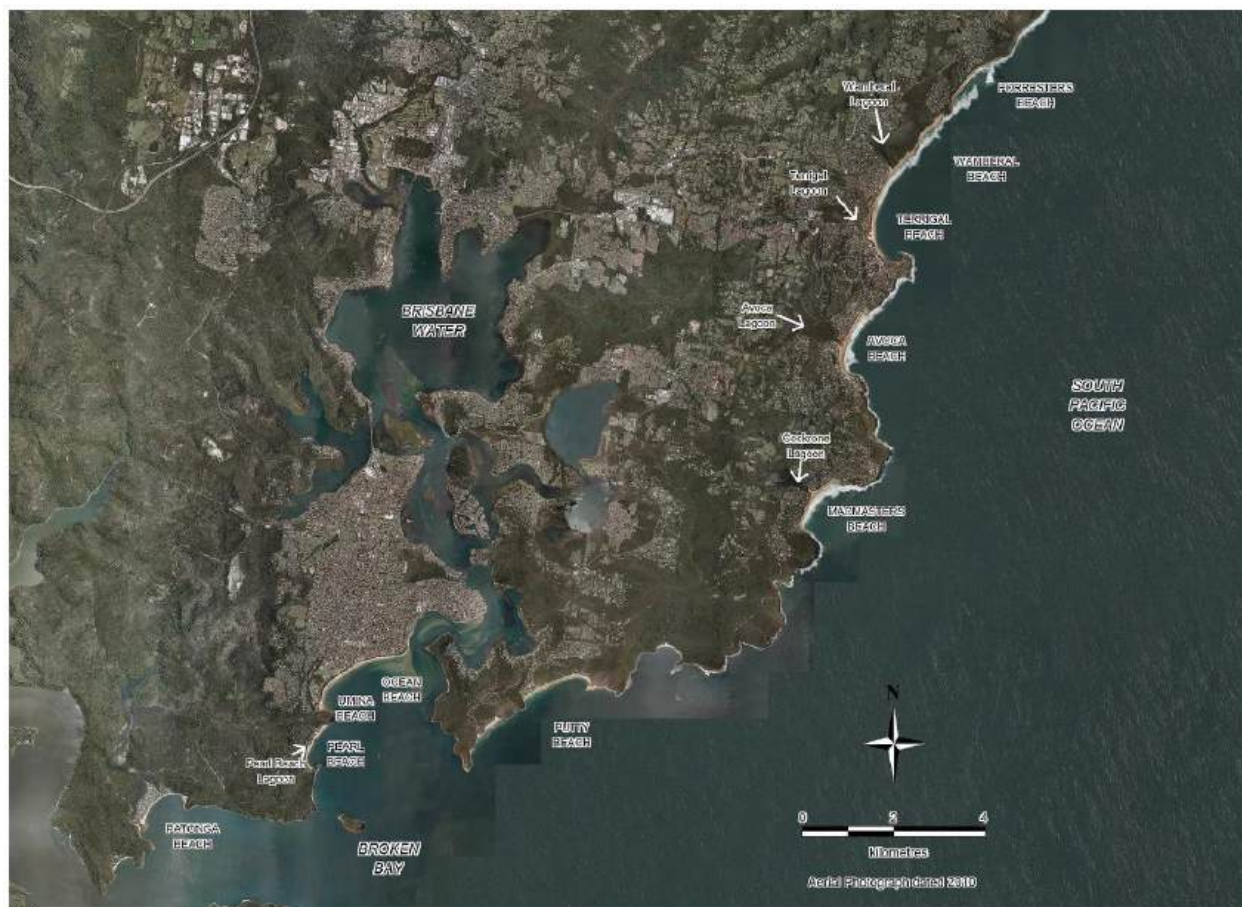
The park contains a range of coastal landscapes including steep coastal cliffs interspersed with small sandy beaches, barrier dune systems and rock platforms. The majority of the coastline within the national park is characterised by sandstone bluffs and headlands, partially traversed by the Bouddi Coastal Walk. There are a number of erodible beaches within the national park (Little Tallow Beach, Tallow Beach, Bullimah Beach, Maitland Bay Beach and Little Beach), however there are minimal constructed assets at these locations. The Plan of Management does not explicitly address coastal erosion (including bluff recession).



Figure 4: Map of Bouddi National Park

5.2.1 Open coast beaches of the southern coast

The open coast beaches of the southern coast of the LGA, as shown in **Figure 5**, are well described within the Open Coast and Broken Bay Beaches Coastal Processes and Hazard Definition Study (WorleyParsons, 2014), with relevant sections included below.



Putty-Killcare Beach – a slightly curving 1.6 km long southeast-facing beach, located between prominent 70 m high sandstone headlands, the eastern third of which is the national park, while the densely vegetated slopes behind the western end rise to 130 m. The beach is well exposed to southerly waves which increase in size towards the western Council managed end of the beach. The eastern end usually has an attached bar which continues to the western end at Killcare surf club. Here higher waves and rips are more common, with up to eight rips forming along the beach, including a permanent rip against the western rocks, where there is also a small rock pool.

Copacabana-MacMasters Beach – occupies a 1.4 km wide southeast-facing embayment bordered by the prominent sandstone 110 m high Tudibaring Head in the north and 90 m high Second Point in the south. The beach faces the east-southeast and receives waves that average 1.5 m at Copacabana, decreasing to about 1 m at MacMasters. These maintain a single bar, which is usually attached along the beach, but cut by 6-8 rips, which decrease in size and intensity to the south, often infilling at MacMasters forming a continuous, attached bar. A strong permanent rip runs out along the northern head, and during high seas a similar rip is formed against the southern head, particularly during summer northeast waves.

Cockrone Lagoon backs the centre of the beach and is mechanically opened once lagoons levels reach the identified trigger level of 2.53 m AHD.

MacMasters Beach was occupied by the MacMaster family from the 1840s, although development progressed rapidly from 1927 onwards when Banavie Estate was subdivided, including beachfront property on Marine Parade (Gosford City Council Website, 2012). Copacabana was known previously as Tudibaring (an Aboriginal word meaning "where the waves pound like a beating heart") until it was subdivided in 1954 and the northern side of Cockrone Lake was subsequently opened up (CentralCoastAustralia.com 2012). Development of MacMasters Beach and Copacabana has occurred rapidly since the 1950s. Short (2007) notes that the Surf Life Saving Clubs at MacMasters Beach and Copacabana Beach were formed in 1946 and 1963 respectively.

North Avoca & Avoca Beach – the 1.7 km long beach lies between two prominent 60 m high sandstone headlands and faces the east-southeast exposing it to waves averaging 1.5 m. Avoca Lake backs the centre of the beach and is mechanically opened once lagoons waters reach an identified trigger level of 2.09 m AHD. The beach receives higher waves towards the north and centre where the bar is often detached and usually cut by several rips, including a permanent rip against the northern headland. At Avoca slight protection by the southern headland lowers waves in the southern corner to form a continuous, attached bar. However rips are common and a permanent rip runs out against the southern rocks.

Avoca Beach became accessible to the public in 1908 when the first bridge was built across Avoca Lake and the Avoca Guest House was constructed at what was then called Moore's Beach (Short, 2007). Avoca Beach around 1926 included a wide sandy beach in front of a densely vegetated foredune which is now occupied predominantly by residential development. By 1948 some development had occurred at Avoca, while development at North Avoca did not commence until the latter half of the 20th Century. The Surf Lifesaving Clubs at Avoca and North Avoca were formed in 1929 and 1957 respectively (Short, 2007).

Terrigal-Wamberal Beach – is a 2.8 km long stretch of sand that trends southwest from the rocks on the north side of Wamberal Lagoon entrance south to Terrigal Lagoon entrance where the beach begins to curve around to the southeast to terminate at the rocks on the southern end of Terrigal Beach, in lee of Broken Head. The beach blocks the entrances to two drowned valleys, now occupied by Wamberal and Terrigal lagoons, which are mechanically opened once lagoons waters reach an identified trigger level of 2.4 m AHD and 1.23 m AHD. The lagoon entrances are managed in accordance with Council's Opening of Coastal Lagoons policy.

The northern 1.5 km of Wamberal Beach lies in the Wamberal Lagoon Nature Reserve. The foredune between Wamberal and Terrigal lagoons has been developed for beachfront housing. The elevation of the section of dune ranges from 8-12 m AHD. Immediately south of the Terrigal Lagoon mouth is a rocky bluff which rises to an elevation of 15 m AHD on the cliff face. A low dune backs the 700 m long Terrigal Beach with the foreshore protected by an engineered seawall. The northern Wamberal Beach is well exposed with waves averaging 1.5 m and up to 15 rips dominating the surf zone. As wave height drops to the south the rips decrease in size, with often a continuous bar forming along Terrigal Beach.

Wamberal Beach has a history of property and beach damage as a result of severe storms. Extensive beach erosion occurred in May 1974 and many houses were threatened. Four years later in June 1978, beach and dune erosion attributed to an intense rip cell undermined and destroyed two houses at Wamberal as shown in **Figure 6**. The erosion escarpment left by these storms crossed some 90% of the seafront properties (GBA, 2006).



Figure 6: Beachfront House Collapse – Wamberal 1978 (GBA, 2006)

In June 2016 an east coast low storm event significantly impacted 1.5 kilometres of Wamberal beach between the Terrigal Lagoon and Wamberal Lagoon entrances as shown in **Figure 7**, although it is noted that with development located in well defined “immediate impact zones”, the damage was both predicted and anticipated (Lord & Macdonald, 2016).

While the wave height and water level measured were not exceptional (less than a 10 year recurrence), the combination of wave approach direction and high water levels resulted in the erosion of the vegetated foredune at Wamberal by up to 15 metres horizontally and cut an erosion scarp in the dune face from 1 metre to 6 metres high. This erosion severely reduced public amenity and damaged private property. The resulting instability of the beachfront posed an ongoing risk to persons and property, and was susceptible to prevailing weather conditions prior to natural recovery or remediation work being undertaken (Lord & Macdonald, 2016).



Figure 7: A section of Wamberal Beach erosion post storms, 5/6/2016 (Lord & Macdonald 2016)

Council established the Wamberal Terminal Protection Working Group in November 2017 to bring together all the stakeholders to progress discussion relating to coastal erosion at Wamberal Beach. The Working Group consists of Council staff, representatives from the NSW Government and two representatives from the Wamberal community.

On 29 January 2019, Council resolved to start the Wamberal Terminal Protection and Sand Nourishment preliminary investigations and concept design.

In May 2020, Council engaged Manly Hydraulics Laboratory to prepare concept plans for a terminal protection structure at Wamberal to assist residents in implementing a long-term solution. This is part funded by Council and the NSW Government through the Coast and Estuary Grants Program at a total cost of approximately \$400,000.

An east coast low storm event between 14 and 18 July 2020 delivered damaging winds and waves, with swells reaching up to 5.8 m. As shown in **Figures 8 and 9**, approximately 30 m of beach at Wamberal was eroded, undermining the foredune and leaving the beachfront homes in a state of structural instability and at risk of collapse, resulting in the evacuation of 18 houses along Ocean View Drive.



Figure 8: A section of Wamberal Beach showing severe erosion post July 2020 storms (image, A. Turnbull, RHDHV)



Figure 9: Wamberal Beach erosion post storms, July 2020 (image, A. Turnbull, RHDHV)

In response, Council worked closely with State Government agencies to deliver emergency coastal protection works in accordance with orders issued by the Local Emergency Operations Controller under section 61(1)(c) of the *State Emergency and Rescue Management Act 1989*, as shown in **Figures 10** and **11**. The works focussed on protecting the toe (base) of the erosion escarpment in the most vulnerable areas and filling in gaps between existing defences (refer **Section 6.3.2.1** for further details).



Figure 10: Emergency coastal protection works at Wamberal Beach, August 2020 (image, A. Turnbull, RHDHV)



Figure 11: Emergency coastal protection works at Wamberal Beach, August 2020 (image, A. Turnbull, RHDHV)

Forresters Beach – a 1.5 km long, southeast-facing sandy beach located along the base of vegetated bluffs rising to 100 m. It is bordered by 130 m high Cromarty Hill in the north and Wamberal Point to the south. The entire beach is fronted by extensive rocks and reefs, which abut the shore in the north extending 250 m offshore in the south. Large wave breaking occurs on the reefs and on the shore in the north, with lower waves occurring at the shore to less than 1 m in the south, maintaining a narrow, steep, reflective beach.

Beachfront property development at Forresters Beach did not commence until the 1950s (PWD, 1994). Extensive subdivision of the top dune, south headland and immediately behind the dune occurred in the 1960s, which involved levelling the top of the dune and pushing a significant volume of sand seaward, completely altering the dune alignment and shape (PWD, 1994). This is discussed further in Appendix I of the Coastal Processes and Hazard Definition Study (WorleyParsons, 2014).

5.2.2 Open coast beaches of the northern coast

The open coast beaches of the northern coast of the LGA, as shown in **Figure 12** are well described within the Wyong Coastal Zone Management Plan 2018 Final Draft Report (BMT WBM, 2018), with relevant sections included below.



Figure 12: Open coast beaches of the northern Central Coast coastline

The northern Central Coast coastline stretching northward of Yumbool and Crackneck Points towards Budgewoi Beach comprises a diverse range of sandy and rocky shorelines, including wide open coast beaches, semi exposed coastal embayment's, a coastal entrance to a major estuary system, complex sand dune systems that include old Pleistocene-age dunes and modern Holocene-age sand dunes, rocky cliffs and bluffs and numerous offshore rocky reefs. Geologically, this coastline has formed within sandstones, shales and conglomerates of the Sydney Basin, which have been eroded into valleys and hills that are now flooded by current sea levels.

From a regional perspective, the northern Central Coast coastline faces southeast and is exposed to the dominant southeast wave climate of the Sydney to Newcastle region. The occurrence of protruding headlands, rocky reefs and coastal embayment's on a local scale result in a locally variable wave climate along the shoreline.

The northern Central Coast coastline includes two long barrier beach systems, namely the Tuggerah Beach compartment in the south and the Budgewoi Beach compartment in the north. Together, these beaches and intervening headland area impound Tuggerah Lakes, a major coastal estuary system comprised of three large interconnected coastal lakes. Both sweeping beaches face predominantly southeast and are mostly exposed to a high energy wave climate. Norah Head forms another regionally significant coastal landform, comprising a prominent rocky headland that protrudes eastward of the surrounding coastline.

It is expected this bedrock headland forms a sediment compartment boundary that limits the transport of sediment along the shoreface (over planning timeframes). On its northern side lies Cabbage Tree Harbour, a natural curving harbour that faces northeast and experiences significant shelter from south-easterly swells. This harbour is also starved of sediment. Together, Tuggerah Lakes and associated beach embayment's, and Norah Head are two major coastal landforms which play a significant role on the form and processes occurring across the northern central coast coastline.

Large extents of submerged rocky reef extend offshore to depths of greater than 20 m from the coastal headlands at Crackneck Point, The Entrance and Norah Head. The high resolution (marine LiDAR) bathymetry indicate that three main sediment bodies are positioned between these submarine rocky outcrops, including two major sand bodies attached to Tuggerah Beach and Budgewoi Beach, and a third moderately sized sand body adjoined to Shelly Beach. No sediment transport is expected to occur between the Tuggerah and Budgewoi sand bodies.

Small sediment bodies also occur at Bateau Bay, Toowoona and Blue Bays, Soldiers Beach, Pebbly Beach, Cabbage Tree Harbour and Jenny Dixon Beach, which are considered to be either isolated or 'leaky'. The large (greater than 2 km) extent of rocky reef and headland extending south from Bateau Bay towards Forrester's Beach indicates that no significant supply of sediment is sourced from downcoast.

A diverse array of sand dunes occur within northern Central Coast's coastal zone, including: foredune systems that fringe most beaches; two major barrier dune systems that together impound Tuggerah Lakes Estuary; numerous transgressive, blowout and clifftop dunes; as well as relic (Pleistocene-age) dune remnants located at Bateau Bay, Blue Lagoon and Cabbage Tree Harbour. Large coastal dune fields occur at Shelly Beach, Tuggerah Beach compartment, Soldiers Beach, Pebbly Beach and Budgewoi Beach compartment, of which many have active dune blowouts.

Transgressive and dune blowout activity is much less now than naturally occurred in the early to middle 20th century as a result of post sand-mining and contemporary dune stabilisation works. A number of active dune fields are still present at Shelly, North Entrance and Soldiers beaches, for example, with a number of these active dune features arguably adding to the aesthetic character of the diverse study area.

Most well-formed dune systems situated north of North Entrance Beach have been subject to heavy mineral mining that took place throughout the 1960's and 1970's. Remediation works associated with the Rutile mining resulted in major reshaping the natural dune topography (e.g. Pelican Beach) as well as the introduction of invasive dune stabilising vegetation (e.g. Budgewoi Beach).

Northern central coast's coastal dunes have also been subject to intense foreshore development at Blue Lagoon, Toowoona and Blue Bays, North Entrance Beach, Cabbage Tree Harbour and Hargraves Beach, noting that all these locations except for Blue Lagoon are identified as coastal erosion 'hot spots'.

An east coast low storm event between 14 and 18 July 2020 delivered damaging winds and waves to The Entrance North (as well as Wamberal, previously noted), with swells reaching up to 5.8m. As shown in **Figure 13**, approximately 20m of beach at The Entrance North was eroded, undermining the foredune and leaving one beachfront home at Hutton Road in a state of structural instability and at risk of collapse, resulting in the evacuation of the property.



Figure 13: The Entrance North Beach erosion post storms, July 2020 (image, A. Turnbull, RHDHV)

In response, Council worked closely with State Government agencies to deliver emergency coastal protection works in accordance with orders issued by the Local Emergency Operations Controller under section 61(1)(c) of the *State Emergency and Rescue Management Act 1989*, as shown in **Figures 14 & 15**. The works focussed on protecting the toe (base) of the erosion escarpment and filling in the gap between existing defences (refer **Section 6.3.5** for further details).



Figure 14: Emergency coastal protection works at The Entrance North Beach, August 2020 (image, A. Turnbull, RHDHV)



Figure 15: Emergency coastal protection works at The Entrance North Beach, August 2020 (image, A. Turnbull, RHDHV)

5.3 Ecological Values

The ecological value of the natural environment is a key consideration in the sustainable management of the open coast, as the open coast supports a diverse range of flora and fauna within its coastal and marine ecosystems. While there are stretches of relatively undeveloped coastline within the study area, particularly along the Bouddi and Wyrabalong National Parks, coastal development over the past decades along with the population intensification of the coastal zone has led to increased pressure being placed on the coastal environment.

The Central Coast is recognised as being very rich in terms of biodiversity, with approximately 2,100 native flora (plant) species and over 600 native fauna (animal) species recorded in the Local Government Area. The unique Central Coast landscape is of national, state and regional significance hosting a range of threatened species and habitats; some of the plant species such as the Somersby mintbush and Charmhaven apple are endemic to the region, occurring nowhere else in the world. This in part is due to high vegetation cover, the presence of major estuarine systems and proximity to coastlines (Council, 2019).

The study area contains numerous Matters of National Environmental Significance (as defined by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), including five (5) Listed Threatened Ecological Communities (Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community; Coastal Upland Swamps in the Sydney Basin Bioregion; Littoral Rainforest and Coastal Vine Thickets of Eastern Australia; *Posidonia australis* seagrass meadows of the Manning-Hawkesbury ecoregion; and Subtropical and Temperate Coastal Saltmarsh), along with 87 Listed Threatened Species and 77 Listed Migratory Species. There are an additional 101 listed marine species and 14 whales and other cetaceans protected by the EPBC Act that are recorded within the location (DAWE, 2020; included as **Appendix A**).

Council is committed to ensuring the sustainability of the Central Coast natural environment and recognises that it is obligated to protect and restore biodiversity along with natural habitats through appropriate land use management and planning. Following community engagement for the Community Strategic Plan, where the care and protection of the natural environment was identified as important to the Central Coast community, as well addressing amalgamation of the former Gosford and Wyong local government areas, Council has developed the draft Central Coast Council Biodiversity Strategy in order to work towards these commitments in a comprehensive and coordinated manner (Council, 2019).

The Biodiversity Strategy highlights the roles that Council has to support biodiversity: as a land use planning authority, a community leader, and a major landholder and land manager. Council currently manages over 6,000 ha of land in the Central Coast local government area primarily for its natural values, and the goal is to increase this in the future. The Biodiversity Strategy outlines Council's administrative and policy framework for responding to the actions identified to progress and implement on-ground change, and guides Council's own actions and informs the actions of the community and a wide range of other organisations (Council, 2019).

There are many coastal wetlands in the region, which are also mapped by the State Environment Planning Policy (Coastal Management) 2018. The vegetation community types associated with these wetlands are diverse and, in most cases, have been declared threatened ecological communities. Nine Wetlands of National Significance are located within the local government area: Avoca Lagoon, Brisbane Water Estuary, Budgewoi Lake Sand Mass, Cockrone Lagoon, Terrigal Lagoon, Tuggerah Lakes Estuary, Wamberal Lagoon and Wyong Racecourse Swamp (Council, 2019).

Porters Creek Wetland is the single largest coastal wetland in the region comprising 12% of the region's total wetland area (624 ha) and provides habitat for many species. A survey undertaken in 1999 recorded 168 species of plants, macroinvertebrates from 70 families, 62 bird species including 9 migratory species, and 25 mammal species including 7 species of bats. *Baumea* sedgelands are only found in a few localities near Avoca and Cockrone Lagoon and around the estuaries of Brisbane Water, whereas *Juncus* sedgelands are known from estuaries in Lower Mangrove and Spencer along the larger river systems (Council, 2019).

Estuarine Mangrove Scrub occurs immediately within and adjacent to tidal estuaries, such as along the Woy Woy Inlet, on the edges of Brisbane Water, along the Hawkesbury River and its tributaries, along Erina Creek and the southern shore of Lake Macquarie. The vegetation community is dominated by grey mangrove (or river mangrove in and near major rivers) with a ground layer devoid of any other plants. Mangroves are well known as nurseries for fish and a source of food for wading birds and crabs. They also serve as soil stabilisers against erosion caused by wave action. Mangroves are often found on the fringes of saltmarsh, and can encroach on saltmarsh communities. Mangroves are protected under the *Fisheries Management Act 1994* (Council, 2019).

There are a considerable number of estuaries in the Central Coast region supporting mangroves, seagrass beds, saltmarsh / grassland, and inter-tidal sand and mudflats. Estuarine Saltmarsh / Grassland occurs immediately within and adjacent to tidal estuaries and is dominated by saltmarsh (*Sarcocornia quinqueflora subsp quinqueflora*) or grasses (*Sporobolus virginicus* and *Zoysia macrantha*). Estuarine Saltmarsh is found in low lying areas surrounding Brisbane Water with good examples in Bensville, Empire Bay, Crangan Bay, Cockle Bay, Davistown-Saratoga and on Tuggerah Lake Estuary foreshores. Coastal saltmarsh is a threatened ecological community. The on-going threats to saltmarsh include illegal in-filling, grazing, weed invasion and recreational vehicles. Saltmarsh protects the coastline from storm erosion and acid sulphate soil exposure. Saltmarsh provides a valuable source of food in the form of crabs, molluscs and many insects for wading birds, many of which are migratory (Council, 2019).

There is a wide diversity of fish species that inhabit coastal lagoons, and resident species may spend their entire lives in one lagoon. Marine estuarine dependent species will need to utilise the estuaries at some point over their life cycle, for example, as juveniles and during part of their adult stages, then as adults migrating out to sea to spawn. Haines (2008) reports that ICOLLs tend to exhibit lower fish species diversity when compared to permanently open estuaries. This is particularly evident following extended periods of closure.

Sampling undertaken by Newcastle University in 2009 and cited by Cardno (2010) found that Terrigal Lagoon had the greatest diversity of fish (23 species), followed by Avoca (15 species), Wamberal (13 species) and Cockrone (12 species) (Cardno, 2010). The diversity appears to be correlated to opening frequency, with the more frequently open the lagoon, the greater the fish diversity. Species counts for these systems are not considered to be a good indicator of estuary health.

An opposite correlation between opening frequency and abundance of fish in the lagoons has been observed (Cardno, 2010). Comparing the lagoons, Wamberal had the highest abundance of fish and Terrigal the lowest (Edwards and Gladstone, 2009, cited in BMT WBM, 2015), likely due to the low habitat diversity of this lagoon. While there were substantial changes in the abundance and diversity of larval and juvenile fish in all the lagoons over time, there was no evidence that these changes were associated with lagoon openings. It was generally found that both the diversity and abundance of fish in Wamberal, Avoca and Cockrone Lagoons (which opened at approximately the same frequency) decreased after entrance openings. Few prawns or other crustaceans were recorded in the surveys by NSW Fisheries between 1986 and 2008, as cited by Cardno (2010).

Seagrasses occur in the intertidal and subtidal zones of estuaries. Common species are *Zostera capricorni* (eelgrass) and *Halophila spp.* (paddleweed), while important seagrass areas occur in the Brisbane Water, Hawkesbury River and Tuggerah Lake Estuary. Seagrasses are important habitat for a range of fauna species, including the White's sea horse (*Hippocampus whitei*) and as habitat for a range of estuarine fish such as bream (*Acanthopagrus sp.*) (Council, 2019).

There is a Green and Golden Bell Frog resident population of about 100 adults, in North Avoca centred on Bareena Wetland (BMT WBM, 2015). The University of Newcastle is currently undertaking further research on the population size, distribution and habitat use of this species at Avoca/North Avoca which will provide important information to facilitate future management of this population.

Natural grasslands in the Central Coast typically occur in exposed coastal places where growth of shrubs is inhibited by strong onshore winds. Coastal Headland Grassland vegetation community is part of the Themeda Grassland on Seacliffs and Coastal Headlands threatened ecological community. Examples can be found at Wyrabalong National Park, Bouddi National Park, The Haven, Mt Ettalong Reserve and Munmorah State Conservation Area. Coastal Sand Beach Spinifex occurs on ocean beaches above the high water mark, particularly those that have not been disturbed through excessive recreational use or invasion by bitou bush (*Chrysanthemoides monilifera subsp. rotundata*) (Council, 2019).

Freshwater rivers and streams are important habitat for a range of species, including platypus, along with a range of macroinvertebrates and rainforest stream frogs, such as the stuttering frog. Riparian vegetation provides an important resource for a range of specialised aquatic and terrestrial fauna that feed along waterways (e.g. fishing bat, kingfishers, water dragons) or spend a portion of their lifecycle in water. Riparian vegetation also provides leaf and litter input to streams that forms the basis of the food chain in freshwater streams. Important freshwater streams on the Central Coast include the upper reaches of the Wyong River in Olney State Forest and the upper reaches of Mooney Mooney Creek which flow through Brisbane Water National Park (Council, 2019).

The marine environment is outside of Council's responsibility; however, 75.5 km of coastal zone creates the eastern boundary of the LGA. The Bouddi National Park Marine extension protects a range of threatened species, migratory species, and habitats including sandy beaches, intertidal rocky shores, and open ocean. It stretches from Bullimah Beach to Bombi Point (approximately 3.5 km of shoreline) and out to sea for 400 m, protects about 20 ha of marine and rock platforms, including invertebrates (Council, 2019).

The dunes of the bioregion generally support coast banksias, coast wattle, coast tea-tree, smoothbarked apple (*Angophora costata*), red bloodwood (*Corymbia gummifera*) and blackbutt (*Eucalyptus pilularis*) with a diverse scrub layer. The oldest dunes which are protected by coastal barriers such as bluff and headlands support a mature coastal forest community. Coastal forest of the bioregion are characterised by Sydney blue gum (*Eucalyptus saligna*), blackbutt, turpentine, grey ironbark (*Eucalyptus paniculata*), spotted gum, black ash and bangalay (*Eucalyptus botryoides*) (WorleyParsons, 2014).

The value of the natural environment is also a paramount consideration in the sustainable management of the coastline. While beaches may appear barren and largely devoid of life, they support a great diversity of flora and fauna, and provide habitat and nursery ground for many coastal and estuarine species. Moreover, sandy beaches are an important ecosystem that links the ecology of sand dunes, the surf zone, intertidal zones, and nearby rocky reefs. Sand dunes also exhibit high biodiversity value and protect developments during storms. Several natural coastal and marine ecosystems are at risk from human use

and coastal hazards now and into the future. They are impacted through landward migration and erosion, recreational activities (i.e. fishing, harvesting), coastal development and construction of protective works, beach cleaning and nourishment (WorleyParsons, 2014).

5.4 Recreational water quality

Recreational water quality has been monitored in the Central Coast region since 2002 by Central Coast Council under the Department of Planning, Industry and Environment's Beachwatch Partnership Program. This report summarises the performance of 32 swimming sites on the Central Coast of New South Wales, providing a long-term assessment of how suitable a site is for swimming. Monitored sites included ocean beaches, ocean baths, estuarine areas in Brisbane Water, designated swimming areas in Lake Macquarie, Lake Munmorah and Tuggerah Lake, and four coastal lagoons (Beachwatch, 2019).

In 2018–2019, 50% of swimming sites in the Central Coast region were graded as Good or Very Good, as shown in **Figures 16** and **17**. These sites were suitable for swimming for most or almost all of the time. While this is a slight decline in overall performance from the previous year, a large proportion of lake/lagoon and estuarine swimming locations are included in the program, which have been most susceptible to impacts from wet weather conditions (Beachwatch, 2019).

Two of the 15 ocean beaches were graded as Very Good: MacMasters Beach and Killcare Beach. Water quality at these beaches was suitable for swimming almost all of the time. Lakes Beach, Soldiers Beach, North Entrance Beach, The Entrance Beach, Shelly Beach, Wamberal Beach, Terrigal Beach, North Avoca Beach, Avoca Beach, Copacabana Beach, Ocean Beach and Umina Beach were graded as Good. Water quality at these sites is suitable for swimming most of the time but can be susceptible to pollution following rainfall. Terrigal Beach improved to Good from a Poor grade in 2017–2018, reflecting a slightly higher proportion of water samples collected during dry weather conditions compared to the previous year (Beachwatch, 2019).

Toowoona Bay was graded as Poor in 2018–2019, downgraded from Good in the previous year. A Poor grade indicates the site is more susceptible to pollution and not always suitable for swimming. While water quality at Toowoona Bay was mostly suitable for swimming in dry weather conditions, elevated enterococci levels were occasionally recorded after little or no rain. Microbial water quality at this site has declined in recent years, with slightly elevated bacterial results occurring more frequently since 2017 (Beachwatch, 2019).

As shown in **Figure 17**, the four lagoons were graded Poor, the same result as previous years: Wamberal Lagoon, Terrigal Lagoon, Avoca Lagoon and Cockrone Lagoon. Water quality was often unsuitable for swimming during dry weather conditions and swimming should be avoided if there are any signs of pollution such as discoloured water, odours or floating debris. Bacterial levels increased significantly with increasing rainfall. Pollution inputs can accumulate in coastal lagoons due to very low levels of flushing. Pollution is usually diluted when the lagoon entrance is open to the ocean (Beachwatch, 2019).



Figure 16: Sampling sites and Beach Suitability Grades in Central Coast Council (northern) (Beachwatch, 2019)



Figure 17: Sampling sites and Beach Suitability Grades in Central Coast Council (southern) (Beachwatch, 2019)

5.5 Central Coast Coastal Lagoons

5.5.1 Overview

As noted previously, the spatial extent of this CMP includes four open coast lagoons within the Central Coast LGA (being Wamberal, Terrigal, Avoca, and Cockrone lagoons), while a separate CMP is being developed by Council for Tuggerah Lakes. Within the LGA there is one other coastal lagoon that is located at Pearl Beach; however, this lagoon and surrounding coastline will be included in the *Hawkesbury-Nepean River System Coastal Management Program*, and therefore is not included within this CMP. The four lagoons and their catchment boundaries are shown in **Figure 18**.



Figure 18: Lagoon catchment boundaries (Cardno, 2010)

The four coastal lagoons considered in this CMP exhibit an intermittent connection to the ocean and are classified as *Intermittently Closed and Open Lakes or Lagoons* (ICOLLs). An ICOLL is a shallow coastal water body with an entrance barrier, which has some intermittent connection to the ocean through one or more restricted inlets. It is noted that ICOLLs are considered to be typically less tolerant of external pressures when compared to other types of estuaries, and therefore should be managed carefully to avoid significant environmental degradation (Haines, 2008).

Lagoons are an interface between a variety of different environments. This includes an interface between marine and freshwater, and between terrestrial and aquatic environments. These environments provide habitats ranging between terrestrial, intertidal and aquatic, and support considerable biodiversity within and surrounding the four lagoons of this study (Cardno, 2010). Apart from their ecological value, the lagoons represent considerable social and economic value to the community. All of the lagoons are utilised for a range of recreational activities by local residents and tourists alike, and both Terrigal and Avoca lagoons support commercial watercraft hire businesses (Council, 1995).

Some key characteristics of each lagoon are summarised in **Table 2**. It is noted that these characteristics were largely determined through investigations undertaken as part of the *Gosford Coastal Lagoons Processes Study* which was prepared for Gosford City Council in 2010. As such, these characteristics, particularly those related to lagoon bathymetry, should be treated as indicative only.

Table 2: Summary of key characteristics of each coastal lagoon (Cardno, 2010).

Characteristic	Lagoon			
	Wamberal	Terrigal	Avoca	Cockrone
Waterway area (ha)	50	30	70	38
Catchment area (ha)	655	892	1187	722
Catchment land use	31% urban 36% rural 24% forest 9% waterway	36% urban 44% rural 16% forest 3% waterway	25% urban 21% rural 45% forest 9% waterway	9% urban 16% rural 69% forest 6% waterway
Avg. bed level (m AHD)	0.9 – 1.0	0.5 – 0.7	0.8 – 0.9	0.4 – 0.6
Water levels (m AHD)	Min: 0.21 Median: 1.67 Mean: 1.59 Max: 2.89	Min: 0.10 Median: 0.92 Mean: 0.89 Max: 2.09	Min: -0.05 Median: 1.23 Mean: 1.26 Max: 2.85	Min: -0.05 Median: 1.79 Mean: 1.73 Max: 3.10
Volume at mean water level (ML)	448	176	644	306
Trigger level for artificial entrance opening (m AHD)	2.40	1.23	2.09	2.53
Avg. No. of openings per year	2.9	12.9	3.5	2.4

One of the key human influences on lagoon processes is the timing of lagoon openings, with the entrance berm actively managed for flood mitigation purposes. While the entrance management policy identifies other issues of concern (e.g. odours after breakout, water quality and the exposure of habitat for the Green and Golden Bell Frogs at Avoca) in relation to lagoon water levels, the implementation of the policy focuses on Council's obligations to mitigate risk to life and property from flooding (Cardno, 2010).

Historical development of low lying lands around the foreshores has resulted in mechanical breakout levels being set at relatively low levels when compared to the Highest Astronomical Tide (HAT) occurring in the adjacent Tasman Sea. For Wamberal, Avoca and Cockrone Lagoons the let out levels are more than 1 m higher than HAT giving a reasonable level of confidence that there is sufficient freeboard to both convey extreme floods from the lagoon to the ocean and avoid inundation by extreme ocean levels that arise during Storm surges (Cardno, 2010).

The adopted let out level for Terrigal Lagoon is only 0.15 m higher than HAT making it susceptible to inundation from the sea as well as catchment flooding. The management of the entrance berm requires break out on a regular, approximately monthly basis. This artificial opening of the entrance has likely resulted in significant modification of the natural range of water levels such that the variation in water levels is much less than those observed for the other three lagoons. While current entrance management practices would also be having a similar effect on the hydraulics in the other lagoons, the magnitude of the impact is much greater in Terrigal Lagoon (Cardno, 2010).

The 2010 *Gosford Coastal Lagoons Processes Study* included investigations on the potential impacts of climate change on the lagoons and discussion is provided on the likely berm response and changes in lagoon water levels. The projected sea level rise (SLR) of 0.4 m by 2050 (i.e. HAT increases by 0.4 m) is likely to increase the low range of water levels and groundwater levels around the lagoons by a similar 0.4 m. Given that current entrance management regime is expected to continue, the future maximum water levels would be tied to the present day flood mitigation levels and hence the range of water levels would decrease by roughly the 0.4 m to 2050. This scenario assumes that there would be sufficient operating range in the lagoons to accommodate the reduced range. Results indicate that while the freeboard above HAT is sufficient to accommodate SLR effects in Avoca, Wamberal and Cockrone Lagoons, the Terrigal Lagoon let out level of 0.25 m below HAT would not be sustainable (Cardno, 2010).

The decrease in minimum water levels and hence operating range would lead to the three “mostly closed” lagoons transitioning towards more open conditions, i.e. more frequent breakouts and probably slightly longer open periods of tidal influence. The current entrance management of Terrigal Lagoon, however, will need to be carefully considered in terms of the options available to mitigation potential flooding. The current strategy will not be appropriate as a flood mitigation action under the 2050 SLR scenario. The projected increase in the intensity of rainfall events will likely lead to more flash flooding with more rapid increases in lagoon water levels, possibly necessitating faster response to breakout events. The projected decrease in water level range in Avoca, Wamberal and Cockrone Lagoons will also have implications for lagoon water and ecosystem response (Cardno, 2010).

5.5.2 Wamberal Lagoon

Wamberal Lagoon is enclosed largely within the Wamberal Lagoon Nature Reserve, which is protected by the *National Parks and Wildlife Act, 1974*. The Nature Reserve comprises the entire coastal barrier on the seaward side of the lagoon and portions of the north and western foreshores, as shown in **Figure 19**. Surrounding the remainder of the lagoon is land of variable width which offers some protection from other land uses. The existence of relatively extensive riparian vegetation surrounding the lagoon offers increased protection from stormwater runoff from the catchment of the lagoon and from the tributaries which enter the lagoon (Council, 1995).

The lagoon has a catchment area of approximately 655 ha which is made up of predominately rural land use and approximately 31% urban land use (Cardno, 2010). Its main tributary is commonly known as Forrester's Creek, and it drains through a highly vegetated sub-catchment to the north of the lagoon. Forrester's Creek tributary to Wamberal Lagoon is a Crown Waterway with submerged Crown land below the mean high-water mark (MHW). Crown land includes the seabed and subsoil to three (3) nautical

miles from the coastline of NSW that is within the limits of the coastal water of the state. Two other large tributaries enter the lagoon through the vegetated areas generally on either side of the Wairakei Road Playground.



Figure 19: Wamberal Lagoon Nature Reserve (NPWS, 2006)

The majority of the lagoon water body is relatively shallow with a mean water level of +1.59 m AHD, and average bed levels typically ranging between +0.9 and +1.0 m AHD, whilst there are areas of slightly greater depth which range down to approximately -1.5 m AHD. The outlet to the Tasman Sea through Wamberal Beach is typically closed by the beach berm with water levels within the estuary being generally not influenced by tides. The outlet is opened an average of 2.9 times per year either naturally or artificially. Council artificially opens the lagoon entrance when the water level reaches the trigger level of +2.40 m AHD.

As shown in **Figure 20**, Wamberal Lagoon is mapped within the CM SEPP as containing significant areas of Coastal Wetlands, which require specific consideration in regards to any proposed development within the adjoining buffer areas. Council has further mapped the areas and types of vegetation as shown in **Figure 21**.

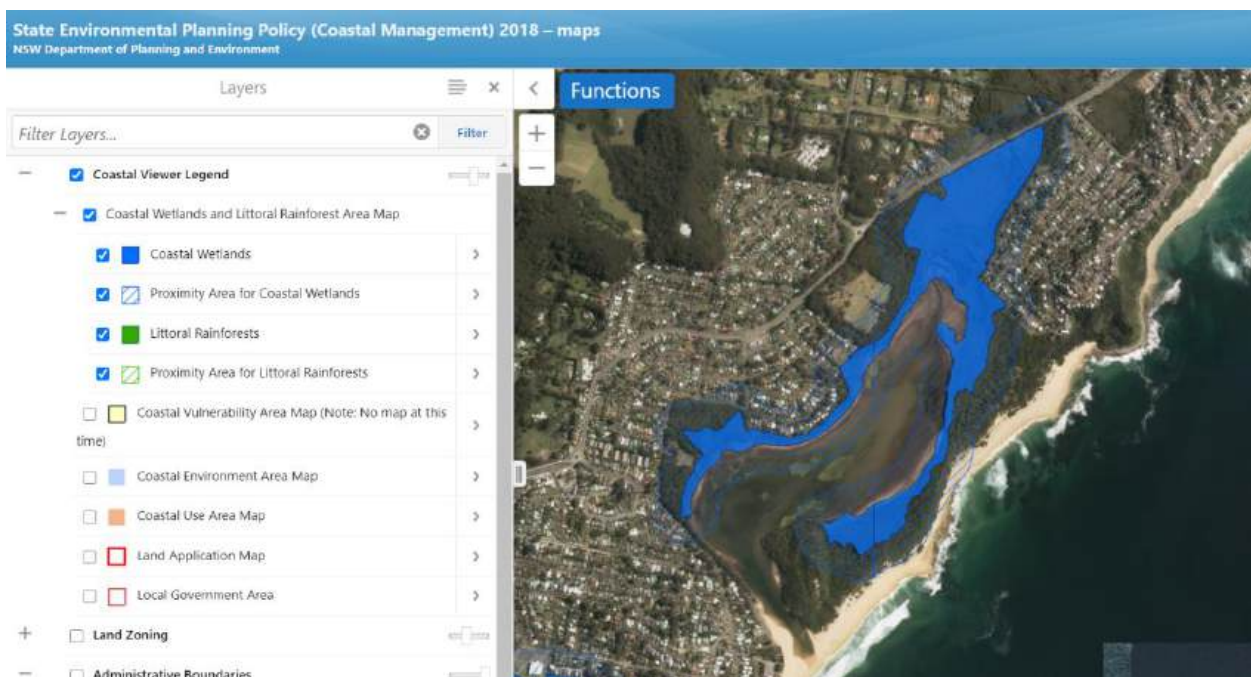


Figure 20: Wamberal Lagoon Coastal Wetlands & Littoral Rainforests Area Map - CM SEPP 2018

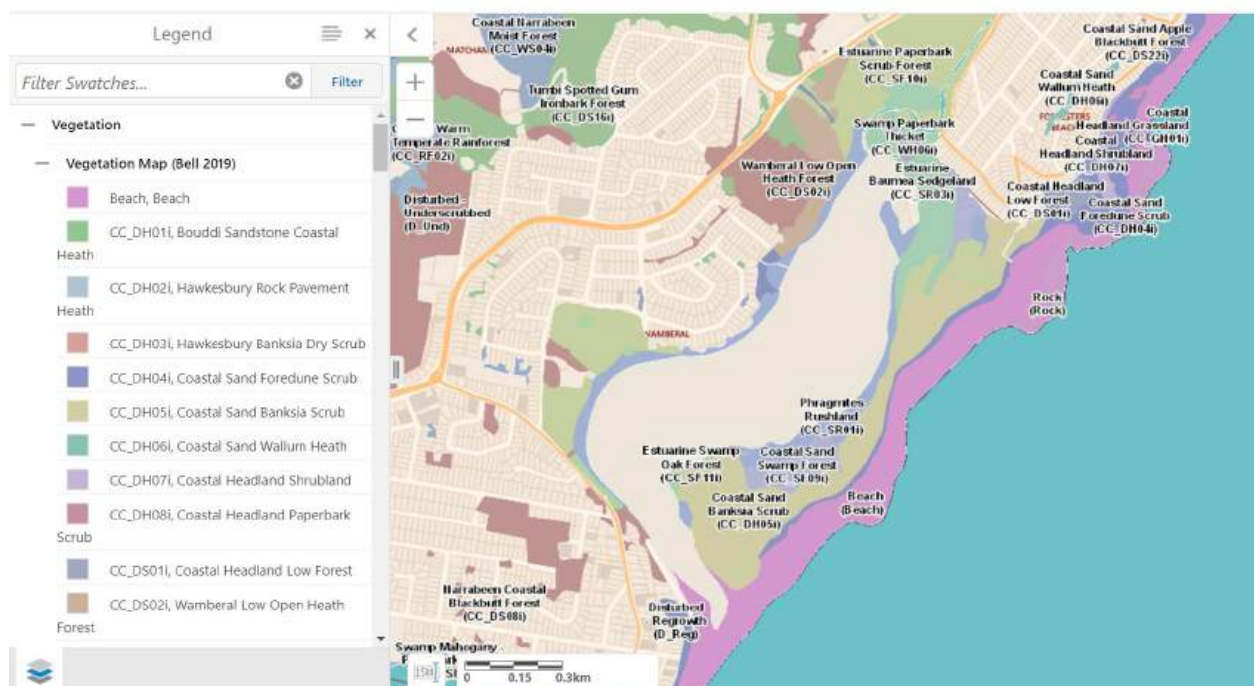


Figure 21: Wamberal Lagoon vegetation map - Central Coast Council online mapping tool 2020

5.5.3 Terrigal Lagoon

Terrigal Lagoon is located such that the water body is surrounded by the suburbs of Wamberal and Terrigal. The lagoon is separated primarily into two arms, the north arm and the west arm, by a knoll in the lagoon's north-west (Council, 1995). A highly urbanised part of Wamberal fringes the northern and eastern banks of the lagoon's north arm and entrance channel, while the suburb of Terrigal meets all other banks of the lagoon's north and west arms as well as the southern bank of the entrance channel.

Terrigal Lagoon is a Crown waterway with submerged Crown land below the MHW. Crown land includes the seabed and subsoil to three (3) nautical miles from the coastline of NSW that is within the limits of the coastal water of the state. Parts of the southern foreshore are Crown Land (reserve No. 48956 & 65601) managed by Council. There are incomplete claims lodged under the *Aboriginal Land Rights Act 1983* (ALR Act) on these reserves. There are a number of Crown Land licences for private, domestic waterfront structures along the eastern foreshore of the lagoon.

The lagoon is popular with both local and tourist recreational users for activities including paddle boating, paddle boarding, and fishing. It is also commonly used for swimming, though only near the outlet at Pacific Street. As such, Council are often subject to community pressure to provide a system with healthy water quality and adequate water depth, particularly heading into summer months (BMT WBM, 2015).

The lagoon has a catchment area of approximately 892 ha which is made up of predominately rural land with large portions of cleared land, and approximately 36% of the catchment is urban land which makes up a large proportion of the lower catchment slopes.

The mean water level of the lagoon is +0.89 m AHD with bed levels typically ranging between +0.5 and +0.7 m AHD making the lagoon generally quite shallow. Dredging activity from the mid-1960s has historically left dredge depths of down to -3.0 m AHD in some locations, which remain visible when the lagoon is drained. The outlet to the Tasman Sea through the beach berm between Wamberal and Terrigal beaches is opened more frequently than that of the other three coastal lagoons discussed within this scoping study, with an average of 12.9 openings per year either artificially or naturally. Council artificially opens the lagoon entrance when the water level reaches the trigger level of +1.23 m AHD in order to mitigate the risk of flooding of residential properties.

As shown in **Figure 22**, Terrigal Lagoon is mapped within the CM SEPP as containing significant areas of Coastal Wetlands, which require specific consideration in regards to any proposed development within the adjoining buffer areas. Council has further mapped the areas and types of vegetation as shown in **Figure 23**.

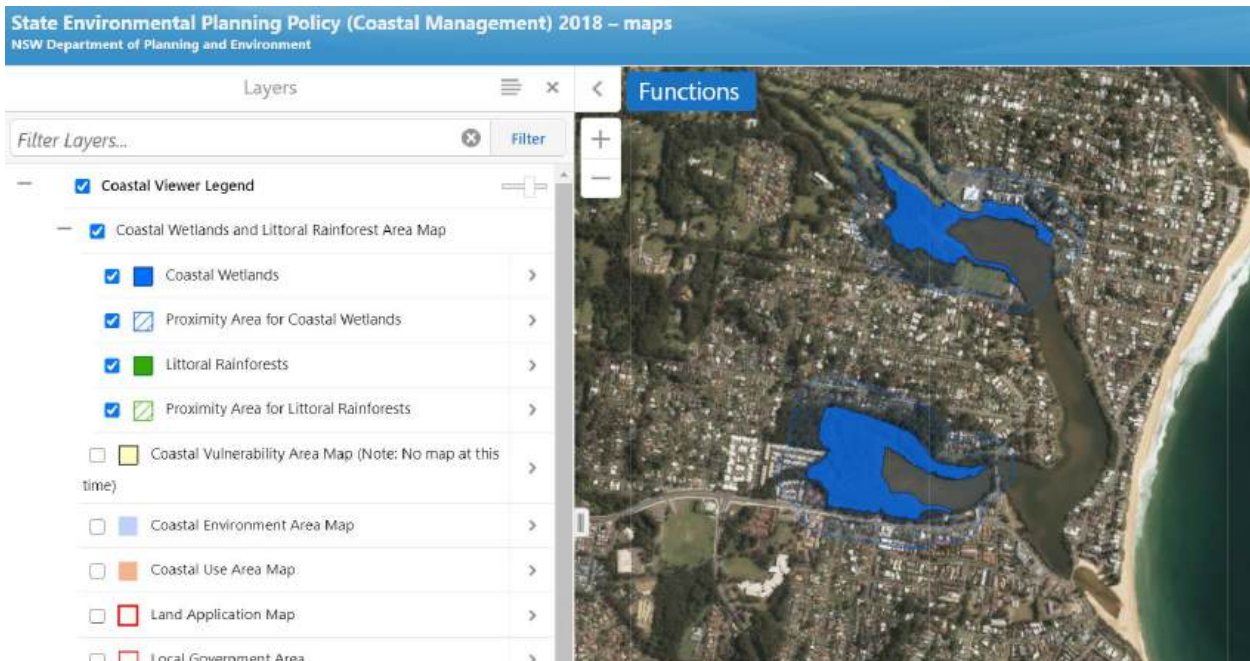


Figure 22: Terrigal Lagoon Coastal Wetlands & Littoral Rainforests Area Map - CM SEPP 2018

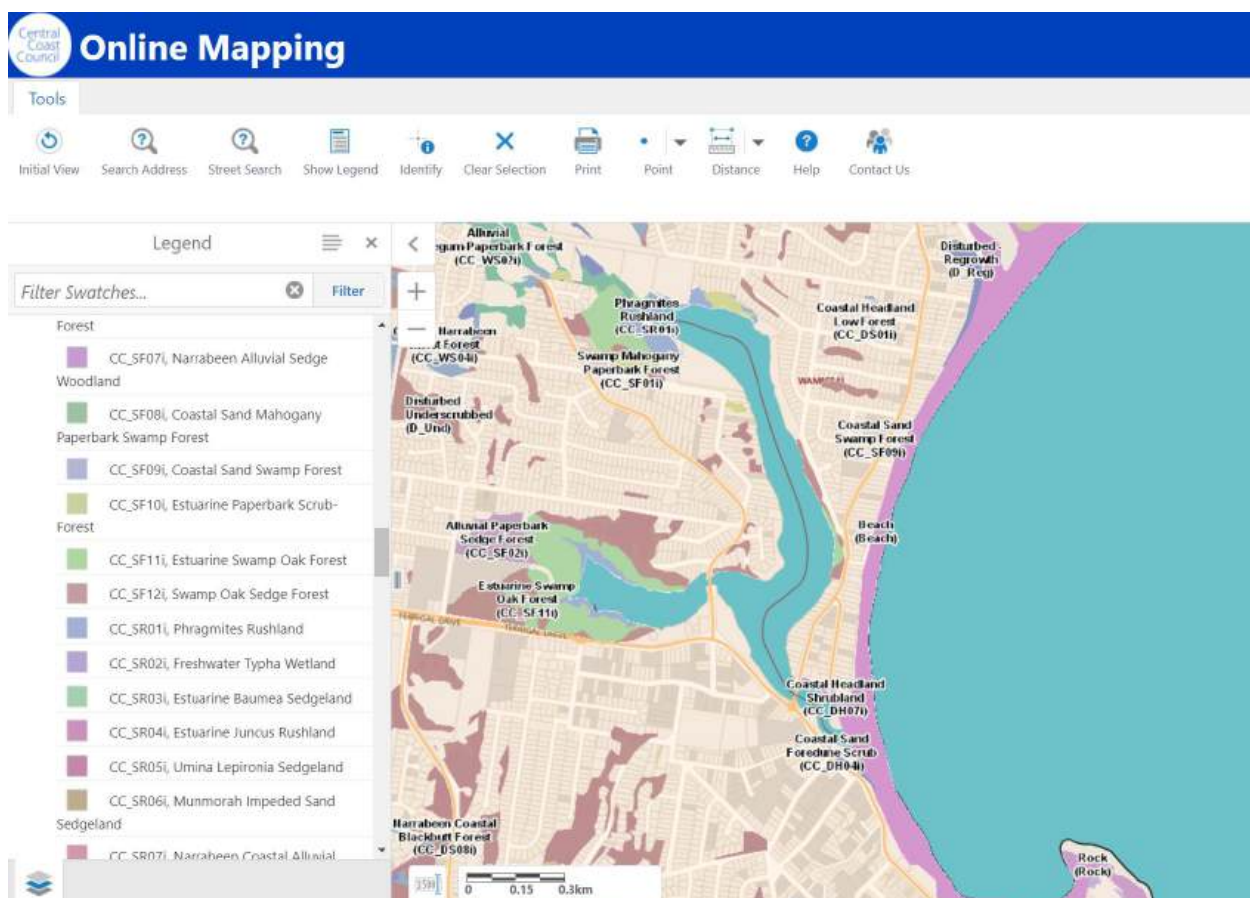


Figure 23: Terrigal Lagoon vegetation map - Central Coast Council online mapping tool 2020

5.5.4 Avoca Lagoon

Avoca Lagoon is the largest waterway by area (actual area will be variable dependent on water level) of the four lagoons discussed within this study. Immediately to the north of the lagoon is the suburb of North Avoca, whilst the suburb of Avoca Beach lies to its south. The western banks of the lagoon are fringed by the suburb of Terrigal.

Avoca Lagoon is a Crown waterway with submerged Crown land below the MHW. Crown land includes the seabed and subsoil to three (3) nautical miles from the coastline of NSW that is within the limits of the coastal water of the state. Crown Land reserves (No. 86090, 53288, 91496 & 53284) are managed by Council, and there are incomplete claims lodged under the ALR Act on these reserves.

The lagoon is roughly 'cross-shaped' with four irregular arms including the entrance channel and has considerable expanses of wetlands around its perimeter. Avoca Lagoon was the subject of a commercial sand/rutile mining operation which resulted in the removal of between 200-300,000m³ of bed sediments from the central part of the lagoon before closure in the late 1980's. Remnant dredge holes may be contributing to the water quality issues in the lagoon. One feature of the lagoon is Bareena Island which is an approximately 5.3 ha island located roughly at the lagoon's centre-point, and was created in the 1980's by dredging the channel on the western side of the island (Council, 1995).

Avoca Lagoon offers both social, economic and environmental value to both the local and tourist community. Recreational uses of the lagoon typically include fishing, paddle boarding kayaking and canoeing, with a paddle boat hire business operating in the lower estuary as well. Swimming in the lagoon is not uncommon, though it is generally confined to near the outlet.

The lagoon has the largest catchment of the four lagoons with a catchment area of 1187 ha. The land within the catchment is predominately undeveloped forest land which makes up 45% of the area, whilst 25% is for urban use primarily in the low-lying land surrounding the lagoon. Saltwater Creek enters the lagoon in the southern western arm and is the main tributary of the lagoon.

The lagoon is relatively shallow with a mean water level of +1.26 m AHD, and an average bed level of between +0.8 and +0.9 m AHD. The outlet to the Tasman Sea through the beach berm between Avoca Beach and North Avoca Beach is usually closed. The channel is open on an average of 3.5 occasions per year and is opened either artificially or as a result of catchment flooding and /or coastal processes. Council artificially opens the lagoon entrance when the water level reaches the trigger level of +2.09 m AHD in order to mitigate the risk of flooding of residential properties.

As shown in **Figure 24**, Avoca Lagoon is mapped within the CM SEPP as containing significant areas of Coastal Wetlands, which require specific consideration in regards to any proposed development within the adjoining buffer areas. Council has further mapped the areas and types of vegetation as shown in **Figure 25**.

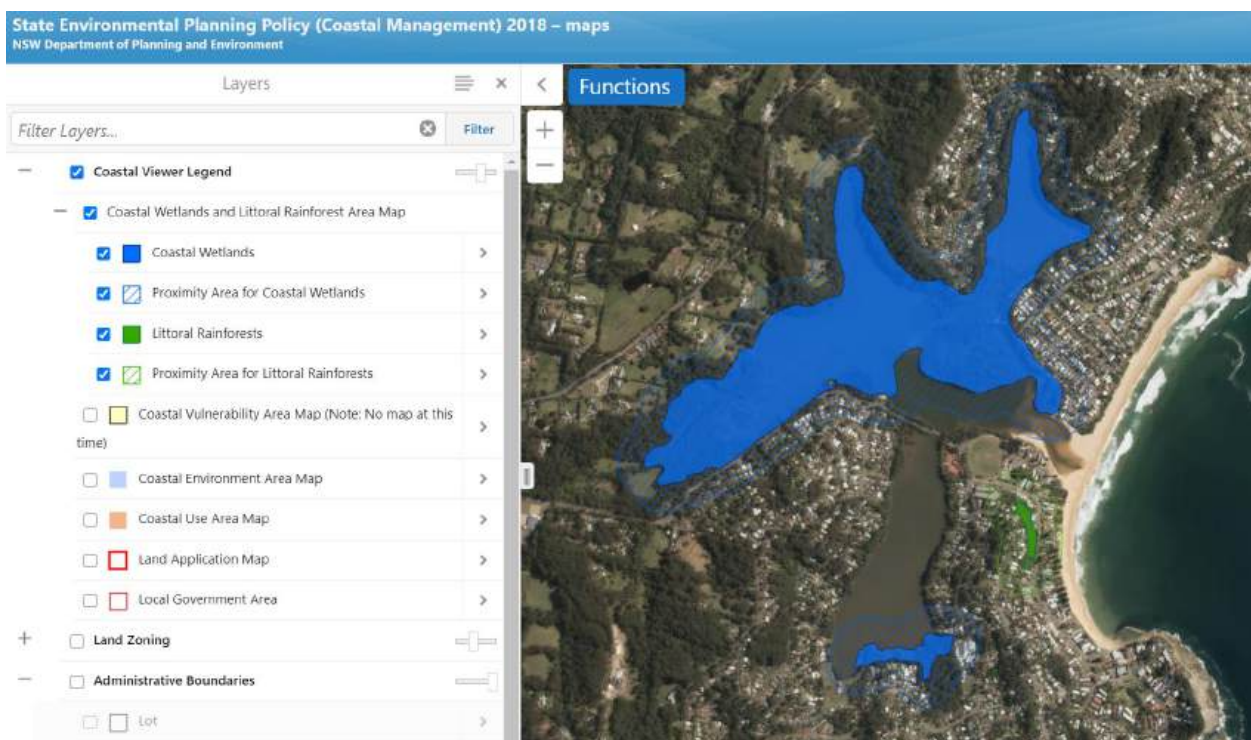


Figure 24: Avoca Lagoon Coastal Wetlands & Littoral Rainforests Area Map - CM SEPP 2018

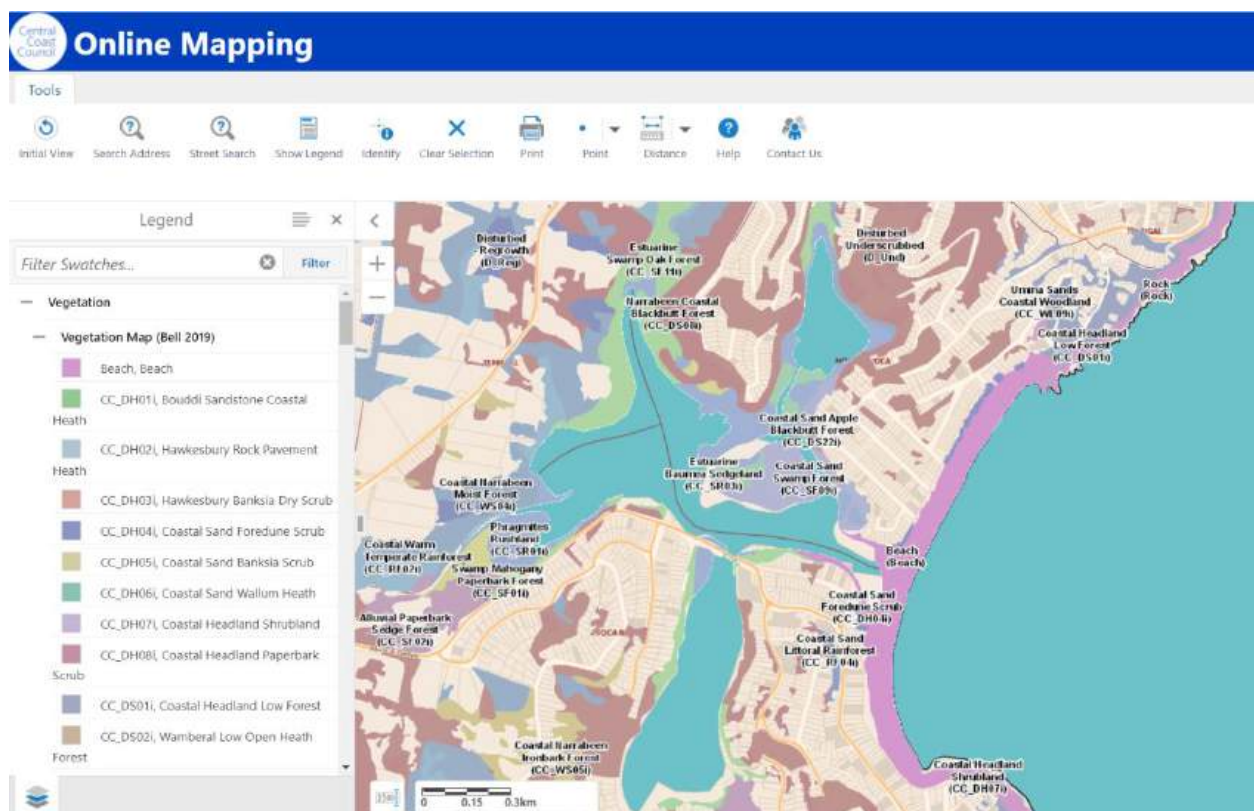


Figure 25: Avoca Lagoon vegetation map - Central Coast Council online mapping tool 2020

5.5.5 Cockrone Lagoon

Cockrone Lagoon is located between the suburbs of Copacabana to the north and MacMasters Beach to the west and to the south. Of the four lagoons discussed in this study, Cockrone Lagoon has the smallest waterway area and is the only lagoon under direct ownership of Council (Lot 379 DP29263), while the remaining three are Crown land under the Care, Control and Management of Council. Cockrone Lagoon and Wamberal Lagoon are not referred to as Crown Waterway (DPIE - Crown Lands, 2021).

Cockrone Lagoon holds social and environmental value due to its natural beauty, relatively undeveloped catchment, and recreational uses which include paddle boarding, kayaking and canoeing, as well as swimming near the outlet.

The Cockrone Lagoon catchment is 722 ha, 69% of which is typically undeveloped rural forest area. The urban area of the catchment is primarily within the eastern parts and surrounding MacMasters and Copacabana beaches embayment. Cockrone Creek is the lagoon's main tributary and drains approximately 60% of the total catchment area through Cockrone Gully and into the western side of the lagoon (Council, 1995).

Mean water level within the lagoon is +1.73 m AHD with bed levels averaging between +0.4 and +0.6 m AHD. The outlet through the beach berm between Copacabana and MacMasters Beach and into the Tasman Sea is closed for the majority of time. The channel is opened an average of 2.4 times per year either naturally or artificially. Council artificially opens the lagoon entrance when the water level reaches the trigger level of +2.53 m AHD.

As shown in **Figure 26**, Cockrone Lagoon is mapped within the CM SEPP as containing significant areas of Coastal Wetlands, which require specific consideration in regards to any proposed development within the adjoining buffer areas. Council has further mapped the areas and types of vegetation as shown in **Figure 27**.

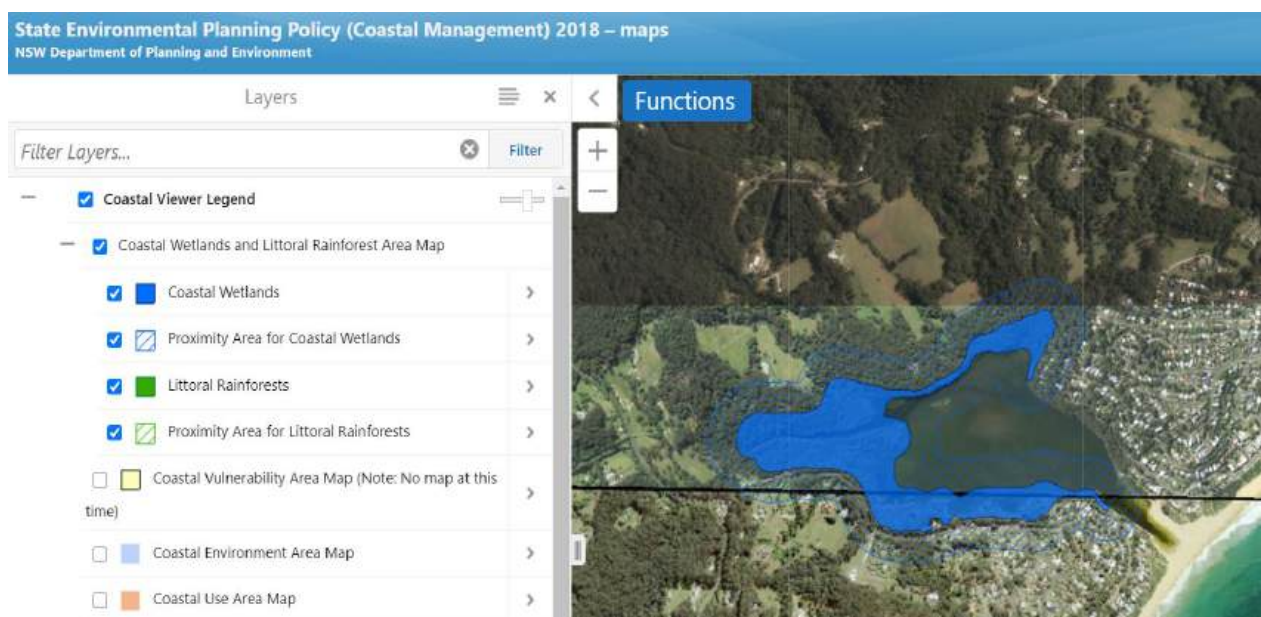


Figure 26: Cockrone Lagoon Coastal Wetlands & Littoral Rainforests Area Map - CM SEPP 2018

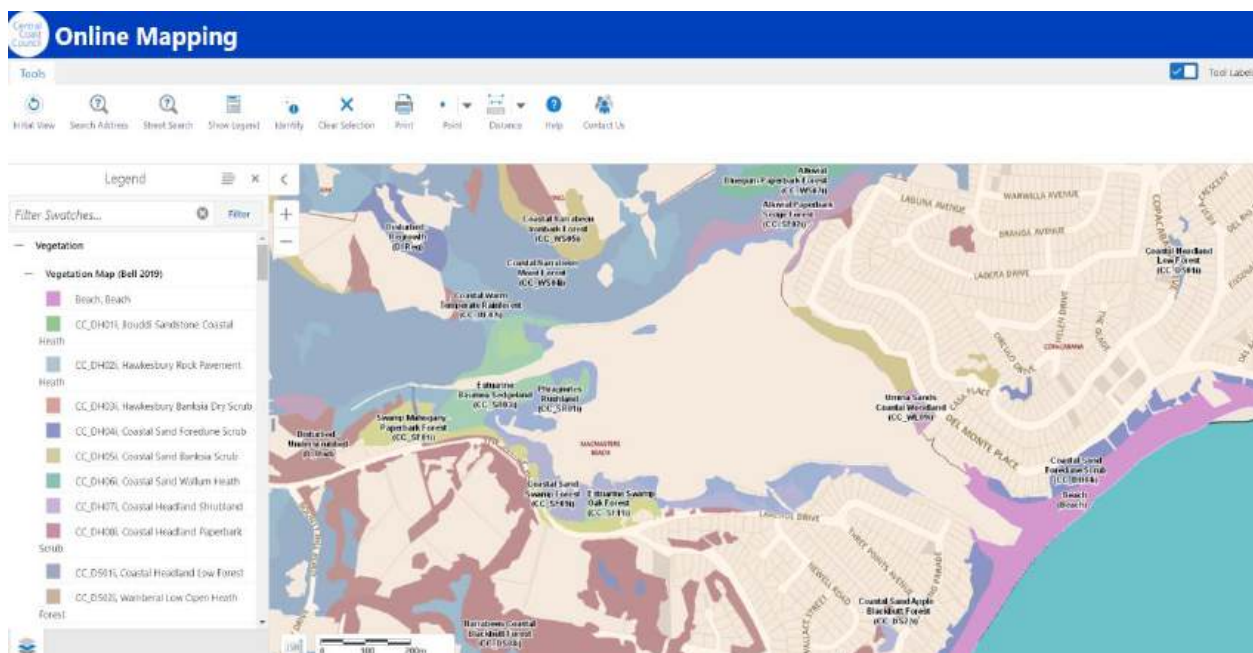


Figure 27: Cockroon Lagoon vegetation map - Central Coast Council online mapping tool 2020

5.6 Existing Coastal Protection Structures

There are a range of existing coastal protection structures in place at many locations across the LGA. These structures vary greatly in their design, materials and integrity, from an approved, Council constructed approximately 450 m long engineered vertical seawall with promenade located at Terrigal Beach, to an engineered 100 m rock groyne constructed by Public Works, now owned and managed by Transport for NSW, at The Entrance, through to a myriad unauthorised ad hoc private protection works (including small “sea bees”, bulka bags, concrete blocks and “shot crete”) such as at Wamberal Beach.

A comprehensive table describing the location, structure type, design and providing additional commentary is provided in **Appendix E - Existing Coastal Protection Structures**.

5.7 Social and Cultural Context

5.7.1 Central Coast Demographics and Economic Context

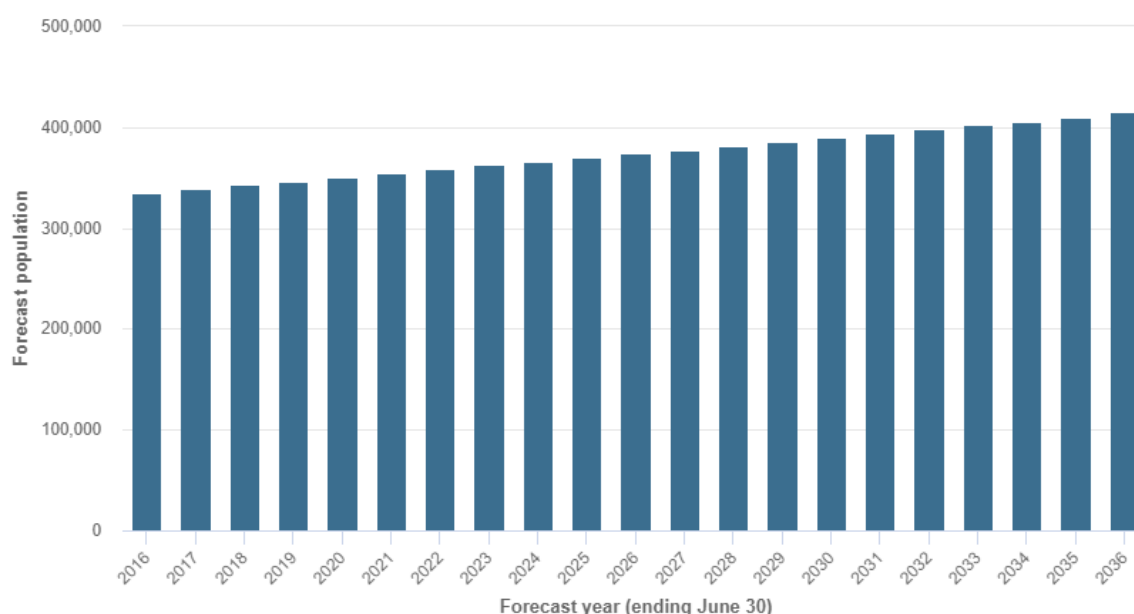
The Central Coast region benefits from being geographically situated mid-way between Sydney and Newcastle, with significant natural assets including beaches, bushland, lakes and waterways, which act as a drawcard for creative industries and tourism. Tourism contributed more than \$1 Billion of visitor expenditure in 2019 to the local economy, and is seen as a significant driver of future economic success. Council seeks to develop a regional destination identity with expanding entertainment and activity prospects, offering an opportunity to increase intraregional exploration, off-peak tourism and a more age diverse tourism profile (Council, 2020).

The Central Coast LGA has an estimated population of 343,968 as at 2019 ABS census (iD Community, 2020). As noted within Council’s Community Strategic Plan (CSP) “One - Central Coast”, the population of the region is projected to increase to 414,615 people by 2036 as shown in **Table 3**, leading to an increased demand for services, increased usage of community facilities, and a projected requirement for a further 41,500 new dwellings by this time (Council, 2018).

Table 3: Population and household forecasts, 2016 to 2036 (iD Community, 2020)

Forecast population

Central Coast NSW



Population and household forecasts, 2016 to 2036, prepared by .id, March 2018.

Recognising the need for a coordinated approach to deliver appropriate and sustainable growth, Council developed the Central Coast Economic Development Strategy, which sets out the economic vision and values, objectives and targets, and the priority actions to deliver results for the Central Coast. Council committed to action through a 2022 Economic Recovery Plan to coordinate economic policy, investment and collaboration that drives employment, trade, local development, and business, with a long term goal of building a resilient Central Coast economy through the 2040 Economic Development Strategy (Council, 2020).

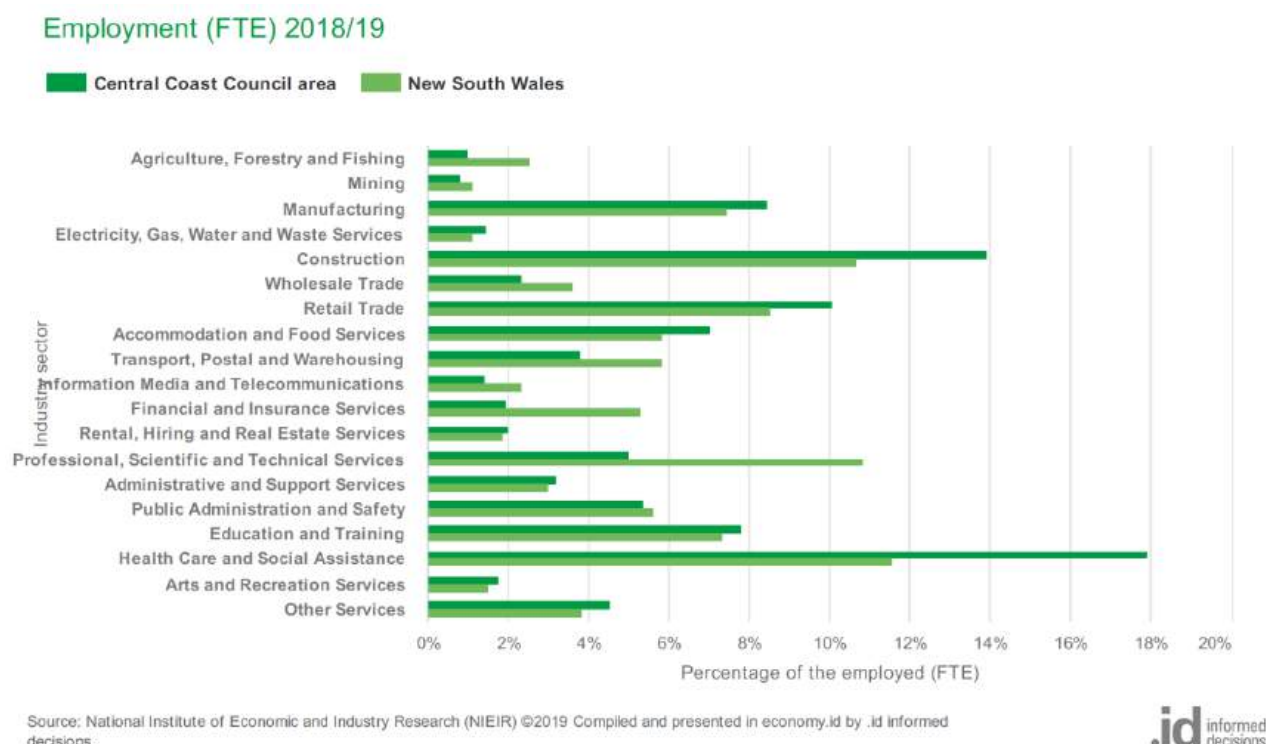
The Economic Development Strategy identified that Council faces a number of challenges within the LGA, including that 4 out of the 10 Central Coast postcodes ranked in top 10% most disadvantaged, and 6 out of the 10 are ranked in the top 30% most disadvantaged communities in NSW (out of the 621 localities). Relatively high unemployment rates and a high median age are seen as reflective of both a high in-migration of retirees coupled with a high out-migration of youth. Council seeks to retain the youth population through a number of initiatives, as they are recognised as key productive contributors to industry, innovation and new business start-ups (Council, 2020).

Based on economic indicators for the local region and NSW, key growth sectors for the Central Coast to 2040 were identified. Existing sectors to support were noted as Health Care and Well-being; Retail Trade; Accommodation and Food Services; and Construction. Emerging sectors to grow were identified as Education, Innovation and Research; Advanced Manufacturing; Sustainable, Green Industries and the Circular Economy; Small Business and Entrepreneurship; Commercial Offsite CBD Headquarters for Commuters; and a Visitor Economy (Council, 2020).

The tourism sector of the Central Coast is recognised as a key economic support for the LGA, however there are seasonal fluctuations across each financial year. In 2018/19, the total tourism and hospitality

sales in Central Coast Council area was \$1933.1m, the total value added was \$957.5 million. However, in the Central Coast Council area, Health Care and Social Assistance is the largest employer, generating 22,618 out of 121,245 local jobs in 2018/19 (iD Community, 2020). This stable employment base, combined with Retail Trade and Construction, contribute over 40% of employment within the LGA, significantly higher than the NSW State average for these sectors, as shown in **Table 4**.

Table 4: Employment by sector, Central Coast compared to NSW (iD Community, 2020).



Of particular relevance for coastal management outcomes, the Economic Development Strategy notes the ongoing challenge of advancing economic, social and environmental sustainability for the region, with an additional focus on land usage. Council is seeking to ensure that conservation outcomes are met as the region develops, recognising that this driver is integral to maintaining liveability and sustainability. Land use challenges within the coastal zone extend to creating clear, consistent and appropriate land zoning for development, while maintaining and enhancing environmental values and attributes (Council, 2020).

In response to the evolving situation with Coronavirus (COVID-19), Council is taking measured precautions to ensure we keep the community safe while navigating the resulting economic crisis. Due to the unpredictable and highly variable nature of the health and economic crisis, Council has recognised that some items within the Economic Development Strategy implementation plan may have to be reprioritised or deferred to be able to meet the immediate needs of other items.

On 30 October 2020, the Minister for Local Government, Shelley Hancock announced the suspension of the elected Council and the appointment of Dick Persson as the new interim Administrator of Central Coast Council for an initial period of three months. This occurred following the reveal of an \$89 million debt in Council finances and an emergency \$6.2 million loan provided by the NSW Government in order for Council to pay its own staff (ABC News, 2020).

On 2 December 2020, Persson delivered the first 30-day interim report which revealed "catastrophic budget mismanagement", including accumulated losses of \$232 million since 2016, increased debt from \$317 million (2016) to \$565 million (2020), and an estimated operating loss of \$115 million for 2020/2021 financial year (Persson, 2020).

The combined influence of COVID-19 and Council's Long Term Financial Plan on the financial capacity of Central Coast Council to commit to actions may be a consideration during development of future CMP's.

5.7.2 Social Values

The development of the Community Strategic Plan (CSP) "One - Central Coast" provided a unique opportunity for Council to understand the aspirations and concerns of the entire Central Coast community as a whole for the first time. Through this plan, Council seeks to shape business activities, future plans, services and expenditure to meet the growing requirements and changing expectations of residents through effective decision-making, planning and service delivery across all government and non-government agencies (Council, 2018).

"One - Central Coast" provides a 10 year plan that defines the priorities of the community, and provides a considered and evidence-based roadmap for the future of the Central Coast. It defines the environmental and social qualities that the community have described, and provides a clear path of action towards what the community has identified as the preferred future state. It also recognised many opportunities and challenges within this timeframe.

Key descriptors that relate to the scoping study include that the Central Coast is a place where towns and villages are surrounded by green landscapes and beautiful oceans and waterways, where the natural environment is important to the coastal identity. Conserving the environment and keeping it free from pollution in light of an increasing population and urban development is vital (Council, 2018).

Ensuring new development is sustainable, equitable and provides affordable housing is an ongoing challenge. The balance between what exists now and planned future development means that a sustained effort must be made to consider how and where new development will occur. As a coastal region, the Central Coast is vulnerable to climate change impacts. Issues include sea level rise, safety in extreme weather events and secure access to fresh water. The need to address climate change is imperative, as is implementing frameworks that address climate risk (Council, 2018).

The Central Coast is known for its natural beauty; maintaining natural assets is a critical component of what is valued by the community. Ongoing education is key to the green approach, as is inviting the community to take a hands-on role in conservation, protection and remediation of our environment. Reducing litter, minimising waste and championing renewable energy in future design and planning will minimise the impacts of climate change in the region and will enable the preservation of the beaches, waterways, wildlife corridors and inland areas for the variety of species that inhabit them (Council, 2018).

The values and desires of the community are reflected throughout "One - Central Coast" and are used to form the objectives to achieve these goals, as well as indicators of achievement. Key community engagement outcomes and CSP objectives that relate to the coastal natural environment area addressed within the scoping study are shown in **Table 5**.

Table 5: CSP community engagement values and desires relating to the coastal natural environment ("One - Central Coast", 2018)

Important Community Value	Community Desire	Related CSP Objective
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Abundant bushland areas, parks and green spaces	Council should take a proactive approach to protect and manage the natural environment under its care	F1 Protect our rich environmental heritage by conserving beaches, waterways, bushland, wildlife corridors and inland areas and the diversity of local native species. F2 Promote greening and ensure the wellbeing of communities through the protection of local bushland, urban trees, tree canopies and expansion of the Coastal Open Space System (COSS).
Access to clean and well-maintained lakes and waterways	Council's Estuary Management Plan, catchment management program, Waterwatch Program and lagoon and coastal protection programs are important	E2 Improve water quality for beaches, lakes and waterways by minimising pollutants and preventing litter entering our waterways. F3 Improve enforcement for all types of environmental non-compliance including littering and illegal dumping and encourage excellence in industry practices to protect and enhance environmental health. K4 Repair and maintain wharves, jetties, boat ramps and ocean baths to increase ease of access to and enjoyment of natural waterways and foreshores
New developments are built with consideration for the environment and local heritage	Development is removing habitat, trees and corridors – local and state government land use planning needs to protect these values	I1 Preserve local character and protect our drinking water catchments, heritage and rural areas by concentrating development along transport corridors and town centres east of the M1. I3 Ensure land use planning and development is sustainable and environmentally sound and considers the importance of local habitat, green corridors, energy efficiency and stormwater management.
Council works in the best interests of the community	Council should map wildlife corridors and extend corridors and protected areas	E1 Educate the community on the value and importance of natural areas and biodiversity and encourage community involvement in caring for our natural environment. E3 Reduce littering, minimise waste to landfill and educate to strengthen positive environmental behaviours.
The community is concerned about the impacts of climate change	Our community is active in environmental protection, and Council should acknowledge and encourage this by undertaking community education about wildlife and local vegetation	E1 Educate the community on the value and importance of natural areas and biodiversity and encourage community involvement in caring for our natural environment. F4 Address climate change and its impacts through collaborative strategic planning and responsible land management.

5.7.3 Cultural Context

The Central Coast has a rich Aboriginal and non-indigenous history, which is reflected by a large number and wide variety of heritage listed built and natural, culturally and socially significant sites within the LGA. Heritage listings give recognition to places or objects that are considered to have heritage significance, as well as providing a level of protection, and improved access to heritage grants for listing owners.

The heritage items within the Central Coast LGA (centralcoast.nsw.gov.au/heritage-advice) include:

- a number of recognised significant sites for Aboriginal culture and heritage, including 4 significant Aboriginal Places declared by the *Minister for the Environment* under the *National Parks and Wildlife Act*;
- 399 local heritage sites of cultural significance to the local area listed in the LEPs under the EP&A Act;
- 18 state heritage sites of cultural significance to NSW (not only the local area) listed on the State Heritage Register under the *NSW Heritage Act 1977*; and
- 1 World Heritage site listed on the World Heritage List as designated by UNESCO (United Nations Educational, Scientific and Cultural Organization). This site is a section of the Old Great North Road, and is listed under UNESCO's *Australian Convict Sites* listing of 11 penal sites across Australia which represent the best surviving examples of large-scale convict transportation and colonial expansion through the presence and labour of convicts. This site is located in Dharug National Park, and is outside the area of this CMP.

The Central Coast coastline is rich in Aboriginal cultural heritage and forms part of the traditional Country of First Nations People, with many formally recognised Aboriginal sites documented along the coast. The places and landscape values associated with the coastline hold important spiritual values to First Nations People, and it is recognised that ecologically sustainable management of the coastal zone will help ensure Aboriginal heritage sites, places and culture are maintained and protected into the future (Umwelt, 2011).

Darkinjung Local Aboriginal Land Council has remit over the traditional boundaries of land extending from the Hawkesbury River in the south, Lake Macquarie in the north, the McDonald River and Wollombi up to Mt Yengo in the west and the Pacific Ocean in the East. Darkinjung is one of 120 Local Aboriginal Land Councils (LALC) in NSW established under the *Aboriginal Land Rights Act 1983*. The NSW Government recognises Darkinjung as a unique and significant land owner in the Central Coast with responsibilities to improve, protect and foster the best interests of Aboriginal persons within the region. Darkinjung LALC works with the NSW National Parks and Wildlife Services (NSW NPWS) and DPIE to ensure the protection of habitats, ecosystems, plant and animal species, significant geological features and landforms and protects icons and sites of national significance (DPE, 2016).

The Central Coast Regional Plan 2036 (Regional Plan) (DPE, 2016) includes a direction to strengthen the economic self-determination of Aboriginal communities (Direction 6) to support implementation of the NSW Government plan for Aboriginal Affairs, Opportunity, Choice, Healing, Responsibility and Empowerment. The Regional Plan recognises that encouraging Aboriginal people to gain economic benefit from their land will support broader regional development, biodiversity and social outcomes. In order to meet this direction, the Interim Darkinjung Development Delivery Plan was prepared for the Darkinjung LALC (Darkinjung) by the Department of Planning and Environment (DPE) as a strategic document designed to support economic and social opportunities for Darkinjung and its community.

The Regional Plan provides a framework to guide growth and change on the Central Coast and includes specific actions to strengthen the economic self-determination of the Darkinjung that are of relevance to the CMP Scoping Study, being:

Action 6.1 — Collaborate with Central Coast Council and the Darkinjung Local Aboriginal Land Council to strategically assess the Land Council's land holdings and identify priority sites to create a pipeline of projects.

Action 6.2 — Incorporate the outcome of the assessment into a revised North Wyong Shire Structure Plan. This Interim Delivery Plan presents the outcome of the initial review of Darkinjung sites, an analysis of environmental and land use constraints and recognises the first stages of the Darkinjung development pipeline. It will guide planning decisions for these sites and assist in the delivery of regional housing and employment needs.

Consultation during development of Council's Community Strategic Plan reflected the cultural aspirations of the community, and as a result "One - Central Coast 2018-28" includes key arts and cultural objectives, including the following themes and objectives:

Our community is our strength:

- Work within our communities to connect people, build capacity and create local solutions and Initiatives
- Celebrate and continue to create opportunities for inclusion where all people feel welcome and participate in community life

Creativity, connection and local identity:

- Support reconciliation through the celebration of Aboriginal and Torres Strait Islander cultures
- Promote and provide more sporting, community and cultural events and festivals, day and night, throughout the year
- Foster creative and performing arts through theatres, galleries and creative spaces, by integrating art and performance into public life
- Activate spaces and places to complement activity around town centres, foreshores, lakes and green spaces for families, community and visitors.

A growing and competitive region:

- Revitalise Gosford City Centre, Gosford Waterfront and town centres as key destinations and attractors for businesses, local residents, visitors and tourists
- Facilitate economic development to increase local employment opportunities and provide a range of jobs for all residents
- Promote and grow tourism that celebrates the natural and cultural assets of the Central Coast in a way that is accessible, sustainable and eco-friendly

A place of opportunity for people:

- Foster innovation and partnerships to develop local entrepreneurs and support start-ups

Working to deliver these objectives, Council developed the Central Coast Cultural Plan 2020-25 to describe the region's cultural vision and aspirations. As a five-year framework, the Central Coast Cultural Plan seeks to position the region's arts and culture as a key strength for community and economic development and destination ambitions, meeting the challenges of the present and the future (Council, 2020).

Building around a framework of four strategic goals (Building a visible creative identity; Growing our creative sector; Embracing our cultural life; Enlivening cultural spaces and places), the Cultural Plan outlines a range of objectives and strategies designed to provide opportunities for people of all ages, backgrounds and abilities to learn, create and be heard, participating in, and contributing to, the cultural life of the Central Coast. It describes Council's support and strategic investment in creative and cultural practitioners to develop and promote a diverse and inclusive cultural identity, and recognises that Council plays a fundamental role in providing the development framework for the public domain, cultural precincts,

new infrastructure, events and activities via its role in strategic planning and development approvals (Council, 2020).

5.7.4 Future Development

The NSW Government has indicated the importance of increasing development of the Central Coast region through the announcement in October 2020 that the Greater Sydney Commission (GSC) would coordinate development and delivery of the Central Coast Strategy. The Central Coast Strategy is to be a first-of-its-kind strategy to identify wider economic and employment opportunities, bringing new businesses and jobs to the fast-growing region (GSC, 2020).

The GSC seek to bring together State and Federal agencies, the local council and private sector partners to providing more jobs on the Central Coast, and have identified several initial areas of interest to be developed further, including;

- Locating a university campus in Gosford city centre to bring greater learning opportunities to the region, stimulate the economy and create local jobs
- Expanding health services in Gosford to support the Central Coast's growing population and to generate local jobs
- Facilitating faster transport connections to and from regional centres to foster economic growth and new jobs on the Central Coast
- Increasing the amount of serviced industrial lands on the Central Coast to support and expand industries such as food technology and advanced manufacturing
- Streamlining planning processes to help remove barriers, such as uncertainty and wait times, for businesses looking to locate on the Central Coast
- Establishing a high-speed internet network to attract new, diverse businesses to the Central Coast and remove any existing barriers for growth related to digital connectivity (GSC, 2020).

The Central Coast Strategy is likely to reinforce and deliver a number of the strategies outlined within the Central Coast Regional Plan 2036, which is discussed in further detail in **Section 6.4.16.4.1**.

6 Strategic Context for Coastal Management

6.1 Legal & Planning overview

Council shares management of the coastline and its coastal zone with the Department of Planning, Industry and Environment (DPIE) with respect to National Parks and Crown land. Features such as beaches, rocky foreshores and the open coast below the mean high water mark are generally designated as Crown land.

The Department of Planning, Industry & Environment - Crown Lands (Crown Lands) is responsible for the administration and/ or management of Crown land under the *Crown Land Management Act 2016*. Crown land includes submerged Crown land, seabed and subsoil to three nautical miles from the coastline of NSW that is within the limits of the coastal waters of the State. Crown land includes much of the submerged land within the estuaries and intertidal areas (below mean high water mark) (for example Terrigal Lagoon and Avoca Lagoon), as well as several foreshore reserves and beaches.

Several of the coastal Crown reserves and foreshores in the study area are under the Care Control and Management of Council. There are other Crown reserves in the coastal zone for which Council is the reserve trust manager or trustee. Where Council proposes works on Crown land not under Council Trust management, an appropriate authorisation is required from DPIE (Crown Lands).

Aboriginal people are the traditional owners and occupiers of the Central Coast coastal zone and have certain land rights under the *NSW Aboriginal Land Right Act 1983*. The purpose of the *Aboriginal Land Right Act 1983* (ALR Act) is to provide land rights for Aboriginal persons in NSW, and to provide for representative Aboriginal Land Councils. The ALR Act makes provision for claimable Crown lands and other dealings by Local Aboriginal Land Councils (LALC). It also provides for agreements to permit hunting, fishing and gathering by Aboriginal groups or persons. The ALR Act is administered by the Minister for Aboriginal Affairs, but allocates roles, responsibilities and powers to The NSW Aboriginal Land Council (NSWALC) and DPIE (Crown Lands).

A number of incomplete claims under the ALR Act have been lodged on Crown land within the study area. Management works proposed on Crown land must give consideration to Aboriginal Land Claims lodged under the ALR Act, and will also need to be compliant with the *Commonwealth Native Title Act 1993*.

The statutory and policy framework for coastal and marine management is governed by the *Marine Estate Management Act 2014* (MEM Act) and the *Coastal Management Act 2016*. The *Coastal Management Act 2016* (CM Act) has practical effect through the requirements of the State Environmental Planning Policy (SEPP) (Coastal Management) 2018. The Coastal Management SEPP (CM SEPP) includes digitised maps for three of the four management areas comprising the coastal zone, plus land use objectives and development controls associated with those management areas.

One of the objectives of the CM Act is “to promote integrated and co-ordinated coastal planning, management and reporting”. The CM Act also requires that the Coastal Management Manual provides guidance regarding the local council’s integration of its Coastal Management Program with its Integrated Planning and Reporting framework obligations under the Local Government Act 1993.

The IP&R Framework seeks to ensure responsible and sustainable decision-making by Councils, and the Coastal Management SEPP has, as a stated core aim, to establish a framework for land use planning to guide decision-making in the coastal zone. The CM Act and the CM SEPP, as well as the *Local Government Act 1993*, are integrated to achieve a consistent and compatible method of identifying current

and future risk, prioritising responses and imposing financial rigor and good practice in terms of allocating scarce resources.

In addition, the CM Act was developed to connect and enable delivery of the priorities outlined within the *Marine Estate Management Act 2014* and its associated planning requirements. Key issues were identified within the Threat and Risk Assessment for the Marine Estate and will be used to inform the identification of coastal management issues within this scoping study.

Local Governments across NSW are preparing Coastal Management Programs (CMPs), in line with State Government legislation, to outline the long-term strategy for managing the coastal zone. Management of the coastal zone presents various and significant challenges, including increasing development pressure and use of the coastal zone, increased impacts from urban pollution on coastal and marine environments and the effects of a changing climate on coastal & marine environments areas and adjoining urban areas.

The purpose of a CMP is to set out the long-term strategy for the coordinated management of the coastal zone, which is a dynamic, evolving and ambulatory landscape. Council is preparing a CMP to provide strategic direction and coordination of its management of the open coastline and coastal lagoons, confirming and consolidating the delivery of priority management actions by Council and public authorities.

6.2 NSW Coastal Management Framework

Local councils and public authorities are required to manage their coastal areas and activities in accordance with relevant state legislation, policies and plans.

The framework for managing the NSW coast as shown in **Figure 28** includes:

- Coastal Management Act 2016 (CM Act);
- State Environmental Planning Policy (Coastal Management) 2018 (CM SEPP); and
- Coastal Management Programs (CMPs) prepared in accordance with the NSW Coastal Management Manual (the Manual).

Other NSW legislation is relevant to the management of the environmental, social and economic values of the coastal zone, including:

- *Marine Estate Management Act 2014* (MEM Act);
- *Environmental Planning and Assessment Act 1979* (EP&A Act);
- *Protection of the Environment Operations Act 1997* (PoEO Act);
- *Local Government Act 1993* (LG Act);
- *Crown Land Management Act 2016*;
- *National Parks and Wildlife Act 1974*;
- *Fisheries Management Act 1994*;
- *Local Land Services Act 2013*; and
- *Biodiversity Conservation Act 2016*.

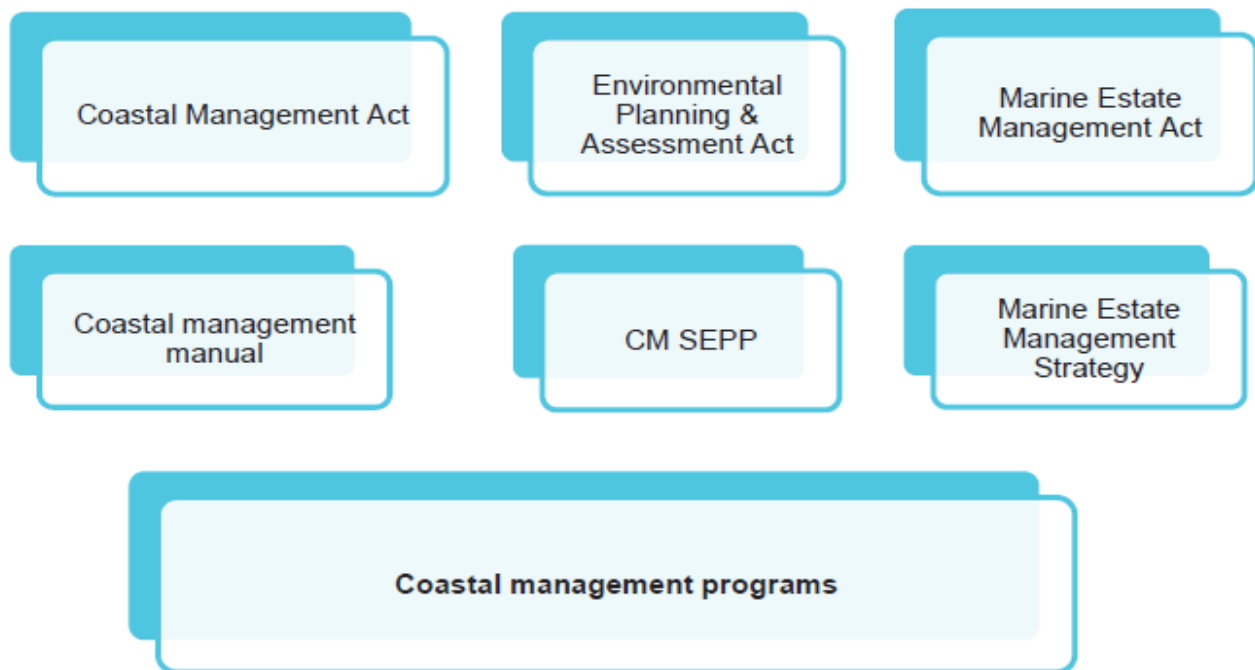


Figure 28: NSW Coastal Management Framework

To reduce social conflict and improve effective management of coastal and marine resources beyond existing marine parks, the NSW Government introduced the *Marine Estate Management Act 2014* (MEM Act). The MEM Act provides for strategic and integrated management of the whole marine estate. The marine estate includes all marine waters, estuaries and coastal areas. The NSW Government also established a new advisory Marine Estate Management Authority (MEMA).

MEMA has undertaken a statewide Threat and Risk Assessment (TARA) (WBM BMT, 2017, for MEMA) to consider and prioritise the social, economic and environmental threats to community benefits of the marine estate. The Marine Estate Management Strategy (MEMA, 2018) has been prepared to allow a holistic approach to dealing with the cumulative threats to the marine estate.

Consistency between the Marine Estate Management Strategy and CMPs is an essential element listed in the Coastal Management Manual (the Manual) (DPIE, 2018). Although the statewide MEMA threat and risk assessment was undertaken at a much broader scale than the Central Coast region, information from the MEMA background reports will be reflected during development of the actions within the Open Coast & Lagoons CMP.

The *Coastal Management Act 2016* (CM Act) declares that the purpose of a CMP is to set the long-term strategy for the co-ordinated management of land within the coastal zone with a particular focus on achieving the objects outlined within the Act (see **Section 3.2**). The Act defines the coastal zone as being made up of four coastal management areas, namely:

- Coastal Wetlands and Littoral Rainforests Area,
- Coastal Vulnerability Area,
- Coastal Environment Area, and
- Coastal Use Area.

The *State Environmental Planning Policy (Coastal Management) 2018* (CM SEPP) identifies the parts of NSW that fall into each of these coastal management areas.

Under the CM Act, and at the direction of the Minister if required, councils are obligated to prepare a Coastal Management Program (CMP) in accordance with the Manual (DPIE, 2018). Part A of the Manual recommends that councils follow a five-stage risk management process for preparation and implementation of a CMP as shown in **Figure 29**. Part B of the Manual provides guidance on preparing Stages 1 to 5 in order to assist council address the requirements of the CM Act.

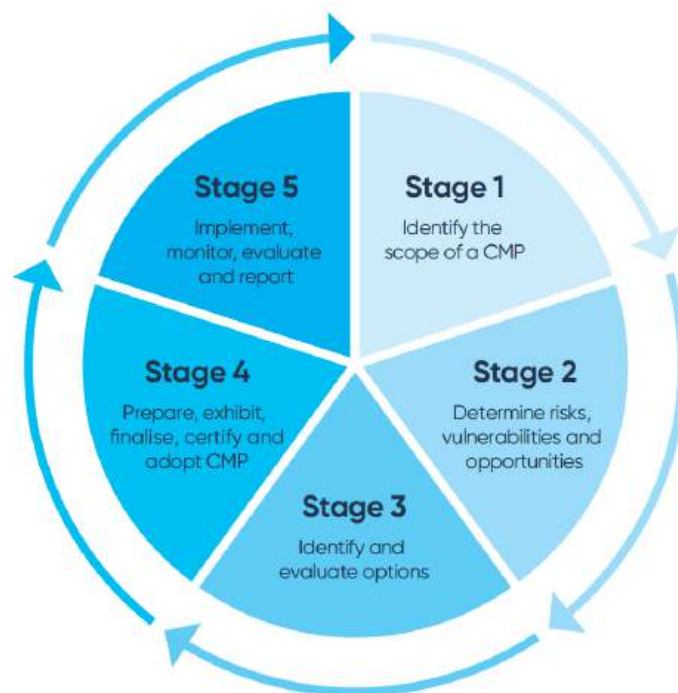


Figure 29: Stages for preparation of a Coastal Management Program (NSW Coastal Management Manual Part A)

This scoping study will form Stage 1 (the first stage) of Council's *Coastal Management Program of Open Coast & Coastal Lagoons* and will be prepared in accordance with *Part B: Stage 1* of the Manual, *Identify the scope of a Coastal Management Program*.

Consistent with the CM Act, the primary purpose of this CMP 'Stage 1' scoping study is to:

- determine the purpose of the CMP and the key outcomes that it is intended to deliver;
- identify the appropriate scope for the CMP, consider the area and range of issues to be dealt with and identify which organisations or communities need to be involved;
- provide the strategic context for management of the coastal zone within the study area and develop a shared understanding of the current situation;
- review the existing management practices and the progress made in managing issues in coastal areas;
- identify within existing studies and, as well as which stakeholders need to be involved; and
- determine the adequacy of available information and management actions, including any knowledge gaps, identify the focus, scope and subsequent stages of the new CMP (including the possibility of fast-tracking) as shown in **Figure 28** below.

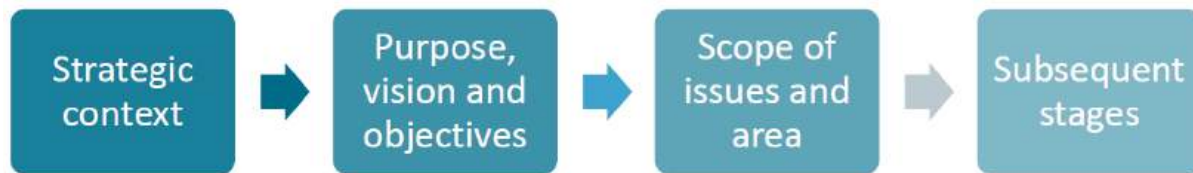


Figure 30: Steps in determining the context, purpose and scope of a CMP (NSW Coastal Management Manual Part A)

6.2.1 Local Government Act 1993

The purposes of the NSW *Local Government Act 1993* (LG Act) are primarily concerned with the governance of councils within NSW including their core functions and responsibilities. Chapter 3 of the LG Act outlines the principles for delivery of the responsibilities of local government. While all principles are relevant, some specific principles that are consistent with the objects of the coastal management framework are:

- Councils should work co-operatively with other councils and the State government to achieve desired outcomes for the local community (consistent with the sediment compartment approach of the Coastal Management Act).
- Councils should consider the long term and cumulative effects of actions on future generations (consistent with planning for sea level rise).
- Councils should identify and prioritise key local community needs and aspirations and consider regional priorities (consistent with CMP engagement processes).
- Councils should identify strategic goals to meet those needs and aspirations (consistent with CMP planning).
- Councils should manage risks to the local community or area or to the council effectively and proactively (CMP risk and threat assessments).
- Councils should make appropriate evidence-based adaptations to meet changing needs and circumstances (consistent with CMP arrangement for management of the Coastal Vulnerability Area).
- Councils should actively engage with their local communities, through the use of the Integrated Planning & Reporting (IP&R) Framework and other measures (consistent with CMP engagement processes).

Chapter 6 of the *Local Government Act 1993* outlines the classification, use and management of public land owned by councils. Plans of management are required for the use and ongoing management of community land, which is categorised into various groups including natural areas, sportsgrounds, parks, cultural significance and general community use.

6.2.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the key legislative act which underpins planning in NSW. The EP&A Act provides a framework for the development of planning instruments which regulate land use, including:

- regional and district strategic plans,
- State environmental planning policies (SEPPs),
- local environmental plans (LEPs), and
- development control plans (DCPs).

The EP&A Act provides a framework for assessment of development proposals which is outlined in Part 4 of the EP&A Act, including development that needs consent, development permitted without consent (including exempt development) and complying development. Part 5 of the EP&A Act relates to infrastructure development and the activity assessment required for these projects.

The *Environmental Planning and Assessment Act 1979* provides a framework for assessment of development proposals. This framework is outlined in Part 4 of the *Environmental Planning and Assessment Act 1979*, including development that needs consent, development permitted without consent (including exempt development) and complying development. Part 5 of the *Environmental Planning and Assessment Act 1979* relates to infrastructure development and the activity assessment required for these projects.

The CM SEPP streamlines coastal development assessment requirements, identifies development controls for consent authorities to apply to each coastal management area to achieve the objectives of the CM Act, and establishes the approval pathway for coastal protection works (DPIE, 2019a). Once a CMP is certified, Council as the consent authority can use the LEP and DCP land use planning controls for the coastal environment area to give effect to management objectives identified in the CMP for this area, and the requirements of the CM SEPP to minimise impacts on environmental systems and values.

6.2.3 Coastal Management Act 2016

The *Coastal Management Act 2016* underpins the management of the coastal zone of NSW. The objectives of the CM Act are:

- (a) to protect and enhance natural coastal processes and coastal environmental values including natural character, scenic value, biological diversity and ecosystem integrity and resilience, and
- (b) to support the social and cultural values of the coastal zone and maintain public access, amenity, use and safety, and
- (c) to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the coastal zone, and
- (d) to recognise the coastal zone as a vital economic zone and to support sustainable coastal economies, and
- (e) to facilitate ecologically sustainable development in the coastal zone and promote sustainable land use planning decision-making, and
- (f) to mitigate current and future risks from coastal hazards, taking into account the effects of climate change, and
- (g) to recognise that the local and regional scale effects of coastal processes, and the inherently ambulatory and dynamic nature of the shoreline, may result in the loss of coastal land to the sea (including estuaries and other arms of the sea), and to manage coastal use and development accordingly, and
- (h) to promote integrated and co-ordinated coastal planning, management and reporting, and
- (i) to encourage and promote plans and strategies to improve the resilience of coastal assets to the impacts of an uncertain climate future including impacts of extreme storm events, and
- (j) to ensure co-ordination of the policies and activities of government and public authorities relating to the coastal zone and to facilitate the proper integration of their management activities, and
- (k) to support public participation in coastal management and planning and greater public awareness, education and understanding of coastal processes and management actions, and
- (l) to facilitate the identification of land in the coastal zone for acquisition by public or local authorities in order to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone, and

(m) to support the objects of the *Marine Estate Management Act 2014*.

Part 3 of the CM Act requires that a coastal management manual be published which led to the *NSW Coastal Management Manual* being published in 2018 by the Office of Environment and Heritage (DPIE). The CM Act stipulates that this manual will provide guidance on the preparation, development, adoption, implementation, amendment, review of, and the contents of coastal management programs, and that local councils are to prepare coastal management programs in accordance with the coastal management manual.

6.2.4 State Environmental Planning Policy (Coastal Management) 2018

State Environmental Planning Policy (Coastal Management) 2018, known as the Coastal Management SEPP (CM SEPP) gives effect to the objectives of the CM Act. The CM SEPP defines the coastal zone and establishes state-level planning priorities and development controls to guide decision-making for development within the coastal zone. The CM SEPP commenced on 3 April 2018 and seeks to promote an integrated and coordinated approach to land use planning in the coastal zone, that is consistent with the objects of the CM Act 2016. The CM SEPP consolidated and updated SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection), which have been repealed.

The focus of the CM SEPP is on ecologically sustainable development that:

- protects and enhances sensitive coastal environments, habitats and natural processes
- strategically manages risks from coastal hazards
- maintains and enhances public access to scenic areas, beaches and foreshores
- supports the objectives for our marine environments under the *Marine Estate Management Act 2014*
- protects and enhances the unique character, cultural and built heritage of our coastal areas, including Aboriginal cultural heritage.

Under the previous *Coastal Protection Act 1979*, the coastal zone comprised of a single area. It is now comprised of four distinct coastal management areas, enabling more targeted management of the diversity of environments, associated pressures and interests in the coast. Targeted development controls apply to each area and are designed to achieve the specific management objectives for that area as set out in the CM Act.

The coastal zone is defined in the CM Act as being the area of land comprised of one or more of four coastal management areas:

- Coastal Wetlands and Littoral Rainforests Area - defined as areas with particular hydrological and ecological characteristics
- Coastal Vulnerability Area - defined as the area affected by any one of seven coastal hazards
- Coastal Environment Area - defined as the coastal waters of the state, estuaries, coastal lakes and foreshores including beaches, dunes, headlands and rock platforms as well as surrounding land
- Coastal Use Area - defined as land adjacent to the coast, where development is or may be carried out.

Each coastal management area has differentiated objectives under the CM Act, which respond to their social and environmental values and key threats, and are described below. The objectives for each management area are to be achieved using both strategic and site-specific approaches. Strategically, councils and other public authorities give effect to these objectives by developing and implementing

detailed actions in Coastal Management Programs, and by using complementary zoning and other strategic planning tools. When considering individual development proposals, councils and other consent authorities will give effect to the CM Act's objectives by applying the development controls in the planning policy.

Some land may be mapped as more than one coastal management area. In these cases, development controls for all of the relevant coastal management areas will apply. In accordance with the Act, in the event of any conflict, the priority order (highest to lowest) of the management objectives and controls for overlapping coastal management areas is: coastal wetlands and littoral rainforests area, coastal vulnerability area, coastal environment area and coastal use area.

6.2.5 Coastal Management Areas

6.2.5.1 Coastal Wetlands and Littoral Rainforests Area

The CM Act defines the Coastal Wetlands and Littoral Rainforests Area as the land which displays the hydrological and floristic characteristics of coastal wetlands or littoral rainforests, as well as a surrounding proximity area to manage impacts of adjacent development. Coastal wetlands mapped in NSW for the development of the CM SEPP include those that are dominated by the following vegetation types: mangroves, saltmarshes, melaleuca forests, casuarina forests, sedgelands, brackish and freshwater swamps, and wet meadows.

Littoral Rainforests are defined by their dominant vegetation which include broad leaved lilly pilly, tuckeroo, brush box, yellow tulip, baurela, red olive plum, plum pine, cabbage palm and various figs. The maps include a 100-metre proximity area, applying to all land zones around coastal wetlands and littoral rainforests. The coastal wetlands and littoral rainforests area mapping provided in the CM SEPP is depicted in **Figure 31**.

The CM Act specifies that the management objectives for this area are:

- to protect coastal wetlands and littoral rainforests in their natural state, including their biological diversity and ecosystem integrity;
- to promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests;
- to improve the resilience of coastal wetlands and littoral rainforests to the impacts of climate change, including opportunities for migration;
- to support the social and cultural values of coastal wetlands and littoral rainforest; and
- to promote the objectives of State policies and programs for wetlands or littoral rainforest management.

Initial inspection of the CM SEPP mapping for Coastal Wetlands and Littoral Rainforests and review of Council's biodiversity inline mapping tools have indicated that mapping of Coastal Wetlands and Littoral Rainforests Area for the Central Coast is inaccurate in part, and may benefit from being updated during the CMP process through a planning proposal.

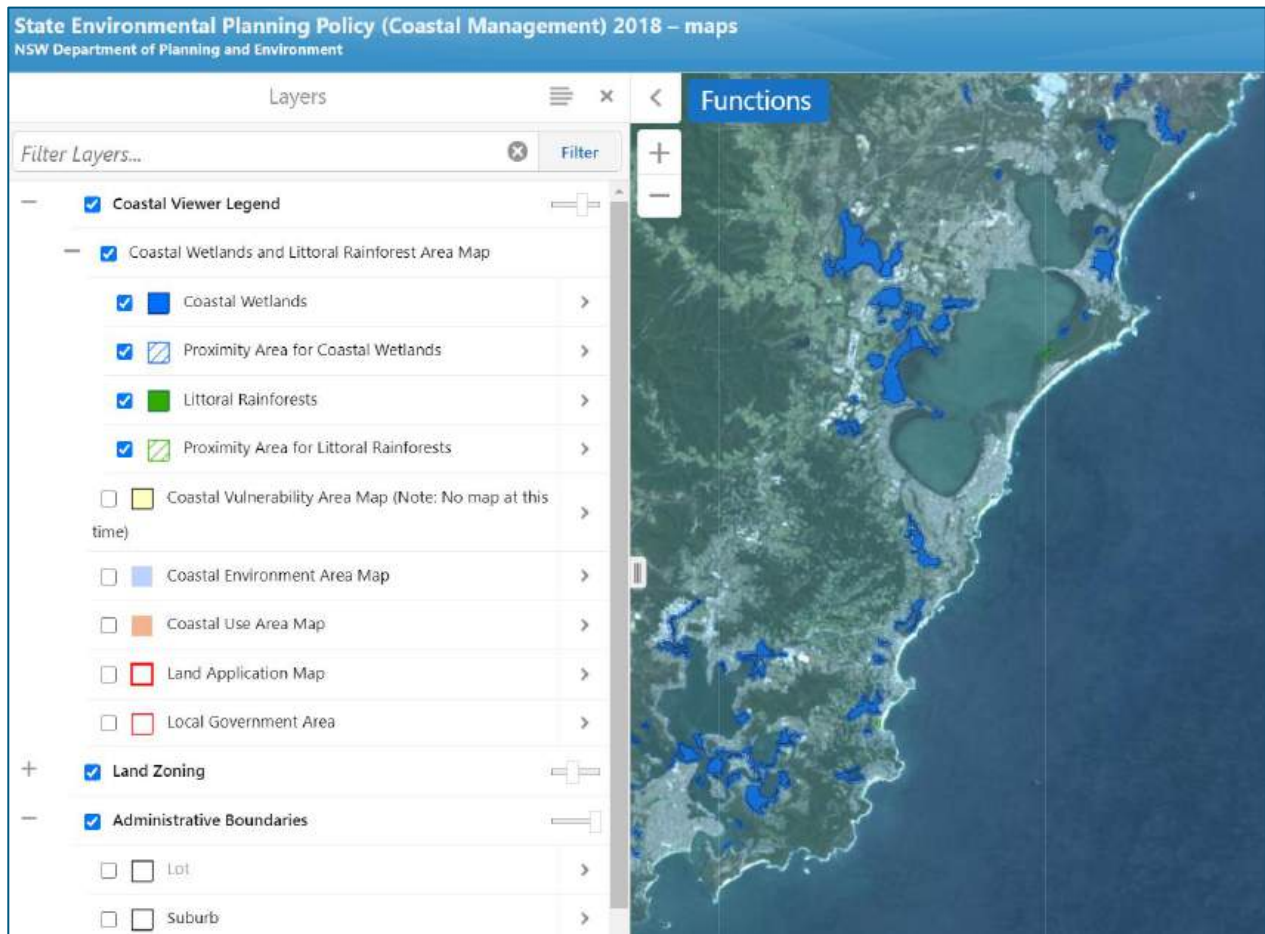


Figure 31: Coastal Wetlands and Littoral Rainforests Area - SEPP (CM) mapping

6.2.5.2 Coastal Vulnerability Area

The coastal vulnerability area (CVA) is defined in the Act as land which is subject to coastal hazards. The area focusses on identifying land subject to current and future coastal hazards, and to ensure land use management and development undertaken in these areas recognise coastal risk and is subsequently appropriate. The Act provides for the management of seven coastal hazards:

- beach erosion;
- shoreline recession;
- coastal lake or watercourse entrance instability;
- coastal inundation;
- tidal inundation;
- coastal cliff or slope instability; and
- erosion and inundation of foreshores caused by tidal water and waves, including the interaction of those waters with catchment floodwaters.

The CM Act specifies that the management objectives for this area are to:

- ensure public safety and prevent risk to human life;
- mitigate current and future risks from coastal hazards, taking into account the effects of coastal processes and climate change;
- maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place;

- maintain public access, amenity and use of beaches and foreshores;
- encourage land use that reduces exposure to risks from coastal hazards, including through siting, design, construction and operational decisions;
- adopt coastal management strategies that reduce exposure to coastal hazards, in the first instance by restoring and enhancing natural defences such as coastal dunes, vegetation and wetlands; and, if that is not sufficient, by taking other action to:
 - avoid significant degradation of biological diversity and ecosystem integrity;
 - avoid significant degradation or disruption of ecological, biophysical, geological and geomorphological coastal processes;
 - avoid significant degradation of or disruption to beach and foreshore amenity and social and cultural values;
 - avoid adverse impacts on adjoining land, resources or assets; and
 - provide for the restoration of the beach or adjacent land if any increased erosion is caused by actions to reduce exposure to coastal hazards.
- prioritise actions that support the continued functionality of essential infrastructure during and immediately after a coastal hazard emergency; and
- improve the resilience of coastal development and communities by improving adaptive capacity and reducing reliance on emergency responses.

It is important to note that the CMP hazard mapping identifies a range of risk exposures (current and future) for several different hazards (listed above). At the time of preparing this Scoping Study, there was no map published under the CM SEPP to identify the CVA across the study area. However previous studies and historical events have made it known that the study area is subject to coastal hazards. For example, Wamberal and the Entrance North Beaches were subjected to beach erosion, shoreline recession, and slope instability during coastal storm events in 2020.

Consideration should also be given to potential tidal inundation in the lagoons (particularly Terrigal) as identified by current Flood Risk Management Plans. It is likely that the CVA will extend beyond the open coast shoreline, which has been the focus of previous coastal hazard studies.

As such, it is proposed that a Coastal Vulnerability Area is relevant to the study area, and that it is recommended that (subject to the outcomes of the CMP), planning proposals will be required that declare a map to be the CVA so that associated planning controls will apply.

6.2.5.3 Coastal Environment Area

The CM Act defines the coastal environment area as land containing coastal features such as the coastal waters of the States, estuaries, coastal lakes, coastal lagoons, and land adjoining those features including headlands and rock platforms. Beaches dunes and foreshores are included in this area. Within estuaries, the coastal environment area extends upstream to the extent of tidal influence.

The area of land adjacent to the open coast, estuary or coastal lake / lagoon is also included in the coastal environment area. This is to ensure nearby development takes into account potential impacts on the coastal environment. The CM SEPP mapping for the coastal environment area therefore includes the following buffers around these coastal features for regional area such as the Central Coast:

- For estuaries and coastal lakes: a 500 m landwards buffer;
- For beaches, dunes, headlands, rock platforms and foreshore: a 250 m landwards buffer.

The coastal environment area mapping provided in the CM SEPP is depicted in **Figure 32**.

The management objectives for the Coastal Environment Area provided in the CM Act are:

- to protect and enhance the coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes and coastal lagoons, and enhance natural character, scenic value, biological diversity and ecosystem integrity;
- to reduce threats to and improve the resilience of coastal waters, estuaries, coastal lakes and coastal lagoons, including in response to climate change;
- to maintain and improve water quality and estuary health;
- to support the social and cultural values of coastal waters, estuaries, coastal lakes and coastal lagoons;
- to maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system operating at the relevant place; and
- to maintain and, where practicable, improve public access, amenity and use of beaches, foreshores, headlands and rock platforms.

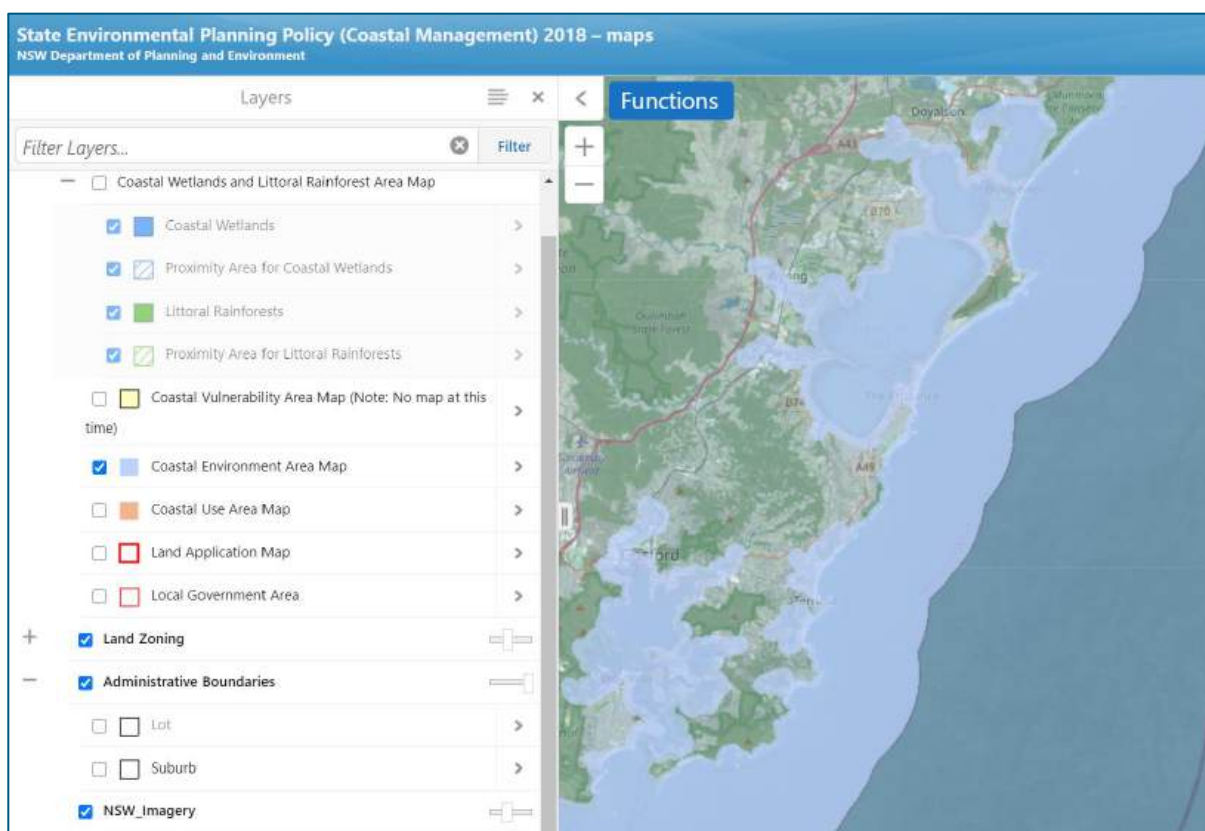


Figure 32: Coastal Environment Area - SEPP (CM) mapping

6.2.5.4 Coastal Use Area

The CM Act defines the coastal use as being land adjacent to coastal waters, estuaries, coastal lakes and lagoons where development is or may be carried out (at present or in the future), and impacts of development on the scenic and cultural values and use and enjoyment of the beaches, foreshores, dunes, headlands, rock platforms, estuaries, lakes and the ocean need to be considered.

In regional NSW (including the Central Coast), the coastal use area is defined as the 500 m landward extent from the open ocean boundary of LGAs, and a 250 m landward extent from the boundaries of estuaries.

The coastal use area mapping provided in the CM SEPP is depicted in **Figure 33**.

The management objectives for this area within the CM Act are to accommodate both urbanised and natural stretches of coastline and to protect and enhance the scenic, social and cultural values of the coast by ensuring that:

- the type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast;
- adverse impacts on cultural and built environment heritage are avoided or mitigated;
- urban design, including water sensitive urban design, is supported and incorporated into development activities;
- adequate public open space is provided, including for recreational activities and associated infrastructure; and
- the use of the surf zone is considered.

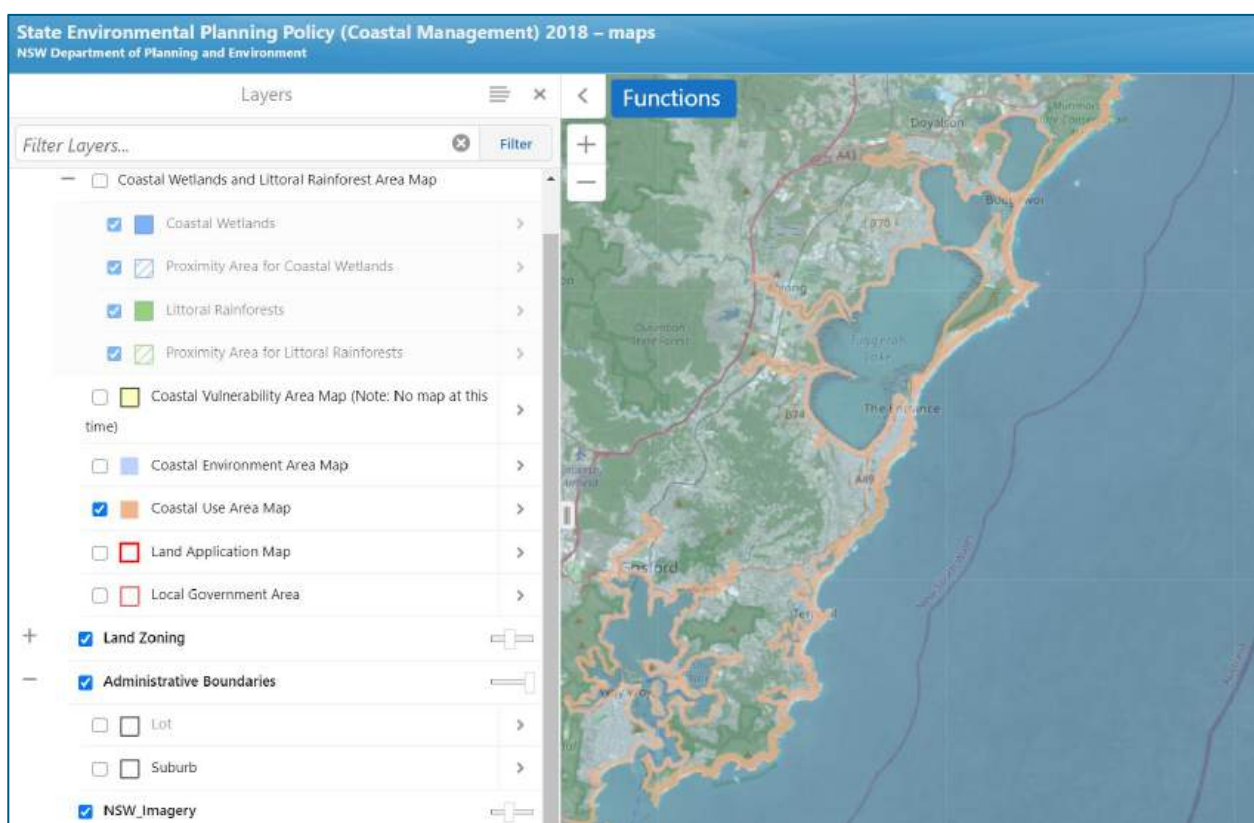


Figure 33: Coastal Use Area - SEPP (CM) mapping

6.2.5.5 Knowledge gaps in the Coastal Management Areas

Gaps in knowledge for each of the coastal management areas from the CM SEPP (Coastal Management) 2018 are outlined in **Table 6**.

Table 6: Coastal Management Program knowledge gaps

Coastal Management Area	Knowledge Gap
Coastal Wetland and Littoral Rainforest Area	Additional locations in the study area that might be considered Coastal Wetlands, potential refinement of existing mapped areas, as well as consideration of mapping upstream catchment areas through defining the hydrological boundary of wetlands; potential planning proposal to amend

	the mapped Coastal Wetland and Littoral Rainforest Area under CM SEPP.
Coastal Vulnerability Area	<p>Technical assessment, economic assessment and concept plans for a terminal protection structure (seawall) and sand nourishment solutions for Wamberal Beach being undertaken for the Wamberal Seawall Advisory Taskforce (MHL, 2020) are only limited to this location.</p> <p>Potential sand source for sand replenishment within the Terrigal-Wamberal embayment not yet identified.</p> <p>Stage 2 of the CMP is expected to deliver changes to coastal hazard lines in response to updated methodologies, erosion events and additional coastal protection works constructed since previous modelling undertaken.</p> <p>Noting tidal inundation in the lagoons (particularly Terrigal) as identified by current Flood Risk Management Plans. It is likely that the CVA will extend beyond the open coast shoreline, which has been the focus of previous coastal hazard studies.</p> <p>Investigate planning proposal due to increased knowledge of coastal hazards to amend the mapped Coastal Vulnerability Area under CM SEPP.</p>
Coastal Environment Area	Consideration of extending the Coastal Environment Area into the upper catchments of the four lagoons; potential planning proposal to amend the mapped Coastal Environment Area under CM SEPP.
Coastal Use Area	Socio economic analysis of the use of the coastal zone.

6.2.6 Marine Estate Management Act 2014

A statutory object of the CM Act is to support the objects of the *Marine Estate Management Act 2014* (MEM Act). The *marine estate* refers to the coastal waters of the State in accordance with the *Interpretation Act 1987*, estuaries up to the highest astronomical tide, lakes, lagoons, coastal wetlands, and lands immediately adjacent to, or in the immediate proximity of, coastal waters that are subject to oceanic processes (including beaches, dunes, headlands and rock platforms). The objects of the MEM Act are as follows:

- (a) to provide for the management of the marine estate of New South Wales consistent with the principles of ecologically sustainable development in a manner that:
 - (i) promotes a biologically diverse, healthy and productive marine estate, and
 - (ii) facilitates:
 - economic opportunities for the people of New South Wales, including opportunities for regional communities, and
 - the cultural, social and recreational use of the marine estate, and
 - the maintenance of ecosystem integrity, and
 - the use of the marine estate for scientific research and education,
- (b) to promote the co-ordination of the exercise, by public authorities, of functions in relation to the marine estate,
- (c) to provide for the declaration and management of a comprehensive system of marine parks and aquatic reserves.

6.2.7 Threats to Marine Estate Assets of the NSW Central Region

The *New South Wales Marine Estate Threat and Risk Assessment Report* (BMT WBM, 2017) details the Threat and Risk Assessment (TARA) process developed by the Marine Estate Management Authority (MEMA) to meet the objectives of the MEM Act. The TARA includes the identification and prioritisation of social, economic and environmental threats to community benefits of the marine estate.

The report outlines the key findings of the TARA undertaken at a State level across three regions, namely the *North region*, *Central region*, and *South region*. The Central Coast and the study area of this CMP lies with the Central region of NSW, which encompasses the coastal and estuarine waters, coastal lakes and lagoons, beaches and ocean waters to the limit of tidal influence landward, and to the limit of state waters (3 nautical mile from the coastline or relevant island baseline) between Stockton and Shellharbour of NSW (BMT WBM, 2017).

According to the 2016 State of the Environment (SoE) report, the main pressures affecting the Australian environment today are the same as reported in the previous SoE report of 2011: climate change, land-use change, habitat fragmentation and degradation, and invasive species. There are no indications that these pressures have decreased since 2011, and there is evidence that some have increased (e.g. coastal waterways are threatened by new classes of pollutants such as microplastics and anoparticles, dumped waste in the marine environment and invasive species generally).

Council's natural areas, as well as most remnant vegetation community types in the LGA, are currently affected to some degree by most of the above threats. Species and populations specifically listed in the schedules of the NSW Biodiversity Conservation Act 2016 and the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 as threatened and that occur, or are likely to occur, in the Central Coast LGA are listed in the Council's Biodiversity Strategy. There are 53 plants, 67 birds, 27 mammals, one insect, 4 reptiles, 9 amphibians and 2 populations on the list.

The threats to the environmental, social, cultural and economic benefits for the Central region recognised through the TARA are ranked in priority order in **Table 7**. Specific consideration of these threats within the context of the Scoping Study was included in the First Pass Risk Assessment included in **Section 7**.

Table 7: Ranked priority threats for the Central Region of NSW (BMT WBM, 2017).

Ranked Priority Threats to Environmental Assets for the Central Region	Ranked Priority Threats to Social, Cultural and Economic Benefits for the Central Region
<ul style="list-style-type: none"> Urban stormwater discharge Foreshore development Estuary entrance modifications (in estuaries) Shipping - Large commercial vessels and associated port activities and industries (trade ships, cruise ships, etc.) Agricultural diffuse source runoff (in estuaries) Clearing riparian and adjacent habitat including wetland drainage Climate change 20 years Recreational Boating - Boating and boating infrastructure (in estuaries) Sewage effluent and septic runoff Navigation & entrance management and modification, harbour maintenance, etc. 	<ul style="list-style-type: none"> Water pollution on environmental values - urban stormwater discharge Water pollution on environmental values - Agricultural diffuse source runoff Water pollution on environmental values - litter, solid waste, marine debris and microplastics Sediment contamination (toxicants in sediment; dioxins in Sydney Harbour, Cooks River) Inadequate social and economic information Anti-social behaviour and unsafe practices Limited or lack of access infrastructure to the marine estate Lack of compliance with regulations (by users) or lack of compliance effort (by agencies) Reductions in abundances of species and trophic levels Climate change stressors 20 years

<ul style="list-style-type: none"> Modified Freshwater flows - Modified freshwater flows (in estuaries) Industrial discharges (in estuaries) Recreation and tourism – Four wheel driving Stock grazing of riparian and marine vegetation (in estuaries) Small commercial vessels (ferries, charter boats, whale watching vessels, fishing vessels etc) (in estuaries) Beach nourishment and grooming Service infrastructure – pipes, cables trenching and boring (in estuaries) Recreational fishing – Shore-based line and trap fishing Recreational fishing – Boat-based line and trap fishing Recreation and tourism – Passive recreational Use Thermal discharges (in estuaries) Commercial fishing - Ocean Trawl Recreation and tourism - Shark control measures Commercial fishing – Estuary general (in estuaries) Oyster aquaculture (in estuaries) Recreational fishing – Hand gathering Mining and extractive industries (in estuaries) Commercial fishing - Ocean Trap and Line (in coastal and marine waters) Shipping - Small commercial vessels (ferries, charter boats, commercial fishing, whale watching etc.) (in coastal and marine waters) Commercial fishing – Ocean Haul (in coastal and marine waters) Commercial fishing – Sea urchin and turban shells (in coastal and marine waters) Charter activities – Charter whale and dolphin watching (in coastal and marine waters) 	<ul style="list-style-type: none"> Inadequate, inefficient regulation, over-regulation (agencies) Overcrowding / congestion Seafood contamination Loss of public access (either by private development or Government area closures) Pests and diseases Conflict over resource access and use Habitat (physical) disturbance Modified hydrology/hydraulics and flood regime Wildlife disturbance (shorebirds, turtles, whales) and impacts to ecological health by dog walkers, 4WD, marine vessels, etc. Lack of community awareness of the marine estate, associated threats and benefits, regulations and opportunities for participation Loss or decline of marine industries Water pollution on environmental values - septic runoff, point source pollution and sewage overflows (such as outfalls, STPs, etc) Lack of or ineffective community engagement or participation in governance Other water pollution/contamination affecting human health and Excessive or illegal extraction
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6.2.8 Other legislation

A number of additional legislative instruments are applicable to management of the coastal zone, and are relevant to the development of CMPs. These instruments can be divided into broad themes, as shown in **Table 8**.

Table 8: Other legislative instruments

Theme	Legislation
Tenure	Crown Lands Management Act 2016
Biodiversity	Biodiversity Conservation Act 2016 Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) Fisheries Management Act 1994 National Parks and Wildlife Act 1974
European heritage	Heritage Act 1997
Aboriginal heritage	National Parks and Wildlife Act 1974 Native Title Act 1993 (Cwlth)

	Aboriginal Land Rights Act 1983 (Cwlth)
Water management and pollution	Water Management Act 2000 Water Act 1912 Protection of the Environment Operations Act 1997 Catchment Management Act 2003 Natural Resource Management Act 2003
Emergency management	State Emergency and Rescue Management Act 1989
Invasive species management	Biosecurity Act 2015
Sand sourcing	Offshore Minerals Act 1999

6.3 Existing Coastal Management Programs

A number of process studies and management plans have been developed by former Gosford and Wyong Councils for respective portions of the Central Coast open coast, lagoons and their contributing catchments. This Scoping Study provides a framework to bring together the coastal management approaches of both former councils into a consistent strategic direction, providing for the integrated management of the Central Coast coastal environment.

The Coastal Zone Management Plans, outlined below, have been prepared over the last 12 years and collectively cover the area of this Scoping Study. The development of these CZMPs generally follows the structure of the previous NSW planning instruments and legislative framework, guided by the requirements of the former *Coastal Protection Act 1979*. Since the finalisation of these plans, the NSW Coastal Reforms have changed the way Coastal Management Programs are prepared and implemented.

This Scoping Study is the first step in drawing together the Gosford Beaches Coastal Zone Management Plan (2017), the Wyong Coastal Zone Management Plan (2011), the Draft Wyong Coastal Zone Management Plan (2018), and the Gosford Lagoons Coastal Zone Management Plan (2015). It should be noted that these CZMPs do not carry equal status, as only the Gosford Beaches Coastal Zone Management Plan (2017) has been certified under the *Coastal Protection Act 1979*.

It is noted that all four of the following adopted and draft CZMPs have been prepared in accordance with former legislation, reflecting the objects of the *NSW Coastal Protection Act (1979)* while variably taking into account the objectives and requirements of the NSW Coastal Policy (1997), the NSW Guidelines for Coastal Zone Management Plans (DECCW 2010), the NSW Guideline for Preparing Emergency Action Subplans (OEH 2011) and the NSW Coastal Planning Guide – Adapting to Sea Level Rise (Department of Planning 2009).

Schedule 3 *Savings, transitional and other provisions* of the *CM Act* state that:

- (1) A coastal zone management plan (including any emergency action subplan in that plan) in force under the former Act before the repeal date continues to have effect in respect of the local council to which it applied immediately before the repeal date until replaced by a coastal management program prepared and adopted under this Act.
- (2) This clause ceases to have effect at the end of 31 December 2021.

The *Environmental Planning and Assessment Act 1979* provides a framework for assessment of development proposals. This framework is outlined in Part 4 of the *Environmental Planning and Assessment Act 1979*, including development that needs consent, development permitted without consent (including exempt development) and complying development. Part 5 of the *Environmental Planning and Assessment Act 1979* relates to infrastructure development and the activity assessment required for these projects.

The CM SEPP streamlines coastal development assessment requirements, identifies development controls for consent authorities to apply to each coastal management area to achieve the objectives of the CM Act, and establishes the approval pathway for coastal protection works (DPIE, 2019a). Once a CMP is certified, Council as the consent authority can use the LEP and DCP land use planning controls for the coastal environment area to give effect to management objectives identified in the CMP for this area, and the requirements of the CM SEPP to minimise impacts on environmental systems and values.

After 31 December 2021, actions contained within the certified Gosford CZMP will no longer be eligible for State Government funding. In order to continue effective management of the coastline under current legislation, and with the support of the State Government, it is important that Council seek to deliver an updated CMP, in accordance with the CM Act, for part or all of the Central Coast LGA within reasonable timeframes, as discussed in **Section 10**.

6.3.1 Coastal Zone Management Plan for Gosford's Coastal Lagoons 2015

Recognising the important strategic context, environmental and social values and external pressures affecting Wamberal, Terrigal, Avoca and Cockrone Lagoons (the four lagoons), the Coastal Zone Management Plan for Gosford's Coastal Lagoons (Gosford Lagoons CZMP) was developed utilising the best available information to describe a suite of actions and related implementation details to be undertaken by Council, other public authorities and the community to address priority management issues. The aim of the Gosford Lagoons CZMP is to improve, protect or maintain the environmental and community uses and values of the four Coastal Lagoons. Major elements of the Gosford Lagoons CZMP focus upon improving water quality through catchment management, review of Council's lagoon entrance management practices, vegetation enhancement and sustainable recreational usage of the lagoon and surroundings.

Underpinning the Gosford Lagoons CZMP, the Gosford Coastal Lagoons Estuary Processes Study (Cardno, 2010) collated and reviewed background information for the four lagoons, including the available scientific data, existing governance framework and management initiatives. It provided a summary of estuary processes (physical and hydrodynamic, water quality, ecological and human use), values, and estuary health pressures, and identified enhancement, development and management needs to ensure the long-term ecological sustainability of the lagoons.

The second key report to inform the Gosford Lagoons CZMP was the Coastal Zone Management Study For Gosford Lagoons (CZMS) (BMT WBM, 2014), which outlined the strategic context, environmental and social values and external pressures impacting upon the lagoon. Particular consideration was given to human influences including the developed land within catchments, modification of foreshore areas, along with artificial opening of lagoon entrances to mitigate flooding of low-lying foreshore areas. It was recognised that these influences have placed different levels of pressure upon the lagoons, with commensurate impact on their health and condition.

As part of the study, a list of over one hundred potential management actions was developed - including planning controls, on-ground works and rehabilitation, economic incentives, regulation and compliance activities, investigations and education initiatives. This extensive list was developed through community

and stakeholder engagement with Council - as well as through technical investigations and experience from other similar waterways. This list was assessed using a cost-benefit approach that considered economic, environmental and social aspects, and a selection of 28 actions were shortlisted for inclusion in the CZMP.

It is noted that the Gosford Lagoons CZMP was prepared in accordance with the Guidelines for Preparing Coastal Zone Management Plans that was the manual for implementation of the objectives of the *Coastal Protection Act 1979* for CZMPs. The NSW Sea Level Rise Policy Statement (2009) was explicitly utilised in determining the threats to the lagoons from sea level rise, however this statement has since been rescinded. Consideration should be given to updating sea level rise predictions, which may have an effect on proposed actions for the four lagoons, particularly entrance management regimes.

In September 2017, Council submitted the Gosford Lagoons CZMP (2015) to seek certification from the Minister, under s.55 of the NSW *Coastal Protection Act 1979*. In April 2018, Council received a letter from the OEHL advised that the Coastal Panel has raised concerns that need to be resolved before the Plan can be certified. It was indicated that Council may choose to submit revised plan or develop CMP under the new *Coastal Management Act 2016*.

In September 2018, Council re-submitted the Gosford Lagoons CZMP 2018 for Certification prior to the deadline (6 months from commencement of the new Act) for submitting Plans under the savings and transitional and other provisions of the *Coastal Management Act 2016*. This contained a table showing where the items identified by the Coastal Panel have been addressed and also included the support letter from NSW National Parks and Wildlife Service.

On 27 September 2018, Council received a letter from the OEHL indicating that the Gosford Lagoons CZMP 2018 did not meet the requirements of the NSW *Coastal Protection Act 1979*, and was not recommended for certification by OEHL or the Coastal Panel. It was recommended that Council use the updated Gosford Lagoons CZMP to commence the process of undertaking the new Coastal Management Program.

6.3.2 Gosford Beaches Coastal Zone Management Plan 2017 (certified)

The Gosford Beaches Coastal Zone Management Plan (Gosford Beaches CZMP) was undertaken for the then Gosford City Council in 2016/17 (WorleyParsons, 2017). The primary objective of the plan was to protect and preserve the beach environments, beach amenity, public access and social fabric of the Open Coast and Broken Bay beaches while managing coastal hazard risks to people and the environment (WorleyParsons, 2017). In the context of this Scoping Study, the plan notably applies to the Open Coast beaches of Putty-Killcare Beach, MacMasters-Copacabana Beach, Avoca Beach, Terrigal-Wamberal Beach and Forresters Beach.

Underpinning the Gosford Beaches CZMP, the Open Coast and Broken Bay Beaches Coastal Processes and Hazard Definition Study (WorleyParsons, 2014) provided a coastal risk assessment, which was undertaken to describe the coastal processes and associated hazards that impact the Gosford coastline and provide an assessment of the risks to life and property posed by these hazards. The coastal hazards considered within included beach erosion, shoreline recession; sand drift; coastal inundation; stormwater erosion; climate change; and slope and cliff instability hazard. The study included consideration of current and future conditions (2050 and 2100) to include future impacts of projected climate changes (WorleyParsons, 2017).

The second key report that informed the Gosford Beaches CZMP was the Open Coast and Broken Bay Beaches CZMS (WorleyParsons, 2015). Having defined the type, nature and significance of coastline

hazards, this study identified options relevant to the environmental planning and management of the area (WorleyParsons, 2015). The outcome of the CZMS was a defined and prioritised set of coastal management options to address specific management issues for each beach – including those along the open coast that are included within the Scoping Study area.

Management actions were developed for each beach based on the specific coastal hazard risks identified along each embayment, the values in the study area, the effectiveness of the existing coastal management measures, and specific issues of importance identified by the local community and in previous studies (WorleyParsons, 2017). In addition to site-specific management actions, more general management actions were included that apply on an LGA-wide basis. The plan includes 14 actions for Putty-Killcare Beach, 22 for MacMasters Beach, 13 for Copacabana Beach, 36 for Avoca Beach, 27 for the Terrigal-Wamberal Beach embayment, and 6 for Forresters Beach.

The plan included a large component of community and stakeholder engagement. Council actively sought input from the wider community in the development of the Management Study and the CZMP. Feedback obtained through engagement activities provided direction on preferred management approaches, and assisted to ensure all relevant factors were sufficiently considered and integrated into the planning process (WorleyParsons, 2017).

6.3.2.1 Coastal Erosion Emergency Action Subplan for Wamberal-Terrigal Beach

During and post development of the Gosford Beaches CZMP, there have been significant storm events that have impacted the open coast. As noted in **Section 4.2**, between the 4th and 6th June 2016 an east coast low storm event impacted Wamberal beach, resulting in 1.5 kilometres of beach between the Terrigal Lagoon and Wamberal Lagoon entrances being severely eroded by high waves and storm tides. The resulting erosion of up to 15 horizontal metres of vegetated foredune left an erosion scarp in the dune face from 1 metre to 6 metres high, and severely damaged public amenity and private property.

An additional east coast low storm event between 14 and 18 July 2020, with swells reaching up to 5.8m, severely impacted the same 1.5 kilometres of beach between the Terrigal Lagoon and Wamberal Lagoon entrances. Approximately 30 horizontal metres of Wamberal Beach was eroded, undermining the foredune and leaving the beachfront homes in a state of structural instability and at risk of collapse, resulting in evacuation orders being placed on 18 houses along Ocean View Drive.

Both of these events resulting in the implementation of the Coastal Erosion Emergency Action Subplan for Wamberal-Terrigal Beach (Subplan) (WorleyParsons, 2015 – included within the Gosford Beaches CZMP 2017), which was prepared in accordance with the *Coastal Protection Act 1979*. The Subplan specifies actions that can be undertaken to proactively manage coastal erosion risks, separate to actions that can be undertaken in the event of an “emergency” as defined in the *State Emergency and Rescue Management Act 1989* and the NSW State Storm Plan.

Actions within the Subplan are:

Before storm:

- monitoring beach erosion and weather/wave conditions and forecasts;
- ensuring sufficient warning signage and barricades are available for use if required (e.g. to close off damaged and potentially dangerous beach access points);
- provision of information and advice to affected beachfront landowners and the wider community; and,
- consulting with SES and other relevant agencies such as OEH as required.

During storm:

- regular monitoring of environmental conditions and beach behaviour;
- assessing the need for barriers and safety signage to be erected at damaged and potentially dangerous beach access points, to minimise risk to public safety;
- erecting barricades and safety signage if required;
- assessing the need to remove existing beach signage, bins and dune fencing where threatened by coastal erosion (and removing these assets where safe to do so to prevent damage or being washed away);
- seeking coastal and geotechnical engineering advice where required;
- seeking advice from OEH staff as required;
- supporting SES as required and where resources allow;
- releasing information to the media; and,
- provision of information and advice to beachfront landowners and wider community.

After storm:

- cleansing the beach of debris and other inappropriate materials;
- remedial works to restore safe beach access;
- repairing or replacing damaged infrastructure, such as dune fencing and beach accessways once the dune has sufficiently recovered;
- rehabilitation of damaged dune vegetation;
- beach scraping and/or sand nourishment to restore beach amenity;
- maintaining photographic and written records of events and decision making processes; and
- monitoring unauthorised coastal protection works and enforcement of penalties under the Coastal Protection Act 1979 (this may also be undertaken before and during a storm).

Specific actions to address coastal erosion within the Subplan are:

Coastal erosion management by local councils - In addition to preparing coastal zone management plans, local councils can carry out activities to reduce the impacts of coastal erosion on property and infrastructure. These activities may include dune restoration, beach nourishment and constructing protection works such as seawalls and groynes. Under the State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP), councils need to refer coastal protection works proposals to the NSW Coastal Panel.

Coastal erosion management by private landowners - Landowners in coastal erosion-prone areas can place sand or sandbags on the beach under strict conditions as Temporary Coastal Protection Works to reduce the impact of coastal erosion on their property during small storm events. "Temporary coastal protection works" has a specific meaning in relation to the *Coastal Protection Act 1979*, generally being sand or sandbags (also known as sand-filled geotextile containers) temporarily placed on a beach to reduce beach erosion impacts. If the bags cause erosion they are to be removed. Private landowners may also lodge a development application for other coastal protection works. It is noted that Temporary Coastal Protection Works are no longer allowable under the CM Act and therefore this sub-plan action is no longer lawful or achievable.

The Subplan further noted that "to achieve effective protection during an emergency only rock or concrete blocks can be considered to be appropriate, with rock also being the cheapest option. That stated, such works could only be implemented if environmental impacts were acceptable. Installation of such temporary or long term coastal protective works may only be permissible based on *State Environmental Planning Policy (Infrastructure) 2007* and if approval were granted under *Part 4 of the Environmental Planning and Assessment Act 1979*." (WorleyParsons, 2015)

The ability of Council and private landowners to implement the Subplan management actions during the declared emergency event of 14 to 18 July 2020 was assessed by Council, Royal HaskoningDHV, Public Works, Manly Hydraulics Laboratory and DPIE during and immediately following the erosion event. The Subplan management actions did not include any protection of private properties. With the Coastal Reforms and *Coastal Management Act 2016* replacing the previous *Coastal Protection Act 1979*, the ability of residents to install Temporary Coastal Protection Works was removed and replaced with the need for residents to lodge a development application for any coastal protection works.

Despite the subplan outlining that coastal protection works of private properties is not proposed as an action under the Subplan, recommendations were made to the Local Emergency Operations Controller (LEOCON) for further measures, and on 21 July 2020 orders for emergency works were issued under section 61(1)(c) of the *State Emergency and Rescue Management Act 1989* directing that works be undertaken in an attempt to mitigate further risk to properties at Wamberal. The orders noted that “These emergency works will focus on protecting the toe (base) of the erosion escarpment in the most vulnerable areas and fill in gaps between existing defences. These works will help mitigate the present hazard and will not hinder the medium- and longer-term strategy for the area.”

In response, Council worked closely with Royal HaskoningDHV, State Government agencies and the LEOCON to deliver emergency toe protection works utilising 2- and 4-ton rock filled bags placed via crane at inaccessible locations, as well as large 1- to 3-ton rocks where beach access by machinery was possible. These emergency works were considered successful in arresting further erosion, and in time enabled the evacuation orders to be lifted on the 18 affected properties.

A review of the Coastal Erosion Emergency Action Subplan (Subplan) for Wamberal-Terrigal Beach should be undertaken during preparation of a CMP, in accordance with the new legislation and the NSW guidelines for preparation of subplans.

6.3.2.2 Delivery of the Adopted Long-Term Protection Strategy for Wamberal Beach

Recognising the need to address the coastal erosion issues at this location, the New South Wales Government established the Wamberal Seawall Advisory Taskforce on the 31 July 2020 to provide Council with support to implement a sustainable long-term solution to the coastal erosion issues at Wamberal Beach.

The Gosford Beaches CZMP contains a number of relevant Risk Management Actions for Wamberal-Terrigal Beach, notably:

- Action TW11 - Terminal protection – Council to action review, design and funding of a terminal protection (seawall) at Wamberal
- Action TW14 – Investigate sources of sand and feasibility of sand nourishment for Wamberal
- Action TW15 - Beach nourishment coupled with a terminal revetment (seawall) to increase buffer against storm erosion

6.3.3 Wyong Coastal Zone Management Plan 2011

The Wyong Coastal Zone Management Plan 2011 (Wyong CZMP 2011) was developed for Wyong Shire Council in 2010/2011 (Umwelt, 2011), to describe how Council and its community will manage the future of the Shire’s 35km coastline, and adopted by Council on the 14 December 2011. The Wyong CZMP 2011 was underpinned by the Wyong Coastal Hazard Study (SMEC, 2010, for Umwelt, 2011) and Wyong Geotechnical Issues Study (Shirley Consulting Engineers, 2010, for Umwelt, 2011), and through engagement during its development, reflected the community’s values and perspectives in its forward actions.

The Plan was prepared in accordance with the objects of the NSW Coastal Protection Act (1979) while taking into account the objectives and requirements of the NSW Coastal Policy (1997), the NSW Guidelines for Coastal Zone Management Plans (DECCW, 2010), the NSW Guideline for Preparing Emergency Action Subplans (OEH, 2011) and the NSW Coastal Planning Guide – Adapting to Sea Level Rise (Department of Planning, 2009).

Following the legislation at the time of development, the Wyong CZMP 2011 was concerned with the management of the immediate coastal fringe. The spatial extent was limited to the first street parallel to the ocean or the extent of the 100-year coastal hazard planning zone (whichever is greater) for urban areas and public reserves, foredunes and hind dunes, and unstable coastal areas such as cliffs and bluffs (Umwelt, 2011).

The Wyong CZMP 2011 focused on managing risks associated with coastal processes, such as erosion, recession, lake entrance management flooding due to wave overtopping and slope instability. It set out three broad strategies for managing coastal risks by using the planning system, strengthening coastal dunes and ecological communities, and by allowing the construction of coastal protection works at specific times and locations and by working closely with its local communities.

Council's long-term strategy reflected in the Wyong CZMP 2011 was managed retreat of assets and infrastructure from coastal risk areas. Clauses in the Wyong Shire LEP and DCP set land use planning controls and triggers for retreat. In the short- to medium-term, Council allowed some interim protection of existing public and private assets in immediate hazard zones, to give residents and businesses time to develop adaptive coastal land uses. A strategy of increased long-term protection was considered not financially or environmentally sustainable.

It was recognised that erosion associated with major storms had threatened residential development and associated infrastructure at North Entrance and Hargraves Beach over the last 40 years, as and such, these two locations were identified in the list of nine NSW 'Authorised Locations' for coastal emergency works, because of the severity of the existing erosion problem. Coastal erosion hazard studies completed during the preparation of the Wyong CZMP 2011 indicated that 62 residential properties and 53 houses at these beaches, and at Blue Bay, are partly or wholly within the immediate coastal erosion risk area. An additional 38 buildings on headlands along the Wyong Shire coastline, many at Cabbage Tree Harbour, are at least partly within the immediate risk area for geotechnical/slope instability processes.

Council's priorities were to provide effective risk reduction for both short and longer term timeframes, and included emergency response (coastal protection) actions for properties in immediate high risk areas which are identified as 'Authorised Locations'. The Wyong CZMP 2011 included three Emergency Action Subplans for Authorised Locations at North Entrance, Hargraves Beach and Cabbage Tree Harbour, and included provisions to give landholders in immediate coastal risk areas some opportunity for short-term coastal protection – as emergency protection works for authorised locations or medium-term removable structures.

The Subplans noted that landowners were allowed to install, maintain and remove Temporary Coastal Protection Works in accordance with requirements under the *Coastal Protection Act 1979*, and could apply to construct other types of coastal protection works of a larger scale than emergency coastal protection works (subject to appropriate approvals).

Temporary Coastal Protection Works are defined as works comprising the placement of the following material on a beach or a sand dune adjacent to a beach, to mitigate the effects of wave erosion on land (in

compliance with the requirements of Section 55P (1) of the Coastal Protection and Other Legislation Amendment Act 2010):

- (a) Sand or fabric bags filled with sand (other than sand taken from a beach or a sand dune adjacent to a beach);
- (b) Other objects or material prescribed by the regulations (other than rocks, concrete, construction waste or other debris).

The Subplans specified that coastal protection works for private property must be constructed wholly on the private property and not on public land (other than certain temporary protection works, for short periods), and that such private property protection works must not detract from the community access and amenity values of beaches.

The Subplans noted that, in some cases, more substantial works over and above sand bag placement may be necessary to protect property or infrastructure (if Council chooses to, and is able to); however, these actions should be seen as a last resort, and only when there is imminent danger to property or infrastructure (as determined by Council or consultant engineers).

6.3.4 Draft Wyong Coastal Zone Management Plan 2018

The draft Wyong Coastal Zone Management Plan 2018 (Wyong CZMP 2018) covered the coastline of the former Wyong LGA, and provided a 2018 update to the Wyong CZMP 2011, and its underpinning studies, the SMEC (2010) Wyong Coastal Hazard Study, and SCE (2010) Geotechnical Hazard Assessment. Key to the revision, it was recognised that the coastal hazard mapping derived from the original coastal and geotechnical hazards studies (SMEC, 2010; SCE, 2010) was inconsistent and incomplete in some areas, and Council resolutions of October 2012 and May 2013 required a revision of Coastal Hazards mapping for Wyong's coastline to be undertaken (BMT WBM, 2018).

The Wyong CZMP 2018 documented a revised hazard assessment, which built on the existing knowledge and provided extended consideration of the complex geological conditions occurring along the coastline. Central to this was the mapping of geological controls on coastal hazards, such as the buried cliff lines beneath beach and dune sands. Transitional mapping between sand foreshores and rock lengths of coastline was completed in a geologically sensible manner that considered the likely exposure of mapped geological controls to coastal processes. The study determined appropriate hazard estimates in zones affected by both beach and cliff (geotechnical) processes, provided new hazard maps for coastal planning purposes consistent with Councils current planning scheme, and sought to provide practical actions to address current and future risks to Wyong's coast from these processes.

To assist with defining and explaining how Wyong CZMP 2018 would be applied, action types were separated into four management "precincts", which would then be applied to varying areas of the Wyong coastline. The precincts were defined in terms of the different risks and values within them that support different levels and types of community usage and development, ecological habitats and function, which in turn require different management intents and actions.

The four management precincts were defined for Wyong's coast as follows;

- **Hot Spot Precinct:** covers the five hot spot embayment's, namely, Blue Bay, Toowoona Bay, North Entrance Beach, Hargraves Beach and Cabbage Tree Harbour. These embayment's are already at imminent risk from erosion. A key action is for detailed cost-benefit analyses to select a feasible and financially viable erosion management action. This shall be implemented as soon as practicable, and prior to irreversible damage to public or private assets and land. The "hot spots"

also hold the community and habitat values, and coastal management shall focus on these attributes also.

- **Recreational and Urban Use Precinct.** This precinct covers those beaches and coast that are more intensively used for recreation, are more accessible from adjacent urban land, and support more intensive urban use; and which therefore have higher community and economic values. Due to their higher usage, these areas require better, more numerous and more varied facilities. The precinct would also benefit from dune management that will improve the erosion protection provided to the recreational amenity and adjacent urban land. Areas within this precinct that are subject to geotechnical hazards will require separate action to manage the different processes driving this risk.
- **Natural Coast Precinct.** This precinct covers the undeveloped and natural landscapes along the coastline, which in turn support higher ecological values. Management actions in this precinct are aimed at maintaining and rehabilitating the natural habitat and landscapes, and reducing anthropogenic impacts. Due to the undeveloped and somewhat inaccessible nature of most of this precinct, the recreational usage is less, and so, fewer and more low-key recreational assets are supported. For sections of rocky coast, the safety of recreational access is a key consideration.
- **Entrance Channel Precinct.** This covers The Entrance channel including the dynamic sand bars within it. The Entrance is affected by catchment inputs, Tuggerah Lake mixing and currents, and tidal currents, in addition to the waves, currents and water levels of the open coast. This makes the channel and sand bars highly variable and complex, requiring a different management approach from the adjacent coastline.

The four management precincts were to be applied across varying areas of Wyong's coast as shown in **Figures 34** and **35**.

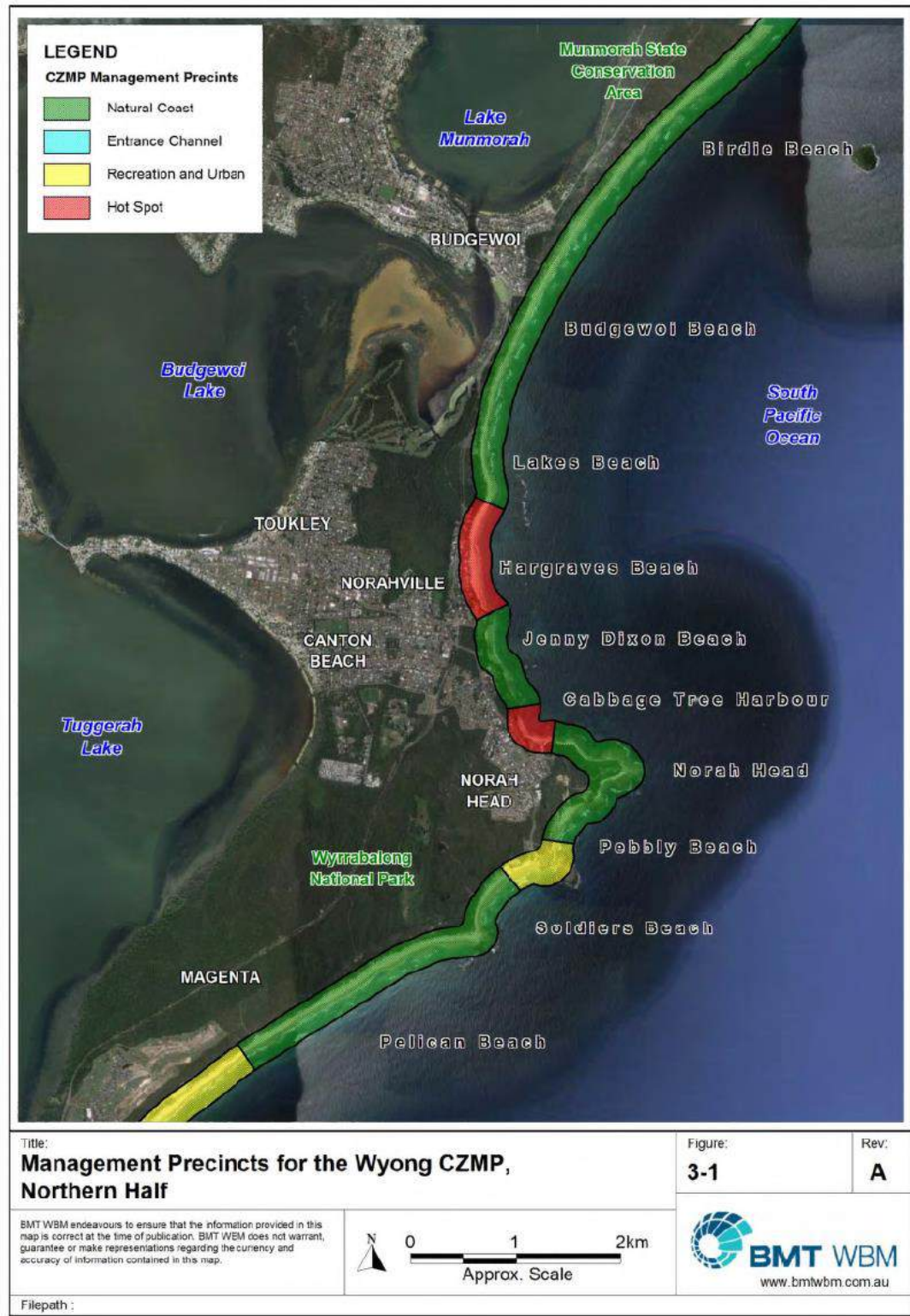


Figure 34: Management Precincts for Wyong's Coastline, Northern Half

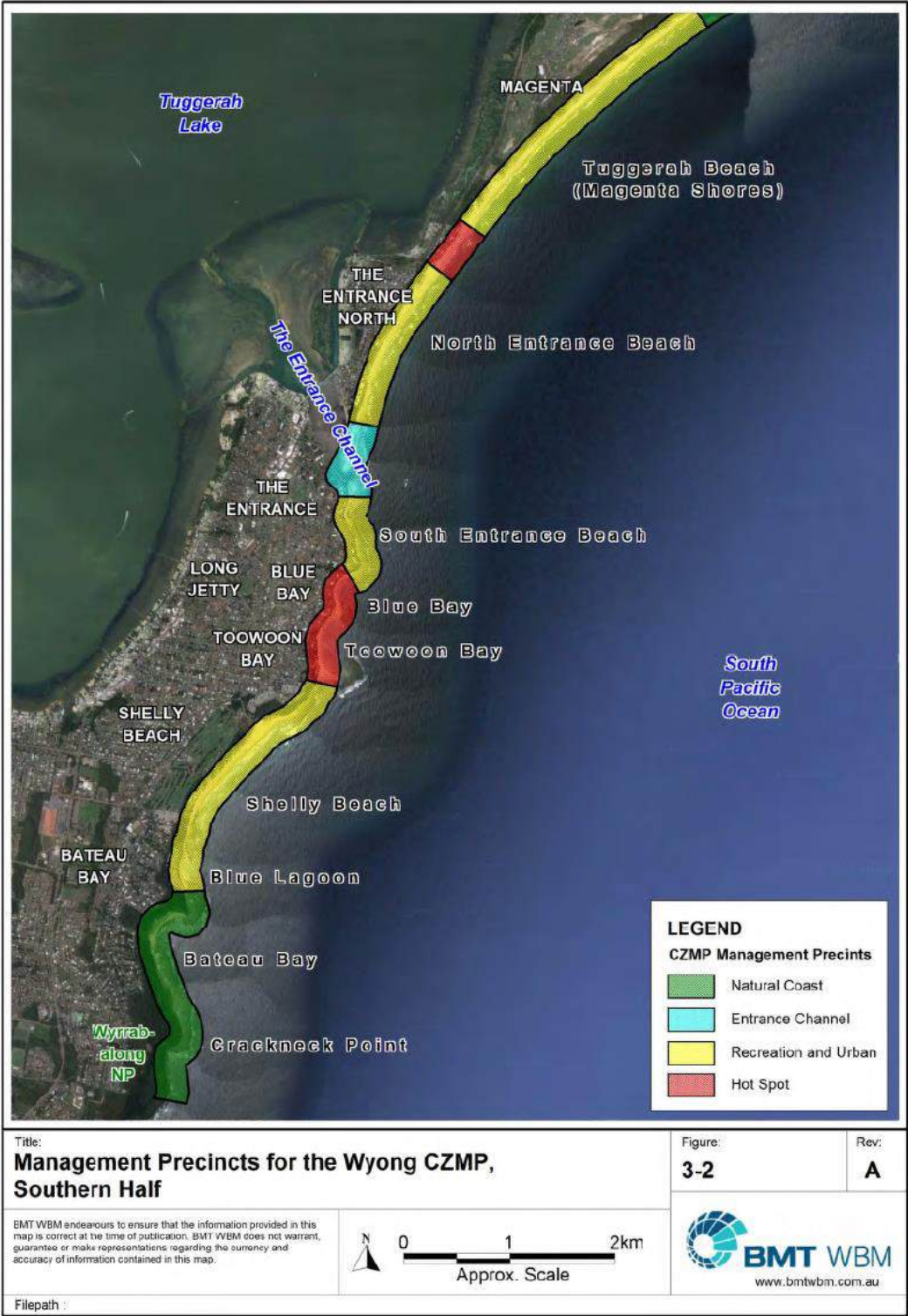


Figure 35: Management Precincts for Wyong's Coastline, Southern Half

The draft Wyong CZMP 2018 included Coastal Erosion Emergency Action Subplans (Subplans) for the three coastal erosion ‘hot spots’ identified by the NSW Office of Environment and Heritage (2011a) within the Wyong region, being the North Entrance Beach, Hargraves Beach and Cabbage Tree Harbour. It was noted that following storms in June 2016, many of the Hot Spot locations may be at or below the sand volume required to provide adequate buffering of a subsequent storm. Management Action 1 in the CZMP provided for beach sand monitoring to assess the volume of sand at these locations, with “triggers” of low sand levels requiring additional management actions such as sand scraping to augment available sand.

Similar to the Wyong CZMP 2011, the Subplans outlined emergency response procedures for residential properties at these locations, being that foreshore landowners at “authorised locations” were permitted to implement Temporary Coastal Protection Works (In line with section 55(p) of the *Coastal Protection Act 1979* (repealed), and following approval from Council). It is noted that Temporary Coastal Emergency Works are no longer allowable under the CM Act and therefore this sub-plan action is no longer lawful or achievable.

Council emphasised that the responsibility for “Temporary Coastal Protection Works” of private property would remain with the landowners. Permissible ‘one off’ temporary protection works included placement of sand or sand filled geotextile bags only. It was recognised that implementation of the Subplans will provide for a temporary reduction in immediate coastal risks, however will not provide a medium-long term solution for the ‘at risk’ coastal locations (BMT WBM, 2018).

Action 5 in the draft Wyong CZMP 2018, being an Options Feasibility Study for the Hot Spot Locations was to enable the development of a suitable action(s) to treat erosion at these locations. A key component of Action 5 was to subject the preferred management options to a detailed and site specific cost benefit analysis. It was noted that Council will not approve protection of existing assets or private development where the works could increase risks to other landowners or to community use of the coastal landscape.

6.3.4.1 Draft Wyong CZMP 2018 - changes in NSW Legislation

It was recognised during preparation of the draft Wyong CZMP 2018 that the NSW Government had commenced Stage 2 of its coastal management reforms. The coastal management reforms indicated that existing certified CZMPs will be able to be fast-tracked into the new framework, capitalising on existing valid work completed to date, and retaining momentum that has been gained in preparing existing CZMPs (BMT WBM, 2018).

Due to the uncertainty with the commencement of the new *Coastal Management Act 2016*, NSW OEH staff recommended to Council that all Plans yet to be certified be submitted. Council submitted the Draft Wyong CZMP 2017 to the Minister for certification in February 2018. The *Coastal Management Act 2016* and State Environmental Planning Policy (Coastal Management) 2018 commenced on 3 April 2018. From August 2017 to May 2018, Council worked with the then NSW Department of Industry - Crown Lands (DoI – Crown Lands) (now known as DPIE – Crown Lands) on outstanding issues related to management at several locations along the coast.

In April 2018, Wyong CZMP 2017 was revised to incorporate agreements between Council and NSW DoI Crown Lands, this final draft was named as Final Draft Wyong CZMP 2018. Council undertook the changes requested by NSW DoI – Crown Lands, forwarded the updated Plan and received a letter of support from Crown Land in May 2018. With respect to the changes to legislation, reference to the coastal legislation pertaining to the coastal zone contained in Umwelt 2011 (i.e. *Coastal Protection Act, 1979*) was unchanged (BMT WBM, 2018).

In June 2018, Council received a letter from the Minister outlining that the Plan was not suitable for certification but could be made suitable with amendments (Office of the Minister for the Environment, 2018). However, the letter also recommended that Council work with NSW OEH to transition the Plan into a new Coastal Management Program under the provisions of the new framework, *Coastal Management Act 2016* and Manual.

In September 2018, Council re-submitted the Wyong CZMP 2018 for Certification prior to the deadline (6 months from commencement of the new Act) for submitting Plans under the savings and transitional and other provisions of the *Coastal Management Act 2016*. This contained the support letter from NSW DoI Crown Lands.

On 27 September 2018, Council received a letter from the OEH indicated that the Final Draft Wyong CZMP 2018 did not meet the requirements and was not recommended for certification by OEH or the Coastal Panel. It was recommended that Council use the updated Wyong CZMP to commence the process of undertaking the new Coastal Management Program.

It is understood from NSW OEH that one of the reasons for the Plan not being recommended for certification is that there were no definitive actions in relation to the coastal erosion hot spots. Rather the Plan outlined a need for further studies to determine the preferred option for managing these coastal erosion hotspots.

6.3.5 Implementation of Subplan actions

In the same storm event that affected Wamberal-Terrigal Beach (described in **Section 6.4.2.1**), the ability of Council and private landowners to implement the Wyong CZMP 2011 (and draft Wyong CZMP 2018) Subplan management actions at The Entrance North Beach during the declared emergency event of 14 to 18 July 2020 was assessed by Council, Royal HaskoningDHV, Public Works, Manly Hydraulics Laboratory and DPIE during and immediately following the erosion event.

The Subplan management actions shown in **Figure 36** did not include any protection of private properties by Council. With the Coastal Reforms and *Coastal Management Act 2016* replacing the previous *Coastal Protection Act 1979*, the ability of residents to install Temporary Coastal Protection Works was removed and replaced with the need for residents to lodge a development application for any coastal protection works were considered to be ineffective and impractical given the scale and impact of the erosion, as well as the immediacy of the required response.



Figure 36: Temporary Coastal Protection Works Options for Private Property at Entrance North Beach – Hutton Road (BMT WBM, 2018)

In particular, it was noted that one property located on Hutton Road at The Entrance North was older than the other properties along Hutton Road, further seaward to the beachfront and unlikely to have any piling support. In addition, there was a gap in existing rock rubble protections in front of this property, resulting in significantly more erosion at this point.

Despite the subplan outlining that coastal protection works of private properties is not proposed as an action under the Subplan, recommendations were made to the Local Emergency Operations Controller (LEOCON) for the placement of protection materials in front of the identified property, and to make these protections continuous with the existing protections at the adjoining properties. On 23 July 2020 orders for emergency works were issued by the LEOCON under section 61(1)(c) of the *State Emergency and Rescue Management Act 1989* directing shoring works to occur.

In response, Council worked closely with Royal HaskoningDHV, State Government agencies and the Local Emergency Operations Controller to deliver emergency toe protection works at The Entrance North Beach, utilising geofabric material and 1- to 3-ton rocks when beach access by machinery was possible. These emergency works were considered successful in arresting further erosion.

A review of the Coastal Erosion Emergency Action Subplan (Subplan) for The Entrance North Beach should be undertaken during preparation of a CMP, due to the changed condition of the location, as well as the limitations experienced during implementation of the Subplan.

6.3.6 Implementation of Existing Coastal Zone Management Plans

As part of this scoping study, an audit was undertaken by Council of the 320 recommended actions and strategies put forth in the adopted CZMPs listed above. The results of the audit are provided in **Appendix B1-3**. For each action item within each adopted CZMP, information has been provided by Council regarding the current status of that action, as shown in **Table 9**. An additional review of actions from the Wyong CZMP 2011, and subsequent actions included within the draft Wyong CZMP 2018 (BMT WBM, 2018) are provided as **Appendix B4**.

Table 9: Status of action items within adopted CZMPs

	Gosford Lagoons CZMP 2015	Gosford Beaches CZMP 2017	Wyong CZMP 2011
Completed	3	41	9
Commenced / Underway	16	25	8
Ongoing	2	84	26
Not Commenced	6	86	14

Council gives effect to many of these actions through the Integrated Planning and Reporting (IP&R) framework and the land-use planning system before being integrated into operational planning processes and resourcing strategies. Individual management actions are assessed for implementation in competition with competing community needs across the Local Government Area. Specifically, Council provides clarity about delivery and intended monitoring indicators for the CZMPs through adopted Delivery Programs and annual Operational Plans which includes relevant information about timing, costs and responsibilities.

Results in **Table 10** and **Appendix B** show that most actions recommended in the plans have been undertaken or are currently ongoing. Additional reporting on delivery of actions is undertaken through Council's Annual Report as part of the NSW Integrated Planning and Reporting process, and through the State of Environment Report (Council, 2020).

Through implementation of existing CZMPs, Council staff have recognised a number of factors that are recommended for inclusion within a CMP. These include;

- It is important to have well defined and articulated actions in the implementation table, as action wording that is not clear can be interpreted in different ways.
- Implementation actions need to clearly tie in with the objectives of the CMP, be realistic and achievable within the life of the program.
- There are examples of existing CZMPs having a very high number of management actions, some of which are considered idealistic, unable to be achieved within the timeframe and / or program funding. Implementation of a robust action review and vetting process is considered important.
- In addition to a table of general actions for the whole area covered by the CMP, each location will benefit from a separate table of specific actions.
- The limitations of Council's existing coastal hazard maps are recognised, as is the Coastal Vulnerability Area mapped by the CM SEPP. Stage 2 of the CMP is expected to deliver changes to hazard lines in response to updated methodologies, erosion events and additional coastal

protection works constructed since previous modelling was undertaken, as well as extending beyond the open coast shoreline to include hazards such as tidal inundation from the lagoons. Council is likely to investigate a planning proposal to amend the mapped Coastal Vulnerability Area under the CM SEPP.

- Recognising the uncertainty of funding from external sources, actions for significant/major work such as an engineered seawall should include a generic statement such as: “implementation is subject to Council receiving financial assistance from the State Government or other sources”.
- Cost estimates for actions (especially medium- and long-term actions) need to incorporate Consumer Price Index (CPI) rates, and would be subject to Council’s available budget and resources.

It is noted that the NSW Coastal Council undertook the *Gosford Beaches Coastal Zone Management Plan (Terrigal Wamberal) Implementation Review*, which was tabled at the Wamberal Seawall Advisory Taskforce meeting of 8 September 2020. The review found that the major impediment identified by Council and communicated to officers in DPIE who assisted the review, is the lack of a, legally robust, and readily implementable methodology for undertaking works that provide protection to private assets.

The two key issues that such a methodology requires are: (1) a way to construct a competent, integrated protective structure that is part of a whole of embayment solution and is likely to be on land that is partially within private ownership and partially on public land; and (2) how to fund the initial construction costs and ongoing maintenance in such a way that the project governance is vested in one authority. Council is working with the Taskforce to address these factors.

DPIE - Crown Lands previous advice and investigations through the Wamberal Terminal Protection Working Group (WTPG) and Wamberal Seawall Advisory Taskforce have indicated that there is no Crown land identified in the proposed protective structure area, only private land and Council managed road. The status of the beach adjacent the private properties at Wamberal is a mix of private land and Central Coast Council road. It is Crown land seaward of the Mean High Water Mark, some distance from the private properties. The footprint of coastal protection works is unlikely to be on Crown land, therefore it is expected that the role of DPIE - Crown Lands is limited (DPIE – Crown Lands, 2021).

A Crown Lands’ land status report was provided to Council for the WTPG on 22/02/18. The report confirmed that for a part of Wamberal Beach, there is a strip of land seaward of the freehold land that is in Council ownership (unformed road). There is also a residue of an old subdivision between the Council land and MHW. Crown Lands, through the Taskforce, will continue to work with and support Council to clarify land management status adjacent the freehold properties (DPIE – Crown Lands, 2021).

6.4 Regional and Local Strategic Direction

6.4.1 Central Coast Regional Plan 2036

The Central Coast LGA is located at the centre of the State’s fastest growing corridor – between Sydney and Newcastle – where the population is estimated to grow to 1.1 million by 2036. Recognising the importance of the Central Coast within wider planning processes, the NSW government developed the *Central Coast Regional Plan 2036* (Regional Plan) (DPE, 2016) which encompasses a vision for the future of a healthy natural environment, a flourishing economy and well-connected communities across the Central Coast region.

The Regional Plan was the product of extensive consultation with Central Coast Council and the wider community between 2014-2016 and provides an overarching framework that will guide the preparation of detailed land use plans, the determination of development proposals and inform infrastructure funding

decisions by State and Local Government through a cascading tier of strategic plans and development controls, as shown in **Figure 37** (DPE, 2016).

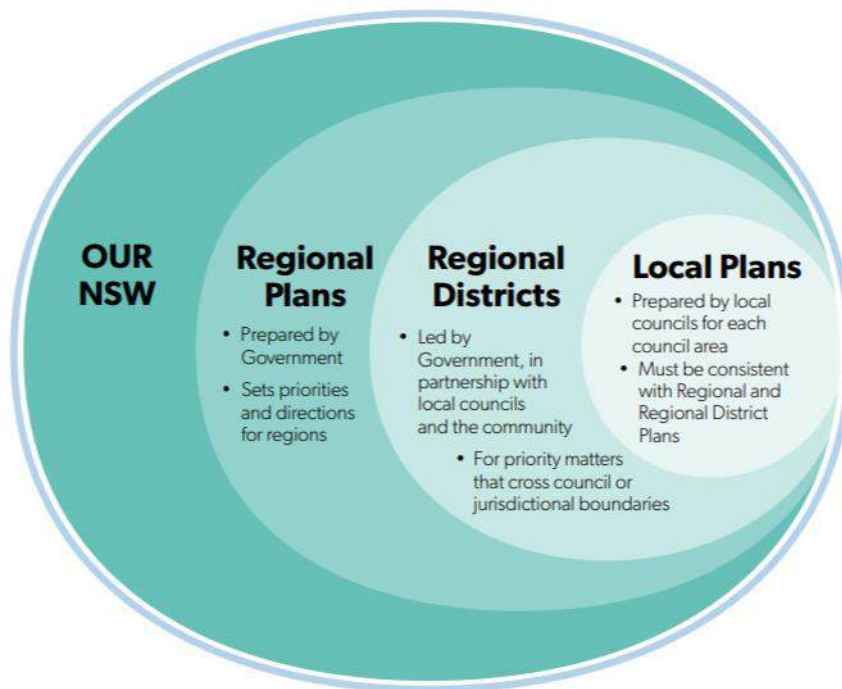


Figure 37: NSW Planning Hierarchy

The Regional Plan outlines four (4) overarching goals;

- A prosperous Central Coast with more jobs close to home;
- Protect the natural environment and manage the use of agricultural and resource lands;
- Well-connected communities and attractive lifestyles; and
- A variety of housing choice to suit needs and lifestyles.

There is enough housing to satisfy demand around Gosford City Centre, in growth corridors and local centres across the region, which are well supported by infrastructure, jobs, services and transport. Greater housing supply has helped housing affordability (DPE, 2016).

The region's renowned natural environment provides attractive settings for a range of lifestyles and is a drawcard for visitors beyond the region. Coordinated land use and infrastructure planning have assured the longer term productivity of agricultural lands. Agribusiness and extractive resources support local communities and contribute to the State's economy.

A 'green grid' criss-crosses the region allowing residents to connect to a network of open space, natural areas and recreational facilities. Protecting the region's coastal areas, water resources and biodiversity has assured the lifestyles, economic prosperity and environmental health of the region (DPE, 2016).

The majority of projected economic growth is in the Northern and Southern Growth Corridors, resulting from increased investment in health, education, advanced manufacturing and service industries. Tourism and recreation have become mainstays of the economy. Current and future settlement is concentrated around existing urban and employment areas, the Warnervale-Wadalba release area, the Northern and

Southern Growth Corridors and existing rural villages to take advantage of jobs, services and public transport, as shown in **Figure 38** (DPIE, 2016).

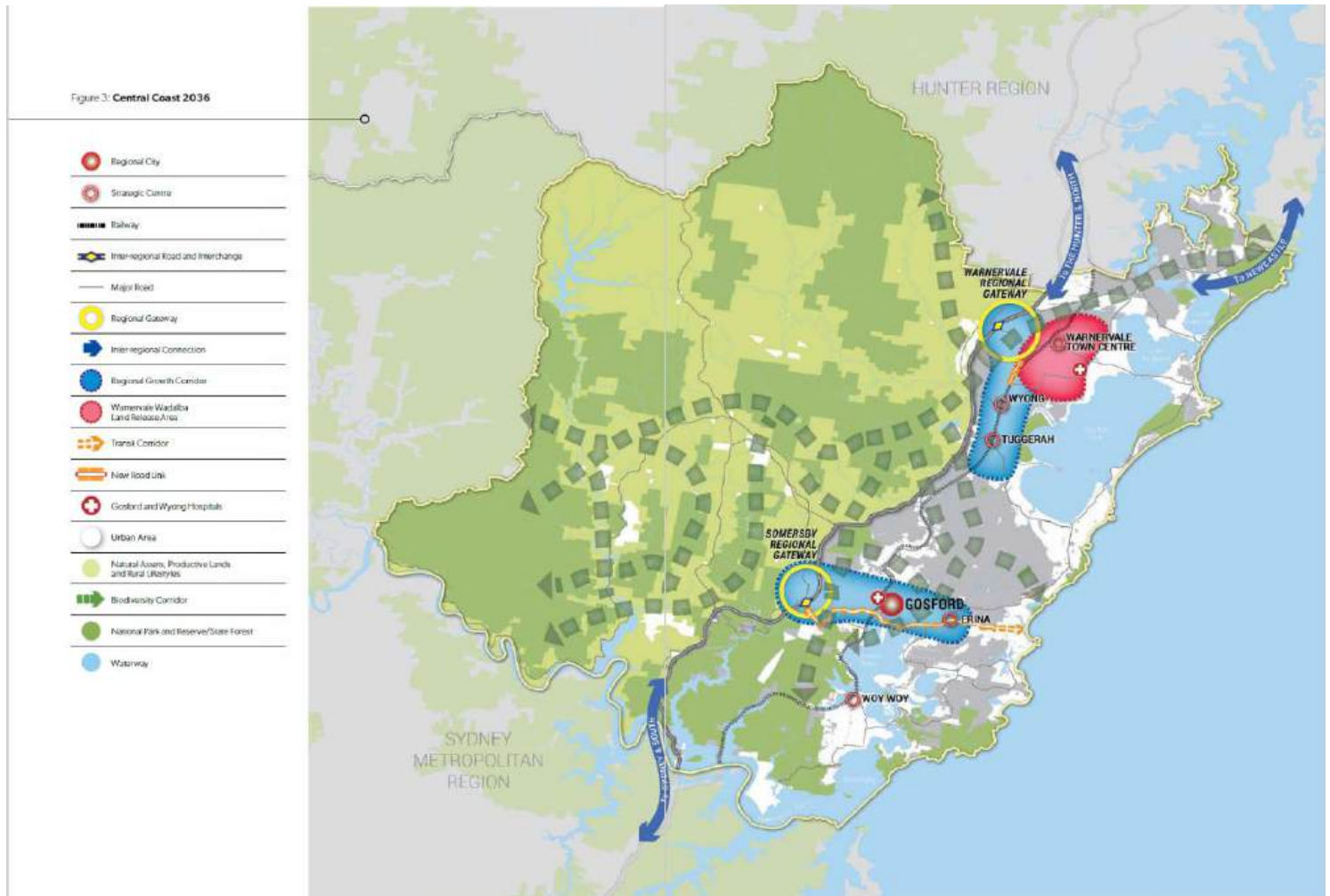


Figure 38: Central Coast 2036 - projected Growth Corridors and land release areas (DPIE, 2016)

The Regional Plan outlines 23 strategic directions intended to deliver those goals, many of which are relevant for development of the CMP, as shown in **Table 10**.

Table 10: Aligned strategic directions within the Central Coast Regional Plan 2036

Direction 8: Recognise the cultural landscape of the Central Coast

- 8.1 Protect the Central Coast's scenic amenity by planning for development that respects the distinct qualities of different places.
- 8.2 Identify and protect heritage values to minimise the impact of urban growth and development, and to recognise its contribution to the character and landscape of the region.
- 8.3 Complete cultural landscape mapping and implement the findings through appropriate local planning controls.

Direction 9: Protect and enhance productive agricultural land

- 9.2 Manage Biophysical Strategic Agricultural Land and other important agricultural land as locations for agricultural activities and complementary uses.
- 9.4 Protect the region's wellbeing and prosperity through increased biosecurity measures.

Direction 10: Secure the productivity and capacity of resource lands

- 10.1 Plan for the ongoing productive use of lands with regionally significant construction material resources in locations with established infrastructure and resource accessibility.
- 10.2 Ensure that longer term extractive resources are not sterilised and minimise impacts on communities and the environment.

Direction 11: Sustain and balance productive landscapes west of the M1

- 11.1 Identify and protect intensive agriculture clusters in local plans to avoid land use conflicts, particularly with residential and rural-residential expansion.
- 11.2 Encourage niche commercial, tourist and recreation activities that complement and promote a stronger agricultural sector, as well as build capacity to adapt to changing circumstances.

Direction 12: Protect and manage environmental values

- 12.1 Identify terrestrial and aquatic biodiversity values and protect areas of high environmental value to sustain the lifestyle, economic success and environmental health of the region.
- 12.2 Identify and strengthen biodiversity corridors as places for priority biodiversity offsets.
- 12.4 Strengthen the Coastal Open Space System by expanding its links and extending new corridors to balance growth in the north of the region and protect the network of natural areas across the region.
- 12.5 Sensitively manage natural areas on the fringe of the urban areas and in the west of the region to mitigate land use incompatibility issues and provide important quality of life and tourism benefits for the region.

Direction 13: Sustain water quality and security

- 13.1 Protect water catchments to sustain high quality and dependable water supplies across the region.
- 13.2 Effectively manage surface and groundwater use in agricultural areas to support ecosystem function, food production and cater for the increasing demands of urban communities and industry.
- 13.3 Incorporate water sensitive design into development that is likely to have an adverse impact on coastal water catchments, water quality and flows.
- 13.4 Plan for the security of the region's water supply.
- 13.5 Implement catchment-based plans for the ongoing sustainable management and health of estuaries in the region.
- 13.6 Apply neutral or beneficial water quality objectives to land use planning in surface and groundwater drinking catchments to minimise the effects of development on waterways including watercourses, wetlands, groundwater dependent ecosystems, riparian lands, estuaries, lakes, beaches and marine waters.
- 13.7 Plan new development to reduce the risk of introduction or spread of aquatic pests and diseases on fisheries and aquaculture industry practices.

Direction 14: Protect the coast and manage natural hazards and climate change

- 14.1 Manage the risks of climate change and improve the region's resilience to hazards such as flooding, coastal erosion, bushfire, mine subsidence and land contamination.
- 14.2 Review and update floodplain risk and coastal management programs to manage flood risk and protect the coast, particularly where urban growth is being investigated.
- 14.3 Incorporate new knowledge on regional climate projections and related cumulative impacts in local plans for new urban development.

Direction 17: Align land use and infrastructure planning

- 17.1 Align land use and infrastructure planning to maximise the use and capacity of existing infrastructure, and the efficiency of new infrastructure.

Direction 18: Create places that are inclusive, well-designed and offer attractive lifestyles

- 18.3 Enhance the amenity and attractiveness of existing places.

6.5 Community Strategic Plan

As noted in **Section 5.6.2**, Council developed the Community Strategic Plan (CSP) “One - Central Coast” which provided a unique opportunity for Council to understand the aspirations and concerns of the entire Central Coast community as a whole for the first time. Through this plan, Council seeks to shape business activities, future plans, services and expenditure to meet the growing requirements and changing expectations of residents through effective decision-making, planning and service delivery across all government and non-government agencies (Council, 2018).

“One - Central Coast” provides a 10 year plan that defines the priorities of the community, and provides a considered and evidence-based roadmap for the future of the Central Coast. It defines the environmental and social qualities that the community have described and provides a clear path of action towards what the community has identified as the preferred future state. It also recognised many opportunities and challenges within this timeframe.

“One - Central Coast” provides 17 overarching goals, each with 4 unique objectives, and the CMP will need to support these strategies and objectives. In order to do this, the relevant strategic linkages have been identified, as shown in **Table 11**.

Table 11: Linkages between the CSP and future CMP

Linkages between the CMP and “One – Central Coast” Community Strategic Plan 2018-2028
A1 Work within our communities to connect people, build capacity and create local solutions and initiatives
A2 Celebrate and continue to create opportunities for inclusion where all people feel welcome and participate in community life
A4 Enhance community safety within neighbourhoods, public spaces and places
B4 Activate spaces and places to complement activity around town centres, foreshores, lakes and green spaces for families, community and visitors
C1 Target economic development in growth areas and major centres and provide incentives to attract businesses to the Central Coast
C2 Revitalise Gosford City Centre, Gosford Waterfront and town centres as key destinations and attractors for businesses, local residents, visitors and tourists
C3 Facilitate economic development to increase local employment opportunities and provide a range of jobs for all residents
C4 Promote and grow tourism that celebrates the natural and cultural assets of the Central Coast in a way that is accessible, sustainable and eco-friendly
E1 Educate the community on the value and importance of natural areas and biodiversity and encourage community involvement in caring for our natural environment
E2 Improve water quality for beaches, lakes and waterways including minimising pollutants and preventing litter entering our waterways

E3 Reduce littering, minimise waste to landfill and educate to strengthen positive environmental behaviours
E4 Incorporate renewable energy and energy efficiency in future design and planning and ensure responsible use of water
F1 Protect our rich environmental heritage by conserving beaches, waterways, bushland, wildlife corridors and inland areas and the diversity of local native species
F2 Promote greening and ensure the wellbeing of communities through the protection of local bushland, urban trees, tree canopies and expansion of the Coastal Open Space System (COSS)
F3 Improve enforcement for all types of environmental non-compliance including littering and illegal dumping and encourage excellence in industry practices to protect and enhance environmental health
F4 Address climate change and its impacts through collaborative strategic planning and responsible land management and consider targets and actions
G1 Build strong relationships and ensure our partners and community share the responsibilities and benefits of putting plans into practice
G2 Communicate openly and honestly with the community to build a relationship based on transparency, understanding, trust and respect
G3 Engage with the community in meaningful dialogue and demonstrate how community participation is being used to inform decisions
I1 Preserve local character and protect our drinking water catchments, heritage and rural areas by concentrating development along transport corridors and town centres east of the M1
I2 Ensure all new developments are well planned with good access to public transport, green space and community facilities and support active transport
I3 Ensure land use planning and development is sustainable and environmentally sound and considers the importance of local habitat, green corridors, energy efficiency and stormwater management
K3 Provide signage, public facilities, amenities and playgrounds to encourage usage and enjoyment of public areas
K4 Repair and maintain wharves, jetties, boat ramps and ocean baths to increase ease of access to and enjoyment of natural waterways and foreshores

6.6 Climate Change Context

Sea level variation, atmospheric, hydrologic and hydrodynamic processes are all predicted to shift under climate change, all of which influence coastal landforms and ecosystems (Roy et al., 2001). Projected climate change impacts on storm frequency, intensity and distribution over the oceans are associated with considerable regional variability and uncertainty, which in turn leads to similar variability and uncertainty in wave climate and storm surge occurring at the coast. Some scenarios predict that there will be more frequent El Niño events in the Pacific, which may influence both wave height and direction along the eastern coast of Australia. Other predictions include increased extreme wind speeds associated with tropical cyclones and temperate low pressure systems, resulting in increased wave height and storm surge in northern Australia (Hemer et al., 2013).

Changes to coastal wave energy into the future are likely to change the levels of storm erosion experienced, and potentially even change the modal beach state so that its range of response to storms is altered. Underlying the responses to coastal waves and water levels due to changing climate conditions

will be the increase in mean sea level due to global warming. By 2090, sea level is predicted to be between 0.4 m and 0.7 m higher than mean sea level at the start of this century. A simplistic assessment of a beach's response to sea level rise suggests that there will be a landward and upward shift of the profile caused by erosion of the beach and dunes by waves and deposition offshore by currents operating during the storms occurring at the higher sea level (CSIRO and BOM, 2015). It is likely that lagoon and estuary habitats will become more important to maintain as they act as a natural buffer from erosion for coastal settlements, although the ability of coastal wetlands to adapt to sea level rise will depend on local factors (e.g. migration potential/barriers, sediment supply).

It is noted that the four of the adopted and draft CZMPs described in **Section 5.4** were prepared in accordance with former legislation, reflecting the objects of the *NSW Coastal Protection Act (1979)* while variably taking into account the objectives and requirements of the NSW Coastal Policy (1997) and the NSW Coastal Planning Guide – Adapting to Sea Level Rise (Department of Planning, 2009), which utilised the sea level rise benchmarks of 0.4 m and 0.9 m rise above 1990 mean sea level by 2050 and 2100 respectively, based upon the latest reports by the IPCC (2007) and CSIRO (2007) available at that time.

For example, the 2010 *Gosford Coastal Lagoons Processes Study* included investigations on the potential impacts of climate change on the lagoons and discussion is provided on the likely berm response and changes in lagoon water levels. The projected sea level rise (SLR) of 0.4 m by 2050 (i.e. HAT increases by 0.4 m) is likely to increase the low range of water levels and groundwater levels around the lagoons by a similar 0.4 m. Given that current entrance management regime is expected to continue, the future maximum water levels would be tied to the present-day flood mitigation levels and hence the range of water levels would decrease by roughly the 0.4 m to 2050. The projected decrease in minimum water levels would lead to the three “mostly closed” lagoons transitioning towards more open conditions, i.e. more frequent breakouts and probably slightly longer open periods of tidal influence, which will have implications for lagoon water and ecosystem response (Cardno, 2010).

In response to projected impacts of climate change, Council has developed a Climate Change Policy that was adopted in July 2019. The strategic principles and Policy commitment statements provide direction for the development of strategies on climate actions, to respond, to adapt and build resilience to changing risks to the community, council assets, infrastructure and the environment.

The Policy provides a framework for Council to progress its planning for climate change, as shown in **Figure 39**, including future development of a Sea Level Rise Policy. The Climate Change Policy does not set planning levels for sea level rise, rather it provides a set of guiding principles and establishes a framework to help with decision making.

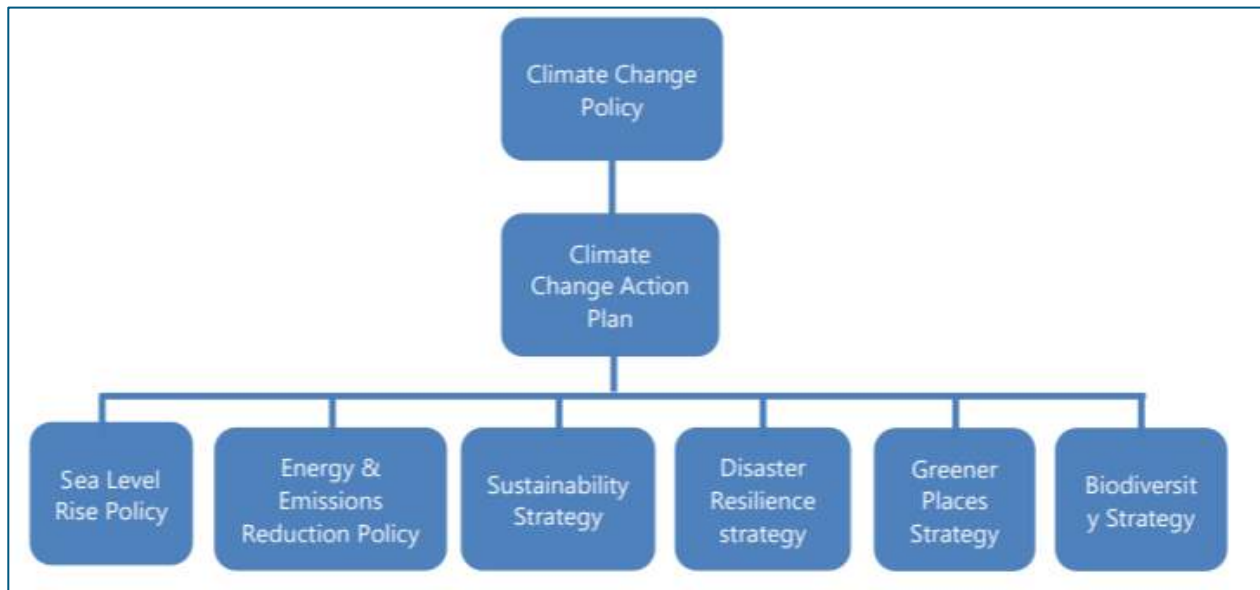


Figure 39: Framework for Council's climate change planning (Climate Change Policy, 2019)

The Policy commits Council to review and update the sea level rise planning levels and coastal hazards to provide a consistent approach that is applied across the Central Coast region. This future work will include the development of plans and strategies that recognise the long term need to protect coastal communities, urban development and Council infrastructure.

Future plans and strategies for sea level rise planning levels will be prepared in line with the strategic principles of the draft Policy and will focus on place-based collaboration with the community to maximise shared learnings and responsibility as well as enhance the regions capacity for climate resilience. It is important to ensure that adopted sea level rise planning levels are consistently integrated within all CMP's developed by Council

Key items in the Climate Change Policy that are relevant to development of a CMP are:

Strategic Principles:

- C4 Principle 1: Council endorse the Ecologically Sustainable Development values through integrating social, economic and environmental considerations into Council's decision making through the implementation of the four principles a) precautionary principles, b) inter-generational equity, c) conservation of biological diversity and ecological integrity and d) improved valuation, pricing and incentive mechanism.
- C5 Principle 2: Council implement a holistic approach to anticipate and adapt to climate change actions that comprise the time scales such as now and the future as well as the impacts of the complex interactions and interdependencies between the human and the environment systems.
- C6 Principle 3: Council implement an evidence based decision making to respond, to adapt and build resilience to Climate Change.
- C8 Principle 5: Council implement a proactive approach and ensure continuity to better anticipate and adapt to complex challenges posed by the changing climate.
- C9 Principle 6: Council implement a Place-based approach to enhance Council and community capacity for climate resilience that is context specific, knowledge based and collaborative.

D. Policy Commitment Statements

Governance

- (D2) Embed climate change planning within Council's Integrated Planning and Reporting Framework, namely the Community Strategic Plan, Delivery and Operational Plans and Council's Corporate Plan.
- (D4) Develop Place Based Climate Change Action Plans in partnership with the community that establishes regional targets for mitigation and prioritises local adaptation planning (e.g. sea level rise, coastal hazards, disaster management).

Risks Management & Resilience Planning

- (D6) Undertake ongoing monitoring and assessment of climate change risks and their impacts on ecological, social, economic and physical built forms systems based on best available science.
- (D7) Incorporate climate change risks in strategic and infrastructure planning for the region to maximise local liveability through informed land use planning, development of planning controls and guidelines that facilitates regional urban growth, transport connectivity and utility services.
- (D9) Undertake climate change risk assessment and incorporate risks and vulnerabilities to inform asset life cycle analysis for all new and existing infrastructure assets, to meet current and projected demands and develop relevant adaptation and mitigation strategies to ensure climate resilience.
- (D10) Support initiatives and education programs to enhance the Central Coast community's understanding of and build resilience to climate change risks.
- (D11) Develop strategies, plans and development controls to protect, conserve and work in partnerships with community and local agencies to enhance resilience of biodiversity across the Central Coast region.

6.7 Governance Context

6.7.1 Local Government

Central Coast Council – Council has a central role in managing the coast, specifically in preparing the CMP that sets out the long-term strategy for management of the coastal zone in its area, in conjunction with a range of regional and local directions described in **Section 5.4**. Council may seek advice from public authorities or the NSW Coastal Council (through the Minister), and is required to consult with the community, relevant public authorities and adjoining councils. In addition, Council may prepare a planning proposal to amend mapping of Coastal Management Areas and make LEPs that amend Coastal Management Area maps in the CM SEPP (if a Gateway determination authorises it).

Council identifies the costs of actions, proposed cost-sharing arrangements and viable funding mechanisms to ensure delivery through the CMP process, which are then embedded within Council's four year Delivery Program and one year Operational Plan. These actions are then monitored and reported through the Integrated Planning and Reporting framework. Under a certified CMP, Council can assess certain development proposals within the coastal zone and be a consent authority in certain circumstances.

As per the requirements of the *Local Government Act 1993*, all NSW local governments are required to prepare a series of strategic plans that conform to the structure of the state Integrated Planning and Reporting (IP&R) Framework. The structure of this framework is depicted in **Figure 40**, and a brief overview of the components is provided below. A summary of relevant planning documents is provided in **Table 12**.

The Community Strategic Plan is the overarching, visionary document that translates the community's key priorities and aspirations into long-term strategic goals that guide the future direction of the LGA. The Plan represents the highest level of strategic planning undertaken by a local council.

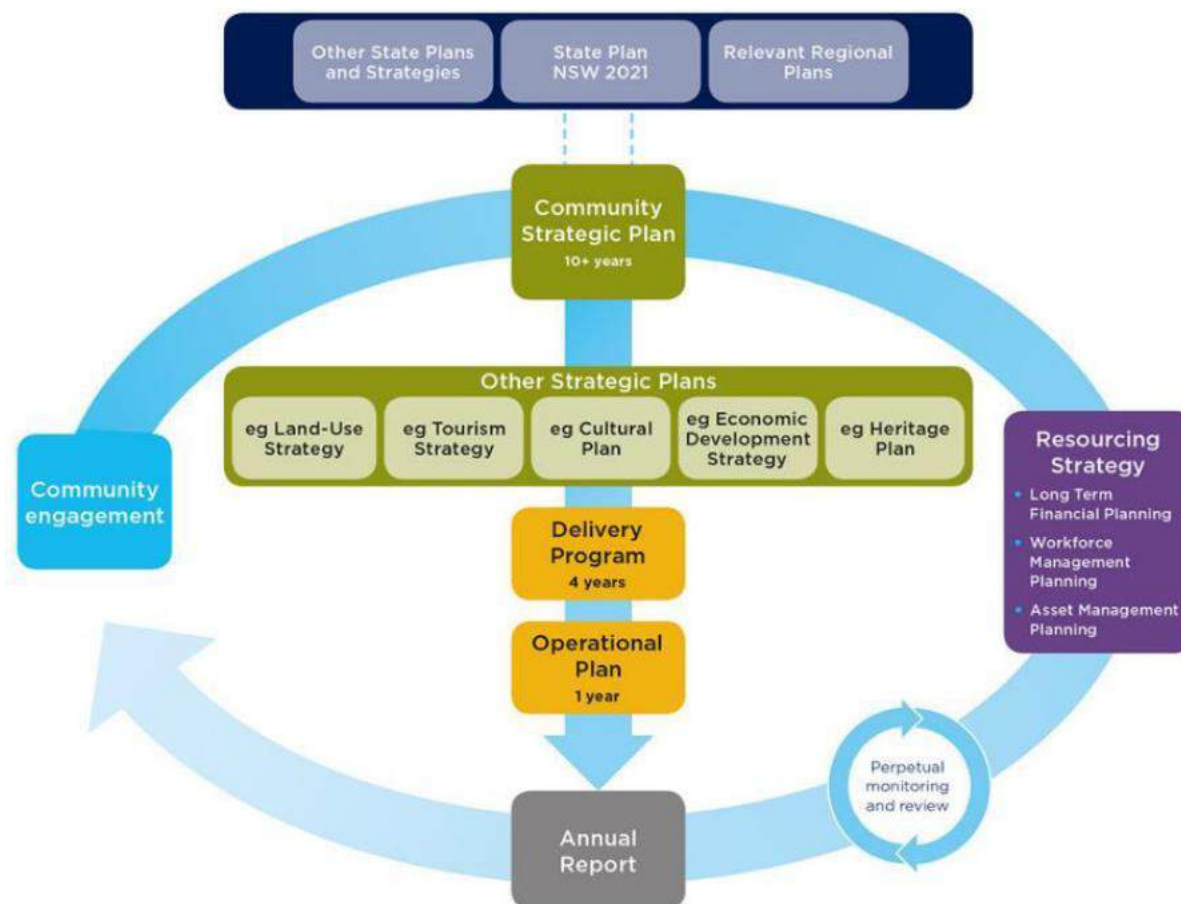


Figure 40: Integrated Planning and Reporting Framework (Source: NSW OLG, 2019)

All other plans developed by councils in the study area (such as CMPs) must reflect and support implementation of the Community Strategic Plan. In fact, under the CM Act, the objectives and management actions developed as part of CMP(s) are required to be strategically aligned with the objectives and strategies outlined in the Community Strategic Plan. Linkages to the Community Strategic Plan “One – Central Coast 2018-2028” are provided in **Section 6.5**.

Other strategic planning activities may be undertaken by a council to support the achievement of outcomes in specific areas identified in the Community Strategic Plan (NSW OLG, 2019). These may include, for instance, a Cultural Plan, an Economic and Tourism Strategy, Emergency Risk Management Planning, Climate Change Planning, or a Heritage Plan.

In March 2018, amendments to the Environmental Planning and Assessment Act 1979 (the EP&A Act) introduced a new requirement for councils to prepare and make a Local Strategic Planning Statement (LSPS), which sets out the 20-year vision for land use in the local area, and how change will be managed into the future (NSW OLG, 2019). These plans provide a link between the state government's strategic plans and local council's local land use plans and guidelines. The LSPS forms part of Council's IP&R Framework, providing an important link with the Community Strategic Plan.

Reporting is a key element of the IP&R framework. Councils must prepare an Annual Report that provides information regarding progress and success in implementation of the Operational Plan and Delivery Program. Local councils are required under the CM Act to embed coastal management within the IP&R Framework, established in the *Local Government Act 1993*. Council's will be required to implement CMPs through their IP&R Framework.

All Councils in NSW are tasked to produce the following documents as part of the State Government's IP&R Framework (as set out in the *Local Government Act 1993*):

- Community Strategic Plan (10+ years), which identifies the community's main priorities and aspirations for the future. A Resources Strategy describes how a council will achieve the objectives and strategies outlined the Community Strategic Plan.
- Delivery Program (4 years), that outlines to the community how council intends to achieve the community priorities and goals.
- Operational Plan (1 year), which outlines the details of the Delivery Program on an annual basis.

Under the CM Act, councils are required to establish links and alignment between management strategies in their CMPs and objectives and strategies in their Community Strategic Plan – with the aim to mainstream coastal management into councils' overall service delivery and asset management responsibilities.

Table 12: Local Planning Documents

instrument	Document
Community Strategic Plan	<i>One Central Coast: Central Coast, Community Strategic Plan 2018-2028</i>
Local Environment Plans	Gosford LEP 2014 [#] Wyong LEP 2013 [#]
Development Control Plans	Gosford DCP 2014 [#] Wyong DCP 2013 [#]
Resourcing Strategy	Central Coast Council Resourcing Strategy 2018-2028
Delivery Program and Operational Plan	Central Coast Council Delivery Program and Operational Plan 2019-20

[#] Note that Central Coast Council is currently working to consolidate the existing LEP into one plan, the Central Coast Local Environmental Plan (CCLEP) Development Control Plan (CCDCP)

The Manual provides information to help councils to develop, evaluate and select management actions that provide feasible and effective measures to manage the coastal environment. These actions are then incorporated into councils' land-use planning instruments, Community Strategic Plans and IP&R Framework, established under the *Local Government Act 1993*.

6.7.2 Relevant Public Authorities

The following public authorities have a role in coastal management of the Central Coast, with some having a final sign-off role at each stage of the CMP process. Input should be sought from all the authorities listed below at each stage of the CMP.

Minister for Local Government – The Minister has as a significant overarching role through administering the CM Act. The Ministers role includes appointing the NSW Coastal Council, may direct the NSW Coastal Council to undertake a performance audit of CMP implementation, tables reports from the NSW Coastal Council in Parliament, and may certify, or refuse to certify, a CMP.

NSW Coastal Council – The Coastal Council provides independent and expert advice to the Minister, oversees the effectiveness of coastal management, provides advice to councils and public authorities if requested by the Minister, and provides advice on compliance by councils with the management objectives and the manual when preparing a CMP. The Coastal Council also conducts performance audits of the implementation of local council CMPs and identifies opportunities for local council capacity building, reporting to the Minister about the outcomes of audits and making recommendations on appropriate remedial actions.

NSW Department of Planning, Industry and Environment – Environment, Energy and Science (DPIE) – The Environment, Energy and Science Group of DPIE has the role of supporting councils and communities in managing the open coast, estuaries and coastal lakes, providing oversight of the State's Coastal Management Framework. DPIE's role is the first point of contact for local councils planning to prepare and implement a CMP, working in partnership with councils and local communities to manage the coast. DPIE provide a range of data and technical advice including wave data and data on historical coastline changes, coastal geomorphology, coastal and estuarine processes, sediment cells, coastal hazard and risk assessment, ecosystem health and habitat mapping. DPIE also administers the Coastal and Estuary Grants Program that provides funding for councils to prepare and implement their coastal management program.

NSW Department of Planning, Industry and Environment – Crown Lands (Crown Lands) – Crown Lands are responsible for the management of NSW's Crown land, in accordance with the *Crown Lands Management Act 2016* (CLM Act). Crown Lands are responsible for the administration and/ or management of Crown land under the Crown Land Management Act 2016 (CLM Act). Crown land includes submerged seabed and subsoil to three nautical miles from the coastline of NSW that is within the limits of the coastal waters of the State. Crown land includes much of the submerged land within the estuaries and intertidal areas (below mean high water mark) of the study area, as well as several foreshore reserves and beaches (for example Avoca Beach, Bateau Bay Beach and Tuggerah Beach). Several of the coastal Crown reserves and foreshores in the study area are under the management of Central Coast Council. Crown Lands licences domestic waterfront structures that occupy Crown land, such as jetties and pontoons. Development and activities on Crown land generally require a form of authorisation under the CLM Act. Crown Lands work in partnership with a range of agencies to make sure that natural resource management is managed across public land in NSW, and regulations and policies are met.

Marine Estate Management Authority (MEMA) – MEMA was established in response to the Independent Scientific Audit of Marine Parks, commissioned by the NSW Government in 2011. The key role of the Authority is to set the strategic direction and priorities for the NSW marine estate through a Marine Estate Management Strategy. Through MEMA, four NSW government agencies have key responsibilities for managing the marine estate, being Department of Regional NSW (DRNSW) - NSW Department of Primary Industries (DPI); Department of Planning, Industry and Environment (DPIE) - Environment, Energy and Science (EES) & Planning and Assessment (P&A); and Transport for NSW (TfNSW).

Transport for NSW (TfNSW) – TfNSW is the operating agency responsible for provision and management of road and maritime networks as part of the transport system. Through the maritime division, TfNSW is responsible for managing recreational boating activities, navigable waterways and assets across the Central Coast. The Maritime Infrastructure Delivery Office (MIDO) is under TfNSW and is responsible for improving the coordination and delivery of coastal and boating infrastructure programs and projects including dredging across NSW that support recreational boating, fishing, tourism and a range of other commercial activities.

NSW State Emergency Service (NSW SES) - NSW SES is the combat agency for floods, storms and tsunamis. NSW SES is responsible for planning for and responding to flood, storm and tsunami events, including evacuation of those at risk. Coastal erosion events that are not caused by storms are the responsibility of the Local Emergency Operations Controller (LEOCON), however under specific circumstances, delegated responsibility may change in accordance with *the State Emergency and Rescue Management Act 1989*. The NSW State Storm Plan (2018) aligns with the *Coastal Management Act 2016*, under which Council's outline emergency responses through development of a Coastal Zone Emergency Action Subplan within the CMP.

NSW Department of Primary Industry – (DPI Fisheries) - DPI Fisheries has a regulatory role which seeks to ensure that developments comply with the requirements of the *Fisheries Management Act 1994*, (namely the aquatic habitat protection and threatened species conservation provisions in Part 7 and 7A of the Act, respectively), and the associated Policy and Guidelines for Fish Habitat Conservation and Management (2013). DPI Fisheries are also responsible for delivery of the *Marine Estate Management Act 2014* (MEM). CMPs should take into account the objectives of the MEM Act and associated regulations which includes the zoning plans.

DPIE National Parks and Wildlife Service – (NPWS) - NPWS manage over 7 million hectares of land across NSW, including more than 870 national parks and reserves, 4 World Heritage-listed sites, a number of Australian National Heritage sites and 17 Ramsar wetlands. These protected areas play a critical role in conserving biodiversity, as well as natural and cultural heritage. NPWS manages significant areas of the Central Coast coastline including Bouddi and Wyrabalong National Parks and is responsible for provision of facilities such as picnic areas, boardwalks and lookouts in the national park areas.

Darkinjung Local Aboriginal Land Council - (Darkinjung) - Darkinjung are a significant land owner in the Central Coast with responsibilities to improve, protect and foster the best interests of Aboriginal persons within the region. Darkinjung LALC works with the NPWS and DPIE to ensure the protection of habitats, ecosystems, plant and animal species, significant geological features and landforms and protects icons and sites of national significance.

Infrastructure NSW - Infrastructure NSW was established in July 2011 to assist the NSW Government in identifying and prioritising the delivery of critical public infrastructure for NSW. It is an independent statutory agency, established under the Infrastructure NSW Act 2011, responsible for preparing project implementation plans for major infrastructure projects, reviewing and evaluating proposed major infrastructure projects by government agencies or the private sector

NSW Local Land Services - Local Land Services is a regional-focused NSW Government agency delivering quality customer services to farmers, landholders and the wider community. The agency's remit covers agricultural production, biosecurity, natural resource management and help during emergencies. Local Land Services administer a variety of funding opportunities to assist farmers, landholders, Landcare, Aboriginal community groups and other partners to assist and promote the adoption of sustainable land management practices.

6.7.3 Engagement with Public Authorities

During development of this Scoping Study, effective engagement with NSW Department of Planning, Industry and Environment – Environment, Energy and Science (DPIE) through representation and active participation in the Council led working group that has overseen delivery of the Scoping Study.

Following the east coast low storm events of July 2020, significant engagement between State Government agencies (including DPIE, Public Work, NSW Police and SES) and Council led to the implementation of a range of emergency coastal protection works at Wamberal Beach and North Entrance Beach under orders issued by the Local Emergency Operations Controller under section 61(1)(c) of the *State Emergency and Rescue Management Act 1989*.

In addition, the New South Wales Government established the Wamberal Seawall Advisory Taskforce (Taskforce) on the 31 July 2020 to provide Council with support to implement a sustainable long-term solution to the coastal erosion issues at Wamberal Beach (from Terrigal Lagoon entrance to Wamberal Lagoon entrance).

The Terms of Reference for the Taskforce note that key areas of focus will include the review, investigation and design of a terminal protection structure for Wamberal, investigating sources of sand and the feasibility of beach nourishment and seeking priority capital and operational funding required. The Taskforce seeks to provide a forum for information sharing and problem-solving involving representatives from State Agencies, the Central Coast Council, key stakeholders and the community. It is recognised as important that Central Coast Council continue to lead the development of a solution at Wamberal.

Taskforce consists of representatives including:

- Independent Chair – Dr Phil Watson. (Although Dr Watson is a DPIE employee, he will chair the Advisory Taskforce in an independent capacity in recognition of his significant expertise and international reputation in coastal management. He is not a DPIE representative on the Advisory Taskforce.)
- Adam Crouch MP, Member for Terrigal and Parliamentary Secretary for the Central Coast
- The General Manager, or their representative from Central Coast Council
- Council's Project Manager for the Wamberal Seawall project
- A representative from the Department of Planning, Industry and Environment (Environment, Energy and Science)
- A representative from the Department of Planning, Industry and Environment (Planning and Assessment)
- A representative from Department of Planning, Industry and Environment (Crown Lands)
- Additional technical experts from the Department of Planning, Industry and Environment and Council may attend in an observer capacity as required.

The Stakeholder and Community Engagement Strategy provided as Appendix D outlines the recommended methodology for further communication during development of the CMP(s), including specific reference to public authorities designated in **Section 6.7.2**.

Support for progressing the Open Coast & Lagoons CMP has been indicated by DPIE, and it is expected that support to progress the CMP will be provided by other agencies provided the requirements of the Communications and Engagement Strategy in **Appendix D** and the CM Act are followed.

6.7.4 Barriers for preparation of CMP planning process

The following have been identified as barriers for the preparation of a CMP and implementation of management actions:

- Political barriers, for example political pressure on Council to take actions that may be inconsistent with existing Council policies and State legislation. These barriers may be overcome by ensuring that there is good communication and collaboration with stakeholders on coastal management issues, however challenges may arise during emergency situations;

- Institutional support, for example stakeholders not agreeing to management actions within a CMP that are within their areas of responsibility. This can be overcome through early and ongoing engagement with relevant agencies and stakeholders throughout development of the CMP to ensure agreement and support;
- Social support, for example community members not agreeing to management actions within a CMP that are within their areas of interest. This can be overcome through early and ongoing community engagement throughout development of the CMP to ensure agreement and support;
- Governance barriers, for example having processes in place to ensure that Council policies are adhered to and formally reviewed on a regular, scheduled basis. This can assist in ensuring that actions undertaken are consistent with Council's policies and not as a result of political and/or social pressure;
- Capacity issues, for example ensuring that Council has the resources to manage delivery of the CMP, as well as to implement the required management actions. These barriers can be overcome by reviewing and reinforcing Council's staffing and financial requirements, as well as by empowering local communities to assist implementation of management actions; and
- Legal challenges, for example by landowners seeking to implement coastal protection works may challenge the Conditions of Consent placed on development. To ensure consistency with the Coastal Management SEPP and Coastal Management Act 2016, it is suggested that the wording of development controls and related conditions be reviewed by Council's legal department to ensure that ambiguities are removed.

7 First-Pass Risk Assessment

7.1 Risk Management Process

It is a requirement of the CM Act that councils follow a risk management process when preparing their CMP(s). Specifically, this is to include a process of identifying and assessing risks to environmental, social and economic values and benefits, and then evaluating these risks and selecting management actions to address them.

As part of the CMP Scoping Study, a first-pass risk assessment is required to establish knowledge gaps regarding the impacts of coastal hazards as well as the vulnerabilities of coastal assets and values. This is primarily a qualitative assessment, based on existing knowledge and information, and will help to inform the latter stages of the CMP by prioritising areas at risk which need to be addressed. In the latter stages of the CMP, councils may refine this risk assessment, and will identify and evaluate specific management actions to address the identified risks. The relationship between CMP stages 1, 2 and 3 of this risk assessment process is summarised in Figure 41.

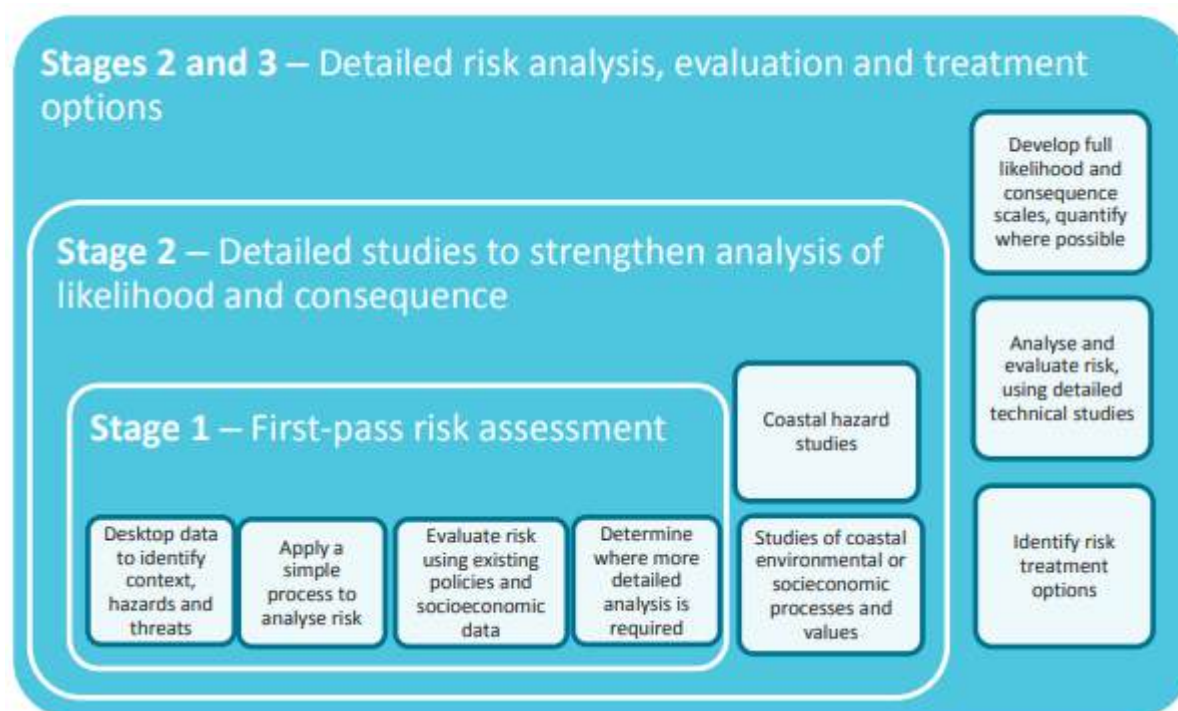


Figure 41: First Pass Risk Assessment process, NSW Coastal Management Manual Part B

The Australian Standard *Risk management - Guidelines* (AS ISO 31000:2018) outlines a general risk management process shown in **Figure 42**, which follows the keys steps of risk identification, risk analysis, and risk evaluation, and should be performed iteratively.

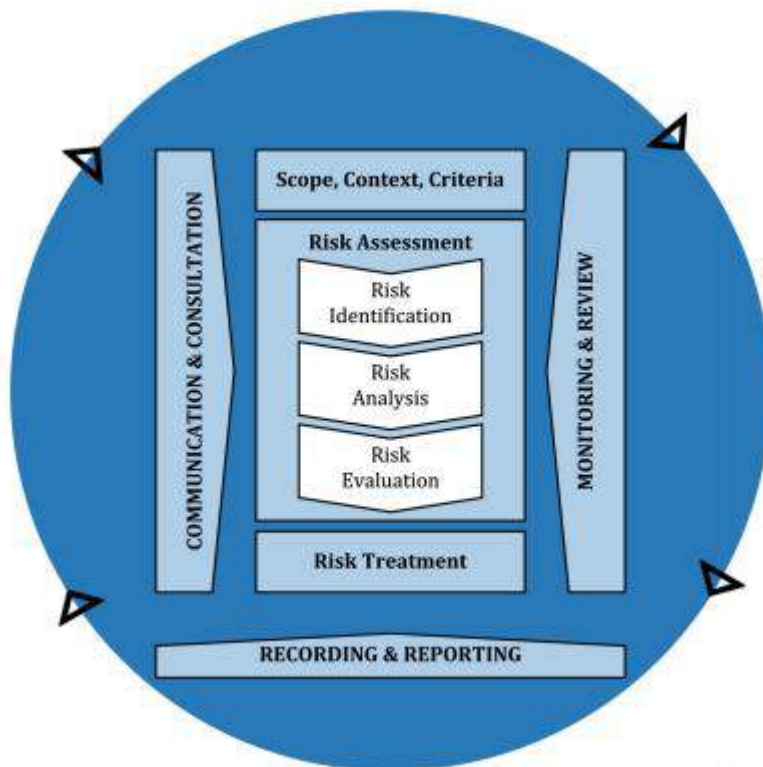


Figure 42: Australian Standard risk management process, AS ISO 31000:2018

According to AS ISO 31000:2018, the purpose of a risk analysis is to gain an understanding of the risk, and where appropriate, the level of risk. In order to generate a risk rating, or to qualify the level of risk for each value category and associated sub-issues, the analysis is to consider both:

- the likelihood of impacts – which assesses the probability of the impact occurring, and
- the nature and magnitude of consequences – made up of assessment of the intensity, scale (geographic extent), duration of impacts (e.g. magnitude) and sensitivity of environmental receptors to the impact.

A combination of these approaches has been utilised within the Scoping Study Risk Assessment.

7.2 Risk Assessment Methodology

A first-pass risk assessment has been completed in the form of a completed Risk Register (tabular presentation of the risk assessment) and is provided within **Appendix C1**. Within each risk category a number of activities or tasks have been identified. For each activity or task there is a hazard for which a perceived risk is determined based on likelihood and consequence. Control measures were then proposed to address the perceived risk, leading to a residual risk.

The risk categories that have been considered in the risk assessment comprise:

- public safety;
- infrastructure damage;
- environmental damage; and,
- negative impacts on public amenity.

Each of the above risk categories were assigned different levels of impact or consequence and a likelihood scale was also adopted for the risk assessment. The likelihood and consequence scores were combined to determine a risk rating in accordance with the matrix provided in **Appendix C2**.

The responses recommended for different levels of risk rating were assessed in the following manner:

- Low – below risk acceptance threshold and do not require active management
- Medium – on the risk acceptance threshold and require active monitoring
- High – exceed risk acceptance threshold and require proactive management
- Extreme – Significantly exceed risk acceptance threshold and require urgent and immediate attention.

7.3 Risk Assessment Results

The risk assessment identified a number of hazards that had a residual 'extreme' and 'high' risk rating and are recommended for proactive management within the CMP. These include:

- Coastal Erosion:
 - Injury to beach users and/or residents caused by structures mobilising during storm events, or by exposure and mobilisation of buried remnants of historic foreshore protection;
 - Injury to beach users caused by erosion, instability of erosion scarps following beach erosion, and undermining at existing beach accessways;
 - Loss of dune and other coastal habitats due to storm erosion; and
 - Exposure/mobilisation of potentially harmful sediment, waste, structures, etc. (e.g. erosion of historic landfill site at Magenta)"
- Population growth & coastal development:
 - Loss of habitats, reduction in the health of ecosystems, reduced biodiversity value;
 - Impact on indigenous and non-indigenous heritage;
 - Loss of migratory waders and shorebirds, loss of threatened species e.g. Green and Golden Bell Frog;
 - Increased use of the coastal zone from residents and tourists resulting in impacts on the health of ecosystems, biodiversity, habitats, and water quality;
 - Increased pedestrian and vehicle traffic over rock platforms, saltmarsh, dunes, and other sensitive areas resulting in damage to habitats; and
 - change in land-use impacting water quality of beaches and coastal lagoons.
- Coastal lagoon entrance dynamics; artificial opening of coastal lagoon entrances; inappropriate entrance management; or community initiated openings:
 - Changes to estuarine ecology and habitat, direct impact on ecology (fish kills, shorebirds, green and golden bell frog);
 - reduced beach amenity;
 - reduced beach access along lagoon frontage caused by lagoon openings, or dynamic behaviour near entrance;
 - impact on coastal lagoon amenity due to poorly managed water levels. "
- Wave runoff and overtopping:
 - Injury to public caused by wave runoff on or wave overtopping during storm conditions.
- Slope and cliff instability:
 - Injury to public caused by rock falls from unstable cliff faces at beach headlands.

- Coastal inundation:
 - Damage to public and private infrastructure and property caused by coastal floodwaters due to storm-wave inundation, tidal inundation and/or catchment based rainfall, particularly in areas surrounding coastal lagoons.
- Coastal inundation and catchment flooding (combined):
 - Damage to public and private infrastructure and property caused by debris and structures mobilising in floodwaters during coastal storm events, particularly in areas surrounding coastal lagoons;
 - Increased duration of flood events due to inability of catchment floodwaters to escape lagoon entrances due to elevated ocean water levels resulting from barometric, storm and wave set-up.

7.4 Knowledge gaps

A key piece of information for assessment of several of the risks identified within the first-pass risk assessment is to update the definition of coastal hazards for the Central Coast open coastline and lagoons. The *Coastal Processes and Hazard Definition Study* for the former Gosford open coast beaches was undertaken in 2015 (WorleyParsons, 2015), while the Gosford Coastal Lagoons Processes Study was undertaken in 2009/2010 (Cardno Lawson Treloar, 2010).

Similarly, while the draft Wyong CZMP 2018 provided an update to address identified gaps in hazard mapping, the underlying studies to inform the mapping was the *Report on the Geotechnical Issues associated with the Coastline Hazard Management Study for the Wyong Shire Council* (Shirley Consulting Engineers 2010), and the *Wyong Coastal Hazard Study Main Report* (SMEC, 2010).

These assessments were undertaken utilising varying methodologies, and since their delivery there has been advancements in the information that is now available to define coastal hazards, including additional beach profile data and improved estimates of sea level rise due to climate change. Utilisation of updated sea level rise projections may have significant bearing on actions in relation to management of lagoon entrances and water levels, as well as associated planning controls. Furthermore, it is now best practice to define coastal hazard lines using a 'risk-based' or probabilistic approach.

Coastal development setbacks in NSW have traditionally been defined through delineation of coastal hazard lines, using a variety of planning periods and hazard zones. However, until recently, there has been no rigorous assessment of the validity of traditional hazard lines in terms of leading to an acceptable risk to property if used as setbacks for new development. Traditionally, coastal hazard assessments have been undertaken under a deterministic approach, whereby each input variable is assigned a single value (e.g. 'design' storm demand, sea level rise projection, etc. with generally conservative estimates applied).

The 'risk-based' or probabilistic approach recognises the inherent uncertainty within the parameters contributing to the definition of coastal hazard lines. The probabilistic approach allows each input parameter to vary randomly according to appropriate probability distribution functions. The randomly sampled parameters are repeatedly combined in a process known as Monte Carlo simulation. All outputs from the Monte Carlo simulation are collated to develop a probability curve for shoreline retreat over the planning period for a site. The likelihood of the shoreline position is then used in conjunction with its consequence to determine an appropriate coastal hazard line position that corresponds to an 'acceptable risk'.

Noting that significant erosion events have occurred at a number of locations since previous studies were undertaken, it is recommended that a Coastal Hazard Study for the entire open coast and lagoons is completed as part of Stage 2 of the CMP process to define updated risk-based derived coastal hazard

lines for use in assessing risks to current and future development. This study would also include further, updated, definition of other hazards including coastal inundation and coastal cliff or slope instability, that may be utilised in by Council within a Planning Proposal to define and map a Coastal Vulnerability Area.

It is noted that a range of public and private structures currently exist within the open coast and estuarine areas that are the subject of this scoping study. Council currently does not hold a register/database of these structures, however a table describing the extent of Council's knowledge of these structures is included in **Appendix E**. It is recommended that Council undertake an audit of existing structures, including (but not limited to) consideration of:

- Ownership (public or private);
- Permissibility ;
- Extent;
- Year of construction (if known);
- Current condition; and
- Design standard (if known).

8 Preliminary Forward Program and Business Case

A preliminary work plan and forward program has been developed for the remaining stages of the CMP based on the five-stage process for the preparation and implementation of a CMP outlined in the NSW Coastal Management Manual. The five-stage process is summarised in **Figure 43**.

This CMP Scoping Study represents only *Stage 1* of the process. The scope of *Stage 5* will only be determined once the actions identified by the CMP are known. As such, the preliminary work plan and forward program covers only *Stage 2*, *Stage 3*, and *Stage 4* of the CMP process.

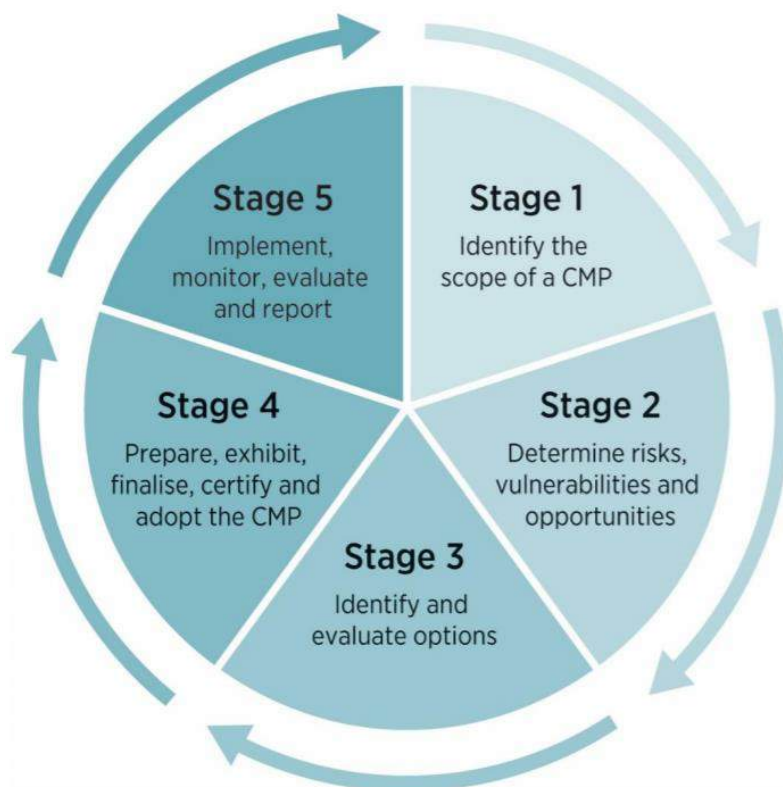


Figure 43: Stages in preparing and implementing a CMP

Under *Schedule 3 Savings, transitional and other provisions* of the CM Act, a Coastal Zone Management Plan in force under the former Act (such as the Gosford Beaches CZMP) continues to have effect until replaced by an adopted and certified coastal management program. However, this clause ceases to have effect at the end of 31 December 2021. Actions contained within the Gosford CZMP will no longer be eligible for State Government funding after this date.

The adoption and certification of CMP(s) will enable the funding and implementation of long-term management actions that will provide benefits to the local community by improving and maintaining environmental attributes, beach amenity and public safety, and protecting public and private assets in areas subjected to current and future coastal hazards.

The incentive for Central Coast Council to prepare one or more CMPs prior to 31 December 2021 includes the ability to secure additional funding for implementation of works. The adoption and certification of one or more CMPs will enable the funding and implementation of a number of projects that will provide benefits to the local community by improving and maintaining environmental attributes, beach amenity and public safety, and protecting public assets in areas subjected to current and future coastal hazards.

8.1 Preliminary work plan for Open Coast & Lagoons CMP

A preliminary work plan for completion of Stage 2, Stage 3 and Stage 4 of the CMP process is outlined in **Table 12** along with indicative budgets for each milestone.

Table 13: Forward Plan – Open Coast and Lagoons CMP

#	Milestone (Study / Activity)	Activity Details	Outputs (dataset, report etc)	Cost (ex GST)		CMP Stage (2, 3, 4 5)*	Responsibility	Priority Level**			Other Details / Comments
				Min	Max			Low	Medium	High	
ALL STAGES											
	Ongoing Consultation	Implement CMP Stakeholder Engagement Strategy, with internal resources and external assistance as needed.	<ul style="list-style-type: none">Stakeholders understand the CMP process and how to get involvedCoastal risks and opportunities understood by stakeholders/communityIncreased community trust of technical informationPublic authorities contribute to options assessment and accept roles and responsibilitiesCommunity/stakeholder support for CMP action and priorities	(see stage specific cost estimates)	All stages	<ul style="list-style-type: none">CCC - primaryDPIE EES - secondaryOther state authorities - tertiaryCommunity - tertiary				<ul style="list-style-type: none">Detailed scope of engagement approach documented CMP Stakeholder Engagement StrategyCost estimate breakdowns provided for each Stage	

#	Milestone (Study / Activity)	Activity Details	Outputs (dataset, report etc)	Cost (ex GST)		CMP Stage (2, 3, 4 5)*	Responsibility	Priority Level**			Other Details / Comments
				Min	Max			Low	Medium	High	
• STAGE 2 – DETERMINE RISKS, VULNERABILITIES AND OPPORTUNITIES											
2.1	Define Project Scope & Engage Consultant/s	<ul style="list-style-type: none">Collate available information and define scope of works*.Seek DPIE grantPrepare project briefs*.Release brief for professional services*.Quotation process and approval*.Engage consultant/s.	<ul style="list-style-type: none">Brief/s specifying scope of works completed.Consultant/s engaged	-	-	Stage 2	<ul style="list-style-type: none">CCC - primaryDPIE EES - secondary				<ul style="list-style-type: none">Number of identified studies to be completed in Stage 2 will be dependent on internal budget constraintsHigh priority studies are required to prepare baseline CMP
2.2	Coastal Hazard Definition Study	<ul style="list-style-type: none">Inception meeting.Literature and information review.Obtain data, e.g. LiDAR.Assess coastal hazards – beach erosion, shoreline recession, entrance instability, coastal and tidal inundation, cliff/slope stability, estuarine foreshore/bank erosionModel and map coastal hazards – all hazards (using probabilistic methods for erosion, recession and inundation)Stakeholder and community consultationDraft Coastal Hazard Study for review prior.	<ul style="list-style-type: none">Draft and Final Coastal Hazard StudyHazard maps	\$130,000	\$150,000	Stage 2	<ul style="list-style-type: none">CCC - primaryDPIE EES - secondary				<ul style="list-style-type: none">Study Area: All central coast beaches (including Broken Bay) and coastal lagoonsImportant to have mapping output in format that can map adopted CVA.Various erosion/recession coastal hazard probabilities needed, where CBAs are required in Stage 3Detailed reassessment of hazards needed for erosion/recession and coastal inundationFirst pass geotech assessment for southern areas may be sufficient as a first step. Geotech

		<ul style="list-style-type: none"> Present Study to Council Incorporate changes required by Council Finalise Study 									<ul style="list-style-type: none"> assessment for N does not need significant revision. First pass assessment of bank instability should be sufficient
2.3	Coastal Lagoons Water Quality & Infrastructure Investigations	<ul style="list-style-type: none"> Inception meeting Literature and information review Analyse existing data (infrastructure, water quality) to identify effectiveness of remediation program (e.g. Terrigal, Terrigal Lagoon) and identify future priorities (e.g. Foresters Creek, Avoca Lagoon) Collaborate with internal stakeholders (water & sewer, Roads & Drainage etc) Draft and final report, with remediation actions to embed in CMP 	<ul style="list-style-type: none"> Draft and Final Coastal Lagoons Water Quality Audit 	\$80,000	\$120,000	Stage 2	<ul style="list-style-type: none"> CCC - primary DPIE EES - secondary 				<ul style="list-style-type: none"> Study Area: Cockrone, Terrigal, Avoca, Wamberal Lagoons
2.4	Cabbage Tree Bay Hydrodynamic Modelling	<ul style="list-style-type: none"> Inception meeting Literature and information review Develop a hydrodynamic model to better understand physical processes (flow patterns and flushing timeframe) within Cabbage Tree Harbour Scenario testing for social driven point source pollution events 	<ul style="list-style-type: none"> Hydrodynamic model of Cabbage Tree Harbour Draft and Final hydrodynamic Processes Report 	\$50,000	\$70,000	Stage 2	<ul style="list-style-type: none"> CCC - primary DPIE EES - secondary 				<ul style="list-style-type: none"> Study Area: Cabbage Tree Bay Use of existing data sources (e.g. weather, waves, beach watch, outfall etc) May be an action in CMP

		<ul style="list-style-type: none">• Focus on fluctuations in enterococci and beach safety concerns (Rock Pool)• Draft and final report, documenting outcomes									
2.5	Avoca Lagoon Estuary Processes Study	<ul style="list-style-type: none">• Inception meeting• Literature and information review• Estuary processes study, with a focus on physical processes and the investigation of external and internal nutrient loads and biogeochemical processes that may drive particularly high P & Chl-a levels in the water column• Include (minimum): review of sediment dynamics, the effect of bathymetric changes from historic dredging; and impact of stratification on nutrient cycling.• Analysis of the effect of lagoon opening• Draft and final reports	<ul style="list-style-type: none">• Draft and Final Estuary Processes Study Report	\$80,000	\$100,000	Stage 2	<ul style="list-style-type: none">• CCC - primary• DPIE EES – secondary				<ul style="list-style-type: none">• Study Area: Avoca Lagoon• Note: Current landuse does not adequately explain persistent poor recreational and ecological water quality results in Avoca Lagoon• Existing catchment and lagoon water quality is available

2.6	Wetland Mapping & Management Plan	<ul style="list-style-type: none"> Re-mapping coastal wetlands for southern LGA, using methods adopted in northern LGA. Integrate wetland weed density information Integrate with northern LGA wetland mapping. Develop a prioritised program of remediation works, to be incorporated into relevant CMPs Recommend updates to CM SEPP CW&LR Management Area, if required 	<ul style="list-style-type: none"> Revised coastal wetland mapping for southern LGA Consolidated coastal wetland mapping for Central Coast LGA Draft and Final Wetland Management Report 	\$90,000	\$120,000	Stages 2 & 3	<ul style="list-style-type: none"> CCC - primary DPIE EES - secondary 			<ul style="list-style-type: none"> Study Area: Central Coast coastal zone If completed in Stage 3, actions in this plan should be included in the Stage 4 CMP implementation table This study may also form an action in CMP, if timing/cost does not permit it to be developed as part of the current CMP
2.7	Surf Amenity Assessment & Management Plan	<ul style="list-style-type: none"> Inception meeting Obtain and analyse data Assess characteristics, diversity and significance of Central Coast surfing breaks (local, region and national context) Consult with stakeholders and community Characterise surfing amenity and value provided to lifestyle and economy Identify of opportunities to enhance surfing value and measures to mitigate identified risk to surfing amenity Develop a strategy that maintains and protects surf amenity on the Central Coast 	<ul style="list-style-type: none"> Surf break register Draft and Final Study 	\$30,000	\$60,000	Stages 2 & 3	<ul style="list-style-type: none"> CCC - primary DPIE EES - secondary 			<ul style="list-style-type: none"> Study Area: Central Coast coastline

2.8	Stage 2 Consultation	<p><i>Implement CMP Communication and Engagement Strategy, with internal resources and external assistance, as needed.</i></p> <p><i>To include:</i></p> <ul style="list-style-type: none"> <i>Circulate Draft study reports to stakeholders for comment</i> <i>Conduct community sessions, where warranted (Stage 2, Stage 3), in accordance with Engagement Strategy (e.g. workshops, surveys, drop-in sessions)</i> <i>Input/s from consultants needed for complex/high profile studies (e.g. hazard study)</i> <i>Prepare report/s on consultation activities and outcomes</i> <i>Incorporate consultation finding into Final deliverables of respective studies/activities</i> 	<ul style="list-style-type: none"> <i>Stakeholders and community familiar with Draft Studies</i> <i>Report/s on stakeholder and community feedback, for specific studies as needed</i> <i>Consolidated report of stakeholder and community feedback.</i> 	\$20,000	\$30,000	Stage 2	<ul style="list-style-type: none"> <i>CCC - primary</i> <i>DPIE EES - secondary</i> 				<ul style="list-style-type: none"> <i>Study Area: Central Coast's open coast and lagoons</i> <i>Note: consultation approach and activities to occur on accordance with Councils communication and engagement strategy, which is a 'living document' and will be updated as the CMP progresses</i>
Stage 2 High Priority Activities – SUBTOTAL				\$310,000	\$400,000						
Stage 2 Medium and Low Priority Activities – SUBTOTAL				\$170,000	\$250,000						

#	Milestone (Study / Activity)	Activity Details	Outputs (dataset, report etc)	Cost (ex GST)		CMP Stage (2, 3, 4 5)*	Responsibility	Priority Level**			Other Details / Comments
				Min	Max			Low	Medium	High	
STAGE 3 – IDENTIFY AND EVALUATE OPTIONS											
3.1	Define Project Scope & Engage Consultant/s	<ul style="list-style-type: none">Collate available information and define scope of works*.Seek DPIE grantPrepare project briefs*.Release brief for professional services*.Quotation process and approval*.Engage consultant/s.	<ul style="list-style-type: none">Brief/s specifying scope of works completed.Consultant/s engaged	-	-	Stage 3	<ul style="list-style-type: none">CCC - primaryDPIE EES - secondary				<ul style="list-style-type: none">Number of identified studies to be completed in Stage 2 will be dependent on internal budget constraintsHigh priority studies are required to prepare baseline CMP
3.2	Full Scale Threat and Risk Assessment	<ul style="list-style-type: none">Inception meeting.Detailed risk assessment, that covers coastal hazards and threats to the marine estateOverlay coastal hazard mapping with critical infrastructure and high value land/asset informationRefine and update assessment of risk from threats to marine estate (incl. threats to lagoon ecology, water quality, recreational amenity), based on updated informationIdentify unacceptable risk types and locations, requiring priority action in CMP	<ul style="list-style-type: none">Updated risk assessment	\$15,000	\$20,000	Stage 3	<ul style="list-style-type: none">CCC - primaryDPIE EES - secondary				<ul style="list-style-type: none">Study Area: Study Area: Central Coast's open coast and lagoons

		<ul style="list-style-type: none"> Document findings in Risk Assessment report 									
3.3	Coastal Lagoons Water Quality Improvement Plan	<ul style="list-style-type: none"> Desktop review of existing knowledge and information and best practice Establish environmental values, management goals and water quality objectives Assess condition and water quality issues. <p>Develop a methodology to assess water pollution sources, if required</p> <ul style="list-style-type: none"> Outline management responses to identifies issues. Prioritise sub-catchments. Recommend remediation actions to include in CMP Develop a monitoring, reporting and evaluation program 	<ul style="list-style-type: none"> Draft and Final Water Quality Improvement Program Report 	\$100,000	\$120,000	Stage 3	<ul style="list-style-type: none"> CCC - primary DPIE EES - secondary 				<ul style="list-style-type: none"> Study Area: Cockrone, Terrigal, Avoca, Wamberal Lagoons Study to link with (and perhaps follow on from) 'Coastal Lagoons Water Quality and Infrastructure Investigations' If completed in Stage 3, actions in this plan should be included in the Stage 4 CMP implementation table This study may also form an action in CMP, if timing/cost does not permit it to be developed as part of the current CMP
3.4	Cultural Landscape Plan for the Central Coast's Coastline and Waterways	<ul style="list-style-type: none"> [awaiting advice from Strategic Planning] 	<ul style="list-style-type: none"> Draft and Final Cultural Landscape Plan 	\$30,000	\$40,000	Stage 3	<ul style="list-style-type: none"> CCC - primary DPIE EES - secondary 				<ul style="list-style-type: none"> Study Area: Central Coast coastal zone

3.5	Options Assessment	<ul style="list-style-type: none"> Review previous coastal management actions and update with coastal hazard information, risk assessment findings, and knowledge of current and future issues. Identify and evaluate management options. Engage public authorities on their assets and responsibilities for management options. Prepare Draft Option Assessment Report Present Draft Report to Council and project partners (e.g. public authorities), as appropriate. Incorporate changes required by Council. Finalise Report 	<ul style="list-style-type: none"> Draft and Final Options Assessment Report 	\$30,000	\$50,000	Stage 3	<ul style="list-style-type: none"> CCC - primary DPIE EES - secondary Public authorities – tertiary 				<ul style="list-style-type: none"> Study Area: Central Coast's open coast and lagoons Focus issues/locations identified with an unacceptable risk, including but not limited to sites of significant open coastal hazards where a preferred course of action has not yet been identified Environmental (ecological health, water quality) and community use issues to covered, if/where not addressed by other planning studies (e.g. Water quality improvement plan, wetland management plan)
3.6	Cost Benefit Assessment (+/- Distributional Analysis)	<ul style="list-style-type: none"> Prepare cost benefit assessment (CBA) and distributional analysis to support evaluation of coastal management, when risks, impacts and complexity are high 	<ul style="list-style-type: none"> Cost benefit and distributional analysis to be used as an input into Stage 3 Report 	\$40,000	\$80,000	Stage 3	<ul style="list-style-type: none"> CCC - primary DPIE EES – secondary Public authorities – tertiary 				<ul style="list-style-type: none"> Detailed CBA is required to assess options involving major investment (>\$1M). This may occur when hard of soft protection options are being evaluated for significant open coast hazard locations, for example Fee will be dependent on how many options/locations require a detailed CBA Note: simple and/or intermediate level of economic assessment to be completed

											through options study, for situations where the risk, impact and complexity are low OR where either risks or complexity are high (but both are not high)
3.7	Coastal Hazard Planning Study	<ul style="list-style-type: none"> Coastal hazard planning study, to guide Councils ongoing management of coastal hazards, including: CM SEPP CVA Advice – policy advice on critical hazard to map in CVA and recommended scenarios (timeframes/probabilities) to adopt Coastal Hazards DCP Update – update and harmonise CCC coastal hazard DCP, in line with new legislation, best practice and revised hazard studies (DCP controls for Nth and Sth currently different) Coastal Erosion Policy – prepare a coastal erosion policy that provides Council with advice on strategic management of ongoing erosion risks Activities to be undertaken include: <ul style="list-style-type: none"> Inception meeting Review of information Consultation – with internal (+/- external) stakeholders Prepare draft coastal planning report Present to Council 	<ul style="list-style-type: none"> Draft and Final Coastal Hazard Planning Study Report Revised Coastal Hazard DCP Coastal Erosion Policy 	\$70,000	\$90,000	Stage 3	<ul style="list-style-type: none"> CCC - primary DPIE EES - secondary 				<ul style="list-style-type: none"> Study Area: All of Central Coast's coastal zone CVA advice to discuss pros/cons including various hazard and adopting various scenarios, with a recommended way forward. This will support a Planning Proposal A Planning Proposal will not form part of this study or the CMP process Coastal Erosion Policy may provide a uniform policy that Council applies, in the absence of a preferred course of action identified in a certified CZMP/CMP * External consultation is needed. This may be targeted or wrapped into broader consultation piece. Upper fee includes targeted (study specific), consultant led, consultation program

		<ul style="list-style-type: none"> Finalise study report 									
3.8	Stage 3 Consultation	<ul style="list-style-type: none"> Engage with stakeholders and community public authorities on their assets and responsibilities for management options. Conduct community & stakeholder workshops. <p>Implement CMP Communication and Engagement Strategy, with internal resources and external assistance, as needed.</p> <p>To include:</p> <ul style="list-style-type: none"> Circulate Draft Stage 3 Summary Report and background studies/assessment to stakeholders for comment Conduct community and stakeholder sessions, where warranted (Stage 2, Stage 3), in accordance with Engagement Strategy (e.g. workshops, surveys, drop-in sessions) Input/s from consultants needed for complex/high profile studies (e.g. hazard study) Prepare report/s on consultation activities and outcomes <p>Incorporate consultation finding into Final deliverables of respective studies/activities</p>	<ul style="list-style-type: none"> Stakeholders and community familiar with, and input to draft studies/ assessments Report/s on stakeholder and community feedback, for specific studies as needed Consolidated report of stakeholder and community feedback. 	\$20,000	\$30,000	Stage 3	<ul style="list-style-type: none"> CCC - primary DPIE EES – secondary Public authorities – tertiary 				<ul style="list-style-type: none"> Study Area: Central Coast's open coast and lagoons Note: consultation approach and activities to occur on accordance with Councils communication and engagement strategy, which is a 'living document' and will be updated as the CMP progresses

3.9	Stage 3 Summary Report	<ul style="list-style-type: none"> • Prepare an overarching (or summary) report that draws all learnings together from Stage 3 into an integrated recommended pathway forward • Draft report and update with consultation feedback • Council approval of changes made • Final Stage 3 Report submitted to Council 	<ul style="list-style-type: none"> • Draft and Final Stage 3 Options Evaluation Summary Report 	\$10,000	\$15,000	Stage 3	<ul style="list-style-type: none"> • CCC - primary • DPIE EES – secondary • Public authorities – tertiary 				<ul style="list-style-type: none"> • This report will form the main consultation piece for Stage 3
• Stage 3 High Priority Activities – SUBTOTAL				\$185,000	\$285,000						
• Stage 3 Medium and Low Priority Activities – SUBTOTAL				\$130,000	\$160,000						

#	Milestone (Study / Activity)	Activity Details	Outputs (dataset, report etc)	Cost (ex GST)		CMP Stage (2, 3, 4 5)*	Responsibility	Priority Level**			Other Details / Comments
				Min	Max			Low	Medium	High	
• STAGE 4 – PREPARE, EXHIBIT, FINALISE, CERTIFY AND ADOPT COASTAL MANAGEMENT PROGRAM											
4.1	Define Project Scope & Engage Consultant/s	<ul style="list-style-type: none">Collate available information and define scope of works*.Seek DPIE grantPrepare project brief*.Release brief for professional services*.Quotation process and approval*.Engage consultant/s.	<ul style="list-style-type: none">Brief/s specifying scope of works completed.Consultant/s engaged	-	-	Stage 4	<ul style="list-style-type: none">CCC - primaryDPIE EES - secondary				
4.2	Draft Coastal Management Program	<ul style="list-style-type: none">Inception meeting.Snapshot of issues (coastal processes, coastal hazards, threats to coastal ecosystems and values, priority coastal management issues for the CMP).Actions to be implemented by Council.Actions to be undertaken by public authorities.Business Plan.Coastal Zone Emergency Action Subplan/sMapping	<ul style="list-style-type: none">Draft Coastal Management Program completed, including implementation schedule of prioritised actions, with IP&R links (Council actions only).	\$40,000	\$50,000	Stage 4	<ul style="list-style-type: none">CCC - primaryDPIE EES – secondaryPublic authorities – tertiary				<ul style="list-style-type: none">Study Area: Open Coast and LagoonsCouncil action to have IP&R links (Council actions only).Coastal Zone Emergency Action Subplan/s to be prepared in consultation with State authorities. An overarching framework is needed, with site specific details based on local conditions. There may be value in draft this component during Stage 3

		<ul style="list-style-type: none"> Draft Coastal Management Program. 									
4.3	Consultation & Exhibition	<ul style="list-style-type: none"> Present draft Coastal Management Program to Councillors. Circulate Draft Coastal Management Program (and associated Coastal Zone Emergency Action Subplan) to stakeholders for comment Engagement with community regarding draft CMP content, including the intent to make a Planning Proposal Publicly exhibit Draft Coastal Management Program. Stakeholders and community provide feedback on Draft Coastal Management Program 	<ul style="list-style-type: none"> Draft Coastal Management Program (and associated Coastal Zone Emergency Action Subplan) approved by Council for consultation. Stakeholders and community familiar with Draft Coastal Management Program. Written support received by relevant stakeholders for actions within respective areas of responsibility Consolidated report of community and stakeholder feedback 	\$10,000	\$15,000	Stage 4	<ul style="list-style-type: none"> CCC - primary DPIE EES – secondary Public authorities – tertiary 				
4.4	Finalise Coastal Management Program	<ul style="list-style-type: none"> Summary of changes required provided to consultant. Update Coastal Management Program in response to comments. Council approval of changes made by consultant. Final Coastal Management Program submitted to Council. 	<ul style="list-style-type: none"> Coastal Management Program (and associated Coastal Zone Emergency Action Subplan) adopted by Council. (noting that the CMP includes an intention to prepare a planning proposal for the purposes of creating or amending the CM SEPP maps); Coastal Management Program provided to DPIE. 	\$15,000	\$20,000	Stage 4	<ul style="list-style-type: none"> CCC - primary DPIE EES – secondary Public authorities – tertiary 				

			<ul style="list-style-type: none"> Coastal Management Program submitted to the Minister for certification. Gazettal of Certified Coastal Management Program. 									
<ul style="list-style-type: none"> Stage 4 High Priority Activities – SUBTOTAL 				\$65,000	\$85,000							

#	Milestone (Study / Activity)	Activity Details	Outputs (dataset, report etc)	Cost (ex GST)		CMP Stage (2, 3, 4 5)*	Responsibility	Priority Level**			Other Details / Comments
				Min	Max			Low	Medium	High	
PLANNING PROPOSAL											
5	Planning Proposal	<ul style="list-style-type: none">Preparation of the planning proposal, based on CMP studies, including justification, consultation details, maps and project timelines, and identifying the need to Minister to approve the map when the instrument is made.Gateway determination of planning proposal by Minister.Public exhibition of planning proposal.Submissions received, considered and post exhibition report to Council.Council forwards planning proposal to DPIE, if authorised by Council determination.DPIE refers the map and planning proposal to Parliamentary Counsels Office for preparation of the LEP instrument.	<ul style="list-style-type: none">Instrument made by Minister or delegate and the maps (created or amended by LEP) are declared to be maps for the purposes of the CM Act and CM SEPP.	\$10,000	\$15,000	N/A	<ul style="list-style-type: none">CCC - primaryDPIE EES – secondary				
Planning Proposal – SUBTOTAL				\$10,000	\$15,000						

*** COASTAL MANAGEMENT PROGRAM (CMP) STAGES:**

Stage 1: Identify the scope of the CMP (scoping study);

Stage 2: Determine risks, vulnerabilities and opportunities (technical investigations);

Stage 3: Identify and evaluate options (options assessment);

Stage 4: Prepare, exhibit, finalise, certify and adopt the CMP (develop CMP);

Stage 5: Implement, monitor, evaluate and report (implementation)

**** PRIORITY LEVEL:**

High: Critical knowledge gap and/or investigation needed to inform the CMP (a 'must have' study that is also achievable given current financial and resourcing constraints);

Medium: Important knowledge gap and/or investigation that would add good value to the CMP (a 'must have' or 'nice to have' study that may not be affordable or achievable given current financial and resourcing constraints);

Low: A knowledge gap and/or investigation that would add value to management of the CC coastal zone (a 'nice to have' study that is not affordable or achievable given current financial and resourcing constraints).

Given the financial and resourcing pressures on Central Coast Council that is expected to be experienced over the period of development of the Coastal Management Program, it is acknowledged that only the 'High' priority studies listed above will likely be achievable. This will mean in some cases some knowledge gaps will need to be filled in the future through adopted 'actions' in the CMP.

8.2 Summary of the forward program for delivery of the Open Coast & Lagoons CMP

Table 14: Summary of forward program for delivery of Open Coast & Lagoons CMP

#	Stage	Milestone	Activity Type	Lower	Upper	Priority
2.1	2	Define Project Scope & Engage Consultant/s	Technical	\$ -	\$ -	High
2.2.	2	Coastal Hazard Definition Study	Technical	\$ 130,000	\$ 150,000	High
2.3	2	Coastal Lagoons Water Quality & Infrastructure Investigations	Technical	\$ 80,000	\$ 120,000	High
2.4	2	Cabbage Tree Bay Hydrodynamic Modelling	Technical	\$ 50,000	\$ 70,000	Low
2.5	2	Avoca Lagoon Estuary Processes Study	Technical	\$ 80,000	\$ 100,000	High
2.6	2	Wetland Mapping & Management Plan	Technical	\$ 90,000	\$ 120,000	Medium
2.7	2	Surf Amenity Assessment & Management Plan	Technical	\$ 30,000	\$ 60,000	Low
2.8	2	Stage 2 Consultation	Consultation	\$ 20,000	\$ 30,000	High
3.1	3	Define Project Scope & Engage Consultant/s	Technical	\$ -	\$ -	High
3.2	3	Full Scale Threat and Risk Assessment	Technical	\$ 15,000	\$ 20,000	High
3.3	3	Coastal Lagoons Water Quality Improvement Plan	Technical	\$ 100,000	\$ 120,000	Medium
3.4	3	Cultural Landscape Plan for the Central Coast's Coastline and Waterways	Technical	\$ 30,000	\$ 40,000	Low
3.5	3	Options Assessment	Technical	\$ 30,000	\$ 50,000	High
3.6	3	Cost Benefit Assessment (+/- Distributional Analysis)	Technical	\$ 40,000	\$ 80,000	High
3.7	3	Coastal Hazard Planning Study	Technical	\$ 70,000	\$ 90,000	High
3.8	3	Stage 3 Consultation	Consultation	\$ 20,000	\$ 30,000	High
3.9	3	Stage 3 Summary Report	Technical	\$ 10,000	\$ 15,000	High
4.1	4	Define Project Scope & Engage Consultant/s	Technical	\$ -	\$ -	High
4.2	4	Draft Coastal Management Program	Technical	\$ 40,000	\$ 50,000	High
4.3	4	Consultation & Exhibition	Consultation	\$ 10,000	\$ 15,000	High
4.4	4	Finalise Coastal Management Program	Technical	\$ 15,000	\$ 20,000	High
5	5	Planning Proposal	Technical	\$ 10,000	\$ 15,000	High

TABLE: COST BREAKDOWN PER STAGE

		SUBTOTALS	Lower	Upper	Average
Stage	All	All Stages/Studies	\$ 870,000	\$ 1,195,000	\$ 1,035,000
Stage	2	STAGE 2 studies	\$ 480,000	\$ 650,000	\$ 565,000
Stage	3	STAGE 3 studies	\$ 315,000	\$ 445,000	\$ 380,000
Stage	4	STAGE 4 studies	\$ 65,000	\$ 85,000	\$ 75,000
Stage	5	STAGE 5 studies	\$ 10,000	\$ 15,000	\$ 15,000

TABLE: PRIORITY BASED COST BREAKDOWN PER STAGE

		SUBTOTALS	Lower	Upper	Average
Priority	High	All Stages high priority studies	\$ 570,000	\$ 785,000	\$ 680,000
Priority	Medium	All Stages MEDIUM PRIORITY studies	\$ 190,000	\$ 240,000	\$ 215,000
Priority	Low	All Stages LOW PRIORITY studies	\$ 110,000	\$ 170,000	\$ 140,000

TABLE: COST BREAKDOWN PER STAGE

		SUBTOTALS	Lower	Upper	Average
Activity Type	Technical	All TECHNICAL activities	\$ 820,000	\$ 1,120,000	\$ 970,000
Activity Type	Consultation	All CONSULTATION activities	\$ 50,000	\$ 75,000	\$ 65,000

8.3 Forward program for delivery of Open Coast & Lagoons CMP

The forward program for CMP delivery based on the key CMP milestones is outlined in **Table 14**.

Table 15: Forward Program for Open Coast & Lagoons CMP Stages 2-4.

	Milestone	Estimated Completion Date
STAGE 2 – DETERMINE RISKS, VULNERABILITIES AND OPPORTUNITIES		
2.1	Define Project Scope & Engage Consultant/s	December 2021
2.2	Coastal Hazard Definition Study	June 2022
2.3	Coastal Lagoons Water Quality & Infrastructure Investigations	June 2022
2.4	Cabbage Tree Bay Hydrodynamic Modelling	Not Progressed
2.5	Avoca Lagoon Estuary Processes Study	June 2022
2.6	Wetland Mapping & Management Plan	September 2021
2.7	Surf Amenity Assessment & Management Plan	June 2022
2.8	Stage 2 Consultation	August 2022
STAGE 3 – IDENTIFY AND EVALUATE OPTIONS		
3.1	Define Project Scope & Engage Consultant/s	August 2022
3.2	Full Scale Threat and Risk Assessment	TBC
3.3	Coastal Lagoons Water Quality Improvement Plan	TBC
3.4	Cultural Landscape Plan for the Central Coast's Coastline and Waterways	TBC
3.5	Options Assessment	TBC
3.6	Cost Benefit Assessment (+/- Distributional Analysis)	TBC
3.7	Coastal Hazard Planning Study	TBC

Project related

3.8	Stage 3 Consultation	December 2022
3.9	Stage 3 Summary Report	December 2022
	STAGE 4 – PREPARE, EXHIBIT, FINALISE, CERTIFY AND ADOPT COASTAL MANAGEMENT PROGRAM	
4.1	Define Project Scope & Engage Consultant/s	December 2022
4.2	Draft Coastal Management Program	March 2023
4.3	Consultation & Exhibition	April 2023
4.4	Certified Coastal Management Program	June 2023
	PLANNING PROPOSAL	
5	Planning Proposal	June 2023

8.4 Potential funding program

The above costs associated with delivery of the CMP(s) can be partly funded by the Coastal and Estuary Grants Program administered by DPIE. A number of activities are ineligible for DPIE grant funding as defined as 'Recipients Core Activities'. These activities include preparation of study briefs, review of proposals and tenders, researching and copying the Recipient's records, attending meetings, contract administration, accounting costs, and liaising with the public and government agencies.

Under the current guidelines, Council will need to match the contribution by the state government. Council cannot use in-kind contributions nor other grant funds as matching contributions.

This program offers funding for coastal and estuary planning activities, including:

- development of a CMP;
- transitioning a Coastal Zone Management Plan (CZMP) into a CMP; and,
- undertaking investigations and designs or cost benefit analyses for infrastructure works recommended in a certified CZMP or CMP.

The savings, transitional and other provisions of the *Coastal Management Act 2016* state that a Coastal Zone Management Plan in force under the former Act (such as the Gosford CZMP) ceases to have effect at the end of 31 December 2021. Actions contained within the certified Gosford CZMP will no longer be eligible for State Government funding after this date.

In order to continue effective management of the coastline under current legislation, and with the financial and technical support of the State Government, it is important that Council seek to deliver updated CMP(s), in accordance with the CM Act, for part or all of the Central Coast LGA within reasonable timeframes.

Funding is available for implementation of actions identified in certified Coastal Zone Management Plans or Coastal Management Programs that are within:

- Coastal Vulnerability Area
- Coastal Wetland and Littoral Rainforest Areas
- Coastal Environment Area
- Coastal Use Area.

Councils in locations identified as significant open coastal hazards may apply for funding throughout the year for works that cannot wait until the next funding round. Funding is available for works that directly reduce/mitigate coastal hazards related to a significant open coastal hazard site. Locations within the Central Coast LGA that have been identified as having significant open coastal hazards are:

- Noraville
- Norah Head
- The North Entrance
- Wamberal/Terrigal

The adoption and certification of CMP(s) will enable the funding and implementation of long-term management actions that will provide benefits to the local community by improving and maintaining environmental attributes, beach amenity and public safety, and protecting public and private assets in areas subjected to current and future coastal hazards.

On 30 October 2020, the Minister for Local Government, Shelley Hancock announced the suspension of the elected Council and the appointment of Dick Persson as the interim Administrator of Central Coast Council for an initial period of three months. On 2 December 2020, Persson delivered the first 30-day interim report which revealed "catastrophic budget mismanagement", including accumulated losses of \$232 million since 2016, increased debt from \$317 million (2016) to \$565 million (2020), and an estimated operating loss of \$115 million for 2020/2021 financial year (Persson, 2020).

The combined influence of COVID-19 and Council Administration on the financial capacity of Central Coast Council to commit to actions may be a consideration during development of future CMP's.

9 Glossary and Abbreviations

ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
BoM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
Council	Central Coast Council
CM Act	<i>Coastal Management Act 2016</i>
CM SEPP	State Environmental Planning Policy (Coastal Management) 2018
CMP	Coastal Management Program
CZMP	Coastal Zone Management Plan
DCP	Development Control Plan
DECC	Department of Environment Climate Change (now DPIE)
DOE	Department of Environment (now DPIE)
Dol	Department of Industry (now DPIE)
DPE	Department of Planning and Environment (now DPIE)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	<i>Fisheries Management Act 1994</i>
FM Regulation	<i>Fisheries Management (General) Regulation 2002</i>
ICOLL	Intermittently Closed and Open Lake/Lagoon
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LEP	Local Environment Plan
LGA	Local Government Area
MEMA	Marine Estate Management Authority
MHWS	Mean High Water Springs
MIDO	Maritime Infrastructure Delivery Office
MLWM	Mean Low Water Mark
NES	National Environmental Significance
NOW	NSW Office of Water
NPWS	National Parks and Wildlife Services
NSR	National Surfing Reserve
OEH	Office of Environment and Heritage (now DPIE)
PoEO Act	<i>Protection of the Environment Operations Act 1997</i>
REF	Review of Environmental Factors
RMS	Roads and Maritime Services
SEPP CM	State Environmental Planning Policy (Coastal Management) 2018
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
SLSC	Surf Life Saving Club
TSC Act	<i>Threatened Species Conservation Act 1995</i>
TfNSW	Transport for New South Wales

10 References

ABC News (2020), Kontominas, Bellinda; ["NSW Government suspends Central Coast Council, appoints administrator over \\$89 million debt"](#). Retrieved 30 October 2020.

Advisory Taskforce (2020) Wamberal Seawall Advisory Taskforce Meeting Record – 8 December. <https://www.centralcoast.nsw.gov.au/council/meetings/wamberal-seawall-advisory-taskforce>

Australian Bureau of Statistics (ABS) (2016), 2016 Census QuickStats. https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/LGA11650?opendocument [accessed 23 July 2020]

Beachwatch (2019); "State of the beaches 2018-2019 Central Coast region", State of NSW and Department of Planning, Industry and Environment (DPIE)

BMT WBM (2015), Coastal Zone Management Plan for Gosford Lagoons, prepared for Gosford City Council.

BMT WBM (2018), Wyong Coastal Zone Management Plan 2018 Final Draft Report, prepared for Central Coast Council.

Cardno Lawson Treloar (Cardno) (2010), Gosford Coastal Lagoons Processes Study, prepared for Gosford City Council.

CSIRO and Bureau of Meteorology, 2015: Climate Change in Australia Information for Australia's Natural Resource Management Regions: Technical Report
Available online at <http://www.climatechangeinaustralia.gov.au/en/publications-library/technical-report/>

CSIRO (2007), Climate change in Australia : technical report Available online at <http://www.climatechangeinaustralia.gov.au/en/publications-library/technical-report/>

Central Coast Council (2018), "One Central Coast" Community Strategic Plan 2018-2028, available at <https://cdn.centralcoast.nsw.gov.au/sites/default/files/Community-strategic-plan-2018-2025.pdf>

Central Coast Council (Council) (2019), "draft Central Coast Council Biodiversity Strategy". Available online: https://www.yourvoiceourcoast.com/sites/default/files/2020-06/Central_Council_Biodiversity_Strategy_2019_v1.pdf

Central Coast Council (2019b), *Central Coast Council Community Participation Plan* https://cdn.centralcoast.nsw.gov.au/sites/default/files/Council/communityparticipationplan_1.pdf

Central Coast Council (Council) (2020a), *State Of The Environment Report*. Available online at: https://cdn.centralcoast.nsw.gov.au/sites/default/files/Council/full-report_0.pdf

Central Coast Council (Council) (2020b), "*Central Coast Economic Development Strategy 2020-2040*". Available online: <https://cdn.centralcoast.nsw.gov.au/sites/default/files/Council/Strategies/finalccc-economicdevelopmentstrategy2020-2040-copy.pdf>

Central Coast Council (Council) (2020c), Cultural Plan 2020-2025. Available online: <https://cdn.centralcoast.nsw.gov.au/sites/default/files/Recreation/ccc-culturalplan2020.pdf>

Central Coast Council (Council) (2020d), Coastlines. Available online:
<https://www.centralcoast.nsw.gov.au/environment/coastlines>

Central Coast Council (2020e), *Draft Central Coast Council Community Participation Plan*
https://www.yourvoiceourcoast.com/sites/default/files/2020-10/community_participation_plan_for_council_-_copy.pdf

Council (2020) Wamberal Beach Terminal Protection and Sand Nourishment - Investigation and Concept Design webpage | Your Voice Our Coast – Central Coast Councils engagement website.
<https://www.yourvoiceourcoast.com/wamberalerosion>

DAWE (2020) Department of Agriculture Water and the Environment, EPBC Act Protected Matters Report,
<https://www.environment.gov.au/epbc/protected-matters-search-tool> accessed 16/12/2020

DPE (2016), *Central Coast Regional Plan 2036*, Department of Planning and Environment

DPIE (2016) NSW Coastal Management Manual Part B: Stage 1 – Identify the scope of a coastal management program. Published by the NSW Office of Environment and Heritage.

DPIE (2017), *Coastal Erosion in New South Wales Statewide Exposure Assessment*, NSW Government

DPIE (2018) *Guidelines for community and stakeholder engagement in preparing and implementing a CMP*, NSW Government

DPIE (2020), *Coastal and Estuary Grants Program Guidelines for applicants 2020-21*, NSW Government

DPIE – Crown Lands (2021), *Letter providing feedback re Central Coast Council Coastal Management Program – Open Coast and Lagoons - Scoping Study April 2021*, Manager Coastal Unit, dated 25 June 2021.

GBA (2006) Wamberal Beach Basement Structures: Development of a provisional model for assessment of additional coastal hazards; Gary Blumberg Principal, Gary Blumberg and Associates (GBA); Presentation to the 2006 NSW Coastal Conference

GSC (2020) Central Coast Strategy, Greater Sydney Commission;
<https://www.greater.sydney/content/central-coast-strategy-drive-regions-growth>

Haines, P. E. (2008), *ICOLL Management: Strategies for a Sustainable Future*. BMT WBM Pty Ltd.

Hemer, M.A., K.L. McInnes, and R. Ranasinghe, 2013: Projections of climate change-driven variations in the offshore wave climate off south eastern Australia. *International Journal of Climatology*, 33(7), 1615-1632.

Hughes, M., 2016: Coastal waves, water levels, beach dynamics and climate change. CoastAdapt, National Climate

Central Coast Council (Council) (1995), *Coastal Lagoons Management Plan*.

iD Community (2020); online demographic reporting tool. Available online: <https://profile.id.com.au/central-coast-nsw/about?WebID=10>

IPCC, 2007: *Climate Change 2007: Synthesis Report*. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change

Lord & Macdonald (2016) "Managing Wamberal Beach – The Forgotten Twin"; Presentation to the 2016 NSW Coastal Conference

MEMA (Marine Estate Management Authority) (2018) *Marine Estate Management Strategy 2018–2028*

MHL (2020) Terminal Protective Structure Project Team Briefing. Presentation by the Manly Hydraulics Laboratory to the Wamberal Seawall Advisory Taskforce on 8 September, 2020.

<https://www.centralcoast.nsw.gov.au/council/meetings/wamberal-seawall-advisory-taskforce>

NPWS (2020) (NSW National Parks & Wildlife Service), Bouddi National Park Plan of Management; Department of Planning, Industry and Environment

NSW Office of Local Government (2019) The NSW Integrated planning and reporting framework. Accessed online at <https://www.olg.nsw.gov.au/councils/integrated-planning-and-reporting/framework>

Office of Environment and Heritage (DPIE, 2017) "*Coastal Erosion in New South Wales Statewide Exposure Assessment*".

Office of the Minister for the Environment (2018), *Response letter to the draft Wyong CZMP 2018*, provided by Central Coast Council.

Paice, R., and Chambers, J., 2016: Climate change adaptation planning for protection of coastal ecosystems. CoastAdapt Information Manual 10, National Climate Change Adaptation Research Facility, Gold Coast.

Patterson Britton & Partners [PBP] (1998), *Broken Bay Beaches Coastal Processes Study*, Issue No. 5, May 1998, for Gosford City Council.

Persson, Dick (2 December 2020). "[Administrator's 30 Day Interim Report](#)" (PDF). Central Coast Council. Retrieved 20 December 2020.

Shirley Consulting Engineers (2010), *Report on the Geotechnical Issues associated with the Coastline Hazard Management Study for the Wyong Shire Council*, developed for Umwelt, 2011.

Short, A.D. (2007), *Beaches of the New South Wales coast: a guide to their nature, characteristics, surf and safety*. Sydney: Sydney University Press.

SMEC (2010), *Wyong Coastal Hazard Study Main Report*, developed for Umwelt, 2011.

Umwelt (2011a), *Coastal Zone Management Plan for the Wyong Coastline*, prepared for Wyong Shire Council by Umwelt (Australia) Pty Ltd, December 2011.

Umwelt (2011b), *Coastal Zone Management Plan for the Wyong Coastline: Supporting Information Volume 1*, prepared for Wyong Shire Council by Umwelt (Australia) Pty Ltd, November 2011.

WBM BMT for MEMA (2017), *NSW Marine Estate Threat and Risk Assessment Report*.

WorleyParsons (2014) Open Coast and Broken Bay Beaches Coastal Processes and Hazard Definition Study. Report by WorleyParsons to Gosford City Council.

WorleyParsons (2015) Open Coast and Broken Bay Beaches Coastal Zone Management Study. Report by WorleyParsons to Gosford City Council.



WorleyParsons (2017) Gosford Beaches Coastal Zone Management Plan. Report by WorleyParsons to Gosford City Council.

Appendix A - EPBC Act Protected Matters Report - Central Coast



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

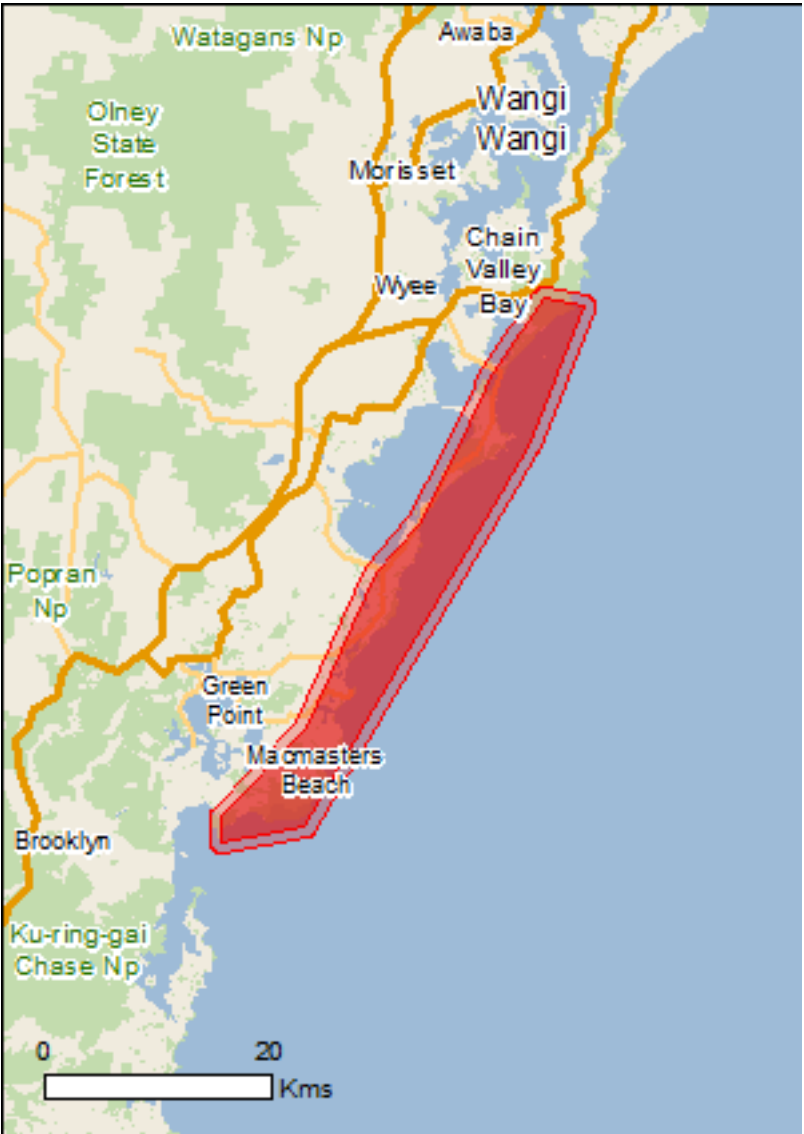
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 16/12/20 20:09:00

- [Summary](#)
- [Details](#)

[Matters of NES](#)[Other Matters Protected by the EPBC Act](#)[Extra Information](#)
- [Caveat](#)
- [Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	87
Listed Migratory Species:	77

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	5
Commonwealth Heritage Places:	None
Listed Marine Species:	101
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	8
Regional Forest Agreements:	1
Invasive Species:	49
Nationally Important Wetlands:	6
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community may occur within area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche bulleri_platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus_cucullatus Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area
Fish		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus_maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll	Endangered	Species or species

Name	Status	Type of Presence
(southeastern mainland population) [75184]		habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat may occur within area
Angophora inopina Charmhaven Apple [64832]	Vulnerable	Species or species habitat likely to occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Astrotricha crassifolia Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat known to occur within area
Corunastylis insignis Wyong Midge Orchid 1, Variable Midge Orchid 1 [84692]	Critically Endangered	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Diuris praecox Newcastle Doubletail [55086]	Vulnerable	Species or species habitat known to occur

Name	Status	Type of Presence
		within area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus parramattensis subsp. decadens Earp's Gum, Earp's Dirty Gum [56148]	Vulnerable	Species or species habitat likely to occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchiid [7528]	Endangered	Species or species habitat likely to occur within area
Grevillea shiressii [19186]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Prostanthera askania Tranquillity Mintbush, Tranquillity Mintbush [64958]	Endangered	Species or species habitat known to occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat known to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known

Name	Status	Type of Presence
to occur within area		
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		
[Resource Information]		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Breeding known to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
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The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited

Listed Marine Species	[Resource Information]
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* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area

Name	Threatened	Type of Presence
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species

Name	Threatened	Type of Presence
Numenius minutus Little Curlew, Little Whimbrel [848]		habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Breeding known to occur within area
Puffinus pacificus Wedge-tailed Shearwater [1027]		Breeding known to occur within area
Puffinus tenuirostris Short-tailed Shearwater [1029]		Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]		Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Breeding known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]		Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat likely to occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species

Name	Threatened	Type of Presence
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		habitat may occur within area Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Name		State
Bird Island		NSW
Bouddi		NSW
Cockle Bay		NSW
Gosford Coastal Open Space System		NSW
Munmorah		NSW
Wamberal Lagoon		NSW
Wambina		NSW
Wyrabalong		NSW

Regional Forest Agreements		[Resource Information]
Note that all areas with completed RFAs have been included.		
Name		State
North East NSW RFA		New South Wales

Invasive Species		[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.		

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern		Species or species

Name	Status	Type of Presence
[23255]		habitat likely to occur within area
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera		
Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata		
Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius		
Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati		
Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes		
Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana		
Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana		
Broom [67538]		Species or species habitat may occur within area
Lantana camara		
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum		
African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana		
Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Opuntia spp.		
Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata		
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla		
Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss,		Species or species

Name	Status	Type of Presence
Kariba Weed [13665]		habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Avoca Lagoon	NSW
Brisbane Water Estuary	NSW
Cockrone Lagoon	NSW
Terrigal Lagoon	NSW
Tuggerah Lake	NSW
Wamberal Lagoon	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.190277 151.600088,-33.195448 151.631673,-33.289057 151.587041,-33.537806 151.411947,-33.547535 151.346029,-33.53151 151.346029,-33.473108 151.412633,-33.371096 151.467565,-33.338978 151.501211,-33.294796 151.528676,-33.250018 151.553396,-33.239106 151.560262,-33.190277 151.600088

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- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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Appendix B1 - Gosford Beaches CZMP - Actions Table 2021



Gosford Beaches CZMP Actions													
Beach	Action ID	Management Category	Strategy Outline	Timing	Location	Primary Responsibility	Project Status	Complete	Commenced	Ongoing	Not Commenced	Unknown	
Avoca/Nth Avoca	A1	Works	Construct seawall to protect water and sewer infrastructure and improve beach access/amenity in front of the surf club	Short term (< 5 yrs)	Avoca Beach SLSC and carpark	GCC	Complete	1	1	0	0	0	0
Avoca/Nth Avoca	A10	Works	Repair of beach accessways and revegetation of dune following erosion in a large storm event	Short term as needed (< 5 yrs)	Properties on Avoca Drive and undermining of Norfolk Island pines	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A11	Works	Encourage and assist Dunecare group to improve dune vegetation management using appropriate endemic vegetation	Short term as needed (< 5 yrs)	Properties on Avoca Drive and undermining of Norfolk Island pines	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A12	Monitoring	Monitor Norfolk Island pine stability	Short term and ongoing	Avoca Drive Norfolk Island pines	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A13	Planning	Development controls for residences to be above inundation levels on redevelopment of properties	Ongoing	Properties south of Austral Avenue	GCC	Complete	1	1	0	0	0	0
Avoca/Nth Avoca	A14	Works	Erosion protection works in front and around the stormwater outlet should storm erosion occur	Ongoing	SW outlets	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A15	Works	Improve energy dissipation at stormwater outlets	Ongoing	SW outlets	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A16	Planning	Development controls for residences to be above inundation levels on redevelopment of properties	Ongoing	Avoca Lake Entrance	GCC	Complete	1	1	0	0	0	0
Avoca/Nth Avoca	A17	Planning	Review entrance management guidelines for mechanical opening of Avoca Lake	Short term (< 5 yrs)	Avoca Lake Entrance	GCC	Complete	1	1	0	0	0	0
Avoca/Nth Avoca	A18	Planning	Allow property owners to self-protect in line with NSW Government legislation and provisions for installation of Temporary Coastal Protection Works	Ongoing	Avoca Lake Entrance	OEH	Complete	1	1	0	0	0	0
Avoca/Nth Avoca	A19	Works	Encourage and assist Dunecare group to improve dune vegetation	Ongoing	Avoca Lake Entrance	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A2	Planning	Survey floor levels to determine degree of inundation hazard	Short term (< 5 yrs)	Avoca Beach SLSC and carpark	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A20	Works	Relocation of sand to improve beach access and amenity	Short term as needed (< 5 yrs)	Avoca Lake Entrance	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A21	Works	Repair damage to carpark and other infrastructure should storm erosion occur	As required	Ficus Ave carpark	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A22	Works	Beach scraping to build dune in front of carpark and properties 165 Avoca Drive to 15 Ficus Avenue	Short term as needed (< 5 yrs)	Ficus Ave carpark	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A23	Planning	Allowing development landward of a specially defined building line with piled foundations into the 2100 Stable Foundation Zone	Ongoing	North Avoca	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A24	Planning	Development approval conditions for new developments to specify that connection to services are to be maintained by owner in the event of storm erosion	Ongoing	North Avoca	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A25	Works	Erosion protection works (temporary) to be allowed for properties	Short - Medium Term (0 - 20yrs)	North Avoca	Landowners,	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A26	Monitoring	Monitor storm run-up levels and dune erosion	Ongoing	North Avoca	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A27	Works	Terminal seawall protection for all the properties	Long Term (>20yrs)	North Avoca	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A28	Works	Terminal seawall protection for the properties north from the Surf Club only	Short-medium term (0-20 years)	North Avoca	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A29	Planning	Investigate beach nourishment to increase erosion buffer in this area	Short term (< 5 yrs)	North Avoca	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A3	Works	Repair damage to carpark and other infrastructure should storm erosion occur	As required, unlikely if A1 implemented	Avoca Beach SLSC and carpark	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A30	Works	Repair of beach accessways and revegetation of dune following erosion in a large storm even	Short term as needed (< 5 yrs)	North Avoca	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A31	Works	Encourage and assist Dunecare group to improve dune vegetation	Ongoing	North Avoca	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A32	Planning	Development controls for residences to be above inundation levels on redevelopment of properties	Ongoing	North Avoca	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A33	Works	Improve energy dissipation at stormwater outlets	Short term (< 5 yrs)	North Avoca	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A34	Works	Repair damage to surf club carpark should storm erosion occur	As required	North Avoca SLSC and carpark	GCC	Ongoing	1	0	0	1	0	0

Gosford Beaches CZMP Actions

Avoca/Nth Avoca	A35	Works	Beach scraping to build vegetated dune in front of surf club and carpark above the wave runoff level with vegetation and/or fencing	Short term (< 5 yrs)	North Avoca SLSC and carpark	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A36	Planning	Confirm whether SLSC is constructed on deep pile foundations and reconstruct on deep pile foundations on redevelopment of the club if required	Medium term (5-20 yrs)	North Avoca SLSC	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A4	Works	Beach scraping to build vegetated dune in front of SLSC and Car Park	Short term (< 5 yrs)	Avoca Beach SLSC and carpark	GCC	Commenced	1	0	1	0	0	0
Avoca/Nth Avoca	A5	Monitoring	Monitor performance of existing rock works in front of surf club and carpark following a large storm	Ongoing	Avoca Beach SLSC and carpark	GCC	Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A6	Planning	Development controls based on a defined building line with new buildings to be founded into 2100 Stable Foundation Zone	Ongoing	Properties on Avoca Drive	GCC	Complete	1	1	0	0	0	0
Avoca/Nth Avoca	A7	Works	Erosion protection works to be allowed for properties for emergency protection	Short - Medium Term (0 - 20yrs)	Properties on Avoca Drive		Ongoing	1	0	0	1	0	0
Avoca/Nth Avoca	A8	Planning	Investigate beach nourishment to increase erosion buffer in this area	Medium term (5 – 20 yrs)	Properties on Avoca Drive	GCC	Not Commenced	0	0	0	0	1	0
Avoca/Nth Avoca	A9	Works	Beach scraping to build dune in front of residences	Short term (< 5 yrs)	Properties on Avoca Drive and undermining of Norfolk Island pines		Not Commenced	0	0	0	0	1	0
Copacabana	C1	Works	Encourage and assist Dunecare group and local residents to maintain and revegetate dune	Ongoing	Precinct 3	GCC	Ongoing	1	0	0	1	0	0
Copacabana	C10	Planning	Geotechnical investigation around surf club area and on landward side of Del Monte Place to confirm level of bedrock and reduced foundation capacity hazard	Short term (< 5 yrs)	Precinct 3	GCC	Not Commenced	0	0	0	0	1	0
Copacabana	C11	Planning	Erosion protection works to be allowed for properties	Short term (< 5 yrs)	Precinct 3	OEH	Complete	1	1	0	0	0	0
Copacabana	C12	Planning	Improve energy dissipation at stormwater outlet	Short term (< 5 yrs)	Precinct 3	GCC	Not Commenced	0	0	0	0	1	0
Copacabana	C13	Planning	Improve existing outlet control structures to prevent scour of the base of the dune				Not Commenced	0	0	0	0	1	0
Copacabana	C2	Works	Erosion Protection works for Copacabana Beach Surf Club	Medium term (5 – 20 yrs)	Precinct 3	GCC	Not Commenced	0	0	0	0	1	0
Copacabana	C3	Works	Reconstruct SLSC on deep pile foundations on redevelopment of the club	Long Term (>20yrs)	Precinct 3	GCC	Complete	1	1	0	0	0	0
Copacabana	C4	Works	Erosion protection works for Del Monte Place	Long Term (>20yrs)	Precinct 3	GCC	Not Commenced	0	0	0	0	1	0
Copacabana	C5	Works	Landward relocation of sewer and water infrastructure as well as other utilities along Del Monte Place	Long Term (>20yrs)	Precinct 3	GCC	Not Commenced	0	0	0	0	1	0
Copacabana	C6	Planning	Investigate beach nourishment in front of surf club and Del Monte Place	Long Term (>20yrs)	Precinct 3	GCC	Not Commenced	0	0	0	0	1	0
Copacabana	C7	Works	Repair damage to Del Monte Place, Surf Club and surrounding land should it be damaged by future erosion	Medium term as required (> 5 years)	Precinct 3	GCC	Ongoing	1	0	0	1	0	0
Copacabana	C8	Works	Long term narrowing, removal and relocation or provision of alternative access for Del Monte Place if erosion protection works are not implemented	Long Term (>20yrs)	Precinct 3	GCC	Not Commenced	0	0	0	0	1	0
Copacabana	C9	Planning	Development controls for residences and commercial premises to be on piled foundations on redevelopment of properties based on a defined building line	Short term and ongoing	Precinct 3	GCC	Complete	1	1	0	0	0	0
Forresters	F1	Planning	Geotechnical investigation to determine the Zone of Reduced Foundation Capacity	Short term (0-5yrs)	Forresters Beach Dune	GCC	Not Commenced	0	0	0	0	1	0
Forresters	F2	Works	Continue dune vegetation management	Ongoing	Forresters Beach Dune	GCC	Ongoing	1	0	0	1	0	0
Forresters	F3	Planning	Complete a vegetation profile for Forresters Beach	Short term (0-5yrs)	Forresters Beach Dune	GCC	Commenced	1	0	1	0	0	0
Forresters	F4	Planning	Collate geotechnical information obtained from DAs into centralised database	Short term (0-5yrs)	Forresters Beach Dune	GCC	Not Commenced	0	0	0	0	1	0
Forresters	F5	Planning	Erosion protection works to be allowed for properties	Ongoing	Forresters Beach Dune	Private	Complete	1	1	0	0	0	0
Forresters	F6	Monitoring	Monitor beach for erosion and cliff lines for instability	Short term and ongoing (0-5yrs)	Forresters Beach Dune	GCC	Ongoing	1	0	0	1	0	0
Killcare	K1	Planning	Geotechnical investigation of surf club area	Short Term (0-5yrs)	Killcare SLSC & carpark	GCC	Not Commenced	0	0	0	0	1	0
Killcare	K10	Works	Move carpark landward in future	Long Term (>20yrs)	Killcare SLSC & carpark	GCC	Not Commenced	0	0	0	0	1	0
Killcare	K11	Works	Improve stormwater outlet by installing energy dissipation to minimise scour and prevent sand ingress into outlet	Short Term (0-5yrs)	Killcare SLSC & carpark	GCC	Not Commenced	0	0	0	0	1	0
Killcare	K12	Works	Regrade/repair scour caused by stormwater outlet	As required following storms	Killcare SLSC & carpark	GCC	Ongoing	1	0	0	1	0	0
Killcare	K13	Works	Future relocation of camping area infrastructure to an area landward of the coastal hazard area		Putty Beach Camping area	OEH NPWS	Not Commenced	0	0	0	0	1	0
Killcare	K14	Monitoring	Monitor beach for erosion in front of surf club and camping area		Killcare SLSC & carpark and Putty Camping area	GCC OEH	Ongoing	1	0	0	1	0	0
Killcare	K2	Works	Erosion Protection works at surf club if required based on outcome of geotechnical investigation	Short - Medium Term (0 - 20yrs)	Killcare SLSC & carpark	GCC	Not Commenced	0	0	0	0	1	0
Killcare	K3	Works	Repair damage to surf club carpark should storm erosion occur	Following storm event	Killcare SLSC & carpark	GCC	Not Commenced	0	0	0	0	1	0
Killcare	K4	Planning	Investigate feasibility of beach nourishment in front of surf club	Short - Medium Term (0 - 20yrs)	Killcare SLSC & carpark	GCC	Not Commenced	0	0	0	0	1	0

Gosford Beaches CZMP Actions

Killcare	K5	Works	Beach scraping to build vegetated dune in front of surf club above the wave runoff level with vegetation and/or fencing	Short term and as required	Killcare SLSC & carpark	GCC	Ongoing	1	0	0	1	0	0
Killcare	K6	Works	Future relocation of surf club and associated infrastructure to an area landward of the coastal hazard area if required	Long Term (>20yrs)	Killcare SLSC & carpark	GCC	Not Commenced	0	0	0	0	1	0
Killcare	K7	Works	Redevelop surf club on deep piled foundations on future redevelopment	Long Term (>20yrs)	Killcare SLSC & carpark	GCC	Not Commenced	0	0	0	0	1	0
Killcare	K8	Works	Assist/encourage community groups with dune management actions	Ongoing	Killcare SLSC & carpark	GCC	Ongoing	1	0	0	1	0	0
Killcare	K9	Planning	Complete a vegetation profile for Putty/Killcare Beach and support the natural vegetation profile	Short Term (0-5yrs)	Killcare SLSC & carpark	GCC	Commenced	1	0	1	0	0	0
MacMasters	M1	Works	Erosion Protection works for Surf Club	Short Term (0-5yrs)	Mac's SLSC	GCC SLSC	Commenced	1	0	1	0	0	0
MacMasters	M10	Works	Improve energy dissipation at stormwater outlets	Short Term (0-5yrs)	Marine Pde Carpark and corner of Marine Pd / Gerda Rd	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M11	Works	Periodic beach scraping to repair damage caused by scour from stormwater outlets	As required following storms	Marine Pde Carpark and corner of Marine Pd / Gerda Rd	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M12	Works	Encourage and assist Dunecare group to improve dune vegetation	Ongoing	Marine Pade dune	GCC	Ongoing	1	0	0	1	0	0
MacMasters	M13	Works	Improve pedestrian access onto beach from carpark and minimise scour caused by beach shower	Short Term (0-5yrs)	Marine Pde Carpark	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M14	Monitoring	Monitor rock pool for storm damage and repair if required	Ongoing	Rock Pool	GCC	Ongoing	1	0	0	1	0	0
MacMasters	M15	Planning	Geotechnical investigation and stability of cliff between 45 and 65 Tudibaring Parade	Short Term (0-5yrs)	45 - 65 Tudibaring Parade	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M16	Planning	Development controls as per existing DCP	Short Term (0-5yrs)	Precinct 2	GCC	Complete	1	1	0	0	0	0
MacMasters	M17	Planning	Not allowing further subdivision of properties on seaward side of Tudibaring Parade	Short Term (0-5yrs)	Precinct 2	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M18	Planning	Investigate feasibility of beach nourishment to increase erosion buffer in this area	Medium term (5 – 20 yrs)	Precinct 2	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M19	Works	Encourage and assist Dunecare group and local residents to maintain and revegetate dune	Ongoing	Precinct 2		Ongoing	1	0	0	1	0	0
MacMasters	M2	Monitoring	Monitor performance of existing erosion works around base of Norfolk Island Pine trees and at surf club at southern end of beach and replace/improve as required	Short Term (0-5yrs)	Mac's SLSC	GCC SLSC	Commenced	1	0	1	0	0	0
MacMasters	M20	Planning	Erosion protection works to be allowed for properties	Short - Medium Term (0 - 20yrs)	Precinct 2	Private	Complete	1	1	0	0	0	0
MacMasters	M21	Works	Seaward extension of existing training wall along southern side of entrance	Medium term (5 – 20 yrs)	Precinct 2	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M22	Planning	Undertake review of entrance management procedure	Short Term (0-5yrs)	Precinct 2	GCC	Complete	1	1	0	0	0	0
MacMasters	M3	Works	Erosion protection works for Marine Parade	Short Term (0-5yrs)	Mac's SLSC	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M4	Planning	Investigate feasibility of beach nourishment in front of surf club and Marine Parade	Medium term (5 – 20 yrs)	SLSC and carpark		Not Commenced	0	0	0	0	1	0
MacMasters	M5	Works	Beach scraping to build dune in front of Surf Club, eroded pine tree roots and Marine Parade in the interim until erosion protection works are constructed	As required following storms	SLSC and carpark	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M6	Planning	Undertake geotechnical investigation of area behind Marine Parade	Short Term (0-5yrs)	Marine Parade	GCC	Commenced	1	0	1	0	0	0
MacMasters	M7	Planning	Development controls as per existing DCP	Short Term (0-5yrs)	Precinct 1	GCC	Complete	1	1	0	0	0	0
MacMasters	M8	Works	Landward relocation of sewer infrastructure along Marine Parade if erosion protection works not implemented	Short Term (0-5yrs)	Marine Parade	GCC	Not Commenced	0	0	0	0	1	0
MacMasters	M9	Works	Repair damage to Marine Parade should it be damaged by future erosion if erosion protection works not implemented	As required following storms	Marine Parade	GCC	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O1	Works	Erosion Protection works to be allowed for four properties and carpark south of Ettalong Creek entrance	Short - Medium Term (0 - 20yrs)	Precinct 1 (south of Ettalong Creek)	Private	Commenced	1	0	1	0	0	0
Ocean/Umina	O10	Planning	Development controls as per existing DCP	Short Term (0-5yrs)	Precinct 1 (south of Ettalong Creek)	GCC	Complete	1	1	0	0	0	0
Ocean/Umina	O11	Works	Construct "tripper" structure to control opening location of creek	Short Term (0-5yrs)	Precinct 1 (south of Ettalong Creek)	GCC	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O12	Planning	Development controls as per existing DCP	Short Term (0-5yrs)	Precinct 1 (south of Ettalong Creek)	GCC	Complete	1	1	0	0	0	0
Ocean/Umina	O13	Monitoring	Monitor existing erosion protection works in front of surf club	Ongoing	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O14	Monitoring	Monitor storm run-up levels and dune erosion	Ongoing	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O15	Works	Repair of beach accessways and revegetation of dune following erosion in a large storm event	Short term as required (0-5 years)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O16	Works	Beach scraping to build dune in front of residences at Berrima Crescent	Short term as required (0-5 years)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O17	Works	Install sand trapping fencing or other appropriate controls in beach access points where sand blowout occurs and in the vicinity of the SLSCs.	Short Term (0-5yrs)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O18	Planning	Complete a vegetation profile for Umina and Ocean Beach and support the natural vegetation profile.	Short Term (0-5yrs)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Commenced	1	0	1	0	0	0

Gosford Beaches CZMP Actions

Ocean/Umina	O19	Education	Increase information signage near surf clubs on the ecology and history of Umina/Ocean Beach	Short Term (0-5yrs)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Complete	1	1	0	0	0	0
Ocean/Umina	O2	Monitoring	Monitor performance of existing training wall works along northern side of Ettalong Creek entrance	Ongoing	Precinct 1 (south of Ettalong Creek)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O20	Works	Improve shade areas around the grassed areas and car parks near the SLSCs	Short Term (0-5yrs)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Commenced	1	0	1	0	0	0
Ocean/Umina	O21	Works	Maintain current signage and facilities on a regular basis	Short Term (0-5yrs)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O22	Works	Encourage and assist Dunecare group to maintain and revegetate dune	Ongoing	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O23	Education	Development of local area (Umina/Ocean Beach) online fact sheets and encourage local educational programs in schools regarding the dunes	Short Term (0-5yrs)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O24	Education	Work with the Central Coast Surf Life Saving organisation to look at ways to support Surf Life Savings Australia's EcoSurf policy in the region – including Ocean and Umina Surf Life Saving clubs	Short Term (0-5yrs)	Precinct 2 (Ettalong Ck to Umina SLSC)	GCC	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O25	Monitoring	Monitor existing erosion protection works in front of surf club	Short term as required (0-5 years)	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O26	Monitoring	Monitor storm run-up levels and dune erosion	Short term as required (0-5 years)	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O27	Works	Repair of beach accessways and revegetation of dune following erosion in a large storm event	As required	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O28	Works	Beach scraping following storm event to build dune crest level and revegetation	Following storms	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O29	Works	Install sand trapping fencing or other appropriate controls in beach access points where sand blowout occurs and in the vicinity of the SLSCs	Short term as required (0-5 years)	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O3	Monitoring	Monitor storm run-up levels and dune erosion	Ongoing	Precinct 1 (south of Ettalong Creek)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O30	Works	Encourage and assist Dunecare group to improve dune vegetation management	Ongoing	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O31	Works	Investigate installation of stormwater energy dissipation to reduce discharge velocities at outlet	Short term (0-5 years)	Precinct 3 (between surf clubs)	GCC	Commenced	1	0	1	0	0	0
Ocean/Umina	O32	Works	Post storm beach scraping to assist natural recovery of the dune and repair scour	Following storms	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O33	Education	Increase information signage near surf clubs on the ecology and history of Umina/Ocean Beach	Short term (0-5 years)	Precinct 3 (between surf clubs)	GCC	Complete	1	1	0	0	0	0
Ocean/Umina	O34	Works	Improve shade areas around the grassed areas and car parks near the SLSCs	Short term (0-5 years)	Precinct 3 (between surf clubs)	GCC	Commenced	1	0	1	0	0	0
Ocean/Umina	O35	Works	Maintain current signage and facilities on a regular basis	Short Term (0-5yrs)	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O36	Works	Construction of a disabled beach access point outside Ocean Beach SLSC	Short term (0-5 years)	Precinct 3 (between surf clubs)	GCC	Complete	1	1	0	0	0	0
Ocean/Umina	O37	Works	Encourage and assist Dunecare group to maintain and revegetate dune	Ongoing	Precinct 3 (between surf clubs)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O38	Education	Development of local area (Umina/Ocean Beach) online fact sheets and encourage local educational programs in schools regarding the dunes	Short Term (0-5yrs)	Precinct 3 (between surf clubs)	GCC	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O39	Education	Work with the Central Coast Surf Life Saving organisation to look at ways to support Surf Life Savings Australia's EcoSurf policy in the region – including Ocean and Umina Surf Life Saving clubs	Short Term (0-5yrs)	Precinct 3 (between surf clubs)	GCC	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O4	Planning	Future relocation of residence on No.8 Berrima Crescent landward of immediate hazard area	On redevelopment	Precinct 1 (south of Ettalong Creek)	Private	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O40	Monitoring	Monitor storm run-up levels and dune erosion	Following storms	Precinct 4 – OB SLSC to Ettalong Point	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O41	Works	Repair of beach accessways and revegetation of dune following erosion in a large storm event	Following storms	Precinct 4 – OB SLSC to Ettalong Point	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O42	Works	Beach scraping following storm event to build dune crest level and revegetation	Following storms	Precinct 4 – OB SLSC to Ettalong Point	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O43	Works	Collapse steep eroded escarpment and revegetate following erosion events	As required	Precinct 4 – OB SLSC to Ettalong Point	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O44	Planning	Investigate feasibility of beach nourishment to increase erosion buffer at Ettalong Point	Short term (0-5 years)	Precinct 4 – OB SLSC to Ettalong Point	GCC	Commenced	1	0	1	0	0	0
Ocean/Umina	O45	Works	Undertake erosion protection works to protect The Esplanade at Ettalong Point	Short term (0-5 years)	Precinct 4 – OB SLSC to Ettalong Point	GCC	Commenced	1	0	1	0	0	0
Ocean/Umina	O46	Works	Encourage and assist Dunecare group to maintain and revegetate dune	Ongoing	Precinct 4 – OB SLSC to Ettalong Point	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O47	Works	Investigate installation of stormwater energy dissipation to reduce discharge velocities at stormwater outlets	Short term (0-5 years)	Precinct 4 – OB SLSC to Ettalong Point	GCC	Commenced	1	0	1	0	0	0
Ocean/Umina	O48	Works	Post storm beach scraping to assist natural recovery of the dune and repair scour caused by stormwater discharge		Precinct 4 – OB SLSC to Ettalong Point	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O49	Education	Development of local area (Umina/Ocean Beach) online fact sheets and encourage local educational programs in schools regarding the dunes	Short Term (0-5yrs)	Precinct 4 – OB SLSC to Ettalong Point	GCC	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O5	Planning	Investigate feasibility of beach nourishment	Long Term (>20yrs)	Precinct 1 (south of Ettalong Creek)	GCC	Not Commenced	0	0	0	0	1	0
Ocean/Umina	O6	Works	Beach scraping to build dune in front of residences at Berrima Crescent	Short term as required (0-5 years)	Precinct 1 (south of Ettalong Creek)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O7	Works	Encourage and assist Dunecare group to improve dune vegetation management	Ongoing	Precinct 1 (south of Ettalong Creek)	GCC	Ongoing	1	0	0	1	0	0
Ocean/Umina	O8	Planning	Develop entrance management guidelines for mechanical opening of Ettalong Creek	Short Term (0-5yrs)	Precinct 1 (south of Ettalong Creek)	GCC	Complete	1	1	0	0	0	0

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Ocean/Umina	O9	Planning	Voluntary purchase of portion of at risk property	Short - Medium Term (5-20yrs)	Precinct 1 (south of Ettalong Creek)	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa1	Planning	Monitor performance of erosion protection works and monitor beach profile at main carpark	Short Term (0-5yrs)	Main carpark	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa10	Planning	Monitor beach profiles	Short Term (0-5yrs)	Boat ramp & access rd	GCC	Ongoing	1	0	0	1	0	0
Patonga	Pa11	Works	Upgrade seawall	Short Term (0-5yrs)	Boat ramp & access rd	DPI Lands	Complete	1	1	0	0	0	0
Patonga	Pa12	Planning	Ensure floor levels for new Development Applications are above inundation levels	Short Term (0-5yrs)	Beachfront	GCC	Commenced	1	0	1	0	0	0
Patonga	Pa13	Planning	Upload flood/inundation information onto Council's website for access by property owners	Short Term (0-5yrs)	Beachfront	GCC	Complete	1	1	0	0	0	0
Patonga	Pa14	Works	Beach scraping and dune management to maintain crest level of dune above wave runup level	Short Term (0-5yrs)	Beachfront	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa15	Works	Continue and enhance dune vegetation management	Short Term (0-5yrs)	Beachfront	GCC	Ongoing	1	0	0	1	0	0
Patonga	Pa16	Planning	Undertake survey of floor levels of existing buildings	Short Term (0-5yrs)	Beachfront	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa17	Planning	Monitor and assess existing erosion protection works	Short Term (0-5yrs)	Dark Corner	DPI - Lands	Ongoing	1	0	0	1	0	0
Patonga	Pa18	Works	Implement erosion control works in front of cottages in accordance with PoM	Medium Term (5-20yrs)	Dark Corner	DPI Lands	Complete	1	1	0	0	0	0
Patonga	Pa19	Planning	Investigate periodic maintenance dredging of sand from the creek entrance	Short Term (0-5yrs)	Patonga Creek entrance	State	Not Commenced	0	0	0	0	1	0
Patonga	Pa2	Works	Repair damage to carpark should storm erosion occur	As required	Main carpark	GCC	Ongoing	1	0	0	1	0	0
Patonga	Pa20	Planning	Investigate lengthening existing entrance breakwater	Medium to Long Term (5-20yrs)	Patonga Creek entrance	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa21	Planning	Investigate installation of stormwater energy dissipation to reduce discharge velocities at outlet	Short Term (0-5yrs)	Eastern end of beach	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa22	Works	Post storm beach scraping to assist natural recovery of the dune and repair scour caused by stormwater discharge	As required	Eastern end of beach	GCC	Ongoing	1	0	0	1	0	0
Patonga	Pa23	Planning	Complete a vegetation profile for Patonga Beach and support the natural vegetation profile.	Short Term (0-5yrs)	Beachfront properties	GCC	Commenced	1	0	1	0	0	0
Patonga	Pa24	Works	Erosion protection works to be allowed for properties	Short - Medium Term (0-20yrs)	Adjacent to wharf	Private	Not Commenced	0	0	0	0	1	0
Patonga	Pa25	Planning	Investigate feasibility of swimming enclosure at Patonga	Short - Medium Term (0-20yrs)	Adjacent to wharf	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa3	Planning	Investigate feasibility of placement of sand sourced from western beach and shoals at creek entrance to provide buffer against storm erosion	Investigate yr 1, implement <5yrs	Fronting carparks	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa4	Works	Beach Scraping	As required	Fronting carparks	GCC	Ongoing	1	0	0	1	0	0
Patonga	Pa5	Planning	Future relocation of carpark and associated infrastructure to an area landward of the coastal hazard area	Long Term (>20yrs)	Main carpark	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa6	Works	Stabilisation of dunes in with vegetation and fencing	Short Term (0-5yrs)	Dunes	GCC	Ongoing	1	0	0	1	0	0
Patonga	Pa7	Planning	Monitor and assess existing erosion protection works	Short Term (0-5yrs)	Boat ramp & access rd	GCC	Commenced	1	0	1	0	0	0
Patonga	Pa8	Planning	Relocate access road as erosion occurs	Long Term (>20yrs)	Boat ramp & access rd	GCC	Not Commenced	0	0	0	0	1	0
Patonga	Pa9	Works	Periodic nourishment of area with sand sourced from Patonga Creek entrance	Investigation included in option Pa3. Works to be costed with Option Pa3.	Boat ramp & access rd	GCC State Govt	Not Commenced	0	0	0	0	1	0
Pearl	Pe1	Works	Erosion Protection works to be allowed for four properties south of Green Point Creek entrance as well as for sewage pumping station and sewer line at end of Gem Road and south from Gem Road extending to protect infrastructure	Short - Medium Term (0-20yrs)	South of Green Pt Creek	GCC Private	Not Commenced	0	0	0	0	1	0
Pearl	Pe10	Planning	Investigate 'tripper' structure to control opening location of creek	Short Term (0-5yrs)	South of Green Pt Creek	GCC	Commenced	1	0	1	0	0	0
Pearl	Pe11	Planning	Identify floor levels to determine degree of inundation hazard	Short Term (0-5yrs)	South of Green Pt Creek	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe12	Planning	Complete a vegetation profile	Short Term (0-5yrs)	Beachwide	GCC	Commenced	1	0	1	0	0	0
Pearl	Pe13	Planning	Monitor rock pool for storm damage and repair if required	Short Term (0-5yrs)	Rock pool	GCC	Ongoing	1	0	0	1	0	0
Pearl	Pe14	Planning	Repair of playground area, toilet block, beach accessways and landscaping works following erosion in a large storm event	After storm events	Playground area	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe15	Works	Beach scraping following storm event to build dune crest level and revegetation	After storm events	Playground area	DPI-Lands	Ongoing	1	0	0	1	0	0
Pearl	Pe16	Works	Continue dune vegetation management	Ongoing	Playground area	GCC	Ongoing	1	0	0	1	0	0
Pearl	Pe17	Planning	Develop entrance management guidelines for mechanical opening of Green Point Creek	Short Term (0-5yrs)	Playground area	GCC	Complete	1	1	0	0	0	0
Pearl	Pe18	Works	Long Term (>20yrs) removal and relocation of playground should erosion escarpment move landward in future	Long Term (>20yrs)	Playground area	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe19	Works	Future installation of erosion protection works	Long Term (>20yrs)	Pearl Parade	Private	Not Commenced	0	0	0	0	1	0

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Pearl	Pe2	Planning	Monitor performance of existing erosion works at properties south of Green Point Creek entrance	Short Term (0-5yrs)	South of Green Pt Creek	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe20	Works	Repair and restoration of Pearl Parade should it be damaged by a future storm	Long Term (>20yrs)	Pearl Parade	Private	Not Commenced	0	0	0	0	1	0
Pearl	Pe21	Works	Landward relocation of water supply and electricity should it be damaged by future erosion	Long Term (>20yrs)	Pearl Parade	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe22	Planning	Development controls as per existing DCP	Ongoing	Pearl Parade	GCC	Complete	1	1	0	0	0	0
Pearl	Pe23	Planning	Monitor performance, upgrade/repair existing erosion protection works at the restaurant	Ongoing	Pearl Parade	Private	Not Commenced	0	0	0	0	1	0
Pearl	Pe24	Planning	Encourage and assist Dunecare group to maintain and revegetate dune after a storm	Ongoing	Pearl Parade	GCC	Ongoing	1	0	0	1	0	0
Pearl	Pe25	Works	Post storm beach scraping	Following storms	Lagoon entrances	DPI Lands	Ongoing	1	0	0	1	0	0
Pearl	Pe26	Planning	Formalise entrance management guidelines for mechanical opening	Short Term (0-5yrs)	Middle and Pearl Beach Lagoon	GCC	Complete	1	1	0	0	0	0
Pearl	Pe27	Planning	Monitor effectiveness of concrete wall on northern bank of outlet	Short Term (0-5yrs)	PB Lagoon	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe28	Works	Continue dune vegetation management	Ongoing	Dunes	GCC	Ongoing	1	0	0	1	0	0
Pearl	Pe29	Planning	Development controls as per existing DCP	Short Term (0-5yrs)	Coral Crescent	GCC	Complete	1	1	0	0	0	0
Pearl	Pe3	Works	Relocate sewer infrastructure and pumping station further landward	Short Term (0-5yrs)	South of Green Pt Creek	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe30	Works	Post storm beach scraping to assist natural recovery of dune	As required	Coral Crescent	DPI Lands	Ongoing	1	0	0	1	0	0
Pearl	Pe31	Planning	Investigate feasibility of terminal protection	Long Term (>20yrs)	Coral Crescent	Private	Not Commenced	0	0	0	0	1	0
Pearl	Pe32	Works	Assist Dunecare group to maintain and revegetate dune	Ongoing	Coral Crescent	GCC	Ongoing	1	0	0	1	0	0
Pearl	Pe33	Planning	Investigate beach nourishment to increase buffer against storm erosion	Medium Term (5-20yrs)	Coral Crescent	GCC, DPI Lands	Not Commenced	0	0	0	0	1	0
Pearl	Pe34	Works	Erosion protection works to be allowed for properties	Short - Medium Term (5-20yrs)	Coral Crescent	Private	Not Commenced	0	0	0	0	1	0
Pearl	Pe35	Works	Post storm beach scraping to assist natural recovery of dune and to maintain crest level of dune above wave runup level	As required	Coral Crescent	GCC, DPI Lands	ongoing	1	0	0	1	0	0
Pearl	Pe36	Works	Encourage beachfront residents to maintain crest level of dune and vegetate dune on private property	Short Term (0-5yrs)	Coral Crescent	Private	Not Commenced	0	0	0	0	1	0
Pearl	Pe37	Planning	Development controls as per existing DCP	Short Term (0-5yrs)	Coral Crescent	GCC	Complete	1	1	0	0	0	0
Pearl	Pe4	Planning	Investigate feasibility/sources of sand for beach nourishment	Medium Term (5-20yrs)	South of Green Pt Creek	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe5	Works	Beach scraping to build dune in front of residences, Gem Road and restaurant	After storm events	South of Green Pt Creek	GCC	Not Commenced	0	0	0	0	1	0
Pearl	Pe6	Works	Erosion protection works to be allowed for properties	Short - Medium Term (0-20yrs)	South of Green Pt Creek	Private	Not Commenced	0	0	0	0	1	0
Pearl	Pe7	Works	Continue dune vegetation management	Ongoing	South of Green Pt Creek	GCC	ongoing	1	0	0	1	0	0
Pearl	Pe8	Planning	Develop entrance management guidelines for mechanical opening of Green Point Creek	Short Term (0-5yrs)	South of Green Pt Creek	GCC	Complete	1	1	0	0	0	0
Pearl	Pe9	Planning	Development controls as per existing DCP	Short Term (0-5yrs)	South of Green Pt Creek	GCC	Complete	1	1	0	0	0	0
Terrigal/Wamberal	TW01	Monitoring	Monitor performance of existing seawall in addressing erosion and inundation	Short term - ongoing	The Haven	Council	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW02	Monitoring	Monitor beach profile following significant storm events	Short term - ongoing	The Haven	Council	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW03	Planning	Investigate beach nourishment to increase buffer against storm erosion	Medium term (5-20 yrs)	The Haven	Council	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW04	Works	Repair post-storm damage to existing infrastructure	As required	The Haven	Council	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW05	Planning	Survey floor levels to determine degree of inundation hazard	Short term (0-5yrs)	Terrigal SLSC	Council	Commenced	1	0	1	0	0	0
Terrigal/Wamberal	TW06	Monitoring	Monitor performance of existing seawall against erosion and inundation	Ongoing	Terrigal SLSC	Council	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW07	Planning	Repair post-storm damage to existing infrastructure	As required	Terrigal SLSC	Council	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW08	Works	Investigate sources of sand and feasibility of beach nourishment for Southern Terrigal Beach to increase buffer against storm erosion and improve beach amenity	Medium term (5-20 yrs)	Terrigal Beach	Council	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW09	Works	Remove old seawall structure at southern end of beach to improve public safety	Medium term (5-20 yrs)	Terrigal Beach	Council	Complete	1	1	0	0	0	0
Terrigal/Wamberal	TW10	Planning	Allowing development landward of a specially defined building line with piled foundations into the 2100 Stable Foundation Zone	Ongoing	Wamberal	Council	Complete	1	1	0	0	0	0
Terrigal/Wamberal	TW11	Works	Terminal protection - Council to action review, design and funding of terminal protection structure for Wamberal	Short-medium term (0-20 years)	Wamberal	Council	Commenced	1	0	1	0	0	0
Terrigal/Wamberal	TW12	Planning	Complete a vegetation profile for Wamberal Beach and support the natural vegetation profile	Short term (0-5yrs)	Wamberal	Council	Commenced	1	0	1	0	0	0
Terrigal/Wamberal	TW13	Works	Continue and enhance dune vegetation	Ongoing	Wamberal	Council	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW14	Planning	Investigate sources of sand and feasibility of beach nourishment for Wamberal Beach	Short term (0-5yrs)	Wamberal	Council	Commenced	1	0	1	0	0	0
Terrigal/Wamberal	TW15	Works	Beach nourishment coupled with a terminal revetment to increase buffer against storm erosion	Short-medium term (0-20 years)	Wamberal	Council	Commenced	1	0	1	0	0	0

Gosford Beaches CZMP Actions

Terrigal/Wamberal	TW16	Planning	Review entrance management guidelines for mechanical opening of Wamberal Lagoon	Short term (0-5yrs)	Wamberal Lagoon entrance	GCC	Complete	1	1	0	0	0	0
Terrigal/Wamberal	TW17	Planning	Ensure floor levels for new Development Applications are above inundation levels	Ongoing	Wamberal Lagoon entrance	GCC	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW18	Works	Repair damage to surf club carpark should storm erosion occur	As required	Wamberal SLSC	GCC	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW19	Works	Beach scraping to build vegetated dune in front of carpark	Short term (0-5yrs)	Wamberal SLSC	GCC	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW20	Works	Continue and enhance dune vegetation	Ongoing	Wamberal SLSC	GCC	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW21	Planning	Check whether surf club is on deep piled foundations and re-construct on deep piled foundations upon redevelopment	Medium term (5-20 yrs)	Wamberal SLSC	GCC	Complete	1	1	0	0	0	0
Terrigal/Wamberal	TW22	Planning	Review entrance management guidelines for mechanical opening of Terrigal Lagoon	Short term (0-5yrs)	Terrigal Lagoon entrance	GCC	Complete	1	1	0	0	0	0
Terrigal/Wamberal	TW23	Planning	Allow lagoon frontage properties at southern end of Pacific Street to self-protect in accordance with existing legislation	Ongoing	Terrigal Lagoon entrance	Landowners	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW24	Planning	Ensure floor levels for new Development Applications are above inundation levels	Ongoing	Terrigal Lagoon entrance	GCC	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW25	Planning	Investigate purchase of small section of southernmost property (1 Pacific Street) to provide public access along lagoon frontage	Short term (0-5yrs)	Terrigal Lagoon entrance	GCC	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW26	Works	Beach scraping from lagoon entrance to reduce erosion and inundation risk to properties at southern end of Pacific Street as well as enhance public access	Short term (0-5yrs)	Terrigal Lagoon entrance	GCC	Ongoing	1	0	0	1	0	0
Terrigal/Wamberal	TW27	Works	Erosion protection works to be allowed for properties	Ongoing	Terrigal Lagoon entrance	Private	Ongoing	1	0	0	1	0	0
								150	41	25	84	86	0

Appendix B2 - Gosford Lagoons CZMP - Action Status 2020



Gosford Lagoons Coastal Zone Management Plan - Action Status

Action ID	Management Goal Addressed	Management Category	Strategy Outline	Timing	Location	Primary Responsibility	Supporting Groups	Cross Reference with Action:	Preliminary Estimate of Capital Cost	Preliminary Estimate of Annual Maintenance	Potential Funding Stream	Actual project costs	Status	Comments
1	All	Research	Council continue to support research which improves understanding of lagoon catchments in order to develop improved management practices	Immediate/ongoing	All lagoons	CCC	Research bodies	All	?	\$10,000.00			Complete	Commenced and ongoing.
2	Water and Sediment Quality	Education, Compliance and Works	Encourage a reduction in catchment pollution through stormwater runoff	Immediate/ongoing	All lagoons	CCC	LLS	3	?	?			On going	
3	Information, Comms and Education	Education	Work Staff Training Program	Within two years	LGA- wide	CCC		1, 2, 4, 5, 6, 7, 8, 9, 10, 16, 17, 20, 22			Internal		On going	Erosion and sediment control training undertaken in 2014. Part 5 environmental assessment training to be rolled out in 2016.
4	Governance	Planning/ Works	Incorporate climate change considerations into infrastructure asset management and planning processes	Within two years	All lagoons	CCC		1, 3, 6, 7, 8, 9, 10, 11, 13, 14, 16, 20, 22			Internal		On going	Liaise with Construction Planning & Management and Asset Operations
5	Habitat and Species Conservation	Planning/ Works	Continue to support volunteer based rehabilitation initiatives such as bushcare	Immediate/ongoing	All lagoons	CCC	Bushcare volunteers, LLS	1, 2, 3, 4, 6, 7, 8, 11, 12, 13, 14, 16, 20, 22			Internal		On going	Input from Culture
6	Governance	Planning	Ensure new planning initiatives are consistent with this CZMP	Immediate/ongoing	All lagoons	CCC	DPIE	All			Internal		On going	
7	All	Planning	Undertake a comprehensive review of the Lagoons opening procedure and policy	Within two years	All lagoons	CCC	DPIE, DPI Fisheries, NPWS	1, 2, 3, 4, 6, 8, 9, 10, 12, 14, 16, 18, 20, 21, 22, 23	\$40,000.00	TBA	Internal		Complete	Review complete, Council in process of implementation of recommendations.
8	Information, Comms and Education	Education	Develop and implement a comprehensive lagoons education program	Immediate/ongoing	All lagoons	CCC	Bush Care, LLS	All	\$40,000.00	\$10,000.00	Estuary Mgmt Program		Not Commenced	
9	Water and Sediment Quality	Planning, Compliance, Education	Reduce sewage contamination of lagoons	Immediate/ongoing	All lagoons	CCC		1, 2, 3, 4, 6, 7, 8, 13, 18, 20, 21, 22			Internal, other		On going	Input required from W&S / Asset Operations
10	Governance	Planning	Ensure that present planning and development controls allow for sea level rise	Within two years	All lagoons	CCC		1, 4, 6, 7, 8			Internal		On going	Commenced and ongoing.
11	All	Planning	Undertake Gosford Wetland inventory and develop associated management strategy	Immediate/ongoing	All lagoons	CCC		5, 6, 7, 8	\$30,000.00				On going	Commenced but delayed. Awaiting GIS data from Culture
12a	Recreational Usage	Planning	Develop and implement a holistic Foreshore Master Plan for Terrigal Lagoon	2-5 years	Terrigal	CCC		1, 2, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 20, 21, 22	\$10,000.00	TBC			Not Commenced	
12b	Recreational Usage	Planning	Develop and implement a holistic Foreshore Master Plan for Avoca Lagoon	2-5 years	Avoca	CCC		1, 2, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 20, 21, 22	\$10,000.00	TBC			Not Commenced	Liaise with Culture
12c	Recreational Usage	Planning	Develop and implement a holistic Foreshore Master Plan for Cockrone Lagoon	2-5 years	Cockrone	CCC		1, 2, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 20, 21, 22	\$10,000.00	TBC			Not Commenced	Liaise with Culture
12d	Recreational Usage	Planning	Develop and implement a holistic Foreshore Master Plan for Southern Foreshore of Wamberal Lagoon	2-5 years	Wamberal	CCC		1, 2, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 20, 21, 22	\$10,000.00	TBC			Not Commenced	Liaise with Culture
13	Sedimentary Processes	Planning	Investigate removal of contemporary sediments from the mouths of creeks entering the lagoons	2-5 years	All lagoons	CCC	CCC (Construction Delivery)	2, 3, 12, 15, 16, 17	\$40,000.00	TBC			On going	Investigation into Terrigal Lagoon entrance underway.
14	All	Planning	Work with State Government to prepare an updated Plan of Management (POM) for Wamberal Lagoon Nature Reserve	2-5 years	Wamberal	DPIE	CCC/ Lands	1, 2, 4, 5, 6, 7, 8, 11, 12(d), 13, 15, 16, 17, 21, 22	Existing	NPWS	NPWS		Not Commenced	Contact NPWS to confirm timing. Wamberal Lagoon Preservation Society is preparing a business plan to address costs associated with water quality improvement including stormwater management devices. The aim is to develop a partnership with Council and DPIE to work towards implementation of the CZMP
15	Water and Sediment Quality	Planning	Encourage inclusion of Stormwater Quality Improvement Devices (SQIDs) in private development activities	2-5 years	All lagoons	CCC		1, 2, 3, 6, 8, 12, 14, 17, 22	Existing				On going	Investigate Great Lakes DCP
16	Habitat and Species Conservation	Planning	Identify sites where there is the potential for landward migration of lagoon vegetation and prioritise these for rehabilitation works	2-5 years	All lagoons	CCC	Bushcare	1, 2, 3, 5, 6, 7, 8, 11, 12, 13, 14, 22	Existing	\$10,000.00			On going	University of Newcastle engaged to undertake habitat mapping of lagoons. This will form basis for assessments moving forward.
17	Water and Sediment Quality	Works	Undertake adequate and appropriate maintenance of existing stormwater improvement devices to maintain their effectiveness, in particular GPT's	Within two years/ ongoing	All lagoons	CCC		1, 2, 3, 6, 8, 12, 15, 21, 22	Existing				On going	Input from asset operations
18	Water and Sediment Quality	Research	Investigate opportunities for harvesting algae from Avoca Lagoon to assist in nutrient management	2-5 years	Avoca	CCC	Universities	1, 2, 6, 7, 8, 9, 12(a), 5, 17, 20, 21, 22	\$25,000.00			\$1491 per day	On going	Liaise with Culture and Uni o Newcastle - Estimated cost of \$1491 per day (2011) from Australian Environmental Services using a bioxlar harvester to undertake this work
19	Water and Sediment Quality	Compliance	Minimise the potential for contaminated sites to leach into the lagoons	2-5 years	All lagoons	CCC	EPA	1, 2, 3, 4, 6, 8, 13, 15, 17, 22	Existing				On going	Liaise with Development & Compliance
20	Habitat and Species Conservation	Research	Investigate opportunities to enhance breeding habitat sites for green and golden bell frogs adjacent to Avoca Lagoon	2-5 years	Avoca	CCC	DPIE		\$25,000.00				On going	Liaise with Culture - Anticipating applying for an Environmental Trust Grant 2015/16 in partnership with the Australian Reptile park to undertake habitat works and monitoring at both sites. Discussions with Reptile Park are on-going.
21	Recreational Usage	Planning	Undertake a review of commercial recreational activities within the lagoon catchments	2-5 years	All lagoons	CCC			\$20,000.00				Complete	Complete. Input from Culture (Tracy Persiani)
22	Information, Comms and Education	Planning / Education	Develop and implement monitoring and reporting programs for Gosford Coastal Lagoons	2-5 years	All lagoons	CCC			\$20,000.00				On going	Underway as part of Gosford Coastal Management Program Strategic Review
		Carry over actions from previous Estuary Management Study												

1W	Water and Sediment Quality	Works	Nutrient filter and scour restoration on drain near Tumbl Road Roundabout within Nature Reserve.	Wamberal	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
2W	Water and Sediment Quality	Works	Nutrient filter on drain at end of Tall Timbers Road.	Wamberal	CCC								Not Commenced	GPT/Sediment trap identified for this location. Planning phase of project commencing 2019/20.
3W	Water and Sediment Quality	Works	Design and construct appropriate sediment control measures in Forresters Creek catchment in line with WSUD principles.	Wamberal	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
4W	Water and Sediment Quality	Works	Sediment traps and nutrient filter is required at Remembrance Drive.	Wamberal	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
5W	Water and Sediment Quality	Works	Ocean View Drive - redesign of drainage outlets is required to provide nutrient and pollution management.	Wamberal	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
6W	Water and Sediment Quality	Works	Sediment removal and ongoing maintenance at end of Loxton Avenue. Sediment control at cemetery.	Wamberal	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
7W	Water and Sediment Quality	Works	Nutrient filter on drain at end of Winston Street.	Wamberal	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
8T	Water and Sediment Quality	Works	Nutrient filters on creek and drains running off Duffys Road.	Terrigal	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
9T	Water and Sediment Quality	Works	Review capacities of drains to minimise flooding within the Bundara Avenue - Lumeah Avenue area.	Terrigal	CCC								Not Commenced	Council has commenced review of flood risk management planning for coastal lagoons.
10T	Water and Sediment Quality	Works	Sediment trap or sediment removal from the drain running off Terrigal Drive between Willoughby Road and Ocean View Drive.	Terrigal	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
12T	Water and Sediment Quality	Works	Nutrient filters on drains running off Terrigal Drive at top end of the western arm of the lagoon and manage the wetland off Bellbird Avenue as a nutrient and sediment filter.	Terrigal	CCC								On going	Council is supporting a volunteer bushcare group in this location.
13T	Habitat and Species Conservation	Works	Manage existing remnants of native vegetation located at the end of Karalta Road, Terrigal Drive/Mittara Road and off Charles Kay Drive within the catchment to protect these remnants in order to assist with water quality management.	Terrigal	CCC								Not Commenced	Works subject to availability of funding and resources.
14T	Sedimentary Processes	Works	Council investigate the deepening of the lagoon to improve the aesthetic appearance by trimming the bed to remove deep pockets which can accumulate undesirable sediment concentrations.	Terrigal	CCC								Not Commenced	Unlikely to be implemented due to cost and potentially significant adverse impacts.
15A	Water and Sediment Quality	Works	Provide nutrient filter/sediment trap and retain existing vegetation at top end of Surf Rider Avenue.	Avoca	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
16A	Water and Sediment Quality	Works	Nutrient filters at end of southern area of lagoon.	Avoca	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
17A	Habitat and Species Conservation	Works	Manage vegetation areas to protect emergent vegetation/nutrient filters within the Saltwater Creek areas off the western arm.	Avoca	CCC								Not Commenced	Works subject to availability of funding and resources.
18A	Habitat and Species Conservation	Works	Protect existing native vegetation and assist re-vegetation of Palmgrove at North Avoca and provide a vegetated foreshore in public reserve.	Avoca	CCC								Not Commenced	Works subject to availability of funding and resources.
19A	Sedimentary Processes	Works	Council investigate rehabilitation of the dredging site and the dredged area of the lagoon to eliminate deep pockets and provide support to Bareena Island by bed trimming of the lagoon.	Avoca	CCC								Not Commenced	
20C	Water and Sediment Quality	Works	Investigate provision of nutrient/sediment filter on Merchants Creek.	Cockrone	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
21C	Water and Sediment Quality	Works	Manage vegetation at Cockrone Creek to provide nutrient filter.	Cockrone	CCC								Not Commenced	Need to undertake inspection to determine whether action has been implemented - liaise with Bushcare, there is a group in this location.
22C	Water and Sediment Quality	Works	Check the performance of the nutrient filter off Lakeside Drive.	Cockrone	CCC								Not Commenced	Water quality improvement devices need to be installed in priority locations. Council need to identify priority locations in order to guide works. A catchment-wide Water Quality Improvement Plan is required.
23C	Habitat and Species Conservation	Works	Manage vegetation along Cockrone Creek and The Scenic Drive to maintain nutrient retention and incorporating the use of local communities to assist in weed control and revegetation works	Cockrone	CCC								On going	Macmasters Beach bushcare undertake some works within this wetland.

Appendix B3 - Wyong CZMP 2011 - Action Status 2020



Wyong Coastal Zone Management Plan 2011 - Action Status

Action ID	Action	Comments	Responsibility	Commencing	Location	Cost			Potential Grant Funds	Project Status	Project Details
						Year 1 (2011-2012)	Year 2 (2013-2017)	Year 3 (2018-2022)			
A83	A83: Secure funding for and maintain a coastal zone management coordinator position	To facilitate streamlined implementation of key strategies in the Plan. 1 FTE for the entire period of implementation of the CZMP	Report to Manager Natural Resources within Environment and Planning Directorate of Council.	Year 1-2	Across the entire Wyong Shire coastline	\$80,000	\$320,000	\$400,000	Grant funds are unlikely – fund from Council budget	Complete	A FTE coastal management officer was employed at the former CCC. Currently, a coastal planning officer and 3 coastal management officers are serving at Catchment to Coast Section (Central Coast Council).
A1	A1: Acquire new high resolution LIDAR data at regular intervals (approximately 5 years)	LIDAR data, combined with aerial photogrammetry and satellite imagery provides a rapid process for evaluating changes to coastal terrain and terrestrial coastal ecology as sea level rises. It reduces field survey requirements and provides data for ongoing modelling and evaluation.	CCC Environment and Natural Resources Unit Support from DPIE, DP&I	Year 4 and 9	Across the entire Wyong Shire coastline	\$20,000	\$30,000	\$30,000	50%, NSW or Australian government	Ongoing	Many LIDAR surveys have been done, typically before and after major coastal events. A 2 year contract with WRL for LIDAR survey for every 6 months value of approx. \$90K was completed (from Dec 2017 to Dec 2019). A new LIDAR survey contract value of approx \$100K with WRL is proposed.
A12	A12: Establish an asset register and maintenance program for major council infrastructure in the coastal risk areas, such as stormwater systems sea walls and sewage pumping stations	For streamlined asset and infrastructure management, including condition records, storm impacts.	Environment and Natural Resources Unit, with Asset/Infrastructure Manager	Year 1 and 2	Across the entire Wyong Shire coastline	Within existing responsibilities	Within existing responsibilities	Within existing responsibilities	No grants required	Complete	Major Council coastal infrastructures were registered in 2018-19.
A67	A67: Establish a detailed monitoring program to clarify how sand placed on North Entrance beach is redistributed and to facilitate a review to provide more effective sand retention	Monitoring using a combination of ground survey and remote sensing will calibrate models, underpin management reviews and help landowners understand how sediment budget processes can best be managed to protect assets.	Environment and Natural Resources Unit, with support from DPIE	Commencing years 1-2 and ongoing	North Entrance, The Entrance Beach and the entrance channel. Some monitoring of dredged sand already occurs	Include in future dredging budgets	Include in future dredging budgets	Include in future dredging budgets	DPIE part funding	Ongoing	The monitoring works are included in regular dredging program (every 2 or 3 years) with 50% funding from Rescue Our Waterways (ROW).
A37	A37: Work with NSW government to provide most up to date method for assessing coastal erosion and recession hazards, including the interaction of coastal recession and processes operating at the entrance to Tuggerah Lake	More reliable models of coastal processes provide better predictions of the actual behaviour of beaches and dunes in storm conditions, el Niño/la Niña cycles and with rising sea level. Council will also review and refine hazard assessments for beaches and dunes that have bedrock at shallow depths.	Investment in improved models is primarily the responsibility of DPIE	Expect Year 5 and 10	Across the entire coastline of Wyong Shire.	No Council budget allocated	No Council budget allocated	No Council budget allocated	No grants required	Complete	Coastal hazard map for Wyong coastlines have been revised in the Draft Wyong CZMP 2018.
A15	A15: Conduct a regular technical review of the validity and effectiveness of management actions	The focus of this review is on the science and engineering – whether actions have achieved the predicted improvement in coastline condition or resilience.	All relevant Council units will maintain industry standards in their work. DPIE will provide technical support on current best practice.	Year 5 and 10	Across the entire coastline of Wyong Shire	No Council budget allocated	No Council budget allocated	No Council budget allocated	No grants required	Ongoing	Technical reviews and effectiveness of management actions are regularly conducting in the form of report cards and other internal reports by Council staff and sometimes with support from external consultants and experts.
A38	A38: Review and update the assessment of coastal erosion and recession hazards as new information from IPCC, Australian and NSW Governments becomes available, and using best available techniques.	Improve the resolution and certainty of inputs to erosion and recession analysis. The outcomes of these reviews will inform planning and on ground works priorities, including review of LEP and DCP clauses.	Environment and Natural Resources Unit Support from DPIE	Year 5 and 10	Relevant to all of the Wyong coastline	No Council budget allocated	\$80,000	\$80,000	50% (NSW Government)	Underway	Coastal hazard map for Northern coastlines have been updated and revised in the Draft Wyong CZMP 2018. The next assessment will be completed in 2021-2020 within the new CMP.

A13	A13: Conduct research into specific coastal issues	Research topics include sediment dynamics at The Entrance; response of frontal dune morphologies to sea level rise; feasibility of offshore sand supplies for beach nourishment.		Year 1 and 2 and ongoing		\$70,000	\$180,000	No Council budget allocated	50% (NSW Government)	Ongoing	A morphological modelling for The Entrance Channel was completed in 2017. A dredging feasibility study of The Entrance Channel was completed in 2019. Currently the REF for the dredging activities at The Entrance Channel is under revision and will be completed in September 2020.
A16	A16: Establish a schedule of annual progress reviews and broader program reviews (every 3 to 5 years)	Annual reviews are implementation tracking; broader reviews aligned with other Council and NRM reviews and reporting – key element of adaptive management	CCC Environment and Natural Resources Unit, with TLECFMC. Condition reviews may be undertaken by management partners such as the DPIE or HCRCA.	Annual reviews commence Year 1 and 2, with broader program reviews Year 5 and 10	Whole of Wyong Shire coastline	Within responsibilities of existing staff	Within responsibilities of existing staff	Within responsibilities of existing staff	No grants required	Ongoing	Annual reviews are regularly conducted in the form of report cards and other internal reports by Council staff and sometimes with support from external consultants and experts.
A56	A56: Continue the role of the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee.	A regular venue for liaison between key community and agency stakeholders with Council; supports integration of coastal, estuary and flood risk management.	CCC Environment and Natural Resources Unit	Year 1 and 2 and ongoing	Whole of coastal zone of Wyong Shire coastline	Within responsibilities of existing staff	Within responsibilities of existing staff	Within responsibilities of existing staff	No grants required	Ongoing	The Committee currently named as "Catchments and Coast Committee - Tuggerah Lakes". This Advisory Group is to advise Council and staff on all matters relating to Council's responsibilities in relation to sustainable management of its coastal, estuarine, waterways, catchment and flood liable areas. Meetings are held bi-monthly.
A17	A17: Report outcomes of management decisions and investment in coastal management to the community on a regular basis	Keep community informed about how risks are being managed and raise awareness about why some actions are more effective than others. Use State of the Environment Report and Council web site	CCC Environment and Natural Resources Unit	Major progress reports at year 5 and years 10	Whole of Wyong Shire coastline	Within responsibilities of existing staff	Within responsibilities of existing staff	Within responsibilities of existing staff	No grants required	Ongoing	All outcomes of management decisions and investment in coastal management are included in the agendas and minutes of the "Catchments and Coast Committee" Advisory Group. All agendas and minutes are available on Council's website.
A74	A74: Make Australian GeoGuides, published by Australian Geomechanics Society, available on Council's web site, as reference material for good practice by landowners and council.	Provides clear information about geotechnical processes	Council web manager, with Environment and Natural Resources Unit	Years 1-2	Relevant to multiple headlands along the coast	Within responsibilities of existing staff	Within responsibilities of existing staff	Within responsibilities of existing staff	No grants required	Complete	Information of Geotechnical Hazard are included in DCPs, CZMPs which are available on Council's websites.
A89	A89: Develop and continue to refine a 3D geomechanical model for predicting slope instability hazards.	Will facilitate continuous improvement of Council's knowledge and capacity to manage slope instability hazards.	CCC Asset planning and natural resources sections	Indicative model is included in the Plan (Appendix 4 Of Volume 2 Supporting information). Refine and update in years 2-5.	All rock and indurated sand landscapes along the coast. Cliffs and bluffs with residential development are a priority.	Preliminary tasks are within existing Council staff responsibilities.	\$50,000	No additional budget proposed	DPIE coastal management grant may be feasible, or engage with universities for research and development tasks.	Not Commenced	
A24	A24: Consider options for government acquisition of private land affected by coastal hazards.	Council will work with NSW and Australian Governments to develop an appropriate strategy for high risk locations. Government acquisition of private land in coastal risk areas is not currently supported by any of these levels of government.	CCC Environment and Natural Resources Unit, Planning Directorate, Asset managers and General Manager	Years 2-5 and 6-10; policy change may take several years.	Relevant to the entire coastline where there is existing development in coastal risk areas.	Within existing staff responsibilities; no additional budget proposed	Within existing staff responsibilities; no additional budget proposed	Within existing staff responsibilities; no additional budget proposed	Not suitable for grant funding.	Not Commenced	
A61	A61: Council will work with the NSW and Australian Government to study the feasibility of off shore sand being used for beach nourishment purposes for maintaining beach area, volume and amenity at key locations.	For instance a large volume of sand would be needed to enhance the dune buffer to prevent overtopping/breakthrough at Budgewoi. Offshore sand supplies are a high cost sand source and Council's decisions will be affected by decisions made for very high profile beaches in the Sydney metropolitan area and the evolution of NSW Government policy over the next five to 10 years.	CCC Environment and Natural Resources Unit	Not for use in the immediate term, but in the context of likely increasing need after 2020. Discussions will be ongoing in the context of policy reviews by NSW and Australian government.	Most important for North Entrance and Budgewoi, but also relevant to all sandy beaches along the Wyong coastline.	Within existing staff responsibilities; no additional budget proposed	Within existing staff responsibilities; no additional budget proposed	Within existing staff responsibilities; no additional budget proposed	Grants expected to be available to assist Councils if use of offshore sand is approved in the future, but the nature of the program is yet to be determined.	Not Commenced	
E4	E4: Train relevant Council officers in coastal hazard management for coastal risk areas, from strategic planning to emergency response activities and time frames. Share training and coordination management with SES and DPIE where feasible	At this stage, Council officers will not be designated as Authorised Officers for regulation of coastal protection works under the Coastal Protection Act 1979.	CCC Environment and Natural Resources Unit (and/or other staff as determined by Council, including Infrastructure Management) Support from DPIE	Year 1-2	Applies to all planning and environmental staff, for CPA 1979 regulatory activities along the entire Wyong coastline.	\$5,000	\$20,000			Ongoing	Coastal management officers and coastal planning officers are regularly attended and completed numerous workshops and trainings in coastal management and coastal risk, as well as climate change and strategic planning and other relevant issues.

A85	A85: DPIE will issue certificates for emergency protection works at North Entrance and Hargraves Beach, in accordance with the Emergency Action Subplan for those locations and the requirements of the Coastal Protection ct 1979	Council's strategy includes provisions to give landholders in immediate coastal risk areas some opportunity for short term coastal protection – as emergency protection works for authorised locations or medium term removable structures.	CCC Environment and Natural Resources Unit, but certificates will be issued by DPIE.	Years 1-2, a few applications may continue in year 3, but unlikely after that time with current legislation. No applications have been made to date.	Authorised Locations.	No Council funds required outside existing staff responsibilities	No Council funds required outside existing staff responsibilities	\$25,000	Statutory training component provided by DPIE at no cost.	Ongoing	The Wyong CZMP 2011 and the associated Emergency Action Subplans (EAPS) for hot spot locations were not certified. These EASPs will be revised/updated as part of the new CMP and will be submitted for Ministerial certification at a later stage which is current scheduled to be completed in 2021-2022).
A57	A57: Identify sand sources which may be used for emergency protection works, either by private landholders or by Council. Ensure necessary approvals are in place to access this sand.	Few appropriate sources are currently available. Linked to investigations in The Entrance and to future opportunities to access off shore sand.	CCC Environment and Natural Resources Unit, with support from DPIE	Initial options scoping in years 1-2. Other options will not be resolved until years 6-10.	Sand demand priority at locations where there is development in immediate coastal risk areas, but likely to be required elsewhere over time.	Within existing Council staff roles; no additional budget proposed	Within existing Council staff roles; no additional budget proposed	No Council funds required outside existing staff responsibilities	DPIE will use its staff resources for this activity	Underway	Several appropriate sources of sand are being considered e.g. dredged sand from The Entrance Channel, and from Stockton.
A8	A8: Conduct dune stabilisation and revegetation works to encourage sand accretion and stabilisation of frontal dunes, in accordance with Plans of Management for ocean frontage reserves managed by Council.	Prepare vegetation management plans for reserves. Dune enhancement is important for biodiversity, recreational access and ecological resilience in the short to medium term, but less effective as a control for long term recession.	CCC Open Space Unit, with Dunecare/Coastcare groups and CEN. Strategic direction from Environment and Natural Resources Unit. Program support from HCRMA	Years 1-2 and ongoing	Key locations are Budgewoi Beach, Lakes Beach, Soldiers Beach, North Entrance Beach, Hargraves Beach	\$50,000	\$200,000	Within existing Council staff roles; no additional budget proposed	Detailed investigations and major policy decisions likely to be within DPIE responsibility	Ongoing	Many dune stabilisation and revegetation works have been done and continues to be done in key locations.
A44	A44: Use beach nourishment or beach scraping to reinforce dunes and maintain dune crest heights above 7m at affected locations, and 8 metres at North Entrance	To prevent oceanic overtopping and inundation.	CCC Environment and Natural Resources Unit, with CCC Open Space Unit. DPIE technical support. Partnerships with Coastcare/Dunecare (see A8)	Years 1-2 and ongoing	Relevant to all beaches and dunes, but particularly at North Entrance, Hargraves Beach and Lakes Beach Budgewoi.	\$50,000	\$200,000	\$250,000	50%, DPIE and H-CRCMA	Ongoing	Beach nourishment have been done for The Entrance Beach and The Entrance North Beach (every 2-3 years with the sand dredged from The Entrance Channel). Beach scraping works have been done and continues to be done in many locations, typically before and after major storm events.
A9	A9: Continue to dredge sand from the active tidal delta in The Entrance channel and place the sand on North Entrance beach. Some sand may also be placed on The Entrance Beach.	Uses locally available sand to manage sediment budget – Council has approval to dredge up to 50,000m3 annually.	Environment and Natural Resources Unit to provide strategic direction. Works carried out by Open Space Unit. Department of Lands (land owner), DPIE and HCRMA also involved in support roles.	Years 1-2 and ongoing	The Entrance channel, North Entrance Beach and The Entrance Beach	Council allocation already made	Continue existing funding arrangements	\$250,000	Not likely to be eligible for grant funding.	Ongoing	Council successfully moved approximately 45,000 cubic meters from The Entrance Channel in 2018. 2020-21 dredge plan in progress; expected to focus on nourishment of North Entrance beach in response to significant erosion experienced.
A3	A3: Integrate Coastal Emergency Response Management plan with other elements of Council's DISPLAN	Streamline emergency response procedures.	CCC Environment and Natural Resources Unit and Asset Manager (Council Services)	Years 1-2	Relevant to entire Wyong Shire coast	Within existing staff responsibilities; not additional budget proposed	Within existing staff roles; no additional budget proposed	Continue existing funding arrangements	No grants	Complete	To be confirmed!
A58	A58: Continue to refine understanding of tsunami risk and appropriate warning and emergency response mechanisms.	Tsunami are infrequent on the Australian east coast, so awareness of potential risks at the local scale is low.	Principally the responsibility of Geoscience Australia, SES and DPIE. Council has a watching brief and will align its activities with best knowledge and practice.	Ongoing	Relevant to the entire Wyong coast	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	No grants are relevant	Ongoing	NSW SES have released maps detailing evacuation areas in the event of a land-threat tsunami. Government agencies, such as BoM (JATWC), are expected to provide warnings for predicted tsunamis.
A60	A60: Involve the TLECFMC informed of progress in implementing the Emergency Response Management Plan/Emergency Action Sub[plans and involve the committee in the review of these plans	Committee is the interface between Council and the community	CCC Environment and Natural Resources Unit	Shire coast emergency response management plan to be reviewed within 5 years. EASP to be reviewed annually, from Years 1-2	Whole of coast with specific actions for Authorised Locations.	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Council has a minor role; most research and policy development will be done by NSW and Australian government	Underway	The EASPs will be revised/updated as part of the new CMP and will be submitted for Ministerial certification at a later stage which is current scheduled to be completed in 2021-2022). The progress is included in the Committee's agendas and minutes, which are available in Council's website.
A35	A35: Contribute to development of new tools and communication measures to refine safe egress models during coastal emergencies, particularly when flooding and coastal erosion coincide.	LIDAR models will allow various egress models to be tested and will assist with integration of lake flooding and coastal emergencies.	CCC, in consultation with SES and DPIE	2-5 years and 6-10 years	Whole of coast, with particular priority for North Entrance, Budgewoi and Hargraves Beach	Costs included in coastal research actions (A13)	Costs included in coastal research actions (A13)	Within existing staff roles; no additional budget proposed	Grants are not relevant.	Ongoing	Council continues development and calibration of decision support tools and coastal monitoring initiatives, such as the MHL FIT tool and WRL monitoring sites.

A6	A6: Include clauses in the Wyong LEP and DCP to restrict new development in immediate coastal hazard planning zones and to control the type and design of development in 2050 and 2100 coastal hazard planning zones. Refers to erosion and recession risks, coastal inundation risks and geotechnical risks.	Measures to be considered include: <ul style="list-style-type: none"> ▣ No new development will be approved within the immediate coastal risk area. All development within the 2050 coastal risk area will require development consent (complying development does not apply). ▣ Appropriate designs for new development in the 2050 coastal erosion hazard area and the 2100 coastal erosion hazard area to including, for example, modular development which can be relocated landward as the coastal erosion scarp recedes. ▣ Prohibit new subdivisions, vulnerable development (including nursing homes and hospitals) or other development that intensifies land use in the 2050 or 2100 coastal risk areas. 	CCC Strategic planning	Immediate	Whole of coastal risk areas	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Costs included in coastal research actions (A13)	50% grant funding.	Complete	The Coastal Hazard Planning Lines/Maps were incorporated in Wyong LED and Wyong DCP 2013 and currently applicable until the new CMP is completed and adopted.
A18	A18: Introduce clauses into the Wyong LEP and DCP to include timed consents as a planning option for development in the 2050 coastal risk area.	Before the expiry date of the timed consent the proponent must apply for and obtain an extension of time, or relocate the structure landward on the block (where this is feasible) or remove the development. Council will review the LEP and DCP at 5 year intervals, using best available knowledge about risks and the cost effectiveness of planning controls.	CCC Strategic planning	Immediate	Whole of coastal risk areas	Within existing staff responsibilities; not additional budget proposed	Within existing staff responsibilities; not additional budget proposed	Within existing staff roles; no additional budget proposed	No grants are relevant	Not Commenced	
A20	A20: Use zoning and other planning measures to provide land for retreat of important coastal ecological communities, where possible	Allow for roll back of coastal dune landforms and associated ecological communities, within risks associated with additional development.	CCC Strategic planning	Immediate	Whole of coastal risk areas	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Within existing staff responsibilities; not additional budget proposed	No grants are relevant	Complete	To be confirmed!
A33	A33 Place notation on s149 certificates of all properties within immediate, 2050 and 2100 coastal risk areas; and also properties within the 2100 coastal risk area for geotechnical hazards; and coastal inundation risk areas.	To ensure that landowners and potential land owners are informed of coastal risk affecting their property.	CCC Strategic planning	Immediate	Whole of coastal risk areas	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	No grants are relevant	Complete	To be confirmed!
A62	A62: Reference maps showing areas affected by coastal inundation in the Wyong LEP	Require that development applications in areas affected by coastal inundation to take the inundation hazard into account. Floor levels for new development in inundation areas must consider the 1% AEP storm wave runoff for each beach.	CCC Strategic planning and development assessment planners.	Immediate, with a review of impacts on land owners after no later than 5 years.	Where coastal inundation will interact with lake and catchment inundation	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	No grants are relevant	Not Commenced	Not commenced in terms of wave run up
A80	A80: Zone ocean front land that is within the immediate coastal risk area for open space or environment protection.	Encourage over time, lower intensity and lower risk development, consistent with Council's long term managed retreat policy. These zones also facilitate roll back of coastal ecological communities.	CCC Strategic planning	1-2 years	All immediate coastal risk areas.	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	No grants are relevant	Not Commenced	
A72	A72: Construct properly engineered toe protection at the base of the steep unstable slope at Cabbage Tree Harbour.	To stabilise the slope and prevent ongoing toe trimming by wave action.	CCC Environment and Natural Resources Unit, in conjunction with other sections of Council, DPIE, Department of Lands and affected landowners	Completed 2011	Cabbage Tree Harbour	\$1,954,000 already invested	No further budget proposed at this time	Within existing staff roles; no additional budget proposed	No grants are relevant	Complete	To be confirmed!
A66	A66: Review the structural integrity of The Entrance sea wall and schedule structural upgrades as necessary to balance risk and cost	The wall is part of a major tourism area and protects community infrastructure, including road, parking and pedestrian promenade	CCC Asset Manager, with DPIE and Department of lands	1-2 Years for structural condition assessment; maintenance requirements ongoing	The Entrance – southern shore	Within Council operational budget	Within Council operational budget	No further budget proposed at this time	50% State government grant.	Underway	Several inspections have been done. External consultants will be engaged to conduct an assessment and concept design.

A10	A10: Council may protect public assets and infrastructure in the short term with properly engineered geotextile structures, with a life of up to ten years. Council may build protection structures for public assets that are vulnerable in the 2050 and 2100 planning periods, but only for major assets with long asset life, whose function will not be compromised by other aspects of climate change.	Intended to provide protection from storm bite erosion to community assets such as surf clubs and pumping stations, over the asset life or until the asset can be relocated landward. Council will not approve new major infrastructure (such as main roads and sewerage systems) in the 2050 or 2100 coastal risk areas, except where it can be protected in a cost effective manner that does not increase risks to other coastal values.	CCC Asset Management Unit, Contract and Project Management Unit, Environment and Natural Resources Unit, with support from DPIE	Commencing 1-2 years as necessary, limit at 10 years	Surf clubs with major assets in immediate hazard zone	No budget allocation	\$100,000	Within Council operational budget	50% government grant likely for major structural works	Not Commenced	
A11	A11: Council may grant development consent to private landholders to install temporary, but properly engineered structural protection, such as sand filled geotextile bags structures, to protect existing private assets in the immediate coastal risk area	Must be installed on private land and be designed to withstand a 1 in 20 year event. The intent is to provide protection for up to ten years. Development applications will be considered on a merit basis. Council will consider applications for the construction of permanent rock sea walls to protect existing houses which are located in the immediate hazard zone only if: <ul style="list-style-type: none"> all affected properties along a section of beach are involved/included the wall is built entirely on private property the wall will have minimal impact/risk in terms of erosion at the ends the landholders agree to contribute to the ongoing cost of beach nourishment to maintain beach amenity for the agreed life of the rock wall Landholders are responsible for ongoing maintenance of the structure, at no cost to the Council.	Private landholders, in consultation with CCC development assessment unit, D&PI, DPIE and Department of lands.	1-2 years, with consents to be timed to expire at ten years. Review effectiveness of this action at ten years.	Considered for North Entrance, Hargraves Beach and Blue Bay.	Costs met by landholders	Costs met by landholders	\$100,000	From Council funds	Underway	A new policy for private assets protection is currently under development. Emergency works at The Entrance North and Wamberal started from August 2020 after July coastal storm.
A21	A21: Prepare a schedule of trigger points for action – for relocating existing community infrastructure and public assets to outside coastal risk areas.	Linked to risk profile and asset life.	CCC Environment and Natural Resources Unit	1-2 years	Applies to all coastal hazard planning zones along the Wyong Shire coastline; priority to assets in immediate hazard areas.	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Costs met by landholders	No grants are relevant	Not Commenced	
A22	A22: Council will plan for the relocation of surf clubs out of coastal risk areas when major upgrades of facilities are due.	Council manages six surf clubs and associated infrastructure. Council will work with surf clubs to identify services/facilities which must remain within the immediate coastal risk area. Council will prepare detailed designs and REF for providing interim (up to 10 years) protection for existing surf clubs and major access infrastructure at surf clubs which are at immediate risk.	CCC Asset Management Unit, Contract and Project Management Unit, Environment and Natural Resources Unit and Sports Leisure and Recreation Unit.	Commencing in 1-2 years, and ongoing depending on risk and asset life.	All surf clubs in CCC	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	Within existing staff roles; no additional budget proposed	No grants are relevant	Not Commenced	
A23	A23: Council will design some surf club buildings and other infrastructure for retreat during erosion emergencies	Relocatable structures are an option both for surf clubs and for private buildings in the 2050 coastal risk area.	CCC Asset Management Unit, with support from Development Assessment Unit and Sports Leisure Unit	Commencing years 1-2, and ongoing	All surf clubs	No budget allocated at this time	No budget allocated at this time	Within existing staff roles; no additional budget proposed	No grants are relevant for planning, but Council will apply for grants for construction, and has been successful in the past. Major surf club rebuilds estimated at \$4 million each.	Ongoing	Two new Surf Clubs - Soldiers Beach and Shelly Beach were constructed around 2011 on deep CFA piles
A70	A70 Review stormwater drainage systems in the vicinity of geotechnical hazard areas to ensure they do not discharge runoff where it could trigger a landslide.	Some geotechnical processes are exacerbated by inappropriate management of surface and groundwater flows.	CCC and landholders. Link to Water Sensitive Urban Design projects within Council.	Commence within 5 years and review after 10 years.	All cliffs and bluffs within coastal hazard planning zone or where stormwater drains to these zones.	No budget allocated – within existing staff roles and programs	No budget allocated – within existing staff roles and programs	No budget allocated at this time	Some grants may be available for new infrastructure.	Not Commenced	

A71	A71: Review Plans of Management for coastal reserves affected by slope instability hazards and ensure that the PoM takes slope instability hazards into account.	Consider drainage, lookouts and walking tracks. Gosford Council DCP 163 is an example.	CCC asset managers, and relevant managers in DPIE (Parks Service) and Department of Lands.	Years 2-5	Norah Head and southern sections of Wyrabalong National Park are priorities, then all headland reserves in Council management	No budget allocated	No budget allocated	No budget allocated – within existing staff roles and programs	No grants are relevant	Not Commenced	
A90	A90: Further investigate the interaction of coastal erosion and geotechnical hazards in areas where both types of hazard may apply now or within the 2100 planning period.	Recession hazard is reduced where there is a bedrock base, current recession assessments have assumed full sand profiles.	CCC Environment and Natural Resources Unit.	1-2 years	Where rock terrain is overlain by a thin mantle of beach/dune sand. Dunes immediately adjacent to headlands are an example.	No Council budget allocated	No Council budget allocated	No budget allocated	Estimated cost is \$50,000 per Plan. Grants may be available from DPIE and Department of Lands; plus their responsibility for PoM over their land	Not Commenced	
A81	A81: Conduct a benchmark survey of the condition of coastal ecological communities.	Will extend survey coverage already completed, such as for rock platforms (H-CRCMA)	CCC Environment and Natural Resources Unit, in partnership with HCRMA and local Landcare groups	1-2 years, with follow up at approximately 3 year intervals.	Locations to be selected with partner organisations, for representative coverage of coastal ecological communities.	No budget allocated	No budget allocated	No Council budget allocated	50% DPIE Coastal Program grant	Not Commenced	
A32	A32: Where feasible establish conservation agreements for high value ecological communities in coastal reserves.	No conservation agreements, negotiated with DPIE or HCRMA currently exist in Wyong Shire. Results of A81 will contribute to selection process.	Department of Lands is the major player – with tenure over rock platforms, coastal slopes and frontal dunes outside National Park.	2-5 years, and continuing	Locations to be negotiated by Department of Lands and other landholders.	No Council budget allocated	No Council budget allocated	No budget allocated	HCRMA Partnership program	Not Commenced	
A75	A75: Continue to work with DPIE to protect nesting and roosting habitats for protected shorebirds such as Little tern.	Bird habitats are disturbed by pedestrians, dogs and vehicles	DPIE are likely to have the lead role, with support from Council and local community environment groups. HCRMA will support this activity.	Ongoing	Norah Head rock platform is a key site identified by HCRMA.	No additional Council budget allocated – contribution is within role of existing staff.	No additional Council budget allocated – contribution is within role of existing staff.	No Council budget allocated		Ongoing	Council continues to protect nesting habitats where possible, such as by setting up temporary fencing around nesting locations on The Entrance channel sand berm.
A5	A5: Enhance community awareness of coastal hazards and emergency response management actions, using tools such as web site, information sheets, face to face meetings, information boards at beaches, media coverage.	Priority action in first two years of the Plan.	CCC Environment and Natural Resources unit with CCC Media manager and community development unit.	Commencing immediately, and ongoing; review outcomes after 5 years.	Relevant to all beaches in the Shire, but priority beaches are: Curtis Parade and Hutton Road North Entrance; Cabbage Tree Harbour, Blue Bay, Hargraves Beach	\$20,000 plus existing staff resources	\$30,000 plus existing staff resources	Within existing staff responsibility	Some funds may be available from NSW Environmental Trust and HCRMA programs (where risks relate to natural resource values).	Ongoing	Educational material is available concerning coastal management on Council's website (https://www.centralcoast.nsw.gov.au/environment/coastlines/coastal-zone-management). Recently during the July/August 2020 event, Council has also maintained a page dedicated to the Coastal Erosion Emergency and Recovery which was regularly updated and supported by media releases, public meetings and interviews. Council officers also regularly respond to resident enquiries as they are made.
A14	A14: Involve community in data collection and record keeping through NRM monitoring programs	Community involvement in monitoring means that additional data can be collected. Dunecare groups already provide a good model for how this could evolve.	CCC Environment and Natural Resources Unit, with input from DPIE and HCRMA	Investigate options in years 1-3, implement years 3-5 and ongoing.	Whole of coastline, but priority for locations of high ecological value and where there are active community groups.	Within existing staff responsibilities, no additional budget proposed	Within existing staff responsibilities, no additional budget proposed	Within existing staff responsibilities, no additional budget proposed	Liaise with HCRMA re community monitoring programs. Also with LMCC about programs being implemented by that Council.	Ongoing	Council is exploring citizen science opportunities, such as Coast Snap, which will improve Council's data collection capabilities. Some groups have extensive photo records of their works (e.g. Budgewoi Dunecare)
A51	A51: Council will continue to support Landcare/Coastcare groups to maintain and enhance the condition and function of native vegetation on coastal dunes, including weed removal and replanting.	Builds on existing successful projects such as Weeds of national significance at Budgewoi, Norah head, North Entrance and Lakes Beach South. Action combines community enjoyment of the coastal landscape with major ecological condition benefits	CCC Open Space Unit will work with HCRMA and Landcare/Coastcare groups	Years 1-2; review program after 5 years	To be determined in consultation with HCRMA, but likely to include further work at North Entrance, Budgewoi, Hargraves Beach and at Soldiers Beach and Blue Bay.	Within existing staff responsibilities – no additional budget	Within existing staff responsibilities – no additional budget	Within existing staff responsibilities – no additional budget	Partnership grants are available from HCRMA.	Ongoing	Council continues to support nine Landcare/Coastcare/Dunecare groups working to maintain and enhance the condition of native coastal environments in the former Wyong Shire Council LGA, from Budgewoi Dunecare in the north to Shelly Beach Coastcare in the south.
A46	A46: Maintain a close working relationship with surf clubs and Surf Life Saving Australia re beach patrols, beach safety information and beach environment information	The surf life saving community is a valuable partner in the management of the coastal zone.	CCC recreation and tourism development units; continue the role of the Beach Liaison Committee.	Ongoing, with review at 5 years.	All patrolled beaches along the coast	Within existing staff responsibilities – no additional budget proposed	Within existing staff responsibilities – no additional budget proposed	Within existing staff responsibilities – no additional budget proposed	From existing Council funds.	Ongoing	Need further information/comments.

A76	A76: Prepare and/or review Plans of management and Master Plans for the main recreational beaches along the Wyong coastline.	Upgrade shade and picnic facilities at high profile beaches in accordance with Plans of Management. Review design and integrity of beach access structures, stormwater outlets, viewing platforms. Align action with plans for relocation of surf clubs.	CCC Open Space and Community Development Units, in consultation with Department of lands	Years 2-5, with on ground works in year 6-10	Examples include Mazlin Reserve, and reserves at main beaches – Toowoan, Shelly, Soldiers, The Entrance, North Entrance and Lakes Beach.	No additional budget	\$750,000	\$1,000,000	50% grant funding, from NSW and Commonwealth community infrastructure programs.	Ongoing	Master Plan for Norah Head was completed in 2018. More info are required from Development.
A79	A79: Review Plans of management for Crown coastal holiday parks and Crown Reserves, to reflect climate change hazards and sea level rise.	These parks are a major social and economic asset for Wyong Shire	Council Asset manager and Open Space and Recreation Manager, with Department of lands	Years 2-5	Toowoan Bay, Norah Head, Sun Valley and Blue Lagoon	No Council budget allocated	No Council budget allocated	No Council budget allocated	Expect some funding from Department of Lands	Underway	Need further information/comments.
A52	A52: Review access ways at high profile beaches, foreshore and headland reserves and provide disabled access	Include disabled access considerations in Plans of Management	CCC Open Space and Recreation and Community Development Units. Involve Department of Lands.	Immediate and ongoing. Work has already commenced. Review usage and feedback after 5 years.	Consider Toowoan Bay as a priority because flat and protected beach.	No budget allocated in this year	\$50,000	\$50,000	NSW and Australian government community infrastructure programs	Ongoing	Need further information/comments.
A48	A48: Assess the safety and suitability of ocean boat launching ramps and associated facilities and identify necessary upgrades/need for new facilities	Include review of structural integrity of ramp at cabbage Tree Harbour with sea level rise; also trailer parking, ramp capacity and interaction with other users.	Liaise with NSW Roads and Maritime Services, Marine rescue and commercial and recreational fishers; also scuba clubs/commercial users.	Watching brief in years 2-5	Cabbage Tree Harbour	No additional budget	No additional budget	No additional budget	Upgrade of the ramp, if required, would be funded by NSW Roads and Maritime Services.	Ongoing	Need further information/comments.
A47	A47: Plan routes and develop a coastal walk along full length of the Wyong coast, and a Mountains to Sea walk.	Potential tourism opportunity, plus encourages outdoor recreation.	CCC Sport and Leisure Unit, with support from Planning and Policy Unit and Asset Management Unit. Liaise with DPIE, Department of Lands and adjoining councils.	Planning over five years, investment to commence after five years.	Priority areas include Norah Head to Budgewoi, The Entrance and North entrance area and extensions of existing paths in National park lands.	No budget currently allocated	No budget currently allocated	No budget currently allocated	NSW and Australian government grants for community infrastructure	Ongoing	Elevated boardwalk concept design for Soldiers Beach was completed in 2018. The Entrance Coast to Lake Scenic Walk is a 'string of pearls' self-guided walk connecting pedestrians to attractions, landmarks and facilities around The Entrance, covering over 7.6km of our beautiful area.
A50	A50: Develop a design theme for coastal information, interpretation and safety signage		CCC Communications Unit has a key role. Involve SLSA, Precinct Committees and Landcare.	Design studies and planning in year 1-2, with implementation in Year 2-3.	High usage/high profile sites as first priority – Shelly Beach, Toowoan Bay.	No additional budget proposed	\$50,000	No additional budget proposed	From Council funds only	Underway	Need further information/comments.
A53	A53: Conduct regular surveys of beach users in relation to facilities and services.	Provides regular feedback on the condition of the coast and outcomes of investment in recreational facilities.	CCC Sport and recreation Unit; consult with Coast, Estuary and Flood Risk Management Committee	At intervals of approximately 4 years, aligned with Council's 4 year delivery plan. May be integrated with Council Open Space Survey.	Whole of Wyong coastline	Within existing staff responsibilities; No additional budget allocated	Within existing staff responsibilities; No additional budget allocated	Within existing staff responsibilities; No additional budget allocated	From Council funds only	Ongoing	Need further information/comments.
A77	A77: Document stories of Aboriginal attachment to the Wyong coastline.	Identify with the Aboriginal community which information could be used in interpretative material about the coast, and where such information should be placed.	CCC Environment and Natural Resources Unit, with Darkinjung LALC, other Aboriginal community groups and HCRMA (Aboriginal Community Support Officer and Aboriginal Culture and Environmental Network)	Data gathering and documentation year 1. Interpretative material in years 2-5.	Relevant to whole of Wyong coastline; specific locations determined in consultation with Aboriginal community	Within existing staff responsibilities; No additional budget allocated	\$30,000	Within existing staff responsibilities; No additional budget allocated	From Council funds; in partnership with HCRMA	Underway	Need further information/comments.
A78	A78: Monitor the condition of known Aboriginal sites on coastal land under Council's care and control.	Include protection measures in plans of management for coastal reserves.	CCC Community Development Unit, with Darkinjung LALC and other Aboriginal community groups, DPIE cultural heritage staff.	Audit condition in Year 1. PoM to reflect Aboriginal site protection measures within 2 years.	Whole of Wyong coastline in Council care and control. Specific locations determined in consultation with local aboriginal community and DPIE.	Within existing staff roles; No additional budget allocated	\$10,000	Within existing staff roles; No additional budget allocated	From Council funds, in partnership with HCRMA and DPIE.	Ongoing	Aboriginal site protection work completed last year at Soldiers Beach midden

Appendix B4 - Wyong CZMP 2018 - Review of Actions in the Wyong CZMP 2011

Table C-1 Review of Actions in the Wyong CZMP 2011

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2018	Recommended changes to Action	Recommended Action for CZMP 2018
A83	Secure funding for and maintain a coastal zone management coordinator position	To facilitate streamlined implementation of key strategies in the plan, 1 FTE for the entire period of implementation of the CZMP	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes (see Action 14)	Action already commenced. Action should be to continue position.	Maintain a coastal zone management coordinator position
A1	Acquire new high resolution LiDAR data at regular intervals (approximately 5 years)	LiDAR data, combined with aerial photogrammetry and satellite imagery provides a rapid process for evaluating changes to coastal terrain and terrestrial coastal ecology as sea level rises. It reduces field survey requirements and provides data for ongoing modelling and evaluation.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes, with changes (see Action 3)	Council is already running a very efficient beach monitoring program using UAV's to collect aerial photogrammetry after storms. A new action to reflect the current monitoring program is required, with this action now changed to showing support for the existing 2-3 yearly NSW Government Lidar collection program. Another new action recommended is for Council to lobby the NSW Government to commence a regular marine LiDAR collection program.	Continue to demonstrate support for the existing NSW 3-yearly Lidar collection program.
A12	Establish an asset register and maintenance program for major council infrastructure in the coastal risk areas, such as stormwater systems sea walls and sewage pumping stations	For streamlined asset and infrastructure management, including condition records, storm impacts. Some monitoring of dredged sand already occurs.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire. [Specific assets/ locations not given]	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes, with changes (see Action 25)	It is likely that the Council already has AMPs across different departments / units. Rather than develop separate registers for coastal risk, the existing AMPs should be appended, to make note potential coastal risk to any asset or infrastructure in the coastal zone. The responsibility for appending the asset management plans should rest with the managers of the AMPs (not the Environment Unit). Note, this revised action may be split into 2 to 3 actions, to separate the responsibility towards the appropriate Council departments.	For all major council assets, document the risk of coastal hazard (immediate, high, low, geotechnical), and the preferred asset replacement action to manage that hazard (relocate, retrofit / redesign, manage to fail) in the Asset Management Plan, as follows. • Document in the Asset Management Plan the hazard type (erosion, wave run up, geotechnical) and risk of impact (immediate, high, low, none for geotechnical) for all transport assets (roads, etc.), stormwater assets (pits, pipes etc.), sewerage assets (pump stations, rising mains, gravity mains), water infrastructure, public buildings (SLSCs, community halls etc.), and any other major Council assets that are within the area affected by coastal hazards as shown on the hazard maps. • Determine an appropriate hazard management action for assets at immediate risk, then assets at high risk. The hazard management action should as a minimum consider relocation of the asset, retrofit/redesign, protection (providing the works will not adversely affect the adjacent beach), or manage to fail. • The appropriate hazard management action shall be listed in the Asset Management Plan and included in the asset replacement cost. • The hazard management action shall be implemented either: when the asset is due for replacement (due to other factors, i.e. wear and tear); or the coastal hazard impact is imminent, as indicated by a specific monitoring trigger point. • Inform the Monitoring program of those assets at immediate risk, to be checked for breaching of triggers.
A67	Establish a detailed monitoring program to clarify how sand placed on North Entrance beach is redistributed and to facilitate a review to provide more effective sand retention	Monitoring using a combination of ground survey and remote sensing will calibrate models, underpin management reviews and help landowners understand how sediment budget processes can best be managed to protect assets.	Adaptive management and knowledge enhancement	North Entrance, The Entrance Beaches; The Entrance Channel.	Lake and Sea Interactions Action Plan (Section 10.0)	Yes, with changes (see Action 10)	Parts of Action A13 and A68 have been combined with this action, to become a specific study into the dynamics of The Entrance and adjacent beaches. Regular beach monitoring will be conducted through Action A1. Ongoing use of dredged sand on North Entrance Beach is recommended in Action A9.	Investigate the sediment transport dynamics of The Entrance channel and adjacent beaches. The study should include: - A detailed monitoring program to track how dredged sand placed on North Entrance beach is redistributed to adjacent beaches / the Entrance channel; - The potential effects of sea level rise on currents and sediment transport / deposition in The Entrance (through "coastal recession"), and the subsequent implications for dredging and sand placement on adjacent beaches; - Recommendations for a program of sand placement on North Entrance that yields greater retention of the sand on the beach. Council could consider pursuing this action as a research project in partnership with a University.

Review of Actions in the 2011 Wyong CZMP

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2018	Recommended changes to Action	Recommended Action for CZMP 2018
A37	Work with NSW government to provide most up to date method for assessing coastal erosion and recession hazards, including the interaction of coastal recession and processes operating at the entrance to Tuggerah Lake	More reliable models of coastal processes provide better predictions of the actual behaviour of beaches and dunes in storm conditions, <i>el Nino/la Nina</i> cycles and with rising sea level. Council will also review and refine hazard assessments for beaches and dunes that have bedrock at shallow depths.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No	The most important contribution Council can make to improve the understanding of the coastal processes in Wyong is to monitor beach change before and after storms. This is already underway, as re-iterated through Action A1. Improvements in coastal modelling capabilities are already progressing through academic institutions, independent consultancies, and OEH. This remains the most efficient method for improving assessment techniques. The original intent of this action (as stated in Sup Vol 1 Part B p89) was that Council would not fund a local scale research project to develop a coastal process model, but could opt to be part of a broader research project. This original intent would be better served through support for a research project specific to Wyong. Most notably, research into sediment transport dynamics between The Entrance and adjacent beaches is recommended as a revised Action A67.	None
A15	Conduct a regular technical review of the validity and effectiveness of management actions	The focus of this review is on the science and engineering - whether actions have achieved the predicted improvement in coastline conditions or resilience.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No, action to instead be noted as part of review process outlined in CZMP 2015	This action will necessarily be outlined as part of the review process for the CZMP. Effectiveness of management actions would be reviewed through implementation of the plan. At 10 years when the plan is fully revised, the effectiveness of actions should be tested by repeating the risk assessment, and determining if the level of risk has been reduced by implementing the management action(s).	None
A38	Review and update the assessment of coastal erosion and recession hazards as new information from IPCC, Australia and NSW Governments becomes available, and using best available techniques	Improve the resolution and certainty of inputs to erosion and recession analysis. The outcomes of these reviews will inform planning and on ground works priorities, including review of LEP and DCP clauses.	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No, action to instead be noted as part of review process outlined in CZMP 2015	This action will necessarily be outlined as part of the review process for the CZMP. At 10 years, it is expected that a full review of coastal hazards assessments will be conducted in combination with the preparation of the next CZMP to cover the subsequent 10 year period.	None
A13	Conduct research into specific coastal issues	Research topics include sediment dynamics at The Entrance; response of frontal dune morphologies to sea level rise; feasibility of offshore sand supplies for beach nourishment <i>Additional notes from Council will commission further studies of sediment dynamics in The Entrance channel, with sea level rise. These studies will help determine whether additional sand could be dredged from The Entrance for beach nourishment purposes. Sand use for emergency beach nourishment or to fill geotextile bags must comply with relevant Ministerial guidelines. Additional Notes from Part B, Section 7.0 Table 7.2 p88.</i> Potential hydrodynamic impacts of breaching of the sandy barrier at Budgewoi, was also listed as a potential research topic.	Adaptive management and knowledge enhancement	[not specified]	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes, amalgamated with other action(s) (see Action 10)	Elements of this action recommending a study for The Entrance and adjacent beaches, including effects of sea level rise, have been incorporated into a revised Action A67. Such a study is specific to Wyong, and would provide very useful insight into the management of existing erosion problems in the Entrance area. Offshore sand studies already have their own action (A61). Investigation of different dune morphology's response to sea level rise is generic to the entire of NSW, and better handled through an OEH or other state-wide supported academic investigation. Such an investigation is also unlikely to change how the Wyong coast should be managed over the next 10 years.	See Action A67 for elements relating to The Entrance.

Review of Actions in the 2011 Wyong CZMP

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2018	Recommended changes to Action	Recommended Action for CZMP 2018
A16	Establish a schedule of annual progress reviews and broader program reviews (every 3 to 5 years)	Annual reviews are implementation tracking; broader reviews aligned with other Council and NRM reviews and reporting - key element of adaptive management	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No, action to instead be noted as part of review process outlined in CZMP 2018	This action will necessarily be outlined as part of the review process for the CZMP. Note also that as CZMP 2018 will be integrated into Councils IPR Framework, regular progress reviews will necessarily be conducted.	None
A56	Continue the role of the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee	A regular venue for liaison between key community and agency stakeholders with Council; supports integration of coastal, estuary and flood risk management.	Adaptive management and knowledge enhancement	Entire coastal zone of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	Yes (see Action 21)	None	Continue the role of the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee, to support ongoing integration of coastal, estuary and flood risk management.
A17	Report outcomes of management decisions and investment in coastal management to the community on a regular basis	Keep community informed about how risks are being managed and raise awareness about why come actions are more effective than others. Use state of the Environment Report and Council web site	Adaptive management and knowledge enhancement	Entire coastline of Wyong Shire	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No	As CZMP 2018 will be integrated into Councils IPR Framework, the outcomes of decisions and investment for the CZMP will necessarily be reported to the community as part of Council's Annual Report.	None
A74	Make Australian GeoGuides, published by Australian Geomechanics Society, available on Council's web site, as reference material for good practice by landowners and council	Provides clear information about geotechnical processes	Adaptive management and knowledge enhancement	Headlands along the coast [specific sites not given]	Geotechnical Hazards Action Plan (Section 11.0)	Yes (see Action 20)	The GeoGuides provide guidance on siting of development, and are already peer reviewed and in production. It is therefore efficient for Council to utilise this existing material	Make Australian GeoGuides, published by Australian Geomechanics Society, available on Council's web site, as reference material for good practice by landowners and council
A89	Develop and continue to refine a 3D geomechanical model for predicting slope instability hazards.	Will facilitate continuous improvement of Council's knowledge and capacity to manage slope instability hazards.	Adaptive management and knowledge enhancement	All rock and indurated sand landscapes along the coast. Cliffs and bluffs with residential development are a priority.	Geotechnical Hazards Action Plan (Section 11.0)	No, alternative action proposed.	3D modelling is extremely expensive, and requires extensive monitoring data as input to generating a reasonable model. A 3D model is only as good as the data underpinning it. In of itself, a 3D model would not provide up-to-date warning data of the likely occurrence of a landslide. It is instead recommended that a monitoring program for locations at high risk from geotechnical hazard be developed. The monitoring program could involve, for example, drilling of boreholes and installation and monitoring of inclinometers (which detect land movement) and piezometers (which detect groundwater depth and flows). Such monitoring data could provide a warning of likely landslide. Furthermore, if at a later date it is decided that 3D modelling would be beneficial for understanding and mapping geotechnical risk, the monitoring program would provide key input data. Notable high priority hot spots for monitoring are: Cabbage Tree Harbour (where residential houses and public access may be at risk); then behind Bateau Bay and Blue Bay (no private houses but there are public safety risks along the accessways. Of lower priority for monitoring, and to contribute to understanding the local geology, old landslips are evident from the topographic data of ridge lines at Crackneck Point and Jenny Dixon Beach.	New Action proposed: Develop a monitoring program for sites at high risk of landslide and geotechnical hazard.
A24	Consider options for government acquisition of private land affected by coastal hazards	Council will work with NSW and Australian Governments to develop an appropriate strategy for high risk locations. Government acquisition of private land in coastal risk areas is not currently supported by any of these levels of government.	Adaptive management and knowledge enhancement	Relevant to the entire coastline where there is existing development in coastal risk areas.	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, as a "future" option (see Approach to Managing Future Risks)	This action does not need to be included in the implementation schedule that covers the next 10 years. The action will be identified as an option for future investigation should an erosion impact occur earlier than predicted over the life of the plan, in combination with other options for current and future coastal erosion risks.	To be noted in "Approach to Managing Future Risks", not within the CZMP Implementation schedule.

Review of Actions in the 2011 Wyong CZMP

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A61	Council will work with the NSW and Australian Government to study the feasibility of offshore sand being used for beach nourishment purposes for maintaining beach area, volume and amenity at key locations.	For instance a large volume of sand would be needed to enhance the dune buffer to prevent overtopping/breakthrough at Budgewoi. Offshore sand supplies are a high cost sand source and Council's decisions will be affected by decisions made for very high profile beaches in the Sydney metropolitan area and the evolution of NSW Government policy over the next 5 to 10 years.	Adaptive management and knowledge enhancement	Most important for North Entrance and Budgewoi, but also relevant to all sandy beaches along the Wyong coastline.	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	As the NSW Government currently prohibits the extraction of sand from offshore waters, this action should be noted as an option for consideration in future CZMPs	May be noted in the "Approach to Managing Future Risks", but won't be included in the current implementation schedule.
A4	Train relevant Council officers in coastal hazard management for coastal risk areas, from strategic planning to emergency response activities and time frames. Share training and coordination management with SES and OEH where feasible.	At this stage, Council officers will not be designated as Authorised Officers for regulation of coastal protection works under the <i>Coastal Protection Act 1979</i> .	Managing significant coastal risks	Applies to all planning and environmental staff, for CPA 1979 regulatory activities along the entire Wyong coastline	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No, alternative action proposed	Elements of emergency management already covered by SES should be removed from this action. This action should focus on training Council staff who work in the coastal zone (so, including works, engineering and parks and recreation, not just environmental staff) regarding the appropriate and legal response to coastal erosion events, particularly at authorised locations. The aim is to "support an informed and consistent approach to coastal ... erosion emergencies across all sections of Council" (Sup Vol Part B p.86). The aim of the action should be to facilitate better implementation of the EASPs and CZMP objectives to avoid ad hoc protection or other works in the coastal zone, particularly where these may leave a legacy of liability on Council for years to come. To support this aim, two additional and related actions are also needed: - A checklist or similar, that defines planning controls and guidelines for Part 5 development and other works undertaken by Council in the coastal zone. - An implementation workshop, to educate all Council units and appropriate staff of the actions they are responsible for implementing in the WCZMP 2018.	New Action proposed, involving training of relevant Council staff regarding appropriate response to coastal erosion events.
A85	OEH will issue certificates for emergency protection works at North Entrance and Hargraves Beach, in accordance with the Emergency Action Sub plan for those locations and the requirements of the Coastal Protection Act 1979	Council's strategy includes provisions to five landholders in immediate coastal risk areas some opportunity for short term coastal protection - as emergency protection works for authorised locations or medium term removable structures.	Managing significant coastal risks	Authorised locations	Emergency Response Management Action Plan (Section 8.0)	No, alternative action proposed.	If or when Council and / or private landholders chose to pursue temporary coastal protection works, this action would be conducted. A specific action to this effect is no longer needed. However, since the WCZMP 2011, there have been changes to the legislation regarding what are now termed "temporary" not "emergency" coastal protection works. An accompanying Code of Practice was also released by the NSW Government in 2013. The temporary coastal protection works elements of the legislation have been a highly contentious and confusing element of the changes to the CP Act since 2011. The mandated form of these works (see Code of Practice), are considered unlikely to be effective in protecting "hot spot" locations during storms. The temporary protection works elements of the legislation are thought likely to be removed as part of the replacement of the CP Act with the proposed Coastal Management Act, expected by 2017 or 2018, which would make pursuit of such works obsolete.	New Action proposed: Revise the EASPs to: (a) reflect the current legislation relating to temporary coastal protection works that allows Council to erect such works on their land prior to the occurrence of a storm and; (b) reflect changes to the legislation arising from the NSW Government's coastal reforms.
A57	Identify sand sources which may be used for emergency protection works, either by private landholders or by Council. Ensure necessary approvals are in place to access this sand.	Few appropriate sources are currently available. Linked to investigations in The Entrance and to future opportunities to access off shore sand.	Managing significant coastal risks	Sand demand priority at locations where there is development in immediate coastal risk areas, but likely to be required elsewhere over time.	Emergency Response Management Action Plan (Section 8.0)	No	Action A44 below covers potential beach sand works for managing existing Council beaches. The process for accessing sand for temporary coastal protection works is specified by the Coastal Protection Act 1979 and in the EASPs. Therefore, this action is considered obsolete.	None

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A8	Conduct dune stabilisation and revegetation works to encourage sand accretion and stabilisation of frontal dunes, in accordance with Plans of Management for ocean frontage reserves managed by Council.	Prepare vegetation management plans for reserves. Dune enhancement is important for biodiversity, recreational access and ecological resilience in the short to medium term, but less effective as a control for long term recession.	Managing significant coastal risks	Key locations are Budgewoi Beach, Lakes Beach, Soldiers Beach, North Entrance Beach, and Hargraves Beach.	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0) Building Biodiversity Resilience Action Plan (Section 12.0)	Yes, but amalgamated with other action(s) (see Actions 6 & 7)	Other actions that specify dune works have been amalgamated with this action (i.e. A44 in relation to dune heights, A30 in relation to making vegetation management plans, as necessary). This action supports and is supported by A51 (Volunteer Dunecare programs). Furthermore, there is only a generic POM for all reserves at present.	New Action proposed: Conduct dune rehabilitation works to encourage sand accretion, stabilisation and growth of frontal dunes. As necessary, prepare and implement vegetation management plans for the dune rehabilitation works to specify species selection, planning, weed removal and fencing plans for a dune rehabilitation area. Dune stabilisation provides a buffer of sand to be eroded during storm events. Where dune heights are maintained above ~ 7 m AHD, dunes can also act as a suitable barrier to wave overtopping.
A44	Use beach nourishment or beach scraping to reinforce dunes and maintain dune crest heights above 7m at affected locations, and 8 metres at North Entrance	To prevent oceanic overtopping and inundation.	Managing significant coastal risks	Relevant to all beaches and dunes, but particularly at North Entrance, Hargraves, Lakes and Budgewoi Beaches.	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0) Lake and Sea Interactions Action Plan (Section 10.0)	Yes, but amalgamated with other action(s) (see Action 6)	Beach nourishment and beach scraping are separate actions. Due to the high cost, it is recommended that beach nourishment be reserved as a future response only (i.e. "Approach to Managing Future Risks"). It is also noted that re-use of dredged sand on North Entrance Beach (see Action A9) is not technically beach nourishment. This action should instead specify an investigation of the viability of beach scraping in Wyong, and a prioritised listing of any suitable locations. Beach scraping does not add any sand reserves to the beach, and instead acts to enhance and speed up beach recovery. Should it be pursued, beach scraping shall be supported by dune rehabilitation (see new action above). Aims to maintain dune heights to address overtopping noted in this action have been added into the new action: dune rehabilitation (replacing Action A8).	New Action proposed: Investigate the viability of beach scraping on Wyong's beaches, and develop a prioritised list of beaches for which beach scraping may be beneficial.
A9	Continue to dredge sand from the active tidal delta in The Entrance Channel and place the sand on North Entrance Beach. Some sand may also be placed on The Entrance Beach.	Uses locally available sand to manage sediment budget - Council has approval to dredge up to 50,000m3 annually.	Managing significant coastal risks	The Entrance channel, North Entrance Beach and The Entrance Beach	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0) Lake and Sea Interactions Action Plan (Section 10.0)	Yes (see Action 9)	The action should be continued as is. However, it should be noted that the revised Action A67 details an investigation of sand movements from the dredge site. Outcomes of Action A67 should be used to improve this program (when they become available).	Continue to dredge sand from the active tidal delta in The Entrance Channel and place the sand on North Entrance Beach. Some sand may also be placed on The Entrance Beach. Recommended improvements to the dredging and placement program arising from Action A67 should be incorporated into this strategy, when they become available.
A3	Integrate Coastal Emergency Response Management Plan with other elements of Council's DISPLAN	Streamline emergency response procedures.	Managing significant coastal risks	Entire coastline of Wyong Shire	Emergency Response Management Action Plan (Section 8.0)	No	The legal status of EASPs is that they are "sub plans" of the DISPLAN. There is no need for an additional action to combine the EASPs with the DISPLAN	None
A58	Continue to refine understanding of tsunami risk and appropriate warning and emergency response mechanisms.	Tsunami are infrequent on the Australian East Coast, so awareness of potential risks at the local scale is low.	Managing significant coastal risks	Entire coastline of Wyong Shire	Emergency Response Management Action Plan (Section 8.0)	No	Tsunami prediction and response is not the subject of CZMPs, in accordance with NSW legislation and guidelines. It is noted, however, that the NSW Government is currently preparing tsunami modelling and prediction assessments, and appropriate emergency response mechanisms.	None
A60	Involve the TLECFMC informed of progress in implementing the Emergency Response Management Plan/Emergency Action Sub plans and involve the committee in the review of these plans.	Committee is the interface between Council and the community	Managing significant coastal risks	Whole of coast with specific actions for Authorised Locations.	Emergency Response Management Action Plan (Section 8.0)	No	EASPs, as an emergency response tool, are the jurisdiction of the NSW SES.	None
A35	Contribute to development of new tools and communication measures to refine safe egress models during coastal emergencies, particularly when flooding and coastal erosion coincide.	LIDAR models will allow various egress models to be tested and will assist with integration of lake flooding and coastal emergencies.	Managing significant coastal risks	Whole of coast with particular priority for North Entrance, Budgewoi and Hargraves Beach	Emergency Response Management Action Plan (Section 8.0)	No	Communication regarding coastal erosion emergencies is already conducted through Councils Emergency Management Plan, with the BOM and SES as lead agencies for warnings. Egress modelling etc. should be undertaken as part of the Floodplain Risk Management Planning process in close consultation with the SES who is the lead combat agency in flooding and coastal storm events. Flood modelling underpinning the FRMPs should include the combined influences of high ocean water levels and rainfall events, to best determine areas affected by lake and / or sea interactions, which is recommended as a new action from Action A62. This action is therefore considered obsolete.	None

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A6	Include clauses in the Wyong LEP and DCP to restrict new development in immediate coastal hazard planning zones and to control the type and design of development in 2050 and 2100 coastal hazard planning zones. Refers to erosion and recession risks, coastal inundation risks and geotechnical risks.	Measures to be considered include: - No new development will be approved within the immediately coastal risk area. All development within the 2050 coastal risk area will require development consent (complying development does not apply). - Appropriate designs for new development in the 2050 coastal erosion hazard area and the 2100 coastal erosion hazard area to including, for example, modular development which can be relocated landward as the coastal erosion scrap recedes. - Prohibit new subdivisions, vulnerable development (including nursing homes and hospitals) or other development that intensifies land use in the 2050 or 2100 coastal risk areas.	Managing significant coastal risks	Whole of coastal risk areas	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, with changes (see Action 17)	Action to be amended to refer to the Wyong DCP Chapter 3.5 Coastal Hazards, currently in progress by Council. Action to also be combined with Action A18. Action will note that DCP should continue to be updated as new planning approaches for coastal hazards are developed, and new coastal hazard / risk information arises.	Implement Wyong DCP 2013 Chapter 3.5 Coastal Hazards. Continue to update the DCP as new planning approaches and / or new information regarding coastal risk are released.
A18	Introduce clauses into the Wyong LEP and DCP to include timed consents as a planning option for development in the 2050 coastal risk area.	Before the expiry date of the timed consent the proponent must apply for and obtain an extension of time, or relocate the structure landward on the block (where this is feasible) or remove the development. - Council will review the LEP and DCP at 5 year intervals, using best available knowledge about risks and the cost effectiveness of planning controls.	Managing significant coastal risks	Whole of coastal risk areas	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Timed consents remain an option for developers to meet the requirements of Wyong DCP Chapter 3.5. A separate action to specifically state this is not required.	None
A20	Use zoning and other planning measures to provide land for retreat of important coastal ecological communities, where possible	Allow for roll back of coastal dune landforms and associated ecological communities, within risks associated with additional development.	Managing significant coastal risks	Whole of coastal risk areas	Building Biodiversity Resilience Action Plan (Section 12.0)	No, alternative action proposed.	Given that in general there is limited land in public ownership that is not already of appropriate zoning for use as a retreat buffer, it is recommended that a new action be developed, to recommend new / amended DCP provisions to provide buffers around wetland and other coastal ecological communities for sea level rise migration, as part of new developments (including infill and re-developments). DCP Chapter 3.4 Conservation Areas for Northern Wyong Shire provides for the maintenance or improvement of green corridors, conservation links and habitat networks in Northern Wyong Shire, when developments are proposed in such areas as specified on a map accompanying the DCP. DCP Chapter 3.10 Wetlands Management requires an assessment for any proposed development of the wetland buffer, and any proposed mitigation measures to retain and preserve that environment.	New Action proposed: Update DCP Chapter 3.10 Wetlands Management to include consideration of migration buffers for sea level rise for wetland communities.
A33	Place notation on s149 certificates of all properties within immediate, 2050 and 2100 coastal risk areas; and also properties within the 2100 coastal risk area for geotechnical hazards; and coastal inundation risk areas.	To ensure that landowners and potential land owners are informed of coastal risk affecting their property.	Managing significant coastal risks	Whole of coastal risk areas	Coastal Knowledge and Community Involvement Action Plan (Section 7.0) Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, with changes (see Action 18)	Appropriate wording for Section 149 notifications of coastal hazard is still under discussion within the Department of Planning and Environment (DPE). The action should be progressed via negotiations with DPE on appropriate wording. Note also that the areas affected by Coastal Hazards will be delineated by the latest Coastal Hazards maps given in the CZMP, and denoted as "immediate, high and low risk" areas.	Undertake negotiations with DPE to develop appropriate notification of coastal hazard on Section 149 Planning Certificates.

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A62	Reference maps showing areas affected by coastal inundation in the Wyong LEP	Require that development applications in areas affected by coastal inundation to take the inundation hazard into account. Floor levels for new developments in inundation areas must consider the 1% AEP storm wave run up for each beach.	Managing significant coastal risks	Where coastal inundation will interact with lake and catchment inundation [Not specified if such mapping has been completed for Wyong]	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No, alternative action proposed.	Inundation Hazard maps can be conflicting and confusing, especially where there is overlap with existing Flood Planning maps. The hierarchy for the use of Inundation Hazard Maps is as follows. Areas affected by immediate (i.e. present day) wave overtopping: in general, it is expected that immediate wave overtopping hazard areas will lie seaward of immediate coastal erosion hazard areas. However, there are existing and sufficient provisions for wave overtopping within DCP Chapter 3.5 Coastal Hazards. Future wave overtopping hazards are only appropriate to the upkeep and replacement of existing coastal protection structures, or the construction of new coastal structures, but not sandy dunes. It is not possible to project the likely future height of sandy dunes, and so, the future potential for wave overtopping. The future wave overtopping hazard is therefore only relevant to hard shorelines that can be expected to exist in future (new or existing). Again, wave overtopping is adequately managed for future development through DCP Chapter 3.5 Coastal Hazards. For inundation within coastal lakes/lagoons: - Are ocean water levels already included in flood modelling for Tuggerah (and other) Lakes? - If yes, the FRMP for the Lake(s) and associated planning controls will already manage coastal inundation. No further maps or controls are required; - If no, this action shall be modified to require combined flood modelling that includes ocean water level events. This allows creation of a single, combined floor planning level and a single set of planning controls.	New actions proposed: Update Draft Chapter 3.5 Coastal Hazards to include controls for wave overtopping, including consideration of sea level rise for proposed new or modifications to existing coastal structures (e.g. seawalls). Check existing flood modelling for coastal lakes, and if not already done so, include ocean water levels within the flood assessment, then update Flood Planning levels and associated planning documents to reflect the new modelling outcomes.
A80	Zone ocean front land that is within the immediate coastal risk area for open space or environment protection	Encourage over time, lower intensity and lower risk development, consistent with Council's long term managed retreat policy. These zones also facilitate roll back of coastal ecological communities.	Managing significant coastal risks	All immediate coastal risk areas	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	The rezoning of private land to restrict development is generally unpalatable, difficult to achieve, and requires Council to pay compensation to landholders. Minimising development intensity in hazardous areas (as this action is intended to do) is already being actioned through the DCP Chapter 3.5 Coastal Hazards. Excluding private lands, there are no substantial public lands in the immediate hazard zone that are not already appropriately zoned. This action was therefore considered redundant.	None
A72	Construct properly engineered toe protection at the base of the steep unstable slope at Cabbage Tree Harbour.	To stabilise the slope and prevent ongoing toe trimming by wave action.	Managing significant coastal risks	Cabbage Tree Harbour	Geotechnical Hazards Action Plan (Section 11.0)	No	This action has been implemented	None
A66	Review the structural integrity of The Entrance sea wall and schedule structural upgrades as necessary to balance risk and cost	The wall is part of a major tourism area and protects community infrastructure, including road, parking and pedestrian promenade	Managing significant coastal risks	The Entrance southern shore	Lake and Sea Interactions Action Plan (Section 10.0)	Yes (see Action 11)	Hazard lines have assumed this seawall is sufficient to provide protection at present. Further investigation and upgrades are a high priority to provide for continued functioning of this seawall as a protection structure.	Review the structural integrity of The Entrance sea wall and schedule structural upgrades as necessary
A10	Council may protect public assets and infrastructure in the short term with properly engineered geotextile structures, with a life of up to ten years. Council may build protection structures for public assets that are vulnerable in the 2050 and 2100 planning periods, but only for major assets with long asset life, whose function will not be compromised by other aspects of climate change.	Intended to provide protection from storm bite erosion to community assets such as surf clubs and pumping stations, over the asset life or until the asset can be relocated landward. Council will not approve new major infrastructure (such as main roads and sewerage systems) in the 2050 or 2100 coastal risk areas, except where it can be protected in a cost effective manner that does not increase risks to other coastal values.	Managing significant coastal risks	Surf clubs with major assets in immediate hazard zone [Specific clubs not given].	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, amalgamated with other action(s) (see Action 25)	Any decision to protect, relocate or otherwise manage the coastal risk to public assets shall be determined through Action A12, via the existing AMPs. Through this process, for each major asset the decision to relocate, redesign (and protect), or abandon the asset will be made. Siting and design of new assets shall be managed via the checklist specified as a new action. Council is already within its rights to build short or long term protection works, provided it goes through the development assessment process, can demonstrate that offsite impacts can be managed, and can equitably fund the works (noting that in general, State and Federal grant programs will preference spending on public assets, before private assets).	See Action A12 for existing assets, with a new action proposed for future assets: Prepare a checklist or Council guideline outlining planning controls (similar or the same as detailed in the DCP Chapter 3.5 Coastal Hazards, and the geotechnical development controls (to be developed through new action replacing A69) that shall apply to all Council works (developments, infrastructure etc.) in the coastal zone. This should capture Part 5 developments, strategic planning for major infrastructure and other works not requiring development consent.

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A11	Council may grant development consent to private landholders to install temporary, but properly engineered structural protection, such as sand structures, to protect existing private assets in the immediate coastal risk area	Must be installed on private land and be designed to withstand a 1 in 20 year event. The intent is to provide protection for up to ten years. Development applications will be considered on a merit basis. Council will consider applications for the construction of permanent rock sea walls to protect existing houses which are located in the immediate hazard zone only if: - all affected properties along a section of beach are involved/included - the wall is built entirely on private property - the wall will have minimal impact/risk in terms of erosion at the ends - the landholders agree to contribute to the ongoing cost of beach nourishment to maintain beach amenity for the agreed life of the rock wall Landholders are responsible for ongoing maintenance of the structure, as per standards specified by the Office of Environment & Heritage (Department of Premier and Cabinet) and Council public safety and access are not compromised.	Managing significant coastal risks	Considered for North Entrance, Hargraves Beach and Blue Bay	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Temporary coastal protection works, as defined by <i>the Coastal Protection Act, 1979</i> , are dictated by the EASPs for the relevant locations. Further notation of this as an action in therefore not considered necessary. It should be noted that the temporary protection works elements of the legislation are likely to be removed as part of the replacement of <i>the Coastal Protection Act, 1979</i> with the proposed Coastal Management Act.	None
A21	Prepare a schedule of trigger points for action - for relocating existing community infrastructure and public assets to outside coastal risk areas.	Linked to risk profile and asset life.	Managing significant coastal risks	Applies to all coastal hazard planning zones along the Wyong Shire coastline. Priority to assets in immediate hazard areas. [Specific assets and locations not given].	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, amalgamated with other action(s) (see Action 25)	General guidance on what measurable coastal processes can be used as triggers shall be given in the CZMP. Action A12 requires trigger points to be noted for assets at immediate risk, with the existing monitoring program to be used to test for breaching of triggers.	See Action A12 for discussion of developing triggers for assets; and New Actions for trigger monitoring.
A22	Council will plan for the relocation of surf clubs out of coastal risk areas when major upgrades of facilities are due.	Council manages six surf clubs and associated infrastructure. Council will work with surf clubs to identify services/facilities which must remain within the immediate coastal risk area. Council will prepare details designs and REF for providing interim (up to 10 years) protection for existing surf clubs and major access infrastructure at surf clubs which are at immediate risk.	Managing significant coastal risks	All surf clubs in WSC	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, amalgamated with other action(s) (see Action 12)	Combine with Action A12, to form part of information appended to the asset management plans. Note that Council only owns 4 surf clubs: clubs at Lakes & North Entrance beaches are leased directly from the crown by the SLSCs.	See Action A12
A23	Council will design some surf club buildings and other infrastructure for retreat during erosion emergencies	Relocatable structures are an option both for surf clubs and for private buildings in the 2050 coastal risk area.	Managing significant coastal risks	All surf clubs in WSC	Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes amalgamated with other action(s) (see Action 23)	This action would be captured by the new action proposing a checklist for all new Council developments	See new action proposed: Prepare a checklist or Council guideline outlining planning controls that shall apply to all Council works in the coastal zone.
A70	Review stormwater drainage system in the vicinity of geotechnical hazard areas to ensure they do not discharge runoff where it could trigger a landslide.	Some geotechnical processes are exacerbated by inappropriate management of surface and groundwater flows.	Managing significant coastal risks	All cliffs and bluffs within coastal hazard planning zone or where stormwater drains to these zones.	Geotechnical Hazards Action Plan (Section 11.0)	Yes, with changes (see Action 26)	Requires a separate study overlaying geotechnical hazard maps with stormwater assets, and inspecting each, to determine if and where stormwater drainage may contribute to a landslide risk. Cost: Minor consultancy, separate project. Recommended timeframe: 4 year delivery plan.	Undertake an inspection of stormwater outlets within the geotechnical hazard zones, to determine if they may contribute to landslide risk. This shall involve: 1. Overlaying the geotechnical hazard maps and stormwater assets in GIS, to identify if and where such assets may exist 2. Inspection of those stormwater assets within geohazard areas

Review of Actions in the 2011 Wyong CZMP

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2018	Recommended changes to Action	Recommended Action for CZMP 2018
A71	Review Plans of Management for coastal reserves affected by slope instability hazards and ensure that the PoM takes slope instability hazards into account.	Consider drainage, lookouts and walking tracks. Gosford Council DCP 163 is an example	Managing significant coastal risks	Norah Head and southern sections of Wyrabalong National Park are priorities, then all headland reserves in Council management.	Geotechnical Hazards Action Plan (Section 11.0)	Yes, with changes (see Action 40)	Expand action to include open coastal hazards (erosion, overtopping). Combine with Action A79 to include POMs for Coastal Holiday Parks (Crown or Council owned/managed). Action will require written agreement from NPWS for the POMs relating to national parks land.	Undertake review of Plans of Management for community, crown and national parks land, including POMs for Holiday/Tourist Parks, to include provision for coastal hazards (erosion, overtopping) and geotechnical hazards. [Action will require written approval from NPWS]. The action could be undertaken when the POMs are due for review.
A90	Further investigate the interaction of coastal erosion and geotechnical hazards in areas where both types of hazard may apply now or within the 2100 planning period.	Recession hazard is reduced where there is a bedrock base, current recession assessments have assumed full sand profiles.	Managing significant coastal risks	Where rock terrain is overlain by a thin mantle of beach/dune sand. Dunes immediately adjacent to headlands are an example.	Geotechnical Hazards Action Plan (Section 11.0)	No	This action has been completed as part of the hazard review given in the WCZMP 2018. Future revision of all hazard assessments is recommended after 10 years as part of the Plan review process.	None.
A81	Conduct a benchmark survey of the condition of coastal ecological communities.	Will extend survey coverage already completed, such as for rock platforms (HCRCA)	Managing significant coastal risks	Locations to be selected with partner organisations, for representative coverage of coastal ecological communities.	Building Biodiversity Resilience Action Plan (Section 12.0)	Yes, with minor additions (see Action 38)	Keep action, and include that the outcomes of survey should be mapped and uploaded to GIS systems. It is presumed this action applies to land outside of the National Parks and Reserves.	Conduct a benchmark survey of the condition of coastal ecological communities. Outcomes of survey should be mapped and uploaded to GIS systems. Location: action applies to land outside of the National Parks and Reserves.
A32	Where feasible establish conservation agreements for high value ecological communities in coastal reserves.	No conservation agreements, negotiated with OEH or HCRCA currently exist in Wyong Shire. Results of A81 will contribute to selection process.	Managing significant coastal risks	Locations to be negotiated by DoI Crown Lands and Water and other landholders.	Building Biodiversity Resilience Action Plan (Section 12.0)	Yes (see Action 39)	It is presumed that this action applies only to high value conservation lands outside of existing NPs.	Where feasible establish conservation agreements for high value ecological communities in coastal reserves. Applicable locations will be based upon outcomes of Action A81.
A75	Continue to work with OEH to protect nesting and roosting habitats for protected shorebirds such as Little Tern.	Bird habitats are disturbed by pedestrians, dogs and vehicles	Managing significant coastal risks	Norah Head rock platform is a key site identified by HCRCA	Building Biodiversity Resilience Action Plan (Section 12.0)	Yes (see Action 37)	Update action to make note that sites other than Norah Head may exist, and should be included in this action.	Continue to work with OEH to protect nesting and roosting habitats for protected shorebirds such as Little Tern. Locations used as nesting sites can vary seasonally. This action shall include identification of sites to be protected on a seasonal basis, to capture all nesting and roosting sites in the LGA.
A5	Enhance community awareness of coastal hazards and emergency response management actions, using tools such as web site, face to face meetings, information boards at beaches, and media coverage.	Priority action in first two years of the plan.	Community Engagement	Relevant to all beaches in the shire, but priority beaches are Curtis Parade and Hutton Road, North Entrance; Cabbage Tree Harbour; Blue Bay; Hargraves Beach [i.e. the authorised locations]	Coastal Knowledge and Community Involvement Action Plan (Section 7.0) Emergency Response Management Action Plan (Section 8.0)	No, alternative action proposed.	For the wider community, information regarding coastal erosion emergencies should focus on storm warnings and advice to stay indoors and off the beaches and dunes during such conditions. Such warnings are already issued by the BOM and SES, and Council is not required to replicate this role. With regard to actions that can be undertaken by landowners during storms, this is limited to temporary coastal protection works only at Authorised Locations (noting that the legislation permits these works to be installed well before a storm warning is issued). As there are only 5 Authorised Locations in the Wyong LGA, education regarding these works is not required for the broader community. Furthermore, Stage 2 of the coastal reforms has indicated that elements relating to temporary coastal protection works are not likely to be included in the new legislation. Until the new legislation is in place, it is recommended that education regarding temporary coastal protection works be stalled. Community education regarding the varying nature of beaches would be valuable, to build the resilience of the community during periods of beach erosion, when accessways and beaches may be temporarily inaccessible. A new action for this is recommended.	New Action proposed: Undertake an education program explaining to the community the dynamic and varying nature of beaches. The education shall aim to build the resilience of the community during periods of beach erosion, when accessways and beaches may be temporarily inaccessible. Through building the community's understanding of the coast, the education program shall also aim to empower the community to provide relevant feedback on coastal management options and initiatives. Education activities are also an opportunity to promote the database of coastal events (see Action A65). A separate action has been formulated to assess the condition of beach accesses after storm events, and restrict access and undertake repairs as required (see new action B15).
A14	Involve community in data collection and record keeping through NRM monitoring programs	Community involvement in monitoring means that additional data can be collected. Dune care groups already provide a good model for how this could evolve.	Community Engagement	Whole of coastline, but priority for locations of high ecological value and where there are active community groups	Coastal Knowledge and Community Involvement Action Plan (Section 7.0)	No.	The intent of this action to involve the community in data collection remains valid. Given the extremely detailed information coming from drone survey, the assistance of the community in monitoring will be best served through Action A65, and supported by Action B11 and B13.	None

Review of Actions in the 2011 Wyong CZMP

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2018	Recommended changes to Action	Recommended Action for CZMP 2018
A51	Council will continue to support Landcare/Coastcare groups to maintain and enhance the condition and function of native vegetation on coastal dunes, including weed removal and replanting.	Builds on existing successful projects such as Weeds of national significance at Budgewoi, Norah Head, North Entrance and Lakes Beach South. Action combines community enjoyment of the coastal landscape with major ecological condition benefits.	Community Engagement	To be determined in consultation with HCRCMA, but likely to include further work at North Entrance, Budgewoi, Hargraves Beach and at Soldiers Beach and Blue Bay	Building Biodiversity Resilience Action Plan (Section 12.0)	Yes (see Action 7)	Only renaming of Coastcare as Dunecare is required to update this action. This action would be supported by new action: dune management by Council, and supports new action: beach scraping investigation.	Council will continue to support Dunecare groups to maintain and enhance the condition and function of native vegetation on coastal dunes, including weed removal and replanting.
A46	Maintain a close working relationship with surf clubs and Surf Life Saving Australia re beach patrols, beach safety information and beach environment information	The surf lifesaving community is a valuable partner in the management of the coastal zone.	Community Engagement	All patrolled beaches along the coast	Access, Recreation and Tourism Action Plan (Section 13.0)	No, alternative action proposed.	The role of paid lifeguard and volunteer lifeguard services in terms of beach patrols; and disseminating beach safety information (such as during erosion events) is already well established. Instead, a new action is recommended, to utilise the available audience and resources of the surf clubs as a platform to provide education relevant to coastal management.	New action proposed: Undertake education through the existing surf clubs and surf lifesaving community regarding periods of erosion and recovery) and the valuable role of dune vegetation. The education of surf club members could also include the location and sensitivity of nesting shorebirds, where they occur on or near patrolled beaches.
A76	Prepare and/or review Plans of management and Master Plans for the main recreational beaches along the Wyong coastline	Upgrade shade and picnic facilities at the high profile beaches in accordance with Plans of Management. Review design and integrity of beach access structure, stormwater outlets, and viewing platforms. Align action with plans for relocation of surf clubs.	Community Engagement	Examples include Mazlin Reserve, and reserves at main beaches - Toowoan, Shelly, Soldiers, The Entrance, North Entrance and Lakes Beach.	Access, Recreation and Tourism Action Plan (Section 13.0)	No, alternative action proposed.	Rather than developing or reviewing POMs, it is suggested that a review of recreational facilities be undertaken to prioritise plans for upgrades, with follow-up on the ground works. This action would follow on from an inventory of all minor recreational assets in the coastal zone.	Three new actions are proposed: Undertake an inventory of all recreational assets in the coastal zone, including notation of current condition, to form a new or updated Asset Management Plan Asset locations should also be logged in GIS. In GIS, overlay the Asset database with the coastal hazard maps, to determine those assets within the immediate coastal risk zone and geotechnical hazard zones, and append this information to the AMP. Develop a post-storm monitoring program for recreational infrastructure on the beaches, particularly beach accessways. This will be important in cases where the EASPs are not activated. Develop a prioritised program of upgrades and additions to recreational infrastructure along the coast, based on asset condition, coastal or geotechnical risk, and recreational demand.
A79	Review Plans of management for Crown Coastal Holiday Parks and Crown Reserves, to reflect climate change hazards and sea level rise,	These parks are a major social and economic asset for Wyong Shire	Community Engagement	Toowoan Bay, Norah Head, Sun Valley and Blue Lagoon	Protecting Cultural Landscapes Action Plan (Section 14.0)	Yes, amalgamated with other action(s) (see Action 40)	Action intent included in Action A71.	See Action A71.
A52	Review access ways at high profile beaches, foreshore and headland reserves and provide disabled access	Include disabled access considerations in Plans of Management	Community Engagement	Consider Toowoan Bay as a priority because flat and protected beach	Access, Recreation and Tourism Action Plan (Section 13.0)	Yes, amalgamated with other action(s) (see Action 29, 30, 31)	Action intent to be included with new actions outlined for Action A76.	Amalgamated into the new action proposed for Action A76
A48	Assess the safety and suitability of ocean boats launching ramps and associated facilities and identify necessary upgrades/need for new facilities	Include review of structural integrity of ramps at Cabbage Tree Harbour with sea level rise; also trailer parking, ramp capacity and interaction with other users.	Community Engagement	Cabbage Tree Harbour	Access, Recreation and Tourism Action Plan (Section 13.0)	No	Norah Head boat ramp in Cabbage Tree Harbour completely replaced and opened in 2015 founded to existing bed rock with wider and more even ramp with vehicular access above predicted Sea Level rise.	None

Review of Actions in the 2011 Wyong CZMP

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A47	Plan routes and develop a coastal walk along full length of the Wyong Coast, and mountains to sea walk.	Potential tourism opportunity, plus encourage outdoor recreation.	Community Engagement	Priority areas include Norah Head to Budgewoi, The Entrance and North Entrance area and extensions of existing paths in National Park lands.	Access, Recreation and Tourism Action Plan (Section 13.0)	Yes, with changes (see Action 32)	Shared Path is in construction on western side of Wilfred Barrett Drive within road reserve between The Entrance North and Noraville – first stage scheduled for opening September 2016. Feasibility studies rejected eastern side due to instability of dunal systems, coastal conditions and prohibition of constructed shared paths from National Park. Future coastal dunal walks will be modelled on the Coast to Lake path and beach walk between the Entrance Channel and Toowoona Bay completed in 2012 to locate fixed infrastructure on stable foundations off dunal systems and use signage to direct movement over routes subject to instability from coastal processes consistent with NPWS track guidelines. This will better manage impacts and be consistent with the Plan of Management for Wyrabalong National Park. The ability to make the path a shared use path (e.g. for bikes / mountain bikes) or disabled accessible should also be investigated, to maximise its tourism potential.	Continue to construct coastal walks when and where feasible. Future coastal dunal walks shall be modelled on the Coast to Lake path and beach walk between the Entrance Channel and Toowoona Bay completed in 2012 to locate fixed infrastructure on stable foundations off dunal systems and use signage to direct movement over routes subject to instability from coastal processes, consistent with NPWS track guidelines. Shared usage of the path, such as with bikes/mountain bikes, or disabled access, should also be considered. The investigation should determine the need for this action compared with other coastal priorities.
A50	Develop a design theme for coastal information, interpretation and safety signage.		Community Engagement	High usage/high profile sites as first priority - Shelly Beach, Toowoona Bay.	Access, Recreation and Tourism Action Plan (Section 13.0)	No	Master Plan process will encompass this action. Beach safety signs are designed by Council with consideration of SLSNSW and other recommendations.	None
A53	Conduct regular surveys of beach users in relation to facilities and services.	Provides regular feedback on the condition of the coast and outcomes of investment in recreational facilities.	Community Engagement	Entire coastline of Wyong Shire	Access, Recreation and Tourism Action Plan (Section 13.0)	Yes, with changes (see Action 21)	The surveys should also include questions regarding the community's views and understanding of coastal risks, including sea level rise, and potential options for managing such risks in future.	Conduct regular surveys of beach users to determine recreational usage and demand patterns, and views and understanding of coastal risks and risk management.
A77	Document stories of Aboriginal attachment to the Wyong coastline.	Identify with the Aboriginal community which information to use in interpretative material about the coast, and where such information should be placed.	Community Engagement	Relevant to entire coastline of Wyong Shire. Specific locations determined in consultation with Aboriginal community.	Protecting Cultural Landscapes Action Plan (Section 14.0)	Yes (see Action 41)	Amalgamation of concepts given in Action description and comments has been recommended only.	Liaise with the local Aboriginal community to determine which information should be used in interpretative signage along the coast.
A78	Monitor the condition of known Aboriginal sites on coastal land under Council's care and control.	Include protection measures in plans of management for coastal reserves.	Community Engagement	Relevant to entire coastline of Wyong Shire, in Council care and control. Specific locations determined in consultation with the local Aboriginal community.	Protecting Cultural Landscapes Action Plan (Section 14.0)	No, alternative action proposed	New action proposed, to develop a decision support tool to determine the most appropriate course of action for Aboriginal assets at risk from coastal hazards. The preferred course of action may not always include protection, and other options (including relocation) should be outlined in the decision support tool.	New Action proposed: Liaise with the LALC, NPWS and other appropriate stakeholders to develop a procedure or decision support tool that outlines the protocols to be followed if significant Aboriginal sites are threatened or uncovered by erosion (See New Actions table for further details)
Actions listed in the Action Plans in Supporting Information Volume 1 (but not included in the implementation schedule of the CZMP 2011)								
A59	Liaise with SES and OEH about shared training and coordinated management of coastal emergencies	Subject to agreements with the NSW Government, Council officers may be authorised officers in relation to regulation of emergency protection structures (see also Action A4). However WSC has decided not to take up the option of training its officers to be Authorised Officers under the CPA 1979.	Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Emergency Response Management Action Plan (Section 8.0)	No.	The EASPs already outline the roles and responsibilities of Council in a coastal erosion emergency. SES remains the lead combat agency during flood and storms. As this process is already clearly defined through the NSW State Storm Plan and associated legislation, this action is considered obsolete.	None
A19	Use clauses in the LEP and DCP to identify appropriate development in coastal risk areas (such as relocatable structures) and to allow for mandatory demolition in certain circumstances.		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Current DCP approach is appropriate.	None
A26	Council may build and maintain sea walls to protect existing public assets that are vulnerable in the 2050 and 2100 planning horizons.	This action would only be used for major assets with a long asset life, whose function will not be compromised by other aspects of climate change or changing community requirements.	Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Generally, for risks not expected to eventuate until 2050 and 2100, we would not recommend action until there is a clear trajectory and monitoring evidence that the risk is occurring and imminent. (i.e., avoid adapting too early).	None

Review of Actions in the 2011 Wyong CZMP

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2018	Recommended changes to Action	Recommended Action for CZMP 2018
A27	Council may grant development consent to permit the construction and maintenance of sea walls to protect existing private assets affected by coastal recession, with specific conditions		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Unnecessary notation.	None
A29	Council will consider a shire wide levy to provide funds for managing climate change impacts on community assets along the coast, such as sewerage systems, roads and public beach accessways		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Use of a levy is considered to be a funding option, not an action in itself	None
A7	Require removal of existing development within immediate coastal hazard zones, when the landward margin of the zone of wave impact is within 5 metres of the structure		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	Council already has powers to order demolition of structures for public safety reasons. This action would appear alarming to the community	None
A43	Advise occupiers of property that is affected by coastal inundation risks by adding a notation on s149 certificates for the property and by direct communication e.g. with rates notices, letters.		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	No	See notes for A62.	None
A65	Maintain a database with information about coastal inundation episodes, including dates, context, photographs, impacts and responses		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Adapting to Coastal Process Hazards and Climate Change Action Plan (Section 9.0)	Yes, with changes. (see Action 36)	Expand the action to collect information about past events, and coastal erosion events also.	Develop and maintain a database of coastal events, including inundation events and erosion events on the beaches. The database could commence with a search and request to the general public for information on past events (date, location, impact, photographs, response). The database would then be maintained with collection of this data for future events. To provide ongoing data, the database should be advertised during other coastal hazard education activities (see New Action B11).
A68	Council will commission further studies of sediment dynamics in the Entrance channel, with sea level rise.	This is likely to include a hydrodynamic model to test sediment budget changes in the entrance channel as sea level rises. Further research is also necessary to clarify the relationship between lake flood levels, coastal recession and oceanic inundation hazards at Lakes Beach area.	Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Lake and Sea Interactions Action Plan (Section 10.0)	Yes, amalgamated with other action(s) (see Action 10)	The intent of this action has been combined with Action A67.	None
A69	Council will introduce planning clauses in the LEP and DCP with consistent requirements for appropriate geotechnical assessments of proposed development within the zone bounded by the immediate hazard line and 2100 low geotechnical hazard line (assessments prepared by a properly qualified geotechnical practitioner). No new development will be approved within immediate geotechnical hazard areas.		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Geotechnical Hazards Action Plan (Section 11.0)	No, alternative action proposed.	At present, the geotechnical hazard areas have been included within DCP Chapter 3.5 Coastal Hazards, however the controls specified for these hazard areas are the same as that for coastal hazards. Such controls may not be applicable, especially in areas subject to geotechnical risk not driven by coastal processes. The new hazard maps in the WCZMP 2018 identify areas subject to "geotechnical hazard" driven by other processes separate to coastal processes, and these areas are also not able to be delineated as "immediate, high, and low" as per the coastal hazard nomenclature. The DCP controls therefore require urgent review and update to reflect controls for geotechnical hazard, preferably as a separate Geotechnical Hazard Chapter in the DCP. If required, there are also separate LEP optional clauses available for geotechnical hazards. A new action to complete these more appropriate changes to the LEP / DCP to manage geotechnical hazards is recommended.	New Action proposed: Update the LEP and / or DCP to include appropriate provisions for managing geotechnical hazards.

Review of Actions in the 2011 Wyong CZMP

2011 Ref. No.	Action	Comments (from WCZMP 2011)	Implementation Schedule Category	Location (if relevant)	Action Plan(s) from Supporting Volume 1 Part B	Relevant to CZMP 2018	Recommended changes to Action	Recommended Action for CZMP 2018
A82	LEP zoning and DCP clauses will discourage land use intensification and reduce risk in areas with a high probability of geotechnical hazards		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Geotechnical Hazards Action Plan (Section 11.0)	No	New action proposed for Action A69 will encompass this action.	
A88	Council will include information about geotechnical hazards affecting infrastructure in the coastal zone, such as stormwater drains, sewer reticulation and pumping systems, in its asset data base and will take geotechnical hazards into account when planning upgrades, relocation or other major system maintenance activities. Council will set out appropriate design requirements in the LEP, which will apply to Council activities, projects by other government agencies and private development		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Geotechnical Hazards Action Plan (Section 11.0)	Yes, amalgamated with other action(s) (see Action 23 & 25)	These are two separate actions. Elements relating to managing existing assets have been combined into Action A12. Elements relating to design requirements for Council strategic planning of new assets have been combined into new Action (Prepare a checklist or Council guideline outlining planning controls that shall apply to all Council works in the coastal zone).	
A73	Repeat LiDAR surveys of the coast at approximately 5 year intervals. Analyse high resolution digital terrain data at 5 yearly intervals to identify any changes in the terrain of areas affected by geotechnical hazards		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Geotechnical Hazards Action Plan (Section 11.0)	No	LiDAR is already collected at 2-3 yearly intervals by the NSW Government. As noted in Action A1, Council should continue to note their support for this collection program.	
A30	Strengthen vegetation communities on dunes by preparing, implementing (including monitoring effectiveness) vegetation management plans that include species selection, planting, weed removal, fencing etc.	Action expands on vegetation management component on A8	Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Building Biodiversity Resilience Action Plan (Section 12.0)	Yes, amalgamated with other action(s) (see Action 6)	Intent of this action has been included with the new action: dune rehabilitation by Council.	None
A55	Review off leash dog exercise areas in terms of compliance and feedback from users and make changes as necessary to minimise negative impacts on other users and values		Not in implementation schedule (only listed in Action Plans in Supporting Information Volume 1).		Access, Recreation and Tourism Action Plan (Section 13.0)	No	Off-leash dog access areas are already monitored and reviewed through other more relevant Council strategic plans and policies.	None

Review of Actions in the 2011 Wyong CZMP

Table C-2 New Actions Recommended for the Wyong CZMP 2018

NEW Ref. No.	Action Detail for CZMP 2018	Comments / relationship to existing actions.
B1	Continue to conduct the beach sand monitoring program after storms, using the most efficient technology (currently UAV (drone) collection of aerial photogrammetry). The monitoring data shall also be used to check if and when trigger points for council assets at immediate risk are reached (with a listing of council assets determined through Action A12). The data shall also be invaluable for review of hazard studies; and effectiveness of management actions through a repeated risk assessment, at time of plan review (10 years).	Action updates and replaces Action A1. (see Action 1)
B2	Lobby NSW government to collect marine LiDAR (out to 30 - 40 m water depth) at regular intervals (10 yearly).	Action updates and replaces Action A1 (see Action 2)
B3	Develop a monitoring program for sites at high risk of landslip and geotechnical hazard. High Priority Sites: Cabbage Tree Harbour, behind Bateau Bay, behind Blue Bay. Low Priority Sites: Old landslips evident from ridge lines at Crackneck Point and Jenny Dixon Beach.	Action updates and replaces Action A89 (see Action 4)
B4	Undertake training of relevant Council staff regarding appropriate response to coastal erosion events	Action updates and replaces Action A4 (see Action 24)
B5	Conduct dune rehabilitation works to encourage sand accretion, stabilisation and growth of frontal dunes. As necessary, prepare and implement vegetation management plans for the dune rehabilitation works to specify species selection, planning, weed removal and fencing plans for a dune rehabilitation area.	Action updates and replaces Action A8, and captures relevant elements of A44 (see following notes) and A30 (regarding vegetation management plans). Dune stabilisation provides a buffer of sand to be eroded during storm events. Where dune heights are maintained above ~ 7 m AHD, dunes can also act as a suitable barrier to wave overtopping (see notes from Action A44). (see Action 6)
B6	Investigate the viability of beach scraping on Wyong's beaches, and develop a prioritised list of beaches for which beach scraping may be beneficial.	Action updates and replaces Action A44 (see Action 8)
B7	Update DCP Chapter 3.10 Wetlands Management to include consideration of migration buffers for sea level rise for wetland communities.	Action updates and replaces Action A20 (see Action 22)
B8	Update Draft Chapter 3.5 Coastal Hazards to include controls for wave overtopping, including consideration of sea level rise for proposed new or modifications to existing coastal structures (e.g. seawalls).	Action updates and replaces Action A62 (see Action 16)
B9	Check existing flood modelling for coastal lakes, and if not already done so, include ocean water levels within the flood assessment, then update Flood Planning levels and associated planning documents to reflect the new modelling outcomes.	Action updates and replaces Action A62 (see Action 12)

Review of Actions in the 2011 Wyong CZMP

NEW Ref. No.	Action Detail for CZMP 2018	Comments / relationship to existing actions.
B10	Prepare a checklist or Council guideline outlining planning controls (similar or the same as detailed in the DCP Chapter 3.5 Coastal Hazards, and the geotechnical development controls (to be developed through Action 19) that shall apply to all Council works (developments, infrastructure etc.) in the coastal zone. This should capture Part 5 developments, strategic planning for major infrastructure and other works not requiring development consent.	See notes for Action A10 (as secondary, Action A23 and Action A88). (see Action 23)
B11	Undertake an education program explaining to the community the dynamic and varying nature of beaches. The education shall aim to build the resilience of the community during periods of beach erosion, when accessways and beaches may be temporarily inaccessible. Through building the community's understanding of the coast, the education program shall also aim to empower the community to provide relevant feedback on coastal management options and initiatives.	Action updates and replaces Action A5 Education activities are also an opportunity to promote the database of coastal events (see Action A65). (see Action 34)
B12	Undertake site specific studies to determine feasible options to manage erosion hot spots	Wyong CZMP 2011 and this review were not able to provide the detailed options assessment and economic cost benefit analysis, funding modelling, business case, and intensive community consultation required to definitively select an action to be implemented at the erosion hot spots, some of which have already exceeded the sand volume trigger buffering them from direct impact to property after the June 2016 storms. The need for site-specific studies is imminent. (see Action 5)
B13	Undertake education through the existing surf clubs and surf lifesaving community regarding beach processes (periods of erosion and recovery) and the valuable role of dune vegetation. The education of surf club members could also include the location and sensitivity of nesting shorebirds, where they occur on or near patrolled beaches.	Action updates and replaces Action A46. (see Action 35)
B14	Undertake an inventory of all recreational assets in the coastal zone, including notation of current condition. The inventory shall form a new or updated Asset Management Plan for recreational infrastructure, and asset locations should also be logged in GIS. In GIS, the Asset database should be overlain with the hazard maps, to determine those assets within the immediate coastal risk zone and within geotechnical hazard zones. This information should be appended to the AMP.	This action provides for asset database update for minor recreational assets, similar to Action A12. An inventory of recreational assets and their current condition is required, for review against coastal and geotechnical hazard risks and to determine priorities for new facilities (see replaced Action A76 below). As recreational facilities are not expected to last longer than around 25 years, only the immediate coastal risk zone is relevant to the planning and replacement of recreational facilities. The inventory shall also include coastal access structures such as stairways and lookouts within geotechnical hazard zones. (see Action 29)

Review of Actions in the 2011 Wyong CZMP

NEW Ref. No.	Action Detail for CZMP 2018	Comments / relationship to existing actions.
B15	Develop a post-storm monitoring program for recreational infrastructure on the beaches, particularly beach accessways. This will be important in cases where the EASPs are not activated. The monitoring program should make note of any general need for repairs also.	Beach accessways are expected to be damaged by coastal erosion from time to time because these assets must necessarily exist within the immediate hazard zone. (see Action 31)
B16	Develop a prioritised program of upgrades and additions to recreational infrastructure along the coast, based on asset condition (as identified through the recreational asset inventory, see New Action B14), coastal or geotechnical risk (including risks to public safety), and recreational demand (as supported by regular community surveys, see Action A53).	Action replaces and updates Action A76. As required, the facility upgrades may be facilitated through new or revised Masterplans or Plans of Management at a beach location. Improvements to beach accessways shall also cater for suitable disabled access. The upgrade program should also make use of the post-storm monitoring data, to prioritise works if needed (see new Action above). (see Action 30)
B17	Liaise with the LALC, NPWS and other appropriate stakeholders to develop a procedure or decision support tool that outlines the protocols to be followed if significant Aboriginal sites are threatened or uncovered by erosion. The Decision Support Tool may include: <ul style="list-style-type: none"> - Persons to be notified if sites are uncovered (i.e. LALC, NPWS); - Monitoring for sites under threat, until a course of action is decided; - The range of options available to manage the threat (e.g. relocate, protect, allow to be eroded) and the pros and cons of the options; - The preferred action for particular types of sites/artefacts (e.g. protection for middens, relocation for burial sites etc.). 	This action updates and replaces Action A78 (see Action 42)
B18	Update the LEP and / or DCP to include appropriate provisions for managing geotechnical hazards.	This action updates and replaces Action A69. At present, the geotechnical hazard areas have been included within DCP Chapter 3.5 Coastal Hazards, however the controls specified for these hazard areas are the same as that for coastal hazards. Such controls may not be applicable, especially in areas subject to geotechnical risk not driven by coastal processes. The new hazard maps in the WCZMP 2018 identify areas subject to "geotechnical hazard" driven by other processes separate to coastal processes, and these areas are also not able to be delineated as "immediate, high, and low" as per the coastal hazard nomenclature. The DCP controls therefore require urgent review and update to reflect controls for geotechnical hazard, preferably as a separate Geotechnical Hazard Chapter in the DCP. If required, there are also separate LEP optional clauses available for geotechnical hazards. (see Action 19)

Review of Actions in the 2011 Wyong CZMP

NEW Ref. No.	Action Detail for CZMP 2018	Comments / relationship to existing actions.
B19	Undertake an implementation workshop, to educate staff from relevant Council units of the actions they are responsible for implementing in the WCZMP 2018.	As the new WCZMP will require input and implementation by all facets of Council, from environmental staff, to planning staff, to engineering and asset management, and on the ground works crews, it is recommended that each of the departments of Council be made aware of their responsibilities through the WCZMP. An implementation workshop to bring all the staff together and inform them of the purpose, intent and their responsibilities for the WCZMP is recommended as an inclusive way to educate all relevant staff. <i>(see Action 15)</i>
B20, B21	Actions B20 and B21 replicate the asset management plan updates recommended in Action A12, but separate actions are required to separate the assets according to their management within Council. Therefore, transport and stormwater assets are covered by Action A12, sewer and water assets by Action B20 and remaining major Council assets, such as SLSCs are covered by Action B21.	Replicate Action A12, but for sewer, water and other council assets. <i>(see Action 27 and 28)</i>
B22	Revise the EASP(s) to: (a) reflect the current legislation relating to temporary coastal protection works; (b) provide appropriate advice on emergency actions for the remainder of the coast (i.e. outside of the "hot spots") and (c) reflect changes to the legislation arising from the NSW Government's coastal reforms in future.	This action updates and replaces Action A85 <i>(see Action 33)</i>
B23	Maintain the rock groyne structure at The Entrance Beach and improve beach amenity through one-off beach nourishment.	This action recognises that a rock groyne has been constructed at The Entrance Beach in January 2018 by DoI – Crown Lands & Water. <i>(see Action 43)</i>
B24	Investigate, clarify and formalise occupations and management arrangements on coastal Crown land for all assets and infrastructure that require ongoing monitoring and maintenance e.g. boat ramps, ocean pools, car parks and coastal protection structures.	This action recognises some outstanding matters regarding ownership and management responsibility for coastal land and assets need remain unresolved and form a barrier to effective management <i>(see Action 44)</i>

Appendix C1 - First Pass Risk Assessment

Project: PA2366 Central Coast CMP: Open Coast and Coastal Lagoons Scoping Study

Risk assessment undertaken by:
Central Coast Council : Ben Fullagar; Paul Donaldson; Kellie Langford; Warren Brown; Vanessa McCann
DPIE: Neil Kelleher
RHDHV: Adrian Turnbull; Mitch Crotty

First Pass Risk Assessment

Risk ID	Threat(s)	Hazards or Environmental Impacts	Perceived Risk			Perceived Risk 20 yr Planning Horizon			Perceived Risk 50 yr Planning Horizon			Perceived Risk 100 yr Planning Horizon			Control Measure(s) (Eliminate, Substitute, Engineering Controls, Administrative Controls)	Residual Risk		
			Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
1. Public Safety Risk Assessment																		
1.1	Coastal erosion	- Injury to beach users caused by exposure and mobilisation of buried remnants of historic foreshore protection. - Injury to beach users and/or residents caused by structures mobilising during storm events - Injury to beach users caused by erosion, instability of erosion scarps following beach erosion, and undermining at existing beach accessways.	3	5	15	4	5	20	4	5	20	5	5	25	- Opportunistic removal of remnant protection and waste as part of remedial/upgrade works projects - Installation of temporary warning signage and exclusion devices at beach access points following erosion events - Periodic beach nourishment campaigns - Natural beach recovery over time - Establish on-going coastal monitoring program to inform actions - Evacuate beachfront properties in storm events as required - Consider beach closures during coastal storms - Detailed design and construction of terminal coastal protection structure(s) - Inform property owners of the hazard(s) facing their property - Re-grading to restore beach profile by Council maintenance staff - Dune maintenance programs undertaken by Council and contractors - Consider beach scraping to build dune, or vegetated dune for coastal protection purposes - New (updated) coastal hazard study (risk-based)	3	4	12
1.2	Beach recession	- Injury to beach users caused by exposure and mobilisation of buried debris and remnant historic foreshore protection.	3	1	3	3	2	6	3	4	12	3	5	15	- Opportunistic removal of historic storm damage debris as it becomes exposed - Installation of temporary warning signage and exclusion devices at beach access points following erosion events - Periodic beach nourishment campaigns - Natural beach recovery over time - Establish on-going coastal monitoring program to inform actions - Detailed design and construction of terminal coastal protection structure(s) - Re-grading to restore beach profile by Council maintenance staff - Dune maintenance programs undertaken by Council and Soil Conservation Service - Consider beach scraping to build dune, or vegetated dune for coastal protection purposes	3	1	3
1.3	Stormwater erosion	- Injury to public due to the erosion and instability of erosion scarps caused by stormwater outlets and runoff (e.g. Forresters Beach; Copacabana)	2	1	2	2	1	2	2	2	4	2	3	6	- Re-grading to restore beach profile by Council maintenance staff - Consider diversion of hazardous stormwater runoff - Natural beach recovery over time - Periodic beach nourishment campaigns - Establish on-going coastal monitoring program to inform actions - Installation of warning signage near stormwater outlets - Improve energy dissipation at stormwater outlets	2	1	2
1.4	Coastal inundation	- Injury to public due to floodwaters caused by high sea level during storm events, particularly in areas surrounding coastal lagoons. - Injury to public caused by structures and/or debris mobilising during storm events.	1	1	1	1	1	1	1	2	2	2	2	4	- Installation of temporary warning signage - Temporary fencing to prevent public access to hazardous areas - Implement development and planning controls within CCLEP/CCDCP applied to new development - Detailed design and construction of flood mitigation structures like earth embankments - Consider beach scraping to build dune, or vegetated dune for coastal protection purposes - Consider road closures depending on extent of inundation	1	1	1
1.5	Coastal inundation and catchment flooding (combined)	- Injury to public due to floodwaters during storm events, particularly in areas surrounding coastal lagoons. - Injury to public caused by structures and/or debris mobilising during storm events.	1	1	1	1	2	2	1	3	3	1	4	4	- Installation of temporary warning signage - Temporary fencing to prevent public access to hazardous areas - Implement development and planning controls within CCLEP/CCDCP applied to new development - Detailed design and construction of flood mitigation structures like earth embankments - Consider beach scraping to build dune, or vegetated dune for coastal protection purposes - Upgrade stormwater system - Consider road closures depending on extent of inundation	1	2	2
1.6	Tidal inundation (coastal lagoons)	- Injury to public due to tidal floodwaters.	1	1	1	1	2	2	1	3	3	1	4	4	- Review entrance management guidelines for mechanical openings of lagoons - Implement development and planning controls within CCLEP/CCDCP applied to new development - Detailed design and construction of flood mitigation structures like earth embankments - Consider road closures depending on extent of inundation - Installation of informative signage	1	2	2
1.7	Wave runup and overtopping	- Injury to public caused by wave runup on or wave overtopping during storm conditions.	4	3	12	4	4	16	4	5	20	4	5	20	- Implement development and planning controls within CCLEP/CCDCP applied to new development - Detailed design and construction of coastal protection structures - Install temporary warning signage - Temporary fencing to create exclusion zones to prevent public access into hazardous areas - Hire security services to enforce exclusion zones	4	3	12
1.8	Slope and cliff instability	- Injury to public caused by rock falls from instable cliff faces at beach headlands.	5	2	10	5	3	15	5	3	15	5	4	20	- monitoring of cliff face stability - consider geotechnical investigations as required - protect/maintain existing vegetation growth over cliff face - installation of appropriate warning signage - installation of fencing in hazardous areas	5	2	10
1.9	Coastal lagoon entrance dynamics; artificial opening of coastal lagoon entrances; inappropriate entrance management; or community initiated openings	- Injury to beach and lagoon users caused by the instability of scarps adjacent to lagoon entrances. - Reduced water quality of coastal lagoons if entrances are not managed appropriately. This could result in human illness.	5	4	20	5	5	25	5	5	25	5	5	25	- Installation of temporary warning signage - Temporary fencing to create exclusion zones and prevent public access to hazardous areas - Re-grading to restore beach profile by Council maintenance staff - Ensure lifeguards are patrolling entrance areas - Consider options for entrance management actions - Improve public education of the impacts of lagoon openings	5	3	15
1.10	Water quality (beaches)	- Illness suffered by beach users caused by poor water quality.	2	1	2	3	2	6	3	3	9	3	3	9	- Improvement/expansion of EPA Beachwatch program and public notification of poor water quality - Install further signage - Sewage treatment and discharge improvements - Stormwater management system improvements	2	1	2

Project: PA2366 Central Coast CMP: Open Coast and Coastal Lagoons Scoping Study		Risk assessment undertaken by: Central Coast Council : Ben Fullagar; Paul Donaldson; Kellie Langford; Warren Brown; Vanessa McCann DPIE: Neil Kelleher RHDHV: Adrian Turnbull; Mitch Crotty																
First Pass Risk Assessment																		
Risk ID	Threat(s)	Hazards or Environmental Impacts	Perceived Risk			Perceived Risk 20 yr Planning Horizon			Perceived Risk 50 yr Planning Horizon			Perceived Risk 100 yr Planning Horizon			Control Measure(s) (Eliminate, Substitute, Engineering Controls, Administrative Controls)	Residual Risk		
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1.11	Water quality (coastal lagoons)	- Illness suffered by lagoon users caused by poor water quality resulting from a variety of water quality processes and potentially worsened by sewer overflows, stormwater runoff, and entrance conditions.	2	2	4	2	2	4	2	3	6	2	3	6	- Review entrance management guidelines for mechanical openings of lagoons - Consider management of algal build-up - Sewage treatment and discharge improvements - Support volunteer based rehabilitation initiatives such as Bushcare - Encourage inclusion of Stormwater Quality Improvement Devices (SQIDs) in private development activities - Undertake maintenance of existing stormwater improvement devices, including Gross Pollutant Traps (GPTs) - Improve containment of contaminated sites to prevent hazardous substances from leaching/spreading	2	1	2
1.12	Sewage/septic overflows	- Illness suffered by those exposed to the overflows in either the terrestrial or the marine environment.	2	2	4	2	3	6	2	4	8	2	4	8	- Install temporary warning signage where sewage/septic overflows are known to have occurred and where known to have impacted - Improve inspection/maintenance/management procedures - Improve containment of contaminated sites to prevent hazardous substances from leaching/spreading	2	2	4

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2. Infrastructure Damage Risk Assessment																		
2.1	Coastal erosion	- Damage to public and private infrastructure and property, including Council beach accessways, caused by storm erosion. - Damage to seawalls caused by scour and/or coastal storms.	5	5	25	5	5	25	5	5	25	5	5	25	- Periodic beach nourishment campaigns - Natural beach recovery over time - Implement planning and development controls within the CCLEP/CCDCP applied to new development - Retrofit or relocate public infrastructure - Establish on-going coastal monitoring program to inform actions - Detailed design and construction of terminal coastal protection structures - New (updated) coastal hazard study (risk-based) - Detailed design and construction of seawall toe protection works	5	3	15
2.2	Beach recession	- Damage to public and private infrastructure and property, including Council beach accessways, caused by beach recession.	3	2	6	3	3	9	3	4	12	4	4	16	- Opportunistic removal of historic storm damage debris as it becomes exposed - Periodic beach nourishment campaigns - Natural beach recovery over time - Retrofit or relocate public infrastructure - Establish on-going coastal monitoring program to inform actions - Detailed design and construction of terminal coastal protection structure(s) - Implement planning and development controls within the CCLEP/CCDCP applied to new development - Re-grading to restore beach profile by Council maintenance staff - Dune maintenance programs undertaken by Council and contractors - Consider beach scraping to build Dune, or vegetated Dune for coastal protection purposes	3	2	6
2.3	Coastal inundation	- Damage to public and private infrastructure and property caused by coastal floodwaters, particularly in areas surrounding coastal lagoons.	4	5	20	4	5	20	5	5	25	5	5	25	- Remove valuable assets from ground floor areas - Consider opening doors/entry points at e.g. SLSC structures to allow water to pass through buildings with potentially less damage - Retrofit or relocate public infrastructure - New (updated) coastal hazard study (risk-based) - Implement development and planning controls within the CCLEP/CCDCP applied to new development - Delivery of coastal inundation mitigation actions and alignment with catchment based flood risk management actions	4	4	16
2.4	Coastal inundation and catchment flooding (combined)	- Damage to public and private infrastructure and property caused by debris and structures mobilising in floodwaters during coastal storm events, particularly in areas surrounding coastal lagoons.	5	5	25	5	5	25	5	5	25	5	5	25	- Remove valuable assets from ground floor areas - Consider opening doors/entry points at e.g. SLSC structures to allow water to pass through buildings with potentially less structural damage - Retrofit or relocate public infrastructure - New (updated) coastal hazard study (risk-based) - Implement development and planning controls within the CCLEP/CCDCP applied to new development - Delivery of coastal inundation mitigation actions and alignment with catchment based flood risk management actions	5	4	20
2.5	Tidal inundation (coastal lagoons)	- Damage to public and private infrastructure and property caused by tidal floodwaters.	1	1	1	2	2	4	3	3	9	3	3	9	- Review entrance management guidelines for mechanical openings of lagoons - Retrofit or relocate public infrastructure - Implement development and planning controls within CCLEP/CCDCP applied to new development - Delivery of tidal inundation mitigation actions and alignment with catchment based flood risk management actions	1	1	1
2.6	Wave runup and overtopping	- Damage to public and private infrastructure and property caused by wave runup and overtopping of seawalls and dunes during coastal storms.	3	2	6	3	2	6	3	3	9	3	4	12	- Implement development and planning controls within CCLEP/CCDCP applied to new development - Retrofit or relocate public infrastructure - Detailed design and construction of coastal protection structures - Allow water to pass through buildings at e.g. SLSC structures with less damage by opening doors/entry points - New (updated) coastal hazard study (risk-based)	3	2	6
2.7	Coastal lagoon entrance dynamics; artificial opening of coastal lagoon entrances; inappropriate entrance management; or community initiated openings	- Damage to public and private infrastructure and property caused by lagoon entrance dynamics and scour.	2	2	4	2	3	6	2	4	8	2	5	10	- Review entrance management guidelines for mechanical openings of lagoons - Retrofit or relocate public infrastructure - Consider sand scraping to provide erosion protection - Re-grading to restore sand profile by Council maintenance staff - Consider options for entrance management actions	2	2	4
2.8	Slope and cliff instability	- Damage to public and private infrastructure and property caused by rock falls, landslides or similar.	5	2	10	5	3	15	5	3	15	5	4	20	- Monitoring of cliff face stability - Geotechnical investigations as required - trigger events for inspections - Periodic removal of debris / hazardous rocks if possible and practical - Protect existing vegetation growth over cliff face, additional planting if possible - Gradual implementation of exclusion zones in hazardous areas	5	2	10

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3. Environmental Risk Assessment																		
3.1	Coastal erosion	- Loss of dune and other coastal habitats due to storm erosion. - Exposure/mobilisation of potentially harmful sediment, waste, structures, etc. (e.g. erosion of historic landfill site at Magenta)	4	3	12	4	4	16	5	4	20	5	5	25	- Periodic beach nourishment campaigns - Establish on-going coastal monitoring program to inform actions - Dune maintenance programs undertaken by Council and Soil Conservation Service - Undertake rehabilitation works in damaged vegetated areas - Consider beach scraping to build Dune, or vegetated Dune for coastal protection purposes - Re-grading to restore sand profile by Council maintenance staff	4	3	12
3.2	Beach recession	- Loss of dune and other coastal habitats due to shoreline recession.	4	2	8	4	2	8	4	3	12	4	4	16	- Periodic beach nourishment campaigns - Establish on-going coastal monitoring program to inform actions - Dune maintenance programs undertaken by Council and Soil Conservation Service - Undertake rehabilitation works in damaged vegetated areas - Consider beach scraping to build Dune, or vegetated Dune for coastal protection purposes - Re-grading to restore sand profile by Council maintenance staff	4	1	4
3.3	Coastal inundation	- Damage to habitats caused by water in low-lying coastal areas, particularly those areas surrounding coastal lagoons, during coastal storms. - Introduction of hazardous materials/pollutants into the marine/estuarine environment. - Loss of wetland habitat through coastal squeeze	2	4	8	2	5	10	3	5	15	3	5	15	- Review entrance management guidelines for mechanical lagoon openings - Delivery of coastal inundation mitigation actions and alignment with catchment based flood risk management actions - Review and consider redesign of existing coastal protection structures - Consider sand scraping to create a dune, or vegetated dune for protection purposes - Repair damage following storm/inundation events - Review/change land-use controls	2	3	6
3.4	Coastal inundation and catchment flooding (combined)	- Damage to habitats caused by water in low-lying coastal areas, particularly those areas surrounding coastal lagoons, during coastal storms. - Introduction of hazardous materials/pollutants into the marine/estuarine environment. - Loss of wetland habitat through coastal squeeze	3	4	12	3	5	15	3	5	15	3	5	15	- Review entrance management guidelines for mechanical lagoon openings - Delivery of coastal inundation mitigation actions and alignment with catchment based flood risk management actions - Review and consider redesign of existing coastal protection structures - Consider sand scraping to create a dune, or vegetated dune for protection purposes - Repair damage following storm/inundation events - Review/change catchment land-use controls	3	3	9
3.5	Tidal inundation (coastal lagoons)	- Loss of habitat. - Damage caused by tidal floodwaters in low-lying coastal areas, particularly those areas surrounding coastal lagoons.	2	1	2	2	3	6	3	4	12	4	5	20	- Review entrance management guidelines for mechanical openings of lagoons - Manage/improve riparian vegetation - Delivery of tidal inundation mitigation actions and alignment with catchment based flood risk management actions - Reservation of land to allow for spatial migration of vegetation/habitat	2	1	2
3.6	Water quality (beaches)	- Various adverse impacts on aquatic ecology due to poor water quality.	4	3	12	4	3	12	4	4	16	4	4	16	- Implement regular operation of beach rake by Council Beach Maintenance crew - Council beach inspectors clean litter (by hand) in response to storm events - Installation of SQIDS at some stormwater outlets - Consider the relocation or diversion of particular stormwater outlets - Sewage treatment and discharge improvements - Stormwater management system improvements - Improve community education on the factors influencing water quality and on mitigation actions	4	2	8
3.7	Water quality (coastal lagoons)	- Various adverse impacts on aquatic ecology due to poor water quality caused by a variety of factors.	4	5	20	4	5	20	5	5	25	5	5	25	- Improved water quality treatment systems. - Improve/manage riparian vegetation. - Sewage treatment and discharge improvements - Stormwater management system improvements - Review entrance management guidelines for mechanical openings of lagoons - Consider management of algal build-up - Support volunteer based rehabilitation initiatives such as Bushcare - Encourage inclusion of Stormwater Quality Improvement Devices (SQIDs) in private development activities - Undertake maintenance of existing stormwater improvement devices, including Gross Pollutant Traps (GPTs) - Improve containment of contaminated sites to prevent hazardous substances from leaching into lagoons - Improve community education on the factors influencing water quality and on mitigation actions	4	3	12
3.8	Stormwater discharge	- Adverse impacts on water quality, particularly in coastal lagoons. - Reduction in the health of ecosystems. - Reduced biodiversity value.	3	5	15	3	5	15	4	5	20	4	5	20	- Stormwater management system improvements - Improve/manage riparian vegetation - Installation of SQIDS at some stormwater outlets - Consider the relocation or diversion of particular stormwater outlets - Encourage inclusion of Stormwater Quality Improvement Devices (SQIDs) in private development activities - Undertake maintenance of existing stormwater improvement devices, including Gross Pollutant Traps (GPTs) - Review/change land-use controls - Improve community education on the factors influencing water quality and on mitigation actions	3	4	12
3.9	Sewage/septic overflows	- Adverse impacts on water quality, particularly in coastal lagoons. - Reduction in the health of ecosystems. - Reduced biodiversity value.	4	5	20	4	5	20	5	5	25	5	5	25	- Improve inspection/maintenance/management procedures - Improve containment of contaminated sites to prevent hazardous substances from leaching/spreading - Sewage treatment and discharge system improvements	4	3	12
3.10	Exotic/pest species	- Loss of native dune vegetation caused by noxious weed infestation (e.g. Bitou Bush). - Loss of native flora and fauna due to intensification of pest species. - Loss of threatened species e.g. Green and Golden Bell Frog. - Damage to heritage listed dune areas and National Park(s).	3	3	9	3	4	12	4	4	16	5	5	25	- Dune, foreshore and wetland maintenance programs undertaken by Council and contractors - Implementation of noxious weed and pest control programs by Council/external agencies - Council support for community based revegetation campaigns - Improve community education on both native and pest species, how to identify species, and how to report pest species	2	3	6

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3.11	Population growth & coastal development	<ul style="list-style-type: none">- Loss of habitats.- Reduction in the health of ecosystems.- Reduced biodiversity value.- Impact on indigenous and non-indigenous heritage- Loss of migratory waders and shorebirds.- Loss of threatened species e.g. Green and Golden Bell Frog.- Increased use of the coastal zone from residents and tourists resulting in impacts on the health of ecosystems, biodiversity, habitats, and water quality.- Increased pedestrian and vehicle traffic over rock platforms, saltmarsh, dunes, and other sensitive areas resulting in damage to habitats.- Change in land-use impacting water quality of beaches and coastal lagoons.	5	5	25	5	5	25	5	5	25	5	5	25	<ul style="list-style-type: none">- Implement development and planning controls within CCLEP/CCDCP applied to new development- Undertake rehabilitation works in damaged vegetated areas- Install signage and fencing in key areas to protect habitats- Identification and mapping of sites of archaeological and cultural heritage significance within the CCLEP- Mapping of Aboriginal heritage sites within Council's GIS system- Cultural Heritage Assessment required as part of development assessment process for all major development proposals- Improve public education on how people impact the environment- Council support for community based revegetation campaigns and other community "ownership" projects	5	5	25
3.12	Clearing of riparian/wetland/dune habitat	<ul style="list-style-type: none">- Loss of habitats.- Reduction in the health of ecosystems.- Reduced biodiversity value.- Loss of migratory waders and shorebirds.- Loss of threatened species e.g. Green and Golden Bell Frog.	4	2	8	4	3	12	4	4	16	4	4	16	<ul style="list-style-type: none">- Enforce Regional Tree Vegetation Vandalism Policy implemented by Council- Encourage dune maintenance programs undertaken by Council and Soil Conservation Service- Undertake rehabilitation works in damaged vegetated areas- Install signage and fencing in key areas to protect vegetation- Implement development and planning controls within CCLEP/CCDCP applied to new development- Council support for community based revegetation campaigns	4	2	8
3.13	Recreational use of the coastal zone	<ul style="list-style-type: none">- Damage to habitats.- Adverse impacts on water quality and aquatic ecology.- Reduced biodiversity value.	3	4	12	3	4	12	4	4	16	5	5	25	<ul style="list-style-type: none">- Encourage dune maintenance programs undertaken by Council and Soil Conservation Service- Undertake rehabilitation works in damaged vegetated areas- Improve public education on how people impact the environment- Install signage and fencing in key areas to protect vegetation- Enforce Council policies on the use of open spaces and the coastal zone- Council support for community based revegetation campaigns- Improve community education on the impacts of recreational activities on the coastal zone	2	3	6
3.14	Coastal lagoon entrance dynamics; artificial opening of coastal lagoon entrances; inappropriate entrance management; or community initiated openings	<ul style="list-style-type: none">- Changes to estuarine ecology and habitat.- Direct impact on ecology (fish kills, shorebirds, green and golden bell frog).	4	5	20	4	5	20	4	5	20	4	5	20	<ul style="list-style-type: none">- Review entrance management guidelines for mechanical openings of lagoons- Improve community education on the impacts of community initiated lagoon openings- Consider options for entrance management actions	4	4	16
3.15	Catchment land-use changes	<ul style="list-style-type: none">- Damage/clearing/thinning of habitats- Adverse impacts on water quality, particularly in the coastal lagoons resulting from intensification and changes in land-use within the catchment, and activities like stock grazing on hobby farms, and mining and extractive industries.- Reduction in the health of ecosystems.	3	3	9	4	3	12	4	4	16	5	5	25	<ul style="list-style-type: none">- Review/change land-use controls- Implement development and planning controls within CCLEP/CCDCP applied to new development- Improve community education on the effects of land-use- Undertake rehabilitation works in damaged vegetated areas- Council support for community based revegetation campaigns	3	2	6
3.16	Damage to service infrastructure (e.g. sewerage line through coastal lagoons)	<ul style="list-style-type: none">- Adverse impacts on water quality.- Reduction in the health of ecosystems.	4	3	12	4	3	12	4	4	16	4	4	16	<ul style="list-style-type: none">- Install temporary warning signage where sewage/septic overflows are known to have occurred and where known to have impacted- Install temporary warning signage and fenced exclusion zones around hazardous damages- Improve inspection/maintenance/management procedures- Improve containment of contaminated sites to prevent hazardous substances from leaching/spreading	3	2	6

Project: PA2366 Central Coast CMP: Open Coast and Coastal Lagoons Scoping Study				Risk assessment undertaken by: Central Coast Council : Ben Fullagar; Paul Donaldson; Kellie Langford; Warren Brown; Vanessa McCann DPIE: Neil Kelleher RHDW: Adrian Turnbull; Mitch Crotty														
First Pass Risk Assessment																		
Risk ID	Threat(s)	Hazards or Environmental Impacts	Perceived Risk			Perceived Risk 20 yr Planning Horizon			Perceived Risk 50 yr Planning Horizon			Perceived Risk 100 yr Planning Horizon			Control Measure(s) (Eliminate, Substitute, Engineering Controls, Administrative Controls)	Residual Risk		
			Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
4. Public Amenity Risk Assessment																		
4.1	Coastal erosion	- Reduced beach amenity caused by loss of beach sand during coastal storms resulting in narrow beach widths, erosion scarps, hazardous beach access, exposure of existing emergency foreshore protection and buried remnants of damage from historic events.	4	5	20	5	5	25	5	5	25	5	5	25	- Periodic beach nourishment campaigns - Natural beach recovery over time - Establish on-going coastal monitoring program to inform actions - Opportunistic removal of historic storm damage debris as it becomes exposed - Detailed design and construction of a terminal coastal protection structure - Re-grading to restore beach profile by Council maintenance staff	3	5	15
4.2	Beach recession	- Reduced beach amenity resulting from beach sand recession.	3	3	9	3	3	9	4	4	16	4	5	20	- Periodic beach nourishment campaigns - Natural beach recovery over time - Establish on-going coastal monitoring program to inform actions - Opportunistic removal of historic storm damage debris as it becomes exposed - Detailed design and construction of a terminal coastal protection structure - Re-grading to restore beach profile by Council maintenance staff	2	3	6
4.3	Stormwater erosion	- Reduced beach amenity resulting from erosion caused by stormwater discharge, runoff, and surcharging pits.	2	3	6	2	3	6	2	4	8	3	4	12	- Re-grading to restore beach profile by Council maintenance staff - Consider redirection of surcharge flows - Establish on-going coastal monitoring program to inform actions - Natural beach recovery over time - Periodic beach nourishment campaigns - Improve energy dissipation at stormwater outlets	2	3	6
4.4	Coastal inundation	- Reduced public amenity of low-lying coastal areas during coastal storm events, particularly surrounding coastal lagoons.	2	4	8	2	5	10	2	5	10	2	5	10	- Review entrance management guidelines for mechanical entrance openings - Delivery of coastal inundation mitigation actions and alignment with catchment based flood risk management actions - Consider sand scraping to ensure adequate sand volume to provide appropriate beach access - Investigate the purchase of small section(s) of private property to provide public beach access along lagoon (and lagoon entrance) frontage	2	3	6
4.5	Coastal inundation and catchment flooding (combined)	- Reduced public amenity of relatively low-lying coastal areas during coastal and fluvial flood event.	2	4	8	2	5	10	2	5	10	2	5	10	- Review entrance management guidelines for mechanical entrance openings - Delivery of coastal inundation mitigation actions and alignment with catchment based flood risk management actions - Consider sand scraping to ensure adequate sand volume to provide appropriate beach access - Investigate the purchase of small section(s) of private property to provide public beach access along lagoon (and lagoon entrance) frontage	2	3	6
4.6	Tidal inundation (coastal lagoons)	- Reduced public amenity in low-lying areas, particularly those surrounding coastal lagoons.	1	2	2	2	2	4	3	3	9	3	4	12	- Review entrance management guidelines for mechanical entrance openings - Delivery of tidal inundation mitigation actions and alignment with catchment based flood risk management actions - Consider sand scraping to ensure adequate sand volume to provide appropriate beach access - Investigate the purchase of small section(s) of private property to provide public beach access along lagoon (and lagoon entrance) frontage	1	2	2
4.7	Wave runup and overtopping	- Reduced public amenity due to wave runup on and overtopping off seawalls, rock platforms and coastal dunes.	2	5	10	2	5	10	2	5	10	3	5	15	- Periodic beach nourishment campaigns - Consider beach scraping to build dune, or vegetated dune for coastal protection purposes - Detailed design and construction of coastal protection structures - Improve community education concerning dangers of wave overtopping	2	4	8
4.8	Coastal lagoon entrance dynamics; artificial opening of coastal lagoon entrances; inappropriate entrance management; or community initiated openings	- Reduced public beach amenity. - Reduced beach access along lagoon frontage caused by lagoon openings, or dynamic behaviour near entrance. - Impact on coastal lagoon amenity due to poorly managed water levels.	3	5	15	4	5	20	4	5	20	5	5	25	- Investigate the purchase of small section(s) of private property to provide public beach access along lagoon (and lagoon entrance) frontage - Review entrance management guidelines for mechanical openings of lagoon - Consider sand scraping to ensure adequate sand volume to provide appropriate beach access - Improve community education on the impacts of community initiated lagoon openings	3	5	15
4.9	Population growth; coastal development; & human use of the coastal zone	- Increased visitation from residents and visitors resulting in more crowded beaches, less available parking, conflicts between user groups, increased requirement for maintenance of accessways and other assets etc. - Reduced public amenity due to increased/damaging private coastal development - Impacts on public amenity caused by the occupation of public spaces by people, businesses and private belongings.	3	3	9	3	4	12	4	4	16	4	5	20	- Enforce time limits on beach parking, particularly at patrolled beaches, and at popular campervan 'hot spots' - Enforce Council policies on the use of open spaces and the coastal zone - Development and planning controls within CCLEP/CCDCP applied to new development - Council support for community based revegetation campaigns and other community 'ownership' projects	3	3	9
4.10	Damage to service infrastructure	- Impact on public amenity due to the lack of services. - Reduced public amenity as a result of pollutants released from damaged services (e.g. stormwater).	4	2	8	4	2	8	4	3	12	4	3	12	- Improve inspection/maintenance/management procedures - Improve containment of contaminated sites to prevent hazardous substances from leaching/spreading	3	2	6

Appendix C2 - Risk Assessment Matrix

LIKELIHOOD		
5	Event will occur	The event is expected to occur. Greater than 90% chance of occurrence.
4	Event almost certain to occur	The event will probably / is likely to occur. 60% to 90% chance of occurrence.
3	Event may occur	The event could occur at some time. 40% to 60% chance of occurrence.
2	Event not likely to occur	The event is unlikely to occur. 10% to 40% chance of occurrence.
1	Event rarely occurs	The event could occur, but it is rare / only in exceptional circumstances. Less than 10% chance of occurrence.

RISK RATINGS	
1-4 Low	Below risk acceptance threshold and do not require active management.
5-8 Medium	On the risk acceptance threshold and require active monitoring.
9-15 High	Exceed risk acceptance threshold and require proactive management.
16-25 Extreme	Significantly exceed risk acceptance threshold and require urgent and immediate attention.

	DESCRIPTOR	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
5	Event will occur	5 MEDIUM	10 HIGH	15 HIGH	20 EXTREME	25 EXTREME
4	Event almost certain to occur	4 LOW	8 MEDIUM	12 HIGH	16 EXTREME	20 EXTREME
3	Event may occur	3 LOW	6 MEDIUM	9 HIGH	12 HIGH	15 HIGH
2	Event not likely to occur	2 LOW	4 LOW	6 MEDIUM	8 MEDIUM	10 HIGH
1	Event rarely occurs	1 LOW	2 LOW	3 LOW	4 LOW	5 MEDIUM
Highest Level of Control		Lowest Level of Control				
Elimination		Substitution		Isolation/Engineering	Administration	PPE

Level	Descriptor	CONSEQUENCE / SEVERITY / IMPACT (PUBLIC SAFETY)
5	Catastrophic	Fatality or permanent disability.
4	Major	Lost time or severe injury, permanent partial disability.
3	Moderate	Medically treated injuries, injuries requiring hospitalisation.
2	Minor	Injury requiring first aid treatment.
1	Insignificant	Minor injuries, not requiring first aid treatment.

Level	Descriptor	CONSEQUENCE / SEVERITY / IMPACT (INFRASTRUCTURE DAMAGE)
5	Catastrophic	Catastrophic failure incurring significant financial loss (e.g. over \$1M).
4	Major	Significant damage incurring high financial loss (e.g. \$500,000 to \$1M).
3	Moderate	Moderate damage incurring moderate financial loss (e.g. \$100,000 to \$500,000).
2	Minor	Minor damage incurring low financial loss (e.g. \$10,000 to \$100,000).
1	Insignificant	Negligible damage possibly requiring minor repairs and negligible financial loss (e.g. less than \$10,000).

Level	Descriptor	CONSEQUENCE / SEVERITY / IMPACT (ENVIRONMENTAL)
5	Catastrophic	Uncontained, irreversible impact.
4	Major	Uncontained, reversible impact managed by a coordinated response from external agencies.
3	Moderate	Contained, reversible impact managed by external agencies.
2	Minor	Contained, reversible impact managed by internal response.
1	Insignificant	Contained, reversible impact managed by on site response.

Level	Descriptor	CONSEQUENCE / SEVERITY / IMPACT (PUBLIC AMENITY)
5	Catastrophic	Indeterminate prolonged impact on public amenity.
4	Major	Prolonged, major impact on public amenity (e.g. duration 4-12 weeks).
3	Moderate	Medium term, temporary, moderate impact on public amenity (e.g. duration 2-4 weeks).
2	Minor	Short term, temporary, minor impact on public amenity (e.g. duration less than 1-7 days).
1	Insignificant	No material public amenity impact (e.g. duration 2-4 hours).

Appendix D – Stakeholder and Community Engagement Strategy

Coastal Management Program – Open Coast and Lagoons Stage 1 Scoping Study

Stakeholder and Community Engagement Strategy

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1 Introduction

Coastal management planning involves important decision-making dealing with large, complex and long-term issues. These can have major economic, social and environmental ramifications for coastal communities and indeed for a range of stakeholders who have an interest in coastal assets or in the use of coastal land. Planning ahead for appropriate engagement opportunities throughout development of the Coastal Management Program (CMP) for the Open Coast and Lagoons of the Central Coast is considered imperative, as described in **Section 2**.

There are a range of legislative requirements for community engagement during development of a CMP, as well as local practices and policy considerations, which are outlined within **Section 3** of this Community and Stakeholder Engagement Strategy. The various Public Authorities that are likely to require engagement at relevant stage(s) during development of the CMP are provided in **Section 3.5**, while a range of potential barriers for preparation of CMP planning process are described in **Section 3.6**.

There has been significant community consultation undertaken across the LGA during development of the “One - Central Coast”, Community Strategic Plan 2018-2028 (Council, 2018), with many objectives and actions having clear relevance to coast and catchment management, as described in **Section 3.4.4**.

The requirements for consultation should Council wish to consider submitting a planning proposal for a Local Environmental Plan, such as to amend the mapping associated with the coastal management areas prescribed by the State Environment Planning Policy (Coastal Management) 2018, are described in **Section 4**.

The intent of this Community and Stakeholder Engagement Strategy is to build upon the existing body of knowledge of the issues of concern and opportunities for improvement that have been identified by the wider community, as well as site specific concerns. This information will be utilised to tailor the communications material produced for Stages 2-5 of the CMP, along with additional input gathered during delivery of this project. The proposed methodology for delivery of community and stakeholder engagement is described in **Section 5**. The opportunities for engagement during future CMP audits and review of the CMP are described in **Section 6**.

1.1 Draft Vision and Objectives for the Open Coast & Lagoons CMP.

The Vision created by Council and the community during development of “One – Central Coast, Community Strategic Plan 2018-2028” has strong relevance to this Scoping Study. It is recommended as a **draft Vision** to be further developed and refined in consultation with the local community and stakeholders during the preparation of the CMP:

We are ONE Central Coast - A smart, green and liveable region with a shared sense of belonging and responsibility.

Consistent with the CM Act 2016, the **Objectives** of the Central Coast CMP of Open Coasts and Lagoons are to manage the coastal environment in a manner that is consistent with the principles of ecologically sustainable development for the social, cultural and economic well-being of the people of the Central Coast.

As such, the objectives of the CMP are:

- to protect and enhance natural processes and environmental values of the Central Coast open coast and lagoons;
- to support the social and cultural values of the Central Coast and maintain public access, amenity, use and safety;
- to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the Central Coast;
- to recognise the subject area as a vital economic zone and to support sustainable coastal economies;
- to facilitate ecologically sustainable development in the Central Coast and promote sustainable land use planning decision-making;
- to mitigate current and future risks from coastal hazards, taking into account the effects of climate change;
- to recognise that the local and regional scale effects of coastal processes, and the inherently ambulatory and dynamic nature of the shoreline, may result in the loss of coastal land to the sea (including estuaries and other arms of the sea), and to manage coastal use and development accordingly;
- to promote integrated and co-ordinated coastal planning, management and reporting;
- to encourage and promote plans and strategies to improve the resilience of coastal assets to the impacts of an uncertain climate future including impacts of extreme storm events;
- to ensure co-ordination of the policies and activities of government and public authorities relating to the coastal zone and to facilitate the proper integration of their management activities;
- to support public participation in coastal management and planning for the Central Coast and greater public awareness, education and understanding of coastal processes and management actions;
- to facilitate the identification of land in the coastal zone for acquisition by public or local authorities in order to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone; and
- to support the objects of the *Marine Estate Management Act 2014*.

2 Objectives of the Community and Stakeholder Engagement Strategy

The objectives of the Community and Stakeholder Engagement Strategy for the CMP are as follows:

- Engage with stakeholders and review (and update if required) key themes that have been identified via past consultation;
- Utilise engagement and consultation methods which are broadly accepted and familiar to the community, as well as exploring opportunities to incorporate innovative communication techniques that may reach alternative audiences;
- Ensure all stakeholders have up to date information about the CMP project, and the framework within which the CMP project exists;
- Provide the opportunity to have direct input into aspects of the CMP development, and to shape and validate the final CMP; and,
- Ensure the community and stakeholders know where and how to get information relevant to their needs.

2.1 Engagement Overview

An overview of the requirements for engagement at each of the key stages is shown in **Figure 1**, while additional details are provided in the sections below to outline how those requirements will be actioned.



	Identify the scope of a CMP	Determine risks vulnerabilities and opportunities	Identify and evaluate options	Prepare, exhibit, finalise, certify and adopt the CMP	Implement, monitor, evaluate and report
Engagement intent	<p>Community/stakeholders Bring all interested parties on board early to share information and ideas (before decisions are made).</p> <p>CMP content Identify stakeholders and prepare stakeholder profile. Review existing information about stakeholder perspectives to help set the focus and priorities of subsequent stages of the CMP.</p>	<p>Community/stakeholders Empower community and stakeholders with knowledge to contribute to decisions in subsequent stages. Share information equitably among stakeholders.</p> <p>CMP content Explore risks, vulnerabilities and opportunities of coastal management. Explore different perspectives on coastal risk management.</p>	<p>Community/stakeholders Share the decision-making dilemma. Establish a process that will be used to choose between options, incorporating community preferences and criteria.</p> <p>CMP content Identify and evaluate opportunities to address coastal risks for relevant coastal management areas, consistent with management objectives.</p>	<p>Community/stakeholders Gain community confidence and support for decisions that are in the documented CMP.</p> <p>CMP content High involvement stakeholders participate in the detailed process of finalising a plan, e.g. within the coastal management advisory committee or other activities relevant to the risks.</p>	<p>Community/stakeholders Maintain community support for and commitment to the CMP, especially among those directly involved in, or impacted by the implementation.</p> <p>CMP content Active community participation in implementation of CMP actions where relevant. Active community participation in monitoring and review of CMP implementation</p>
IAP2 levels of engagement	Inform, consult, involve	Inform, consult, involve	Inform, involve, collaborate	Inform, consult, involve	Inform, involve, collaborate
Level of community influence on decisions	Council retains decision-making about the scope of subsequent stages and will incorporate community input.	Council retains decision-making. Community and stakeholders may contribute to detailed studies on issues of concern and participate in risk assessment and evaluation.	Council, stakeholders and community collaborate to identify the full range of potential responses to manage coastal vulnerabilities and to evaluate options.	Council retains decision-making about the CMP. Community involvement and feedback refine actions in the CMP to address risks considered unacceptable by the community.	Council retains decision-making but will look to the community for advice, innovation and resources to improve implementation of the CMP actions.

Engagement outcomes	<ul style="list-style-type: none"> stakeholders and the community understand how they can be involved in the preparation of a CMP establish working relationships built on mutual trust and respect understand community goals, aspirations, values and priorities understand community motivations to participate in planning and implementation help community understand dynamic nature of coastal processes and the need to set long-term objectives increase community understanding of the new legislative and planning framework –CM Act, CM SEPP and manual determine the engagement activities that are required during the preparation of subsequent stages of the CMP 	<ul style="list-style-type: none"> a shared understanding of risks and opportunities over different timeframes, and the range of actions that could address different risks a shared understanding of the varied perspectives about coastal management within the community council understands community's 'attitude to risk' community and stakeholders understand vulnerabilities, risk and opportunity studies, including technical aspects such as scenarios for sea level rise, hazards and impacts increased community trust of technical information based on their involvement and understanding of assumptions and limitations 	<ul style="list-style-type: none"> strong working partnerships managers within council aware of coastal hazards, threats, risks and vulnerabilities, opportunities and actions relevant to their responsibilities and potential conflict with other council priorities public authorities contribute to identification and evaluation of management options, are aware of responsibilities and accept the adaptive nature of the CMP council understands stakeholder views about cost-benefit distribution, willingness to pay and potential trade-offs robust options, understood by all stakeholders in terms of risks, cost and benefits 	<ul style="list-style-type: none"> community and stakeholder support for actions and priorities in the CMP increased awareness about funding options and how CMP implementation will be integrated with council's Resourcing Strategy and Delivery Program under IP&R public authorities accept roles and responsibilities in the CMP 	<ul style="list-style-type: none"> community understanding of how CMP will be implemented through the IP&R framework and land use planning system; and by other public authorities community informed about progress on actions community is aware of the effectiveness of actions in terms of changes to coastal risk profile, coastal condition and community satisfaction continue partnership with community by creating opportunities for community involvement in implementing, monitoring, evaluating and reporting effectiveness of CMP
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Figure 1: Overview of CMP stakeholder engagement stages (DPIE, 2018)

3 Statutory and Policy Context for Engagement

3.1 State Level

3.1.1 Coastal Management Act 2016

The *Coastal Management Act 2016* (CM Act), at section 16, provides a range of requirements for consultation when undertaking coastal management planning. This includes mandatory consultation with the community, public authorities and adjoining local council in the same coastal sediment compartment or estuary catchment.

The CM Act also requires, at section 17, that a local council may adopt a draft coastal management program and submit it to the Minister for certification, and that the Minister, in certifying the CMP, needs to be satisfied that it has been prepared in accordance with the requirements of the Coastal Management Manual. The Manual provides detailed requirements for engagement and consultation.

Once certified by the Minister, the implementation of the CMP can commence.

In terms of implementation, the CM Act provides, at section 22, that a local council is to give effect to its coastal management program (CMP) in two ways:

- the preparation, development and review of, and the contents of, the plans, strategies, programs and reports to which Part 2 of Chapter 13 of the *Local Government Act 1993* applies; and,
- the preparation of planning proposals and development control plans under the *Environmental Planning and Assessment Act 1979*.

The mechanisms and consultation requirements of the *Environmental Planning and Assessment Act 1979* are discussed below.

3.1.2 Environmental Planning and Assessment Act 1979

It is important to also consider the *Environmental Planning and Assessment Act 1979* (EP&A Act) because there are two processes which overlap - one related to public consultation regarding the CMP and one related to public consultation regarding a proposal to amend a map (or maps) which form part of the CM SEPP. Similar but separate arrangements apply under the CM Act and the EP&A Act.

The EP&A Act provides for State environmental planning policies to be made by the Governor (EP&A Act, section 3.29) and that the SEPP can provide for any matter that, in the opinion of the Minister, is of State or regional environmental planning significance or of environmental planning significance to a district. There is also a requirement that the Minister take such steps, if any, as the Minister considers appropriate or necessary to publicise the intended effect and to seek and consider submissions from the public.

There is no provision within the EP&A Act for a local plan making authority such as Central Coast Council to directly make or amend a State environmental planning policy. There is, however, a power available under Section 3.31 for a local plan making authority to make a local environmental plan. This includes amending Local Environmental Plan (LEP) and Development Control Plan (DCP).

The mechanism by which a LEP is made or amended is via a planning proposal. Sections 3.33 to 3.37 of the EP&A Act provide for the processes, including the preparation of a document explaining the intended

effect and the justification for the proposal. Under section 3.34, there is a "gateway determination" required by the Minister or the Greater Sydney Commission (GSC) and the determination will include the minimum period for public exhibition of the proposal.

The CM SEPP and the NSW Coastal Management Manual provide guidance for linking the CM Act mapping provisions with the EP&A Act requirements. These are examined in that order below.

The Department of Planning and Environment published a *Guide to Preparing Planning Proposals* (DPE, 2016) which outlines the requirements in respect of content and process for a planning proposal.

3.1.3 State Environmental Planning Policy (Coastal Management) 2018

Clause 6 of the State Environmental Planning Policy (Coastal Management) 2018 (CM SEPP) provides that the coastal zone comprises areas mapped as:

- (a) the coastal wetlands and littoral rainforests area,*
- (b) the coastal vulnerability area,*
- (c) the coastal environment area,*
- (d) the coastal use area.*

Clause 6 also defines each of those areas by reference to published maps for each area.

Maps defining the coastal wetlands and littoral rainforest, coastal environment and coastal use areas are contained within the CM SEPP for the Central Coast LGA however the Coastal Vulnerability Area has not yet been defined.

In relation to the CM SEPP Maps, Clause 8 stipulates:

- (1) A reference in this Policy to a named map adopted by this Policy is a reference to a map by that name:*
 - (a) approved by the Minister when the map is adopted, and*
 - (b) as amended or replaced from time to time by maps declared by environmental planning instruments to amend or replace that map, and approved by the Minister when the instruments are made.*

Sub-clause (1)(b) is important because it prescribes the method by which a planning proposal to amend a LEP can formally amend the maps which form part of the SEPP.

This means that a LEP needs to declare a map to amend or replace a map adopted by the SEPP, and the Minister approves the new map by making the amended LEP.

There is a distinction to be made between the maps which may be produced as part of a coastal hazard study for a CMP, and the maps which might subsequently be applied by the CM SEPP. This is because the coastal hazard study maps current and future hazards for any given hazard (such as coastal erosion) and those hazards can be represented by multiple mapped lines which identify the likely presence of hazards under a number of variables, such as the estimated level of the sea at a series of future time periods (e.g. 50 or 100 years).

The maps in the CM SEPP impose development controls and matters for consideration by a consent authority when an activity is proposed within the mapped area.

The need for separate consultation is therefore appropriate because the CMP hazard mapping identifies a range of risk exposures (current and future), whereas the CM SEPP mapping selects one of those lines, or a separate line derived from those lines, to determine where the Coastal Vulnerability Area (CVA) controls will apply. Whereas the CMP hazard mapping answers the question: Where are the likely hazards now and in the future?; the CM SEPP mapping answers the question: Where should the CM SEPP's CVA controls be applied today?

3.2 NSW Coastal Management Manual

Section 21 of the CM Act provides for the Coastal Management Manual (the Manual) to impose mandatory requirements and guidance for CMPs.

Part A of the Manual provides that:

A draft CMP must be exhibited for public inspection at the main offices of the councils of all local government areas within the area to which the CMP applies, during the ordinary hours of those offices, for a period of not less than 28 calendar days before it is adopted. This mandatory requirement does not prevent community consultation, or other consultation, in other ways.

The Manual also provides further guidance on best practice community consultation, by reference to the *Quality Assurance Standard for Community and Stakeholder Engagement* (prepared by the International Association for Public Participation).

The Manual also notes that:

The identification of issues and the decisions made during the preparation of a coastal management program (CMP) are generally of the same level of public impact as the decisions for the CSP, so tools and techniques aligned with the 'involve' and 'collaborate' levels of engagement are strongly recommended. It is important to note that to operate at the 'involve' and 'collaborate' levels, the council will 'inform' throughout the process.

The public participation spectrum prepared by the International Association for Public Participation is reproduced in **Figure 2**.


Increasing impact on the decision 					
Public participation goal (what are we trying to achieve)	Inform	Consult	Involve	Collaborate	Empower
	To provide the public with balanced and objective information to help them understand the problem, alternatives and/or solutions	To obtain public feedback on alternatives and/or decisions	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered	To partner with the public in each aspect of the decision including the development of alternatives and identification of the preferred solution	To place the final decision-making in the hands of the public
Promise to the public	We will keep you informed	We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision	We will work with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible	We will implement what you decide

Figure 2: Public participation spectrum prepared by International Association for Public Participation

Part B of the Manual (part 1.1.1) notes that a CMP should identify whether a planning proposal will be prepared to amend council's Local Environmental Plan (LEP) to include updated boundaries for any coastal management area.

Part 1.5.2 of the Manual (Part B) notes:

The CM SEPP maps of the coastal zone provide a starting point and can be modified by planning proposals or by the NSW Government as further information becomes available. Local studies and modelling undertaken by or on behalf of councils when preparing their CMP will assist in better defining the coastal management areas. The community and government will have the opportunity to be involved in any proposed changes to the mapped areas through the preparation of a planning proposal under the EP&A Act, in parallel with the preparation of the CMP.

In addition, the Manual notes that:

The sensitivity, adaptive capacity and tolerance of the community to coastal hazards may be considerations in mapping of the proposed coastal vulnerability area for land use planning purposes in the local council area.

This further underlines the difference between mapping the areas potentially exposed to hazards now and in the future, and the mapping of the CVA area for the purposes of development control. The latter requires additional considerations, such as the community's risk appetite and capacity to adapt.

The Manual refers to Ministerial Direction 2.2 Coastal Management (made under section 9.1 of the EP&A Act) and notes that:

Under the section 9.1 direction for coastal management, councils may prepare a planning proposal to amend the maps in their LEP to increase or decrease the area mapped in any of the four coastal management areas in their local area.

3.2.1 Ministerial Direction

As noted, the CMP will require the preparation of a planning proposal to amend the LEP as a vehicle by which the strategic planning intent of the CMP can be given effect.

A planning proposal must identify which, if any, Ministerial Directions are relevant to the proposal and whether the proposal is consistent with those directions.

Ministerial Direction 2.2 deals with coastal management. Item 6 in that Ministerial Direction provides:

A planning proposal for a Local Environmental Plan may propose to amend the following maps, including increasing or decreasing the land within these maps, under the State Environmental Planning Policy (Coastal Management) 2018:

- (a) Coastal wetlands and littoral rainforests area map;*
- (b) Coastal vulnerability area map;*
- (c) Coastal environment area map; and*
- (d) Coastal use area map.*

Such a planning proposal must be supported by evidence in a relevant Coastal Management Program that has been certified by the Minister, or by a Coastal Zone Management Plan under the Coastal Protection Act 1979 that continues to have effect under clause 4 of Schedule 3 to the Coastal Management Act 2016.

It further provides, amongst other things, that the planning proposal must give effect to and be consistent with the objects of the CM Act and the objectives of the relevant coastal management areas; the NSW Coastal Management Manual and associated Toolkit; and any Coastal Zone Management Plan under the Coastal Protection Act 1979 that continues to have effect.

3.3 Anticipating the need for a planning proposal

The Stakeholder and Community Engagement Program associated with a Stage 1 Scoping Study and a CMP should therefore provide for engagement at a standard which would satisfy the requirements of a planning proposal under the EP&A Act. This is explored in more detail within **Section 4**.

3.4 Local Level

3.4.1 Integrated Planning and Reporting Framework

The NSW Department of Premier and Cabinet, Division of Local Government, has published the *Integrated Planning and Reporting Manual for Local Government in NSW* (2013).

The Manual notes that:

There is no prescribed format for the [Community Engagement] Strategy, but there is a general requirement to identify stakeholders and plan methods of engaging each of these groups. How this is done will depend on the individual characteristics of the community, its existing relationship with the council and the time and resources available for the process. It is important that sufficient time is allowed for community engagement.

Although the Manual is written primarily for the development of a Community Strategic Plan, the recommended process should also be considered as a guide to preparing a CMP. The Manual notes three key processes:

1. *Providing information to the community*
2. *Seeking information from the community*
3. *Involving the community*

It is also noted that the Manual recommends an exhibition period of 28 days before Council considers comments and adopts the program or plan. It is also recognised that substantial opportunity should be given for community engagement and communication in the stages of the CMP leading up to an exhibition period.

3.4.2 Central Coast Council Community Participation Plan (2019)

The Central Coast Council Community Participation Plan (CPP) (Council, 2019b) recognises that the level and extent of community participation will vary depending on the community, the scope of the proposal under consideration and the potential impact of the decision. The community is noted to include anyone who is affected by the planning system and includes individuals, community groups, Aboriginal communities, peak bodies representing a range of interests, businesses, other local government, and State and Commonwealth government agencies.

Community participation in planning matters is important because:

- It contributes to building community confidence in the planning system;
- Community participation creates a shared sense of purpose, direction and understanding of the need to manage growth and change, while preserving local character; and
- It provides an improved process that generates two-way engagement that recognises and embraces community knowledge, ideas and expertise. (Council, 2019b)

The CPP is intended and designed to make participation in planning clearer for the Central Coast community. It does this by setting out in one place how and when community members can participate in the planning system, outlining the functions of Council and other planning bodies, as well as describing different types of proposals. This CPP also reaffirms Council's community participation objectives which are used to guide the approach to community engagement as detailed within the Central Coast Engagement Framework (adopted January 2017).

The following principles shown in **Figure 3** were designed to support Council's values, and guide its approach to all community engagement activities under the Engagement Framework, whereby engagement is led by both organisation and the community.



Figure 3: Central Coast Council Engagement Framework

3.4.3 Draft Central Coast Council Community Participation Plan (2020)

Council adopted the existing Community Participation Plan on 25 November 2019, which sets out how and when Council will engage with its community on planning projects. This plan has been updated to incorporate recommendations from a Councillor planning workshop held in March 2020, legislative changes due to the introduction of Central Coast Local Planning Panel and the COVID-19 pandemic.

For example, having regard to the current COVID19 Pandemic, the NSW Government has amended the Local Government (General) Regulation 2005, to provide that Council will not be in breach of the CPP exhibition requirements by publishing notices and making exhibition materials available electronically. Amendments have also been made to remove the requirement for Council notices to be advertised in newspapers and instead allow the relevant notice to be published on the Council's website (Council, 2020b).

Community consultation on the draft revised CPP concluded in November 2020.

3.4.4 Central Coast Council Community Strategic Plan 2018-2028

Central Coast Council is constituted under the *Local Government Act, 1993* (LG Act), which requires that Council engage with its community in corporate strategic planning. It is important for the community to know how Council operates, including how it plans and spends its budget, and how this connects to what the community has told us is important. Key plans developed under the LG Act outline how Council identify and plan funding priorities, manage regional challenges and plan for a sustainable future.

The "One - Central Coast", Community Strategic Plan 2018-2028 (CSP) is a 10-year plan developed by Council under the LG Act, developed through engagement with the community to help set the priorities and confirm strategies and activities that best achieve the community's desired outcomes for the future.

The CSP sets out the goals for management of the Central Coast LGA over the next decade and these include that the “Central Coast is known for its natural beauty; maintaining our natural assets is a critical component of what we value as a community” (Council, 2018).

Key relevant community engagement objectives articulated in the CSP are that Council will:

- G2 Communicate openly and honestly with the community to build a relationship based on transparency, understanding, trust and respect
- G3 Engage with the community in meaningful dialogue and demonstrate how community participation is being used to inform decisions
- I3 Ensure land use planning and development is sustainable and environmentally sound and considers the importance of local habitat, green corridors, energy efficiency and stormwater management

3.4.5 Local Government Authorities

Schedule 1 of the CM Act provides a table of coastal sediment compartments in NSW. The majority of the Central Coast is contained within the Central Coast coastal sediment compartment listed within Schedule 1 of the CM Act, however the northern extent of the LGA connects with the Newcastle coastal sediment compartment.

In accordance with Section 16 (1) (b) of the CM Act consultation with other local Councils within this sediment compartment (i.e. City of Newcastle and Lake Macquarie City Council) will be required during development of the draft Open Coast & Lagoons CMP.

3.4.6 Other Public Authorities

Consultation with public authorities is required if the coastal management program:

- (i) proposes actions or activities to be carried out by that public authority, or*
- (ii) proposes specific emergency actions or activities to be carried out by a public authority under the coastal zone emergency action sub-plan, or*
- (iii) relates to, affects or impacts on any land or assets owned or managed by that public authority.*

Further description of relevant public authorities that are recommended for consultation are provided below.

3.5 Relevant Public Authorities

The following public authorities have a role in coastal management of the Central Coast, with some having a final sign-off role at each stage of the CMP process. Input should be sought from all the authorities listed below at each stage of the CMP.

Minister for Local Government – The Minister has as a significant overarching role through administering the CM Act. The Ministers role includes appointing the NSW Coastal Council, may direct the NSW Coastal Council to undertake a performance audit of CMP implementation, tables reports from the NSW Coastal Council in Parliament, and may certify, or refuse to certify, a CMP.

NSW Coastal Council – The Coastal Council provides independent and expert advice to the Minister, oversees the effectiveness of coastal management, provides advice to councils and public authorities if requested by the Minister, and provides advice on compliance by councils with the management objectives and the manual when preparing a CMP. The Coastal Council also conducts performance audits of the implementation of local council CMPs and identifies opportunities for local council capacity building, reporting to the Minister about the outcomes of audits and making recommendations on appropriate remedial actions.

NSW Department of Planning, Industry and Environment – Environment, Energy and Science (DPIE) – The Environment, Energy and Science Group of DPIE has the role of supporting councils and communities in managing the open coast, estuaries and coastal lakes, providing oversight of the State's Coastal Management Framework. DPIE's role is the first point of contact for local councils planning to prepare and implement a CMP, working in partnership with councils and local communities to manage the coast. DPIE provide a range of data and technical advice including wave data and data on historical coastline changes, coastal geomorphology, coastal and estuarine processes, sediment cells, coastal hazard and risk assessment, ecosystem health and habitat mapping. DPIE also administers the Coastal and Estuary Grants Program that provides funding for councils to prepare and implement their coastal management program.

NSW Department of Planning, Industry and Environment – Crown Lands (Crown Lands) – Crown Lands are responsible for the management of NSW's Crown land, in accordance with the Crown Lands Management Act 2016 (CLM Act). Crown Lands are responsible for the administration and/ or management of Crown land under the Crown Land Management Act 2016 (CLM Act). Crown land includes submerged seabed and subsoil to three nautical miles from the coastline of NSW that is within the limits of the coastal waters of the State. Crown land includes much of the submerged land within the estuaries and intertidal areas (below mean high water mark) of the study area, as well as several foreshore reserves and beaches (for example Avoca Beach, Bateau Bay Beach and Tuggerah Beach). Several of the coastal Crown reserves and foreshores in the study area are under the management of Central Coast Council. Crown Lands licences domestic waterfront structures that occupy Crown land, such as jetties and pontoons. Development and activities on Crown land generally require a form of authorisation under the CLM Act. Crown Lands work in partnership with a range of agencies to make sure that natural resource management is managed across public land in NSW, and regulations and policies are met.

Marine Estate Management Authority (MEMA) – MEMA was established in response to the Independent Scientific Audit of Marine Parks, commissioned by the NSW Government in 2011. The key role of the Authority is to set the strategic direction and priorities for the NSW marine estate through a Marine Estate Management Strategy. Through MEMA, four NSW government agencies have key responsibilities for managing the marine estate, being Department of Regional NSW (DRNSW) - NSW Department of Primary Industries (DPI); Department of Planning, Industry and Environment (DPIE) - Environment, Energy and Science (EES) & Planning and Assessment (P&A); and Transport for NSW (TfNSW).

Transport for NSW (TfNSW) – TfNSW is the operating agency responsible for provision and management of road and maritime networks as part of the transport system. Through the maritime division, TfNSW is responsible for managing recreational boating activities, navigable waterways and assets across the Central Coast. The Maritime Infrastructure Delivery Office (MIDO) is under TfNSW and is responsible for improving the coordination and delivery of coastal and boating infrastructure programs

and projects including dredging across NSW that support recreational boating, fishing, tourism and a range of other commercial activities.

NSW State Emergency Service (NSW SES) - NSW SES is the combat agency for floods, storms and tsunamis. NSW SES is responsible for planning for and responding to flood, storm and tsunami events, including evacuation of those at risk. Coastal erosion events that are not caused by storms are the responsibility of the Local Emergency Operations Controller (LEOCON), however under specific circumstances, delegated responsibility may change in accordance with *the State Emergency and Rescue Management Act 1989*. The NSW State Storm Plan (2018) aligns with the *Coastal Management Act 2016*, under which Council's outline emergency responses through development of a Coastal Zone Emergency Action Subplan within the CMP.

NSW Department of Primary Industry – (DPI Fisheries) - DPI Fisheries has a regulatory role which seeks to ensure that developments comply with the requirements of the *Fisheries Management Act 1994*, (namely the aquatic habitat protection and threatened species conservation provisions in Part 7 and 7A of the Act, respectively), and the associated Policy and Guidelines for Fish Habitat Conservation and Management (2013). DPI Fisheries are also responsible for delivery of the *Marine Estate Management Act 2014* (MEM). CMPs should take into account the objectives of the MEM Act and associated regulations which includes the zoning plans.

DPIE National Parks and Wildlife Service – (NPWS) - NPWS manage over 7 million hectares of land across NSW, including more than 870 national parks and reserves, 4 World Heritage-listed sites, a number of Australian National Heritage sites and 17 Ramsar wetlands. These protected areas play a critical role in conserving biodiversity, as well as natural and cultural heritage. NPWS manages significant areas of the Central Coast coastline including Bouddi and Wyrabalong National Parks and is responsible for provision of facilities such as picnic areas, boardwalks and lookouts in the national park areas.

Darkinjung Local Aboriginal Land Council - (Darkinjung) - Darkinjung are a significant land owner in the Central Coast with responsibilities to improve, protect and foster the best interests of Aboriginal persons within the region. Darkinjung LALC works with the NPWS and DPIE to ensure the protection of habitats, ecosystems, plant and animal species, significant geological features and landforms and protects icons and sites of national significance.

Infrastructure NSW - Infrastructure NSW was established in July 2011 to assist the NSW Government in identifying and prioritising the delivery of critical public infrastructure for NSW. It is an independent statutory agency, established under the Infrastructure NSW Act 2011, responsible for preparing project implementation plans for major infrastructure projects, reviewing and evaluating proposed major infrastructure projects by government agencies or the private sector

NSW Local Land Services - Local Land Services is a regional-focused NSW Government agency delivering quality customer services to farmers, landholders and the wider community. The agency's remit covers agricultural production, biosecurity, natural resource management and help during emergencies. Local Land Services administer a variety of funding opportunities to assist farmers, landholders, Landcare, Aboriginal community groups and other partners to assist and promote the adoption of sustainable land management practices.

3.6 Barriers for preparation of CMP planning process

The following have been identified as barriers for the preparation of a CMP and implementation of management actions:

- Political barriers, for example political pressure on Council to take actions that may be inconsistent with existing Council policies and State legislation. These barriers may be overcome by ensuring that there is good communication and collaboration with stakeholders on coastal management issues, however challenges may arise during emergency situations;
- Institutional support, for example stakeholders not agreeing to management actions within a CMP that are within their areas of responsibility. This can be overcome through early and ongoing engagement with relevant agencies and stakeholders throughout development of the CMP to ensure agreement and support;
- Social support, for example community members not agreeing to management actions within a CMP that are within their areas of interest. This can be overcome through early and ongoing community engagement throughout development of the CMP to ensure agreement and support;
- Governance barriers, for example having processes in place to ensure that Council policies are adhered to and formally reviewed on a regular, scheduled basis. This can assist in ensuring that actions undertaken are consistent with Council's policies and not as a result of political and/or social pressure;
- Capacity issues, for example ensuring that Council has the resources to manage delivery of the CMP, as well as to implement the required management actions. These barriers can be overcome by reviewing and reinforcing Council's staffing and financial requirements, as well as by empowering local communities to assist implementation of management actions; and
- Legal challenges, for example by landowners seeking to implement coastal protection works may challenge the Conditions of Consent placed on development. To ensure consistency with the Coastal Management SEPP and Coastal Management Act 2016, it is suggested that the wording of development controls and related conditions be reviewed by Council's legal department to ensure that ambiguities are removed.

3.6.1 The Context for Engagement

Prior Consultation

There has been significant community consultation undertaken during development of each of the existing CZMP's, however it is recognised that engagement was primarily limited to within the relevant former local government areas. Reflecting the expanded Central Coast Council LGA, as well as Council's adopted Community Participation Plan and Engagement Framework, it is recommended that community consultation for the CMP be undertaken across the entire LGA.

Current Expectations

Coastal erosion events of July 2020 have resulted in establishment of the Wamberal Seawall Advisory Taskforce to provide Council with support to implement a sustainable long-term solution to the coastal erosion issues at Wamberal Beach, consistent with the certified Gosford Beaches CZMP. Council has engaged Manly Hydraulics Laboratory (MHL) to complete technical assessments and develop concept plans for the best combination of protection and sand nourishment options for Wamberal Beach, allowing Council and the community to make informed decisions.

In parallel with the MHL-led study, Council are leading a detailed program of community consultation that aims to:

- (i) provide baseline information on the CZMP, erosion issue and preferred strategy;
- (ii) understand how the community use and value Wamberal beach; and
- (iii) seek feedback on the range of concept options to guide decision making, going forward.

Results from Phase 1 of the Community Consultation include:

- 94 community members attended physical drop-in sessions
- 15 questions posted on online Q&A board
- 24,000+ social media users reached
- 1,841 visits to Council website
- 15+ phone calls from interested stakeholders
- 8 people participated in virtual drop-in sessions
- 578 people completed Wamberal Beach Values and Uses Survey

Community consultation for all Central Coast CMPs was conducted from April to June 2021 with the launch of a dedicated online Our Coast, Our Waterways consultation hub and community survey, as part of awareness raising ahead of targeted community engagement to be undertaken during Stages 2-4 of the CMP process. Consultation activities included:

- 3,918 visits to the Your Voice Our Coast project page;
- 1,168 survey responses received;
- Over 350 respondents have entered the focus group candidate pool;
- Over 220 stakeholder emails sent;
- 3 focus groups hosted with over 20 participants;
- 403 community members reached at pop up events; and,
- Over 500 postcards distributed.

It is expected that additional community consultation will occur during Phase 2 of this project.

4 Requirements for Consultation Regarding a Planning Proposal

The DPE *Guide to preparing planning proposals* describes the components of a planning proposal and explains the requirements. Much of the research and analysis during the Stage 1 Scoping Study will inform key parts of the planning proposal, such as Part 3 - the justification for the proposed planning instrument. The justification needs to provide information, amongst other things, on whether the planning proposal is the result of any strategic study or report (such as a CMP). The study (CMP) should be submitted with the planning proposal and forms part of the exhibition materials.

The information provided at Part 3, Section C of the planning proposal needs to be sufficient to satisfy the Gateway that the level of information available leads to the conclusion that the LEP can be completed within a reasonable timeframe and that identified potential impacts can be addressed. This will be enabled by quality engagement at the CMP stage.

Part 5 - community consultation of the planning proposal needs to outline any proposed consultation to be undertaken with the planning proposal. The Gateway process will determine what consultation is required to ensure interested parties can make an informed decision.

The EP&A Act makes the following provisions relating to the Gateway process:

3.34 Gateway determination

(1) After preparing a planning proposal, the planning proposal authority may forward it to the Minister or, if the planning proposal relates to the Greater Sydney Region, to the Greater Sydney Commission.

(2) After a review of the planning proposal, the Minister or Greater Sydney Commission is to determine the following:

- (a) whether the matter should proceed (with or without variation),*
- (b) whether the matter should be resubmitted for any reason (including for further studies or other information, or for the revision of the planning proposal),*
- (c) the minimum period of public exhibition of the planning proposal (or a determination that no such public exhibition is required because of the minor nature of the proposal),*
Note. Under Schedule 1, the mandatory period of public exhibition is 28 days if a determination is not made under paragraph (c).
- (d) any consultation required with State or Commonwealth public authorities that will or may be adversely affected by the proposed instrument,*
- (e) whether a public hearing is to be held into the matter by the Independent Planning Commission or other specified person or body,*
- (f) the times within which the various stages of the procedure for the making of the proposed instrument are to be completed,*
- (g) if the planning proposal authority is a council—whether the council is authorised to make the proposed instrument and any conditions the council is required to comply with before the instrument is made.*

(3) A determination of the community consultation requirements includes a determination under section 3.22 (or other provision of this Act) that the matter does not require community consultation.

(4) The regulations may provide for the categorisation of planning proposals for the purposes of this section, and may prescribe standard community consultation requirements for each such category.

Note particularly the provisions of subclause (2)(c) which allow the Gateway determination to specify the exhibition period. This will be based, in part, on the consultation undertaken as part of the CMP.

As noted previously, Clause 8 of the CM SEPP provides for the maps which give a spatial reference for the development controls in the SEPP. The SEPP stipulates:

- (1) A reference in this Policy to a named map adopted by this Policy is a reference to a map by that name:*
- (a) approved by the Minister when the map is adopted, and*
 - (b) as amended or replaced from time to time by maps declared by environmental planning instruments to amend or replace that map, and approved by the Minister when the instruments are made.*

Sub-clause (1)(b) is important because it prescribes the method by which a planning proposal to amend an LEP can formally amend the maps which form part of the SEPP.

This also guides the sequencing of the steps associated with a CMP and planning proposal, including engagement.

1. Scoping Study stakeholder engagement to articulate the vision and objectives for the Central Coast coastal management, and community awareness raising regarding planning proposals (Stage 1);
2. Engagement with stakeholders and community on identification of hazards, risk, vulnerabilities and opportunities (Stage 2);
3. Engagement with stakeholders and community on the evaluation and application of options (Stage 3);
4. Engagement with community regarding draft CMP content, including the intent to make the planning proposal (Stage 4);
5. Council endorses draft CMP (noting that CMP includes an intention to prepare a planning proposal for the purposes of creating or amending the CM SEPP maps);
6. Referral to Coastal Council, if required;
7. Certification of the CMP by the Minister and notification via Gazette;
8. Preparation of the planning proposal, based on CMP studies, including justification, consultation details, maps and project timelines, and identifying the need to Minister to approve the map when the instrument is made;
9. Gateway determination of planning proposal by Greater Sydney Commission or Minister;
10. Public exhibition of planning proposal;
11. Submissions received, considered and post exhibition report to Council;
12. Council forwards planning proposal to DPIE, if authorised by Council determination;
13. DPIE refers the map and planning proposal to Parliamentary Counsels Office for preparation of the LEP instrument;
14. Instrument made by Minister or delegate and the maps (created or amended by LEP) are declared to be maps for the purposes of the CM Act and SM SEPP.

5 Delivery of Community Consultation for CMP Stages 2-5

5.1 Stage 1A: Identify the Scope of Community Consultation

Risk Assessment and risk management

Identify and consider the risks associated with the CMP consultation and engagement, especially those that may have a negative impact. Identify stakeholders and existing networks that should be involved in the engagement process.

Risks could include:

- Councillors, community groups or stakeholders feeling excluded from the engagement process;
- community members having different expectations of the community meetings;
- low participation or conversely larger than expect attendance;
- controversy of some aspects, such as hazard lines;
- under-representation or over-representation by organised interest groups; and
- inaccurate media coverage.

Risk management strategies should be developed and agreed prior to commencement.

Roles and responsibilities

Agree the allocation of roles and responsibilities between Council and the CMP service provider.

Agree approvals process for the publication of information or representation to the community.

Messaging

Agree on key messages, style and language.

Community profile

Consider the socio-economic and demographic attributes of the Central Coast area to ensure consultation is tailored to variables such as language background, age and particularly the economic activity of the area which is part of the 'saltwater economy'.

Geographic segments

Identify discrete geographic units for engagement purposes. Four precincts have been identified under previous coastal studies and these remain relevant as a basis for ongoing investigation and management planning.

Adjoining local government authorities

Document how the scope of the CMP relates to the roles and responsibilities of adjoining authorities.

Conduct a scenario planning exercise to anticipate any issues likely to be raised by adjoining authorities (including integration with any related studies or planning initiatives in those areas) and proposed management responses.

Advisory Group / Forum / Working Group

Establish a coastal management Advisory Committee (or similar entity) to ensure that any existing coastal management committee is briefed and engaged in the preparation for broader community and stakeholder consultation and engagement. It is recommended that a single advisory body be established which can have a central role in guiding the CMP process but also a role in further coastal management planning within the local government area. This reflects the likelihood of further coastal management

programs being considered in other coastal areas of the Central Coast. Continuity of skills and knowledge will assist in productive engagement. Terms of reference should ideally contemplate this wider role.

Staging

Identify the key stages at which specific information or specific engagement is required from key authorities.

5.2 Stage 1B: Awareness Raising

Content

- Linkages between key legislation, regulation, policies, plans and strategies.
- Why a CMP is being prepared and the benefits of coastal planning.
- Scope of the proposed CMP - spatial extent; hazards; coastal management areas.
- Processes and stages of a CMP.
- Opportunities and avenues to contribute and comment.

Audience

- Primary – “Hot Spot” residents and key stakeholder groups.
- Secondary - Central Coast residents and key stakeholder groups.

Methods

- Council website.
- Social media.
- Newsletter.
- Local media.
- Registration of Interest facility.

5.3 Stage 1C: Shared vision

Content

Draft Vision Statement and Objectives for the CMP.

The Vision created by Council and the community during development of “One – Central Coast, Community Strategic Plan 2018-2028” has strong relevance to this Scoping Study. It is recommended as a **draft Vision** to be further developed and refined in consultation with the local community and stakeholders during the preparation of the CMP:

We are ONE Central Coast - A smart, green and liveable region with a shared sense of belonging and responsibility.

Consistent with the CM Act 2016, the **Objectives** of the Central Coast CMP of Open Coasts and Lagoons are to manage the coastal environment in a manner that is consistent with the principles of ecologically sustainable development for the social, cultural and economic well-being of the people of the Central Coast.

As such, the objectives of the CMP are:

- to protect and enhance natural processes and environmental values of the Central Coast open coast and lagoons;

- to support the social and cultural values of the Central Coast and maintain public access, amenity, use and safety;
- to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the Central Coast;
- to recognise the subject area as a vital economic zone and to support sustainable coastal economies;
- to facilitate ecologically sustainable development in the Central Coast and promote sustainable land use planning decision-making;
- to mitigate current and future risks from coastal hazards, taking into account the effects of climate change;
- to recognise that the local and regional scale effects of coastal processes, and the inherently ambulatory and dynamic nature of the shoreline, may result in the loss of coastal land to the sea (including estuaries and other arms of the sea), and to manage coastal use and development accordingly;
- to promote integrated and co-ordinated coastal planning, management and reporting;
- to encourage and promote plans and strategies to improve the resilience of coastal assets to the impacts of an uncertain climate future including impacts of extreme storm events;
- to ensure co-ordination of the policies and activities of government and public authorities relating to the coastal zone and to facilitate the proper integration of their management activities;
- to support public participation in coastal management and planning for the Central Coast and greater public awareness, education and understanding of coastal processes and management actions;
- to facilitate the identification of land in the coastal zone for acquisition by public or local authorities in order to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone; and
- to support the objects of the *Marine Estate Management Act 2014*.

Audience

- Primary – “Hot Spot” residents and key stakeholder groups.
- Secondary - Central Coast residents and key stakeholder groups.
- Adjoining landowners.

Methods

- Council website.
- Social media.
- Newsletter.
- Local media.
- Advisory Committee briefing.
- Feedback facility.

5.4 Stage 1D: Integration with a Planning Proposal - *Optional*

Content

Prepare explanatory public-facing material for a non-technical audience which explains the concept of a planning proposal, how it overlaps with the CMP process and the integration of consultation. It should also signal the Council's intent to define a Coastal Vulnerability Area map for the purposes of the CM SEPP and point to the development controls and matters for consideration which are required under the CM SEPP within a mapped CVA.

Audience

Community generally.

Method

- Council website.
- Social media.
- Newsletter.

5.5 Stage 2: Determine Risks and Opportunities

5.5.1 Content

- Character and extent of risks and opportunities, including the identification of public and private assets within mapped vulnerability zones, and the range of risk treatments.
- The disclosure of risk (e.g. planning certificates) and liability issues.
- Technical information and guidelines on how to interpret the findings, including projections, sea level rise, assumptions, methods. Also include explanatory material regarding any changes to risk exposure or projections since the last coastal studies were conducted.
- Risk appetite, time horizons, funding and financing context.

5.5.2 Audience

- Primary – “Hot Spot” residents and visitors.
- Secondary - Central Coast residents and visitors.
- Targeted stakeholders including Councillors, State and Commonwealth public authorities, utilities, community.

5.5.3 Methods

- Council website.
- Social media.
- Newsletter.
- Local media.
- Advisory Committee briefing.
- Digital maps available via Council website.
- Drop in sessions with paper maps available.
- Focus groups of representative sectors.

5.6 Stage 3: Identify and Evaluate Options

5.6.1 Content

- Priorities in local risk management (hot spots, risk types, vulnerability ranking, financial risk).
- The main pathways for risk treatment (e.g. avoid, protect, accommodate and retreat) and the various sub-options within those pathways.
- Criteria on which evaluation is based.
- The costs and benefits, including the limitations and trade-offs, willingness to pay, capacity to pay.

- Arrangements for cost sharing, funding methods and financing feasibility, including principles upon which arrangements are based (e.g. beneficiary pays; public goods).
- Alignment and coordination with adjoining council plans and intentions.

5.6.2 Audience

- Primary – “Hot Spot” residents and visitors.
- Secondary - Central Coast residents and visitors.
- Targeted stakeholders including Councillors, State and Commonwealth public authorities, utilities, community.

5.6.3 Methods

- Council website.
- Social media.
- Newsletter.
- Local media.
- Advisory Committee briefing.
- Digital maps available via Council website.
- Drop in sessions with paper maps available.
- Facilitated workshops, including speakers from DPIE.

5.7 Stage 4: Prepare, Exhibit, Finalise, Certify and Adopt the CMP

5.7.1 Content

- Draft CMP.
- Supporting materials, technical reports, copies of CM SEPP and CM Act.
- Explanatory material on how feedback will be considered, recorded and incorporated (e.g. submissions report).
- Q&A document.
- Maps.
- Reports on outcomes of earlier engagement and consultation.

5.7.2 Audience

- Primary – “Hot Spot” residents and visitors.
- Secondary - Central Coast residents and visitors.
- Targeted stakeholders including Councillors, State and Commonwealth public authorities, utilities, community.

5.7.3 Methods

- Place copies in the main office of Council (mandatory).
- Council website.
- Social media.
- Newsletter.
- Local media.
- Advisory Committee briefing.
- Digital maps available via Council website.

- Drop in sessions with paper maps available.
- Facilitated workshops, including speakers from DPIE/DPE.
- Adoption of final draft by Council, including background materials and briefings.
- Publication of CMP in Government Gazette (pending certification by Minister) and notification to local community of gazettal.
- Copy of CMP available for inspection (no charge) at Council offices and on website within seven days after gazettal.

5.8 Stage 5: Implement, Monitor, Evaluate and Report

5.8.1 Content

- Implementation and progress reporting.
- Arrangements for monitoring and evaluation.
- Citizen science and partnerships.
- Benchmarking and integration with adjoining councils.

5.8.2 Audience

- Primary – “Hot Spot” residents and visitors.
- Secondary - Central Coast residents and visitors.
- Targeted stakeholders including Councillors, State and Commonwealth public authorities, utilities, community.

5.8.3 Methods

- Council website.
- Report cards (snapshot information) for specific projects.
- Social media.
- Newsletter.
- Local media.
- Advisory Committee engagement (assuming that the terms of reference provide for this stage of work).
- Consider evaluation audit by a third party for objectivity (but may also be internal) subject to funding availability.

6 Future Audits and Review

The Minister may request the Coastal Council to conduct a performance audit of CMP implementation (under section 26 of the CM Act), and Council is required to review its CMP at least once every ten years.

Broadly the engagement strategy for either event is:

- informing the community about the review or audit of the CMP, in both print and web-based formats, specifically identifying how the community may participate in the review;
- conducting surveys of satisfaction, for instance as part of the broader community satisfaction survey for the Community Strategic Plan;
- conducting focus groups with existing stakeholder groups to gauge whether community and stakeholder priorities have changed during the period since the CMP was certified;
- identifying if there are new or emerging risks that may be the focus of the next stage for the CMP, or whether there are new stakeholder groups who will need to be engaged; and,
- assessing community satisfaction with the engagement process to refine the stakeholder engagement strategy.

Appendix E - Existing Coastal Protection Structures

Existing Coastal Protection Structures

Beach / Foreshore	Structure present (yes/no)	Structure location	Structure type	Design / constructed to standards	Other details / comments
Patonga Creek	Yes	Inside creek mouth adjacent to campground, eastern foreshore	Sandstone block seawall	No	
Patonga Beach	Yes	Adjacent to Boat Ramp	Sandstone block seawall	No*	Constructed by DPIE - Crown Lands 2016/17 – designed to protect public recreation values and Council managed Crown Land. Structure damaged following a storm event due to overtopping. The structure was subsequently repaired by Crown Lands.
Pearl Beach	Yes	Gem Road	Buried revetment on private property	Yes	Check Worley Parsons Hazard Definition Study, I believe it has the exact location
		4 Coral Crescent	Unauthorised “bulka bag” type structure	No	Constructed c.2015/16
		62 Coral Crescent	Unauthorised “bulka bag” type structure	No	Constructed c.2015/16
Umina - Ocean Beach	Yes	Ocean Beach SLSC carpark	Concrete Block Wall	No(?)	
		Eastern foreshore, fronting The Esplanade – Opposite Barrenjoey Road	Geobag seawall	Yes	Constructed 2015
		Ocean Beach – Ettalong Point	Groynes - sandstone boulders	No	Historical coastal protection structures c.1970's, no maintenance still insitu.
		Barrenjoey Road to Kourung Street	Boulder “revetment”	No*	Historical coastal protection structure. C.1950's-1970's, no maintenance buried under dune. *unsure on design standards
Ettalong Beach	Yes	Kourung Street to Bangalow Street	Groyne field (3 groynes)	No*	Historical Coastal Protection works Constructed c.1970's. At least 2 groynes still remain in some capacity,

Existing Coastal Protection Structures

Beach / Foreshore	Structure present (yes/no)	Structure location	Structure type	Design / constructed to standards	Other details / comments
					no maintenance. * unsure on design standards.
		Lagoon Street to Beach Street	Sandstone revetment (2 layer structure)	Yes	Constructed 2012/13
		Picnic Parade to Schnapper Road	Sandstone rip-rap revetment	Yes	Constructed 2014/15
Kilcare – Putty Beach	???				Check Worley Parsons, maybe some buried historical structure below the dune directly in front of SLSC
Little Beach	no				NPWS, no structures
Macmasters – Copacabana Beach	Yes	Southern beach corner, fronting the SLSC	Unauthorised “bulka bag” structure.	No	Constructed 2015. Design for long term solution being finalised
		Armouring on stairs for Macmasters Beach ocean bath	Sandstone boulders	Yes	Constructed 2015/16.
		Del Rio Drive Drain – northern corner of Copacabana	Sandstone block wall	No*	Constructed along the northern bank of the drain and around the drainage headworks. *unsure of design standards. <i>Primary purpose not necessarily coastal protection.</i>
Cockrone Lagoon	Yes	Approximately 51 Lakeside to beach	Sandstone block wall	?	Failing at beach end.
Avoca – North Avoca Beach	Yes	Southern beach corner, fronting the SLSC	Rock revetment	Yes	Constructed 2017-2019
Avoca Lagoon	Yes	Ficus Avenue Car Park	Sandstone Block	No.	Extends from approximately surf viewing platform to 1 Ficus Avenue.
Terrigal – Wamberal Beach	Yes	Southern beach, fronting the Esplanade / SLSC areas	Approx. 450m Vertical seawall with promenade	Yes	
Terrigal – Wamberal Beach	Yes	Wamberal Beach, spanning Terrigal and Wamberal Lagoon	Informal ad hoc rock works, including 2020 temporary emergency protection works	No	Range of ad hoc private protection works (including small “sea bees”, bulka bags, concrete blocks, “shot crete”)

Existing Coastal Protection Structures

Beach / Foreshore	Structure present (yes/no)	Structure location	Structure type	Design / constructed to standards	Other details / comments
			(rocks, two- and four-ton rock-filled bags)		
Terrigal Lagoon	yes	Private works from approximately 34 to 4 Ocean View Drive.	Appear to be mostly vertical seawalls, details unknown	No(?)	
		Council land parcel 2 Ocean View Drive	Vertical block wall (sandstone?)	No(?)	
		Ocean View Drive Bridge - armouring on abutments	Mix of concrete and sandstone block work	Yes(?)	Possibly unlikely to have coastal engineering input into design
Wamberal Lagoon	??? (No)				
Spoon Bay	No				
Forresters Beach	No				
Bateau Bay Beach	No				
Blue Lagoon – Shelly Beach	No				
Toowoona Bay Beach	Yes	Southern corner, fronting the SLSC	???		
Blue Bay Beach	???				
The Entrance Beach	Yes	Whole beach	Various, including sandstone block wall, ad hoc rock revetment, and rock groyne	No - rock walls Yes – rock groyne	A rock groyne of 100m long was constructed by Public Works in December 2017.
The Entrance Beach	Yes	North of The Entrance Ocean Bath	Sandstone seawall	Yes – rock seawall	32m of sandstone block seawall was constructed by Council in 2018 to protect the BB07 pump station.
The Entrance Channel	Yes	Along the Entrance Road, west of the bridge, immediately east of the NSW Maritime foreshore building	Rock revetment of basalt stone and placed concrete blocks.	Yes – rock revetment	20m long of rock revetment constructed by Council in April 2015.

Existing Coastal Protection Structures

Beach / Foreshore	Structure present (yes/no)	Structure location	Structure type	Design / constructed to standards	Other details / comments
The Entrance Channel	Yes	West of the bridge, along The Entrance Road, from NSW Maritime building to the bridge.	Seawall with concrete piles and concrete panels.	Yes – Seawall	Approx. 300m of old seawall has been repaired and upgraded by Council from 2015-2015.
The Entrance Channel	Yes	East of the bridge, along the foreshore of Memorial Park and Marine Pde.	Seawall with concrete piles and concrete panels.	Yes – Seawall	Approx. 550m of degrading and undermining seawall.
The Entrance Channel	Yes	Southern embankment, adjacent Marine Pde	Rock rubble revetment	No?	
		Northern embankment, adjacent Karagi car park	Block wall		
Tuggerah Beach (Entrance North – Pelican Beach)	Yes	Entrance North Beach, between Karagi Reserve and Hargraves Street	Informal ad hoc rock works, including 2020 temporary emergency protection rock works	No	Informal ad hoc rock works were reported to be installed circa 1970s-1980s.
Soldiers Beach	No				
Pebbly Beach	No				
Cabbage Tree Harbour	Yes	Boat ramp	Rock revetment	Yes	The Toe Drainage Structure was constructed by Council between June and September 2011.
		Beachside houses	Rock toe drainage structure		
Jenny Dixon Beach	No				
Hargraves Beach	No				
Budgewoi Beach (Lakes – Birdie Bch)	No				
Frazer Beach	No				

Appendix F – CMP Scoping Study Assessment of Mandatory Requirements

Department of Planning, Industry and Environment

Scoping Study Assessment Tool

Name of Scoping Study:	Central Coast Open Coast and Lagoons
Council(s):	Central Coast Council
Synopsis/Key issues:	Consolidation of 4 current CZMPs (1 certified) from two previous Councils into one consistent CMP Inadequacy of existing emergency subplans
DPIE contact officer:	Neil Kelleher
Risk & Planning endorsement:	

Document History

Version	Date submitted to DPIE:	Reviewed by:	Date Review Complete	Action

Process Guide: DPIE review by regional officer. Peer review by Planning and Risk.

Criteria	Yes	No
Is fast tracking proposed? If no, complete Table 1. If yes, please complete Tables 1 and 2	<u>YES</u>	
Are changes to Coastal Management Areas mapped under the SEPP proposed to be addressed through a planning proposal		<u>YES</u>

Table 1 – CMP Scoping Study assessment sheet

Task	Evidence required	Adequate (Yes / No)	Comments (demonstrate and include document references)
Stakeholder Engagement	Public authority involvement <ul style="list-style-type: none"> Have relevant public authorities been involved in the development of the Scoping Study? 	Yes	Section 4
	<ul style="list-style-type: none"> Is there evidence of (relevant) public authority commitment to ongoing involvement in CMP development? 	Yes	Section 4
Determine the strategic context of Coastal Management	Environmental Context -The document provides an overview of the environmental context, including <ul style="list-style-type: none"> physical features / coastal processes 	Yes	Section 5, 5.1, 5.2
	<ul style="list-style-type: none"> sediment compartment / estuary catchment 	Yes	Section 5.1, Table 1 and Figure 3
	<ul style="list-style-type: none"> habitat condition / extent 	Yes	Section 5.3, 5.4, 5.5
	<ul style="list-style-type: none"> significant storm or environmentally significant events since most recent study / coastal plan 	Yes	Section 5.2.1, 5.2.2
	Social Context - The document provides an overview of the social context including a description of: <ul style="list-style-type: none"> community demographics / population projections 	Yes	Section 5.6.1 (Mandatory Requirement 12)
	<ul style="list-style-type: none"> seasonal fluxes 	Yes	Section 5.6.1, table 4
	<ul style="list-style-type: none"> cultural context / Aboriginal cultural heritage and use 	Yes	Section 5.6, Section 5.6.3
	<ul style="list-style-type: none"> social values 	Yes	Section 5.6.2

Task	Evidence required	Adequate (Yes / No)	Comments (demonstrate and include document references)
	<ul style="list-style-type: none"> projected use of coastal land for infrastructure, housing, commercial, recreational and conservation purposes. 	Yes	Section 5.6.4 and Section 6.4.1 (Mandatory Requirement 12)
	Economic Context -The document describes the economic context including coastal related tourism, industries and aquaculture	Yes	Section 5.6.1
	Legal / Planning Context – The document provides an overview of <ul style="list-style-type: none"> legislation, land tenure and Environmental Planning Instruments 	Yes	Section 6.1
	<ul style="list-style-type: none"> public authority roles 	Yes	Section 6.7.2
	<ul style="list-style-type: none"> existence of a previous Coastal / Estuary Plan 	Yes	Section 6.3
	<ul style="list-style-type: none"> other strategic / planning documents (such as CSP) 	Yes	Section 6.5
	<ul style="list-style-type: none"> the strategic direction established for the coast through planning documents 	Yes	Section 6.4
	Barriers - The document identifies barriers including political, governance or capacity.	Yes	Section 6.7.3, 5.6.1
	<ul style="list-style-type: none"> Opportunities to overcome these are discussed. 	Yes	Section 6.7.3
Establish the purpose, vision and objectives	Vision statement – The vision reflects the local context while remaining consistent with the states overarching vision of managing the coastal environment in a manner consistent with the principles of ESD for the social, cultural and economic well-being of the people of NSW.	Yes	Section 3, Section 3.2
	Objectives – Objectives are <ul style="list-style-type: none"> consistent with the 13 objects of the Coastal Management Act 	Yes	Section 3.3
	<ul style="list-style-type: none"> consistent with management objectives in the SEPP 	Yes	Section 3.3

Task	Evidence required	Adequate (Yes / No)	Comments (demonstrate and include document references)
	<ul style="list-style-type: none"> in alignment with the community strategic plan 	Yes	Section 3.3, Section 6.6
	<ul style="list-style-type: none"> realistic 	Yes	Section 3.3, Section 6.6
Identify the scope of the CMP including key management issues and areas	Issues The document provides a list of key issues for consideration in the CMP	Yes	Section 7.3 (Mandatory Requirement 3)
	First pass risk assessment – The risk assessment process: <ul style="list-style-type: none"> includes tailored likelihood and consequence scales that are valid, transparent and applicable to environmental, social and economic consequences 	Yes	Section 7, Appendix C
	<ul style="list-style-type: none"> utilises information provided through regional scale assessments such as TARA, framework for water quality and hazard mapping where locally specific information is not available 	Yes	Section 7, Appendix C
	<ul style="list-style-type: none"> describes and assesses the vulnerability (including sensitivity and tolerance) of environmental, economic and social/cultural values to coastal risks describes and assesses benefits and opportunities (including without limitation risks to environmental, social and economic values) 	Yes	Section 7, Appendix C (Mandatory Requirement 6)
	<ul style="list-style-type: none"> considers pathways and planning timeframes from now, 20 years, 50 years and 100 years and beyond (where appropriate) 	Yes	Section 7, Appendix C (Mandatory Requirements 2 and 12)
	<ul style="list-style-type: none"> demonstrates consideration of a range of future scenarios including rare or potentially catastrophic events 	Yes	Section 7, Appendix C (Mandatory Requirement 12)
	<ul style="list-style-type: none"> presents the results in a clear manner 	Yes	Section 7, Appendix C
	Assessment of adequacy of existing information – The document discusses the adequacy of information available for hazards and threats to inform future stages including:	Yes	Section 7.4

Task	Evidence required	Adequate (Yes / No)	Comments (demonstrate and include document references)
	<ul style="list-style-type: none"> available hazard mapping and suitability cognisant of the risk levels 		
	<ul style="list-style-type: none"> level of uncertainty for high priority risks 	Yes	Section 6.6
	<ul style="list-style-type: none"> location and integrity of coastal protection works (if available) 	Yes	Section 5.2.3.1, 5.3.5, Section 5.6 and Appendix E
	<ul style="list-style-type: none"> coastal and catchment processes 	Yes	Section 7.4
	<ul style="list-style-type: none"> climate change 	Yes	Section 6.6
	<ul style="list-style-type: none"> other threats to environmental and social values 	Yes	Section 7.3, S7, Appendix C
	Coastal Management Areas –The document <ul style="list-style-type: none"> maps coastal management areas 	Yes	Section 6.2.5
	<ul style="list-style-type: none"> assesses the suitability of management areas to address identified high priority issues 	Yes	Section 5.2.5.5 – talks about knowledge gaps
	<ul style="list-style-type: none"> identifies where modifications to boundaries may be sought through a planning proposal? 	Yes	Section 5.2.5.5 and 6.2.5.2 in relation to CVA
	CMP spatial extent –The document demonstrates that: <ul style="list-style-type: none"> Provides rationale for selecting the proposed CMP area is appropriate and whether it applies to all or part of the coastal zone 	Yes	Section 5.1 (Mandatory Requirement 4)
	<ul style="list-style-type: none"> consideration has been given to sediment compartment and catchment boundaries 	Yes	Section 5.1, Table 1 and Figure 3
	<ul style="list-style-type: none"> benefits and drivers for larger spatial areas have been considered 	Yes	Section 5.1, Table 1 and Figure 3
Review the current coastal management arrangements	Existing Management Plans - The document includes: <ul style="list-style-type: none"> details of previous coastal management related plans 	Yes	Section 6.3

Task	Evidence required	Adequate (Yes / No)	Comments (demonstrate and include document references)
	<ul style="list-style-type: none"> an audit of implementation 	Yes	Section 6.3.6 Appendix B
	<ul style="list-style-type: none"> outcomes for actions implemented against intended indicators 	Yes	Section 6.3.6
	<ul style="list-style-type: none"> analysis of implementation barriers for outstanding actions 	Yes	Section 6.3.2.2 as they pertain to Wamberal, and Section 6.3.6
	<ul style="list-style-type: none"> learnings from implementation process 	Yes	Section 6.3.6
	<ul style="list-style-type: none"> analysis of coastal emergency response or impacts where a storm event has occurred during the implementation phase 	Yes	Section 6.2.3.1, 6.3.5
	<ul style="list-style-type: none"> commentary of integration with IP&R 	Yes	Section 6.3.6, Section 6.7.1
	<ul style="list-style-type: none"> details of monitoring undertaken 	Yes	Section 6.3.6, Appendix B
Identify roles and responsibilities	Responsibilities for CMP development. The document <ul style="list-style-type: none"> nominates a lead applicant for CMP development 	Yes	Section 6.7
	<ul style="list-style-type: none"> provides evidence of adequate engagement with other public authorities 	Yes	Section 6.7.3
	<ul style="list-style-type: none"> describes a governance structure that will facilitate collaboration (This may include a description of any intended advisory groups, MoUs etc.) 	Yes	Section 6.7 and a bit on the Wamberal Taskforce in s4
Determine where action is required	Prioritised list of risks- The document includes a prioritised list of risks including those resulting from coastal hazards and those related to other threats to coastal values	Yes	Section 7, Appendix C
	Knowledge Gaps- The document provides an appropriate prioritised list of knowledge gaps to be filled in later stages	Yes	Section 7.4

Task	Evidence required	Adequate (Yes / No)	Comments (demonstrate and include document references)
	Determine where action will be required in stage 2 – The document recommends appropriate further studies for stage 2	Yes	Section 7.4, S8.1, S8.2
Prepare a community and stakeholder engagement strategy	Who - The community and stakeholder engagement strategy identifies: <ul style="list-style-type: none"> the broad community, industry and internal and external public authority stakeholder groups to be engaged in developing a CMP the level of participation for each group (using IAP2 Spectrum or similar) 	Yes	Appendix D
	How – The community and stakeholder engagement strategy identifies: <ul style="list-style-type: none"> a range of proposed strategies for engagement to reach the target audience pathways to engage with aboriginal people and communities specific stakeholder consultation required to align with the preparation of a planning proposal how the community and stakeholder engagement strategy will be evaluated 	Yes	Section 6.7, Appendix D
	What - The community and stakeholder engagement strategy describes: <ul style="list-style-type: none"> the aims and key messages for community and stakeholder engagement specific mapping required to align with the preparation of a planning proposal how the community will be consulted in the preparation of a planning proposal how stakeholders will be consulted in the preparation of a coastal zone emergency action subplan (where CVA is to be mapped) 	Yes	Appendix D (Mandatory Requirement 5)
	When – The community and stakeholder engagement strategy: <ul style="list-style-type: none"> indicates timing for key engagement activities considers specific stakeholder consultation required to align with the preparation of a planning proposal 	Yes	Section 8.6 – Appendix D
	Business case – The scoping Study outlines:	Yes	Section 8

Task	Evidence required	Adequate (Yes / No)	Comments (demonstrate and include document references)
Prepare a preliminary business case	<ul style="list-style-type: none"> components required to develop a CMP including costs/funding mechanisms, responsibilities and indicative timeframes 		
	<ul style="list-style-type: none"> the benefits of preparing a CMP as proposed 	Yes	Section 2, Section 6.2, Section 8.4 and Addendum A
	<ul style="list-style-type: none"> the risks associated with preparing and not preparing the CMP 	Yes	Section 2, Section 6.2, Section 8.4 and Addendum A
	<ul style="list-style-type: none"> fit with the IP&R framework 	Yes	Section 6.7.1
	<ul style="list-style-type: none"> support from relevant public authorities for the process proposed 	Yes	Section 3, Section 6.7.3
Develop a forward program	Timeframes – are realistic around CMP development such as grant acquisition, consultation, review and exhibition	Yes	Section 8.3
	Planning Proposal (PP)– <ul style="list-style-type: none"> Will a PP be prepared to amend council’s Local Environmental Plan (LEP) to include updated boundaries for any coastal management area? Where a PP is proposed, it is this integrated with the proposed CMP preparation time frame? 	Yes	Section 9 (Mandatory Requirement 5)

Table 2 – Fast-tracking proposal assessment sheet (Mandatory Requirement 7)

Evidence required	Adequate (Yes / No)	Comments
What fast-tracking is proposed?	Yes	Fast track from Stage 1-4, significant studies and community engagement are currently underway. See Addendum A. <i>Is the council proposing to fast-track from stage 1 to 4, or only complete parts of stages 2 to 3. Please describe the proposal.</i>
Has fast-tracking been justified?	Yes	Addendum A

Evidence required	Adequate (Yes / No)	Comments
		<i>Please demonstrate how this justification is consistent with section 1.11.2 of the manual</i>
Do existing assessments (of coastal risks/ vulnerabilities and opportunities/ evaluation of management options) provide sufficient information to enable council to prepare the CMP	Yes	Section 3, Section 6.3, Addendum A <i>Please describe how the information enables preparation of a CMP in accordance with mandatory requirement 8 and sections 14 and 15 of the CM Act</i>
Has the effectiveness of the existing coastal management been assessed and described?	Yes	Section 6.3, Addendum A <i>Please describe how the existing management approaches have been considered and assessed.</i>
Have any circumstances concerning the coastal management of the study area changed?	Yes	Section 3, Section 4.2.1, 4.2.2, Section 6.3, Addendum A <i>Please describe how the effectiveness existing coastal management has been considered for the study area?</i>

Recommended Changes to the Draft Scoping Study (if any)

Reference	Recommended Change
Examples:	
Whole of Document	
Section 1.1.1	