PORT STEPHENS COUNCIL

Coastal Management Program

Stage 1 – Scoping Study

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Figures

Tables

Glossary and acronyms

Abbreviation	Full Name
CMP	Coastal Management Program
OEH	Office of Environment and Heritage
NPWS	National Parks and Wildlife Service
NPW Act	National Parks and Wildlife Act
WCL	Worimi Conservation Lands
CLM Act	Crown Lands Management Act 2016
CM Act	Coastal Management Act 2016
PSC	Port Stephens Council
LGA	Local Government Area
LALC	Local Aboriginal Land Council
EP&A Act	Environmental Planning and Assessment Act 1979
SEPP	State Environmental Planning Policies
CSP	Community Strategic Plan

IP&R Framework	Integrated Planning and Reporting framework
Crown Lands	Department of Industry – Lands & Water
LEP	Local Environmental Plan
DCP	Development Control Plan
DPI	Department of Primary Industries
MEMA	Marine Estate Management Authority

1. Introduction

Coastal Management is rapidly becoming a high profile area of concern for coastal Councils, public and private asset owners, and the extended community. No longer is coastal management purely about coastal protection; it is now about addressing and contributing to the broader conversations around:

- How do we use our coastal zone?
- How do we balance the environment with these uses?
- What do we want our coastal zone to look like moving into the future and;
- How do we adapt to the increasing challenges of living on the coast?

The Port Stephens Coastal Zone is characterised by its natural beauty, clear water and white sandy beaches. The unique natural, cultural, social and economic values attract residents and visitors in ever-increasing numbers, driving local growth and presenting increasing pressures on the natural environment. Escalating natural and socio-economic pressures, combined with sensitivity to shifts in environmental conditions, make the coastal zone highly vulnerable to change over time. In order to successfully meet these challenges, it is important that Port Stephens develop a robust coastal management program.

The *Port Stephens Community Strategic Plan* sets out the long term vision for the Local Government Area by identifying the community's priorities for the next ten years and outlining how Council will work with other governments and agencies to achieve them. Our Coastal Management Program is the delivery of these priorities within the coastal zone in consideration of the unique vulnerabilities and threats that must be managed.

1.1 The Coastal Management Program Framework

In 2016, the NSW Government established a new framework to manage the coastal environment in an ecologically sustainable way for the social, cultural, and economic well-being of the people of NSW (Figure 1). The cornerstone of this framework, the *Coastal Management Act 2016*, requires Port Stephens Council to develop a long-term strategy for the management of our coastal zone.

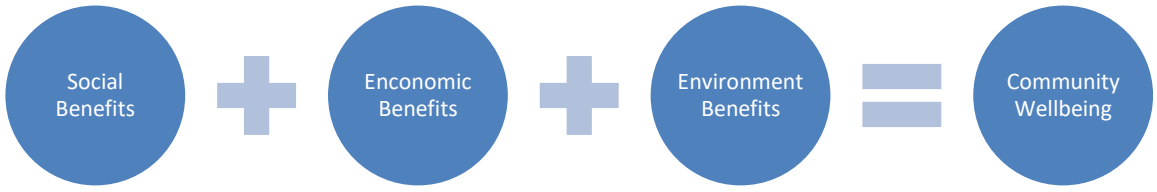

Figure 1 Threat & Risk Assessment Framework for the NSW Marine Estate (Fletcher and Fisk 2017).

The *NSW Coastal Management Manual* outlines a five-stage program to developing a Coastal Management Program (Figure 2). This scoping study is the key deliverable of Stage 1.

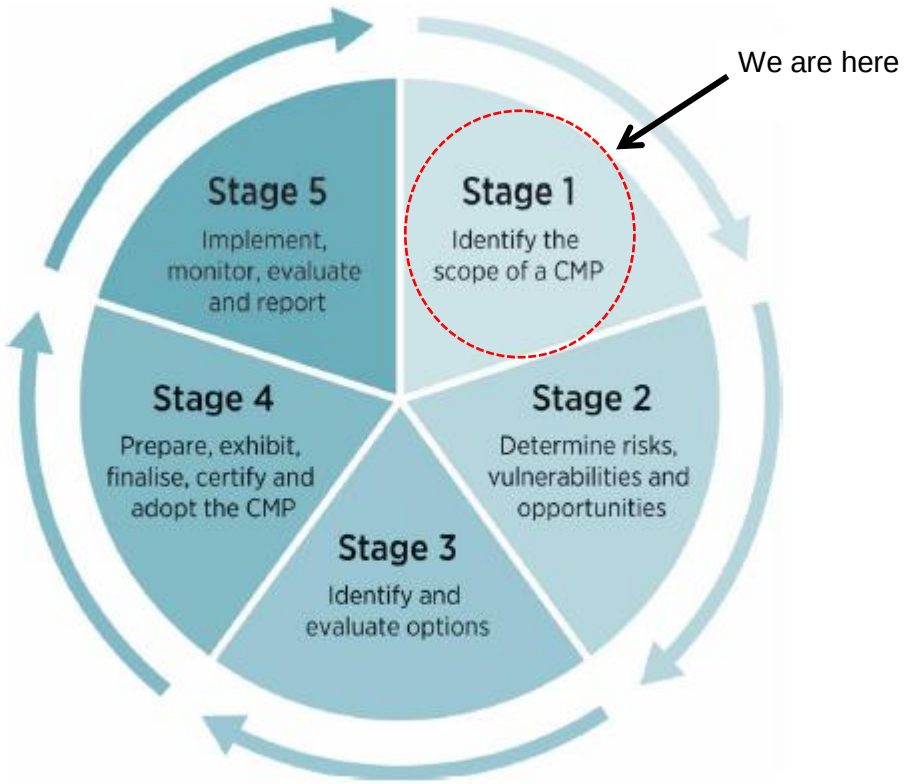

Figure 2 Stages in preparing and implementing a Coastal Management Program (NSW Coastal Management Manual).

1.2 Vision, Purpose and Objectives

Port Stephens Vision

The Community's Vision for Port Stephens LGA is *"A great lifestyle in a treasured environment*."

To achieve the community's visions we require a coastal environment that is managed in a manner consistent with the principles of ecologically sustainable development and for the social, cultural and economic well-being of the community.

Purpose and Objectives

The purpose of the Coastal Management Program is to provide a framework for the long-term strategic and integrated management of priority coastal hazards, issues and risks to the Port Stephens Coastal zone in line with the community's needs, state objectives and legislation. Successful development and implementation of a strong Program will yield a range of short, medium and long term outcomes for Port Stephens. Therefore, the Coastal Management Program seeks to achieve the following:

Short term outcomes

Development Outcomes (Stage 1 – 4)

- Risk management approach to identify coastal management issues. Identify built, social, natural and cultural assets under threat now and in 20, 50 and 100 years.
- Integration of coastal considerations into land-use, infrastructure and asset planning frameworks and decision making.
- Management solutions that are feasible and affordable, including cost benefit analysis and a business case for priority actions.
- Alignment of coastal management priorities with broader community priorities —inclusion in Community Strategic Plan and improved monitoring, reporting and ongoing community engagement and stakeholder consultation.

Medium term outcomes

Implementation outcomes (Stage 5)

In ten years, Port Stephens coastal zone will have;

- Transparent, informed and supported strategic planning decisions.
- Clear development controls and guidance.
- Management of both natural and built public and private assets that addresses current risk levels and community demand with documented actions for managing future risks.
- Community understanding and involvement.

Long term outcomes – 10 years +

Success

In the presence of increasing coastal risk, our community will have established adaptation pathways that support evidence based decision making for the management of current and future private and public assets. The overall objective is to preserve the following key coastal community values:

- unique character
- amenity
- public access
- equity and fairness
- water quality
- biological diversity
- ecosystems integrity and resilience.

Purpose of Stage 1 - Scoping Study

The primary purpose of Stage 1 is to obtain a preliminary understanding of the current and potential future threats and management issues within the Coastal Zone of Port Stephens to inform the focus and guide further investigation for the Coastal Management Program.

Purpose of Scoping Study

1. Using a risk management approach, identify the current and future priority threats for the Port Stephens coastal zone incorporating consideration of population growth and climate change scenarios.
2. Review current coastal management practices and challenges.
3. Identify priority knowledge gaps for further investigation.
4. Produce a forward works program for the further development of the Coastal Management Program.
5. Produce a Stakeholder Engagement Plan.

1.3 Program Governance

A key outcome of the development of a Coastal Management Program is the commitment and collaboration across agencies to manage coastal risk in a strategic way. A large body of work has been undertaken to facilitate the strategic approach to coastal management in Port Stephens. A governance framework has been developed to formalize and facilitate involvement and commitment (Figure 3).

Membership of the Stakeholder Reference Group comprises:

- Office of Environment and Heritage, incl. National Parks and Wildlife
- Department of Industry – Lands & Water (Crown Lands)
- Department of Primary Industries – Fisheries and Marine Parks
- MidCoast Council
- NSW Roads and Maritime Services.

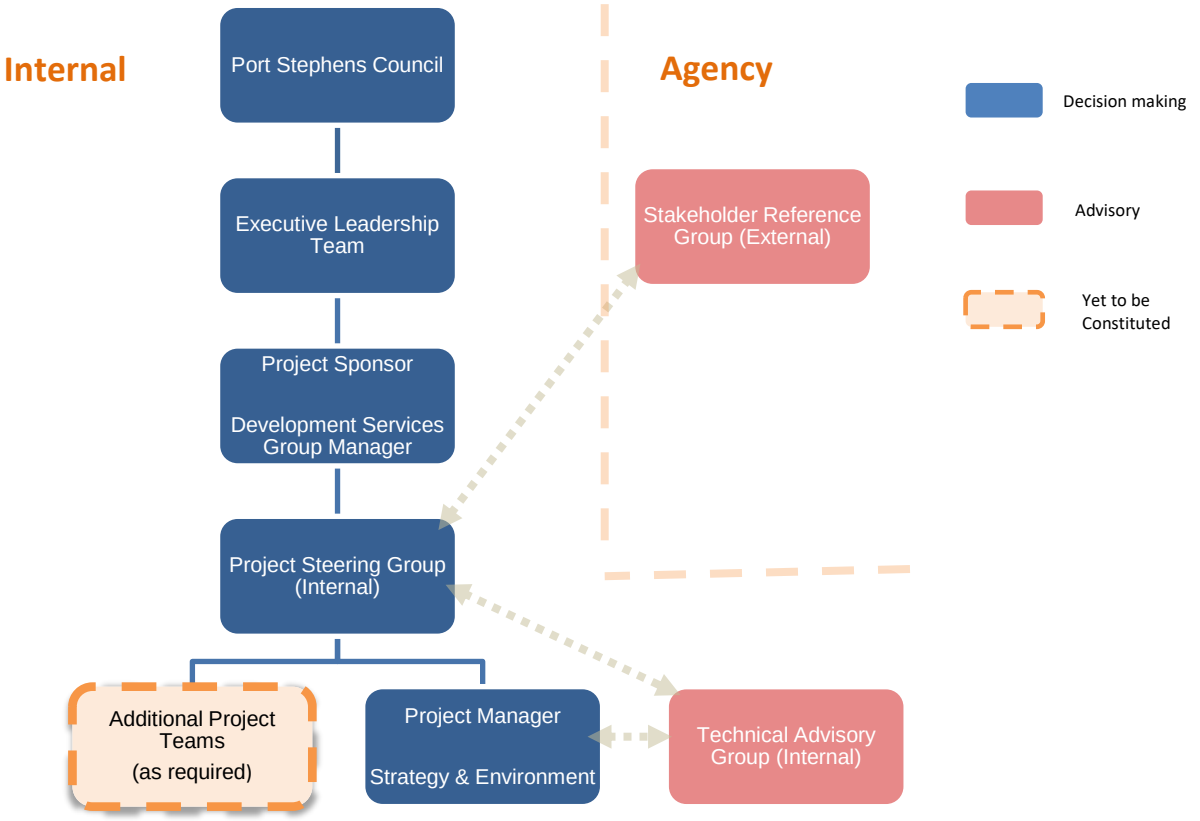

Figure 3 Governance framework

This group worked together to facilitate the development of the scoping study and actively participated in the provision of information, assessment of risks, and review of documents.

Other agencies and groups that have been involved in the initial stages are: Worimi and Karuah Land Councils, Local Land Services—Hunter, and the Port Stephens/Myall Lakes Estuary and Coastal Zone Consultative Committee.

As we move through the Coastal Management Program development process, we will continue to work with these agencies and engage with additional stakeholders, including: City of Newcastle, Hunter Water, and the NSW Department of Planning and Environment.

This coordinated and collaborative approach will allow for sustainable and consistent management of the Port Stephens Coastal Zone.

2. Port Stephens Coastal Zone

The area addressed by the Port Stephen Coastal Management Program is the coastal zone as defined by the Coastal Management SEPP. It extends from Fern Bay in the south to Yacaaba Headland in the north including the estuary of Port Stephens (Figure 4). Catchment influences originating from outside these areas are also considered for management of risks relating to coastal values such as water quality. Fullerton Cove and the Hunter Estuary are covered separately by the Hunter Estuary Coastal Zone Management Plan 2017. The coastline to the north of Yacaaba is covered by the Great Lakes Coastal Zone Management Plan 2016.

The study area contains the Local Government Areas (LGA) of Port Stephens and Mid Coast. The open coast and the southern foreshore of the Port Stephens estuary are located in Port Stephens LGA while the northern shoreline from the Karuah River is located in MidCoast LGA.

For the purposes of the Coastal Management Program, the study area has been further divided into three geographic areas of consideration: the open coast, the inner port, and the outer port. These areas reflect three distinct and unique landscapes, with different management and conservation challenges.

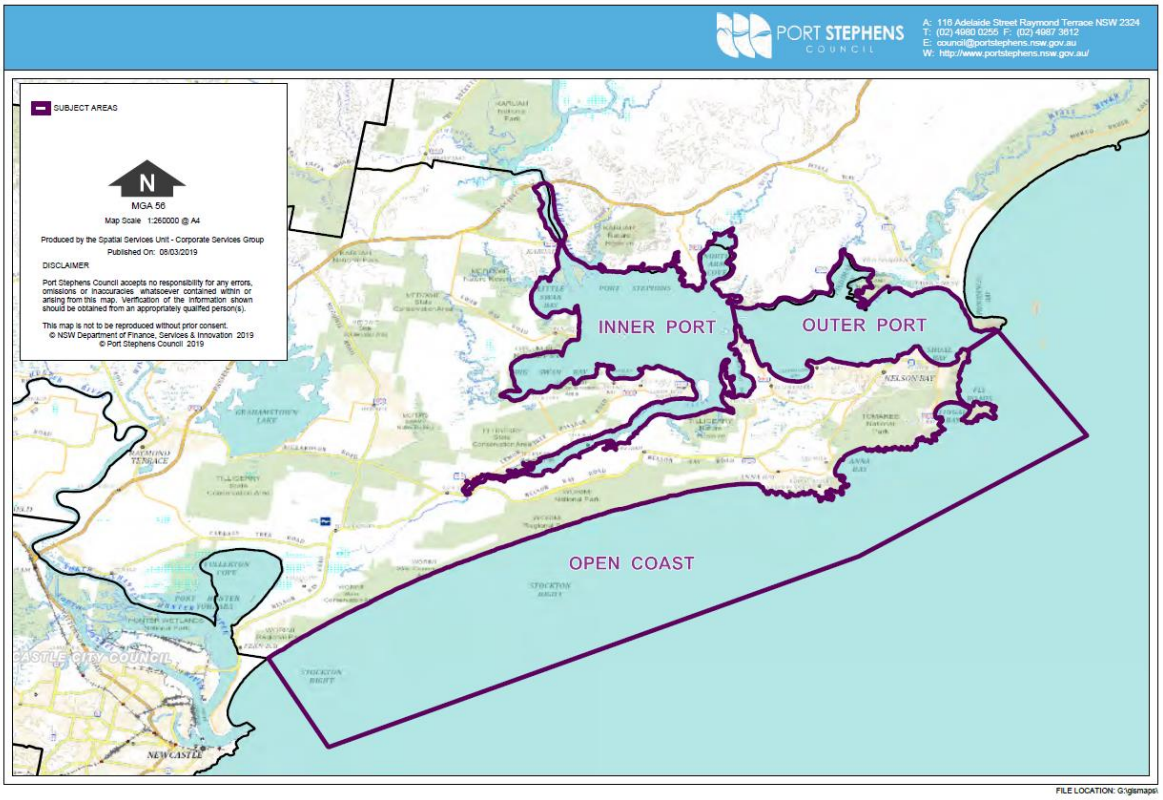

Figure 4 Areas for Consideration (outer port, inner port, and open coast)

Each area of consideration presents a different profile and unique threats associated with the coastal management areas that are contained within them. The coastal management areas are those defined in the Coastal Management SEPP, each with different management objectives and limitations:

1. Coastal Vulnerability Area: land subject to coastal hazards
2. Coastal Wetland and Littoral Rainforest: land that displays the hydrological and floristic characteristics pf coastal wetlands or littoral rainforest and land adjoining those features
3. Coastal Environment Area: land that contains coastal features such as the coastal water of the State, estuaries, coastal lakes, coastal lagoons, and land adjoining those features
4. Coastal Use Area: land adjacent to coastal waters, estuaries, coastal lakes and lagoons, where development is or may be carried out at present or in the future

Dividing the study area into the three areas of consideration allows us to assess and prioritise coastal management threats at a more detailed level of focus (Figure 4). For instance, the characterisation of coastal use areas (and the associated threats and management challenges) will be different in the open coast compared to the inner port.

Embedding this differentiation into the scoping study allows us to better understand and respond to the unique environments we are managing.

3. Community values and shared responsibilities

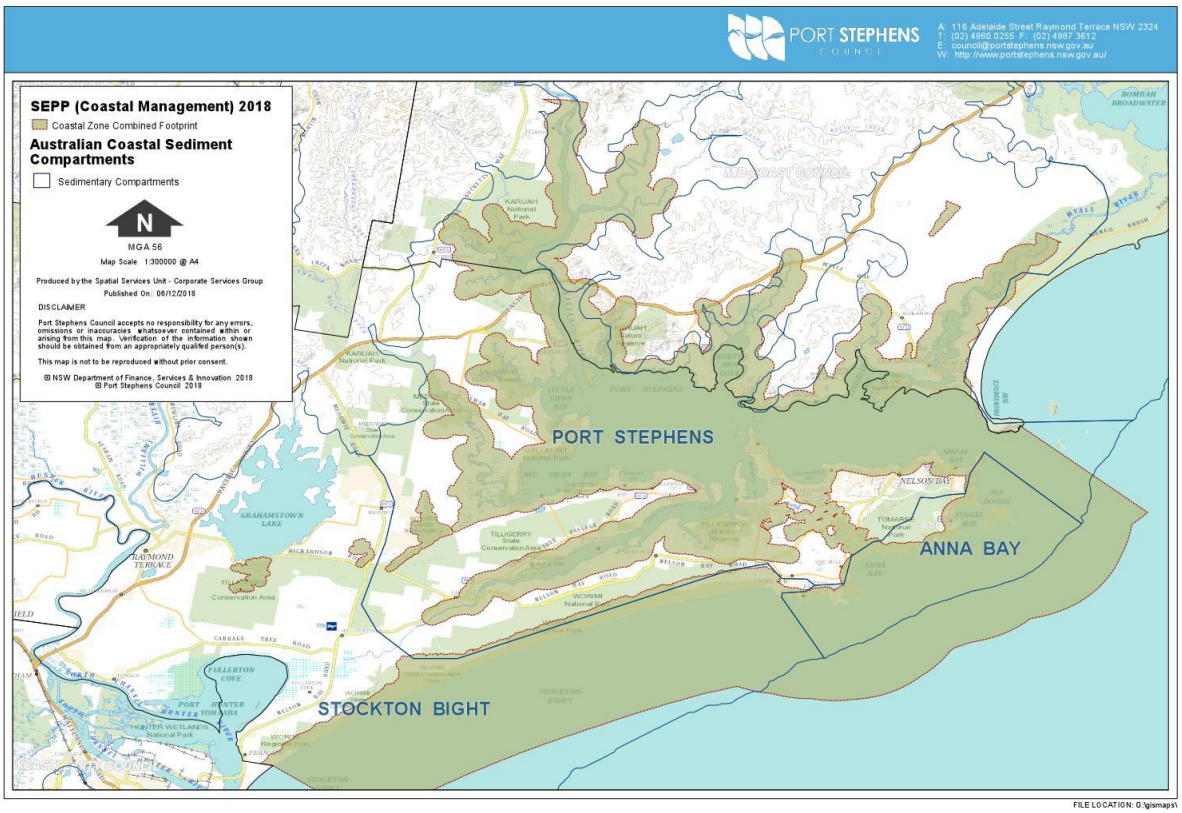

Figure 5 Coastal Zone Sediment Compartments

The study area contains 3 sediment compartments across both the Port Stephens and MidCoast Council LGAs, therefore MidCoast Council has been a key stakeholder in the preparation of the Scoping Study (Table 1, Figure 5). The MidCoast 2030: Shared Vision, Shared Responsibility[1] has been considered as part of the PSC Coastal Management Program.

Table 1 Sediment Compartments within the Study Area (Coast Adapt)

	Area Included	Geomorphology
Stockton Bight	From the southern Port Stephens LGA boundary to Birubi Point[2]	Transgressive dune barrier, foredunes and blowouts.
Anna Bay	From Birubi Point to Tomaree Point	Volcanic headlands, pocket beaches, transgressive dunes, tombolo
Port Stephens	From Tomaree Head to Yacaaba Head	Volcanic headlands, deep embayment, pocket beaches

[1] MidCoast 2030's first community strategic plan since the amalgamation of Great Lakes, Greater Taree and Gloucester Councils in 2016.

[2] The Stockton Bight sediment compartment extends from Nobbys Head to Birubi. The section of the sediment compartment contained within the Newcastle LGA is covered separately by the Newcastle Coastal Zone Management Plan 2018.

The MidCoast Community Strategic Plan sets out the longer term vision for identifying the priorities for the next ten years and helps to outline how both Councils will work together to achieve those related to Coastal Management. The context and scope of the Coastal Management Program is not limited to being a document solely for Council use, but one that can be utilised by the entire community.

The vision for both the Port Stephens Community Strategic Plan and the MidCoast 2030 are underpinned by key community values (Table 2).

Table 2 Key Community Strategic Plan Values

Port Stephens Community Strategic Plan	MidCoast 2030
1. Our Community – Port Stephens is a thriving and strong community respecting diversity and heritage 2. Our Place – Port Stephens is a liveable place supporting local economic growth. 3. Our Environment – Port Stephens' environment is clean and green, protected and enhanced. 4. Our Council – Port Stephens Council leads, manages and delivers valued community services in a responsible way.	1. We value our unique, diverse and culturally rich communities. 2. We value a connected community 3. We value our environment. 4. We value our thriving and growing economy. 5. We value strong leadership and shared vision.

Significant community consultation has also been previously undertaken around the important assets, values and benefits that characterise the coastal zone. These identified community values can be summarised under the following categories, which will be used to guide the long term outcomes for the Coastal Management Program;

- Unique character;
- Amenity;
- Public access;
- Equity and fairness;
- Water quality;
- Biological diversity and;
- Ecosystems integrity and resilience;

Table 3 Values identified from Marine Estate Threat & Risk Assessment, Port Stephens Foreshore Management Plan and stakeholder consultation

Economic	Social	Environmental
Recreation	Public Access	Seagrass
Visual amenity	Natural coastal landscape Aboriginal cultural heritage	Koala Habitat
Primary industry e.g. Fishing / oyster industry, irrigation	Strong community ownership of foreshores	Endangered Ecological Communities
Tourism	Safe place for socialising	Wildlife Corridors

Commercial Boating	Encourages an active, healthy lifestyle	Clean waters
Commercial sand extraction	Cultural heritage for future generations	Abundant marine life
Coastal infrastructure - roads, drains	Natural beauty	Unique biodiversity
Growth centres	Boating	Migratory shorebirds
	European Heritage	Threatened species
	Public reserves / infrastructure	Coastal Wetlands & Littoral Rainforest
		Source of Scientific discoveries

Previous community consultation (Umwelt Pty Ltd, 2009) also identified the following issues, concerns, and perspectives regarding coastal management:

- There is a strong sense of community concern and ownership of foreshore reserves, the waterway and the environment in general.
- People are concerned that future development will impact on the values which currently make the foreshore so attractive and important to them.
- Strong focus of community towards environmental resilience against environmental risks, natural hazards and climate change.
- Community seeks the use of resources sustainably, efficiently and equitably.
- Biodiversity conservation being supported through health and dynamic systems is important for the Port Stephens community.

4. Strategic Context

4.1 Environmental Context

Physical Features

Port Stephens is a drowned river valley (Roy et al. 2001) with an estuary system that covers approximately 1,400km^2 (Vila-Concejo et al. 2007b). The major tributaries that flow into the estuary are the Karuah River, Myall River and Tilligerry Creek. Thom et al (1981) provides a description of the late quaternary geological evolution of the Port Stephens area including mapping of prominent Holocene and Pleistocene barriers and dune sands within the region.

The Foreshore Management Plan (Umwelt Pty Limited, 2009) describes the Inner Port (to the west of Soldiers Point) as dominated by fluvial processes, characterised by wide mud flats with mangrove and saltmarsh. Sediment consists of muddy lithic sands that originate from the Karuah River. The Outer Port (to the east of Soldiers Point) is dominated by tidal and wave processes. The form and composition of the sands and mud in the Outer Port are predominately from the marine system. The rapid flushing time and sandy bottom results in high water clarity.

The open coast between Yacaaba Headland and Birubi Point is dominated by a rock shoreline with numerous headlands and small bays. Many of the bays have small cobble and boulder beaches as their inner extremities, resulting in a number of identifiable boulder beaches. Sand beaches range from 50 metres to approximately 2.7 kilometres in length along this stretch, and significant reef systems and rock platforms are also a prominent feature.

Stockton Beach surpasses all other beaches in NSW in terms of length, wave energy, size of the barrier and sand dunes, and the age of its backing barriers. It occupies Stockton Bight and lies to the north of the Hunter River mouth and the city of Newcastle. This beach is 31.8km in length and extends from Birubi Point in the north in a long sweeping arc, initially heading west then gradually swinging round to the south west and in the last few kilometres to the south. For most of its length the beach is exposed to the high waves and wind from the south. The waves have delivered masses of Hunter River sand to the beach, which has then blown for up to 3km inland, building a massive coastal dune system (Short, 2007).

Biodiversity

The Port Stephens Coastal Zone supports a diverse range of species and their habitats. Over 200 fish species including the Critically Endangered grey nurse shark and the Vulnerable great white shark and black rock cod inhabit The Port Stephens Great Lakes Marine Park (Marine Park). The Marine Park supports 3 marine turtle species, hawksbill, loggerhead and green turtles, all of which are listed as threatened species under Commonwealth and State legislation. These species use the habitat as juveniles and adults to bask and feed.

The Marine Park is home to more than 90 resident bottlenose dolphins. Offshore, it is common to see large common dolphin pods. Up to 1,000 individuals have been recorded in a single pod. Large numbers of humpback whales visit during their north and south migrations. Southern right whales, sei whales, fin whales and the blue whale have also been recorded. Therefore whale and dolphin watching is a popular activity in the area. There are a number of local charter operators that run tours to view the animals, including by kayak.

The Port Stephens estuary is important shorebird habitat with 3000 birds across 31 different species surveyed in 2013. Beach Stone Curlews, which are listed as Critically Endangered in NSW legislation, Australian Pied Oystercatchers (Endangered in NSW) and 30 Sooty Oystercatchers (Vulnerable in NSW) have all been recorded in the area.

Significant shorebird roosting locations include the wetlands, sand flats, beaches and oyster racks of;

- Jimmys Beach
- Winda Woppa Point
- Corrie Island
- Pindimar Bay (amongst ship wrecks)
- Tahlee
- Karuah River
- Fenninghams Island
- Shoal Bay
- Salamander Bay
- Wirrung Island
- Swan Bay
- Oyster Cove
- West Tanilba Bay
- Cromarty Bay
- Mud Point
- Mud Island
- Tilligerry Creek

Port Stephens has the second most extensive seagrass beds in NSW, covering over 1000 ha (SoE, 2016). *Posidonia Australis* has been listed as *Endangered Populations* under the Threatened Species Schedules of the *NSW Fisheries Management Act 1994* in certain areas within NSW; however populations of *P. Australis* within Port Stephens are not currently

included in this listing. The *P. Australis* seagrass meadows of the Manning-Hawkesbury ecoregion are also listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). There has been some destruction of seagrass throughout the Port since European settlement, mainly due to boating activities including moorings, marine sand inundation changes in water quality and other activities affecting the waterways such as dredging and reclamation.

A number of species in the Port Stephens catchment are classified as part of endangered populations under the *Biodiversity Conservation Act 2016*. One of the most significant species is the koala, which is currently classified as vulnerable to extinction. Port Stephens has been identified as one of the richest koala sites in the state containing prime habitat which supports one of the state's last viable populations. (Port Stephens Council, 2002).

4.2 Social Context

The desire to live in a beautiful and pristine natural environment has been a key driver of the "sea change" phenomenon for many years now. Increasingly, advancements in technology are enabling flexible work arrangements leading to decisions about where to live being driven less by work location, and more by lifestyle considerations.

The estimated resident population of the Port Stephens LGA in the 2016 census was 69,555, with populations predicted to increase to approximately 91,000 people in 2036 (Figure 6). Port Stephens is also attractive to retirees, the population statistics show that seniors (65+) represent approximately 20% of the Port Stephens population compared to 15% in greater NSW figures. Approximately 40% of the population is aged 50 years and over (REMPLAN, ABS 2016).

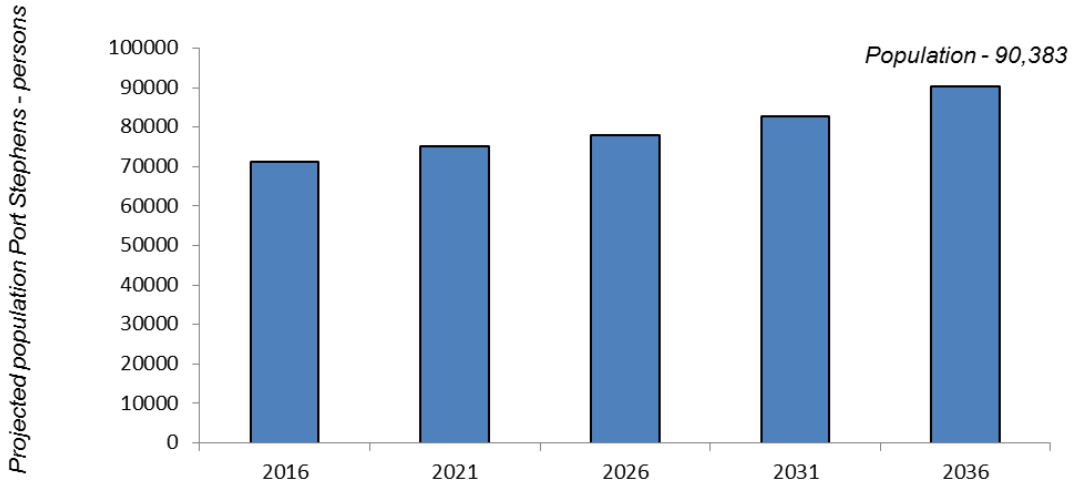

Figure 6 Population growth forecasts for Port Stephens to 2036. Population is predicted to increase to approximately 91,000 people (+33%) by 2036. Estimated growth rate is around 1.4% per year over a 20 year period (ABS 2016).

The main population centres on the southern shoreline of Port Stephens are Shoal Bay/Nelson Bay and Salamander Bay/Soldiers Point, although the entire southern shoreline of the outer port is fairly intensively developed. The area sees a substantial influx of visitors at various times of the year primarily the September, December and March school holiday periods. In

2016-17 Port Stephens LGA welcomed 1.31 million visitors to the area, including 655,000 overnight visitors and 620,000 day trippers (Port Stephens 2016/17 Tourism Monitor).

The majority of the northern shoreline is undeveloped. The main population centre is Hawks Nest/ Tea Gardens on the lower Myall River with a population of 4,114 (ABS 2016 Census data). The population expands to over 9,000 people in peak summer holiday periods (Umwelt Pty Limited, 2009).

Statistics from the National Visitor Survey results show that of the 640,000 overnight domestic visitors to Port Stephens in 2012, the majority in engaged in activities at the beach, foreshores, and town centres (Figure 7). There is also vast anecdotal evidence for day trippers coming to Port Stephens to engage in beach activities, fishing, surfing and scuba diving. Such results show the principal attraction for visitors is the coastal environment of Port Stephens, and confirms that foreshores are a major attraction for visitors and most activities require the use of a foreshore facility (e.g. boat ramps, beach access including jetties and pathways, and parking).

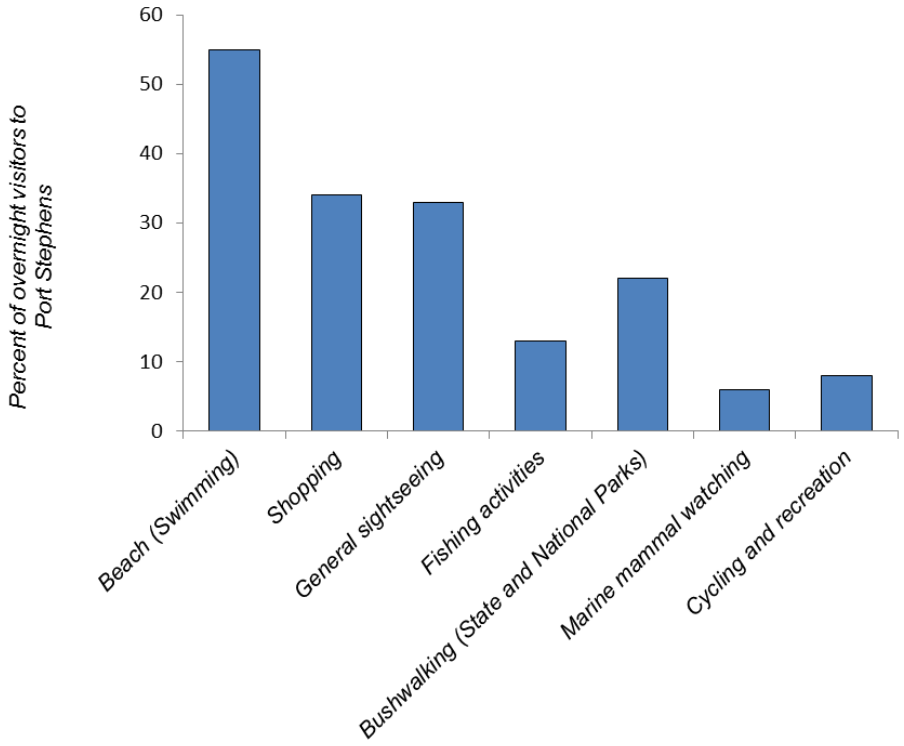

Figure 7 Overnight visitors to Port Stephens in 2012 engaged in a range of activities including, bushwalking, beach activities and general sightseeing (National Visitor Survey Results).

Cultural Heritage

Council recognises and values the role that culture plays in helping to create vibrant and healthy communities and the Port Stephens Cultural Plan 2015–2018 clearly articulates Council's commitment to ensuring access to and participation in local cultural activity. At the core of Council's involvement in cultural business are the arts and creativity, Aboriginal culture, heritage and history, architecture and design, festivals and events. Historic heritage places that are included in the NSW and local government heritage lists are also highlighted in the Port Stephens LEP. Omissions from these lists are a number of historic shipwreck sites including the Sygna, HMAS Psyche, Patterson (Winda Woppa).

Aboriginal culture and heritage

Port Stephens is the land of the Worimi Nation. The Port Stephens Aboriginal community is represented by the Worimi Local Aboriginal Land Council (LALC), Worimi Traditional Elders and Owners Groups, and the Karuah LALC. Over the last number of years a strong relationship has been formed between PSC and the Worimi Traditional Owners. This relationship has seen the recognition of a number of significant Aboriginal Sites (objects) and Aboriginal Places[3] (Feary 2015).

The coastal zone includes an extraordinary number of Aboriginal cultural sites that pre-date the arrival of non-Aboriginal people to the area. Port Stephens and the wider region is home to numerous sites of deep cultural significance, from the area now known as the Worimi Conservation Lands of the Stockton Bight to significant relic sites, including canoe trees at Little Beach. In the area stretching from Wallis Lake to Newcastle there are 37 recorded Ceremonial Sites (stone arrangements, bora grounds, carved trees and burial sites), 115 recorded campsites (mia mia, scarred tree, open campsite, shelter with deposit, well, fish trap, abraded grooves and quarries) and 97 middens. Middens are located at Yacaaba Head, Fingal Spit, Anna Bay, Schnapper Point, Boat Harbour, Skate Bay and Fishermans Bay as well as the 3.2km swale area on Stockton dunes that contains a complex suite of culturally significant middens (WCL Plan of Management). There is a repatriation site at Yacaaba Head, burial site at Skate Bay and grinding grooves at Morna Point.

In the Port Stephens Coastal Zone the Soldiers Point Aboriginal Place Plan of Management was gazetted in June 2016 and the Birubi Point Aboriginal Place Plan of Management was gazetted in 2018. These two documents are two of such recognised places in the Port Stephens coastal zone, and 114 throughout NSW. These documents seek to provide a clear and transparent management framework in line with the requirements under the Local Government Act 1993 and also the requirement of the NSW National Parks and Wildlife Act 1974 as an Aboriginal Place. The declaration of Soldiers Point and Birubi Point as Aboriginal Place's within the coastal zone will recognise the history and connection to the land as well as enabling the ongoing future use, development and maintenance of the area to be compatible with the cultural significance of the Place.

Military History

Port Stephens also has a strong military history both written and in visible military sites and infrastructure. These include the Stockton Rifle Range, Tomaree Headland Gun Emplacement, and Gan Gan Army Camp.

4.3 Economic Context

Lifestyle attributes and the relationship to the natural environment underpin the economy of the Port Stephens area. There has been a steady change in the economic character of the Port Stephens and Great Lakes regions. The traditional manufacturing, agriculture, logging and fishing industries have been steadily declining while the cultural and recreational industry has experienced very strong growth (Umwelt Pty Limited, 2009). Of the 27,346 people working in the Port Stephens LGA, Public Administration & Safety (includes defence) is the

[3] An Aboriginal Place is defined in the NSW National Parks and Wildlife Act 1974 (NPW Act) as a place that 'is or was of special significance with respect to Aboriginal culture'.

largest employment sector with 4,034 jobs (19%); followed by Manufacturing, 3,225 jobs (16.9%) and construction, 3,119 jobs (11%).

Agriculture, Forestry and Fishing accounted for 376 jobs (ABS 2016; Port Stephens Council REMPLAN, 2016) and Port Stephens is one of the key ports for commercial fishing. The various types of fisheries that operate in the Port Stephens-Great Lakes Marine Park include; fish and prawn trawling, beach hauling, purse seining, line fishing, trapping (fish, crab, lobster, eel), hand gathering, and drop-lining, abalone diving, sea urchin and turban shell diving, estuary prawn netting and estuary mesh and haul netting.

One of the largest commercial fishing types in Port Stephens is beach hauling. One of the main target catches is Sea Mullet and this activity is visible both on the open coast and inside the estuary from March through to June each year. Sea mullet comprises the largest catch by weight of all species taken in commercial fisheries in NSW.

Aquaculture and the oyster industry within Port Stephens are relatively small in terms of economic activity compared with other sectors as described above. While not within the direct study area, Huon Aquaculture undertook a research trial of farming Kingfish in sea pens over two and half years between Cabbage Tree Island and Broughton Island. As of February 2019, the trial is being finalised with Huon retaining a commercial 62-hectare lease near the trial site but with no plans to farm it for the foreseeable future (Huon - Media Release 5 February 2019). The moorings and marker buoys are to be removed from the trial site and pens, nets and other equipment will be cleaned, disinfected and taken to Tasmania. Kingfish farming represents a relatively new potential coastal use within the Port Stephens and MidCoast region with associated risks and benefits. The Huon trials were monitored by DPI – fisheries and are understood to have had no significant impacts of seafloor ecology or water column chemistry. Council will work with DPI – Fisheries throughout the development and implementation of the Program to ensure any future aquaculture operations within the region are appropriately managed. Council will also consider the NSW Marine Waters Sustainable Aquaculture Strategy which aims to address the risks of suitable site selection, design, operation and both environmental and community impacts.

The 2018 Business Health Check asked business owners to rate lifestyle attributes on their importance. The natural environment was rated second behind community safety, clearly demonstrating the value the community places on the environment.

In 2016 Port Stephens tourism generated over $433 million for the local economy (REMPLAN, 2016-2017 ABS). This nature-based visitation drives the economy of the area, providing business opportunities and employment for much of the local population. Tourism contributes $156.59 million value-added to the local economy and tourism related employment accounts for 1,669 jobs or 7.4% of the total 22,689 jobs in Port Stephens with 69.6% of this employment (1,162 jobs) in accommodation & food services, and 12.4% (207 jobs) in retail (Port Stephens Council Remplan, 2016).

The Stockton sand dunes currently supplies the majority of sand used in the NSW glass manufacturing industry and is a major source of construction and foundry sand for the Sydney and Hunter markets (Umwelt, 2009). The Stockton sand dunes are also a tourism destination but while there is no specific data for the income generated from this tourism REMPLAN shows that visitor expenditure per dollar in order in Port Stephens is accommodation and food($0.54), transport ($0.21), retail trade ($0.07) and $0.02 spent on arts and recreation. This would include activities undertaken within the Stockton sand dune area.

5. Planning Context

5.1 Legislation

The key NSW legislation specifically targeting the coastal zone is the:

- *Coastal Management Act 2016* (**CM Act**): The CM Act establishes the framework and overarching objectives for coastal management in NSW which focuses on strategic, integrated and ecological sustainable management of the NSW coastal zone.
- State Environmental Planning Policy (Coastal Management) 2018 (**Coastal Management SEPP**): updates and consolidates into one integrated policy SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection) and divides every part of the 'coastal zone' into one of four management areas. (See Section 9)
- *Marine Estate Management Act 2014* (**MEM Act**): provides for strategic and integrated management of the whole marine estate – our marine waters, coasts and estuaries.

In addition, a number of key Commonwealth and NSW legislation supports the delivery of coastal management (Table 4);

Table 4 State and Federal legislation that supports the delivery of coastal management.

Commonwealth	Environment Protection & Biodiversity Conservation Act 1999
	Native Title Act 1993
	Aboriginal Land Rights Act 1983
NSW	Environmental Planning & Assessment Act 1979
	Protection of the Environment Operations Act 1997
	Local Government Act 1993
	Crown Land Management Act 2016
	Fisheries Management Act 1994
	National Parks and Wildlife Act 1974
	Water Management Act 2000
	Water Act 1912
	Natural Resources Management Act 2004
	Biosecurity Act 2015
	Biodiversity Conservation Act 2016
	Local Land Services Act 2013
	NSW Heritage Act 1977
	Marine Parks Act 1997
	Marine Safety Act 1998
	Marine Safety Regulation 2016

5.2 Roles and Responsibilities

The coastal zone is owned and/or managed by a number of different government agencies, private individuals, and other organisations (an outline of the Roles & Responsibilities of each agency is located in Appendix 15.4)

The land below the mean high water mark is under the care and control of Department of Industry – Lands & Water (Crown Lands) and Marine Parks; and in Stockton Bight the Worimi Conservation Lands are managed through an MOU with Worimi LALC and National Parks and Wildlife Service (Figure 8).

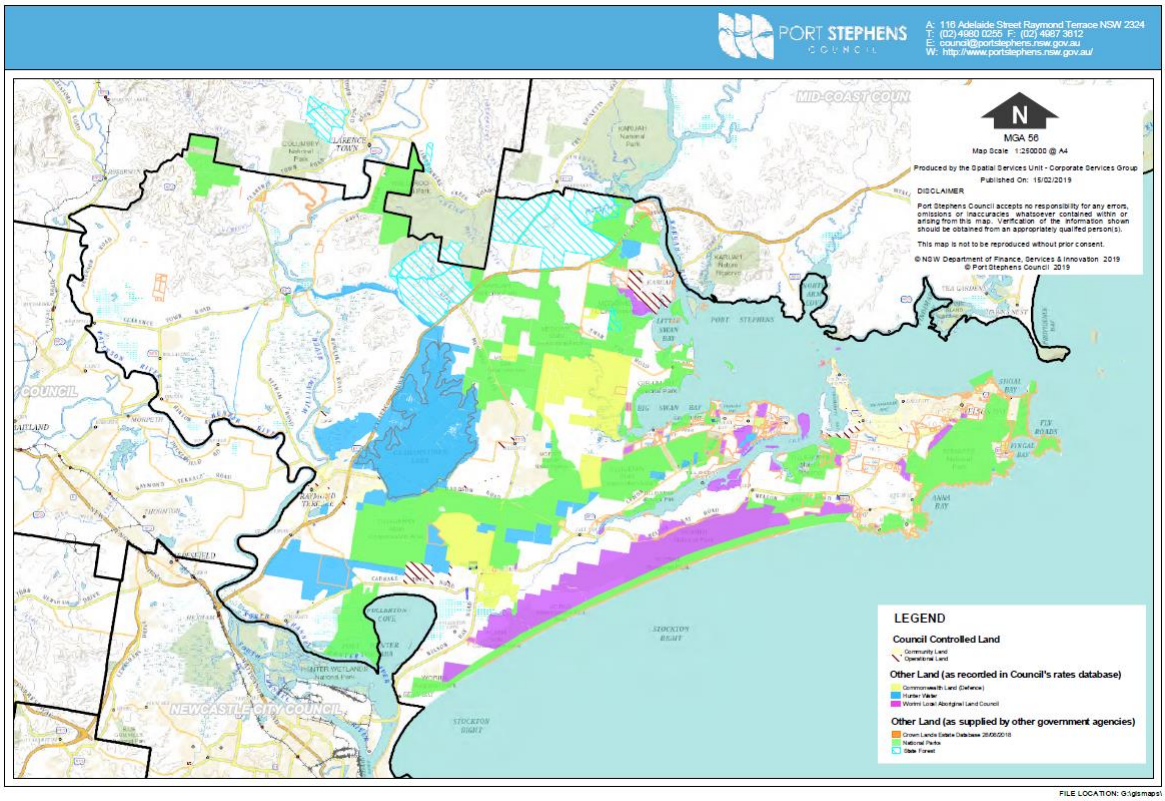

Figure 8 Map showing Land Tenure and Management Areas within the Port Stephens LGA.

Marine Parks

Marine protected areas are parts of the NSW marine estate managed to conserve marine biodiversity and to support a broad range of activities including marine science, recreation and education. Marine parks include a variety of habitats stretching from the beaches and headlands of our coastline to 3 nautical miles (about 5 km) out to sea.

Marine protected areas operate by regulating activities in a prescribed area and implementing a range of non-regulatory programs that together aim to reduce the threats and risks to biological diversity, and/or meet community values of scientific research, public appreciation and enjoyment and/or Aboriginal cultural uses.

There are six marine parks in NSW which are declared and managed under the Marine Estate Management Act 2014 by NSW Department of Primary Industries. The Marine Park relevant for the Port Stephens coastal environment is the Port Stephens-Great Lakes Marine Park (PSGLMP). On the 1 December 2005 the NSW Government declared the Port Stephens - Great Lakes Marine Park. The aim of the park is to preserve marine habitats, biological diversity and ecological processes. Proposals for development within, or adjacent to, the marine park must be assessed under marine estate and planning legislation (see below) and a marine park permit may be required.

The park includes all offshore waters to the 3 nautical mile limit of state waters between Cape Hawke Surf Life Saving Club near Forster to the Birubi Beach Surf Life Saving Club and all estuarine waters of Port Stephens and the Karuah River, the Myall River, Myall and Smiths Lakes and all of their creeks and tributaries to the limit of tidal influence. It is the largest marine park in NSW covering approximately 98,000 hectares.

The PSGLMP Operational Plan 2010 combined with operational policy and guidelines are used to inform decision making, which includes:

- Policy statement - Marine protected areas within the NSW marine estate, their role and purpose
- Marine Parks Permits policy
- Aboriginal Engagement and Cultural Use of Fisheries Resources policy
- Mooring and Anchoring policy
- Artificial Reefs and Fish attracting devices in NSW marine parks policy
- Policy and guidelines for fish habitat conservation and management

Sanctuary zones within Marine Parks provide the highest level of protection for habitats, animals and plants, ecological processes, natural features and areas of cultural significance by allowing only activities that do not harm plants, animals or habitats. Many recreational activities can be conducted in sanctuary zones including guided tours, boating, surfing, snorkelling, diving and permitted research and educational activities.

The study area comprises the following PSGLMP sanctuary zones:

- Fingal Island
- Cabbage Tree Island
- Zenith Beach
- Fly Point - Corrie Island
- Jimmys Beach
- Salamander Bay
- Cromartys Bay
- Wallis Creek and Fenninghams Island Creek
- Mallabula
- Twelve Mile Creek
- Little Swan Bay
- Karuah River
- Little Branch Creek
- Number One Cove
- North Arm Cove
- Pindimar
- Fame Cove

Worimi Conservation Lands

The 4200-hectare Worimi Conservation Lands located in the Stockton Bight is managed by the local Worimi Traditional Owners, in partnership with the NSW National Parks and Wildlife Service. The Worimi Conservation Lands Board of Management released their formal ten-year management plan in 2015 to improve awareness, understanding and protection of Worimi culture and sites, and guide conservation and sustainable recreation and tourism. Therefore, the Worimi are key land holders and managers who ensure the protection of the natural and cultural values of the coastal zone. The WCL comprises a national park, state conservation area and regional park. The NPW Act sets out the management principles for each reserve category.

Co-management relationships will need to be established with the Worimi LALC and PSC in regard to the Coastal Management Program implementation especially concerning Aeolian sand inundation around the Stockton dune system. Stakeholder engagement will continue in Stages 2 and 3 of the Program.

5.3 Planning instruments

Hunter Regional Plan 2036

The Hunter Regional Plan (HRP) will guide the NSW Government's land use planning priorities and decisions over the next 20 years. Two of the four goals in the HRP are to achieve “a biodiversity-rich natural environment” and “thriving communities” both of which are aligned to the objectives of the Coastal Management Program. The HRP is intended to provide an overarching framework to guide subsequent and more detailed land use plans, including but

not limited to: local strategies, local environmental plans, development control plans, planning proposals, development proposals and infrastructure funding decisions.

One of the regional priorities is to leverage to major global gateways – and its attractive and valuable natural environment and coastal and rural communities – to generate economic growth and diversity.

Greater Newcastle Metropolitan Plan 2036

The Hunter Regional Plan 2036 set the vision for the Hunter to be the leading regional economy in Australia with a vibrant new metropolitan city at its heart. The Greater Newcastle Metropolitan Plan (GNMP) delivers a collaborative framework for a significant part of the Regional Plan by setting out the outcomes and strategies to be an integrated metropolitan city. The Metropolitan Plan provides the strategies and actions to deliver on the vision, create great places across Greater Newcastle and align infrastructure and services in catalyst areas.

Aboriginal Land Rights Act 1989

The Worimi LALC is the applicant for Aboriginal Land Rights Claims under the ALR Act 1989. The Worimi LALC first made a number of land claims under the NSW Aboriginal Land Rights Act 1989 over Crown land at Stockton Bight in the 1990s. There are currently many outstanding claims from Worimi LALC over the Port Stephens LGA. Should land claims from Worimi LALC result in areas incorporated into the WCL in the future this could likely result in management collaboration between PSC and Worimi LALC in regard to Coastal Management Program implementation.

Port Stephens Planning Strategy

The Port Stephens Planning Strategy is the overarching land use strategy for the local government area providing future direction for Port Stephens over a 25 year period. The Strategy was adopted by Council on 20 December 2011 and provided a rationale for the land use planning policies that were included in the Port Stephens Local Environmental Plan 2013 and the Port Stephens Development Control Plan 2014.

Local Strategic Planning Statement

Council is currently developing a Local Strategic Planning Statement that will repeal the PSPS while also providing a new direct link between the HRP and GNMP and Council's IP&R Framework. This will also include the development of the Port Stephens Liveability Index (PSLI). Values and characteristics identified in surveys relating to the PSLI will be used to create character statements which could align with the values and characteristics identified for the Coastal Management Program.

Local Environment Plans

The aim of the Port Stephens Local Environmental Plan 2013 (LEP) is to provide the statutory framework for planning within the Port Stephens local government area. It provides planning and environmental control over the use and development of land, and waterways within the Port Stephens local government area. Under the Environmental Planning and Assessment Act 1979, Council has responsibility for identifying the area's heritage assets and protecting them through environmental planning instruments. Port Stephens Local Environmental Plan 2013, Schedule 5, identifies items of heritage significance, heritage conservation areas and archaeological sites. This ensures significant heritage is identified, protected and managed,

allowing the environmental, social and economic benefits of these valuable assets to be retained into the future.

Within the MidCoast local government area, the lands and waterways potentially affected by the Port Stephens Coastal Management Program are currently regulated by Great Lakes LEP 2014.

Following the merger of Gloucester, Great Lakes and Greater Taree Councils in 2016, MidCoast Council is undertaking significant strategic work to prepare new local strategies, local strategic planning statements which will inform the preparation of a new MidCoast LEP that will replace the existing LEP/s.

MidCoast Council LEP is currently being updated and amended to reflect the amalgamation between Great Lakes Council, Gloucester and Taree Council.

Development Control Plans

The aim of the Port Stephens Development Control Plan 2014 (DCP) is to provide further guidance to facilitate development in accordance with the LEP. The DCP applies to all developments requiring development consent in accordance with Part 4 *Development Assessment of the Environmental Planning and Assessment Act 1979 (EP&A Act).*

Within the MidCoast local government area, the lands and waterways potentially affected by the Port Stephens Coastal Management Program are currently subject to the objectives and controls of the Great Lakes Development Control Plan.

Following the merger of Gloucester, Great Lakes and Greater Taree Councils in 2016, MidCoast Council is undertaking significant strategic work to prepare new local strategies, local strategic planning statements which will inform the preparation of a new MidCoast DCP that will replace the existing DCP/s.

To effectively manage the coastal zone clear and consistent management direction, guidance and information must exist at every level with established feedback loops. As a result the Coastal Management Program will provide additional guidance for development approvals, LEPs and DCP when working and developing in the coastal zone.

Marine Estate Management Strategy

The Marine Estate Management Strategy 2018-2028 (the Strategy) is a first for NSW and is the centrepiece of the marine estate reforms. The Strategy is a requirement of the Marine Estate Management Act 2014 and sets out the vision and principles for the management of the marine estate.

The Strategy has nine interlinked management initiatives supported by detailed actions that address the priority and cumulative threats to the marine estate over the next ten years. It outlines how these threats to community benefits will be managed.

The Strategy was developed by the Marine Estate Management Authority (the Authority) with input from key stakeholders and the broader community. It reaffirms the NSW Government's commitment to holistic management of the marine estate as a single continuous system.

<u>Statewide threat and risk assessment</u>

The Strategy is underpinned by the comprehensive, evidence-based NSW Marine Estate Threat and Risk Assessment Final Report (Statewide TARA).

The Statewide TARA found that the greatest threats to the environmental assets of the marine estate were:

• Urban and rural water pollution or run off

• Climate change (over a 20-year outlook)

• Disturbance to habitats and species from estuarine entrance modification, harbour maintenance, foreshore development, wetland drainage and other works.

The greatest threats to social, cultural and economic benefits were primarily associated with water pollution and a general lack of social, cultural and economic information, lack of compliance with regulations and lack of access to the marine estate. Cumulative threats were also assessed.

The Statewide TARA identified five cumulative threats (in no priority order):

• Multiple threats to estuarine water quality

• Climate change (over a 20-year outlook)

• Multiple threats to Aboriginal cultural heritage

• Multiple threats to marine wildlife

• Multiple threats to fish assemblages.

While there are some differing priorities between the Strategy and the Coastal Management Program, the initiatives of the Strategy should be considered by Council and collaboration with MEMA to achieve mutual goals may be required.

6. Integrated Planning & Reporting Framework (IP & R)

Local government serves a two-fold purpose. The first is the administrative purpose of supplying goods and services; the second is to represent and involve citizens in determining specific local public needs and how these local needs can be met.

Integrated Planning and Reporting (IP & R) gives local governments a framework for establishing local priorities and to link this information to operational functions. Three parties are involved in the development of an integrated plan; the local government administration, the Council and the community. Each party has a unique role and responsibilities for effective and sustainable integrated planning and reporting, with the Local Government (Administration) Regulations 1996.

The Integrated Plans comprise of the Community Strategic Plan, Council's Delivery Program and Operational Plan. See Figure 9.

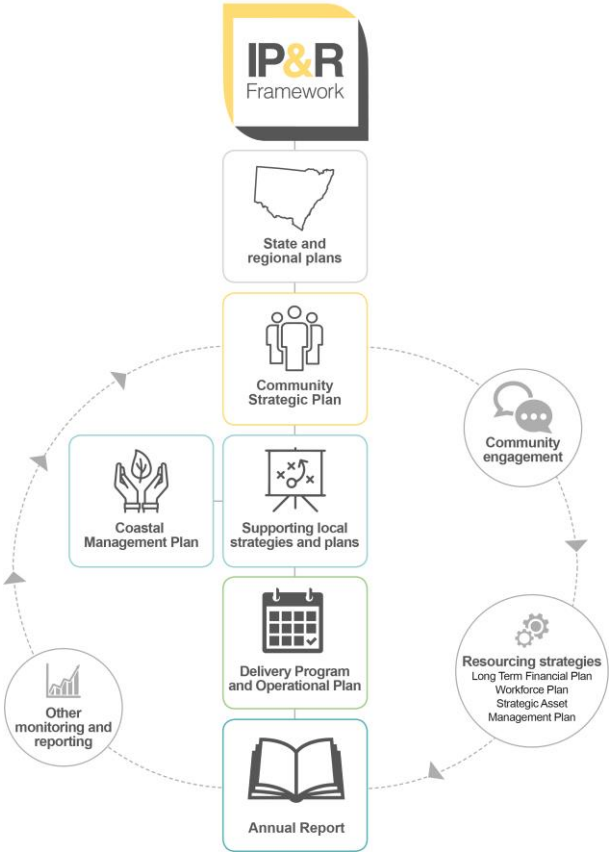

Figure 9 IP & R Framework

The Community Strategic Plan sets the longer term vision of where our community wants to go.

- Identify community aspirations and priorities over the next ten years
- Outline Council's role in delivering these priorities
- Work with other governments and agencies to achieve our community's priorities
- Provide for community participation in decision making
- Provide a basis of accountability and consistency in reporting

For the purpose of this exercise, we envisage the Coastal Management Program sitting with other Strategic Plans in the integrated framework for both Port Stephens and MidCoast Councils.

The Delivery Program sets out Council's objectives for the next 3 years to assist in achieving the Community Strategic Plan Key Directions. The Delivery Program is reported on every six months.

The Operational Plans include actions that Council will undertake to implement its Delivery Program, and which area of Council is responsible for implementing each action and what we deliver. Operational Plans are annual with budgets and includes fees and charges.

The Coastal Management Program has been nominated as a key priority for the period of 2018-2021 within the key delivery program objectives of both Councils;

Port Stephens Council;

E3.1 Encourage community resilience to coastal hazards.
P3.1 Provide land use plans, tools and advice that sustainably support the community
E1.1 Protect and enhance the local natural environment.

MidCoast Council; for the period 2018 – 2021 within the Key delivery program objective:

7.2 Ensure Climate change risks and impacts are understood and managed.

The Strategic Asset Management Plan (SAMP) provides a framework to help us manage current and future Council assets so that appropriate services are effectively delivered to the community now and in the future. Legislation requires that the SAMP is for a minimum 10 year period and that it is reviewed and rolled over annually. This asset base includes traditional asset infrastructure such as roads, footpaths, buildings and drainage as well as assets which are unique to coastal councils such as seawalls, surf clubs, lifeguard towers, wharves and jetties.

6.1 Policies

A policy is a set of basic principles and associated guidelines to direct actions that align with endorsed long-term goals. The policies that are relevant to the management of the coastal zone are set out in Table 5 below;

Table 5 Policies relevant to the coastal zone.

Port Stephens Council	MidCoast Council
• Floodplain Risk Management Policy	• On-site Sewage Management Policy
• Environment Policy	• Storm water Management Policy
• On-site Sewage Management Policy	• Vehicles on Beaches Policy
• Erosion & Sediment Control Policy	• Planning Proposal and Development Control Plan Application Policy
• Local Weed Prioritisation Policy	• Building Near Water and Sewer Services Policy
• Tree Vandalism Policy	• Environmental Policy (Water Services)
• Dinghy Storage Policy	• Rural Residential Sewerage Policy
• Commercial Operators Policy	• Vegetation Vandalism Policy
• Heritage Policy (indigenous & European)	• Draft Policy to account for Climate Change (2008)

7. Monitoring

Healthy waterways and catchments are vital systems that keep our coastal communities thriving, and ensure a healthy and vibrant future. Monitoring of the health of our waterways is undertaken for a variety of purposes.

MidCoast Council in partnership with OEH monitors the ecological health of the Myall and the Karuah Estuaries every year (September – March) and this is presented in the MidCoast Waterway and Catchment Report Card. Since 2004 Beachwatch by OEH have monitored Enterococci levels. Eleven swimming sites across the PSC LGA are sampled weekly between October and April. Monitoring of faecal coliforms and E. coli is undertaken through the Shellfish

Quality Assurance Program. Office of Environment and Heritage surveys locations in the inner and outer port, and Tilligerry Creek every 3 years as part of a state-wide estuary ecosystem health monitoring program.

The water quality monitoring results are heavily influenced by the amount of rainfall both locally and within the catchment. The more rain the more runoff resulting in greater quantities of sediment and nutrients entering our waterways and lower water quality. The 2017/2018 sampling period for both Beachwatch and the Catchment Report Card coincided with an extended dry period resulting in good water clarity due to the minimal amount of catchment runoff entering the estuary.

Further discussion regarding water quality results is contained within Appendix 15.2.

Regular monitoring of erosion of recession rates is currently undertaken, as is monitoring of fish assemblages, sharks, water temperature and salinity and marine and estuarine habitats by a range of government agencies. Monitoring data of the NSW coast is also collected by OEH for photogrammetric analysis. The database collates and presents aerial survey data of NSW from the 1930's from historical aerial photography and now uses modern technology including drone surveying and LiDAR (Light Detection and Ranging). Data available for Port Stephens includes Stockton, Shoal Bay, Tanilba Bay and Jimmys Beach.

Department of Primary Industries also undertakes regular monitoring in collaboration with other State agencies, CSIRO and universities including University of Newcastle. The projects are in a number of stages from completed to active, and data is regularly published in scientific paper and journals. The projects include sand movement research, monitoring of rocky reef fishes, white shark monitoring, climate change research and research on estuarine sanctuary zones and seagrass habitats. All data could be useful for further stages of the Coastal Management Program.

DPI is also undertaking a range of social research projects with universities. These studies focus on the relationship and social impacts of marine parks, coastal conservation and socio-ecological values which could feed into PSC's community engagement plan.

Even with the above examples, monitoring of the Port Stephens coastal environment is relatively limited and can be improved to aid in effectively managing the coast. Currently monitoring undertaken does not cover all potential threats to coastal management areas and in some areas adds to the level of uncertainty regarding existing and future coastal hazards. The coastal management program will recommend ongoing monitoring requirements that will allow assessment of management actions on the coast and facilitate ongoing improvements in future iterations of the Coastal Management Program.

8. Climate Change

The breadth of potential impacts due to climate change is significant for coastal areas and necessitate that they be considered in coastal adaptation and management responses. The impacts of sea level rise are of particular relevance to Port Stephens given the prevalence of low lying areas.

Port Stephens Council undertook a vulnerability assessment of its operations to determine future climate change through the Port Stephens Councils Climate Change Risk Assessment which preceded the development of an Adaptation Action Plan. The Adaptation Action Plan

details the adaptation actions for the high priority climate change risks to Port Stephens Council.

The Climate Change Risk Assessment investigated the following parameters under a climate change scenario;

- Sea level rise (Upper range: 0.91m sea level rise by 2100, Lower Range 0.49m sea level rise by 2058 relative to 1990 mean sea level.)
- Changes to annual rainfall;
- Changes to storm frequency and intensity;
- Changes to average temperature and;
- Changes to the number of hot days per year.
  (Haines et al. 2009)

In May 2009 Port Stephens Council adopted a sea level rise planning benchmark of 0.91m for the year 2100 from 1990 mean sea levels with an assumed linear increase from present day levels. In 2010 (the former) Great Lakes Council adopted the NSW Sea Level Rise Policy Statement (now removed) benchmarks of 0.4m and 0.9m rise above 1990 mean sea level by 2060 and 2100 respectively. At the time of writing, the now MidCoast Council continues to use these widely accepted projections. These projections have been adopted for the first-pass risk assessment (this study) however Council recognises that a range of potential future scenarios exists regarding sea level rise, physical impacts and changes to the coast, and impacts of climate change. When identifying and assessing the viability of potential future management options (Stage 3) Council will consider the sensitivity to change and relative vulnerability of different social, environmental and economic values of the coast. Should impacts that are worse than those assumed from the adopted scenarios eventuate, implementation of management responses would be expected to be required sooner than initially anticipated.

Throughout future phases of the coastal management program revision, updated data regarding projected climate change impacts will be incorporated to ensure management responses are appropriate given the expected ongoing evolution of coastal risk understanding.

9. Coastal Management Areas

All four coastal management areas (CMA) as defined under the Coastal Management SEPP are applicable to the issues that will be of focus for the Coastal Management Program. This study has identified a wide range of threats, management challenges, and priority values that align with both the coastal management areas, and Port Stephens areas of consideration (Figure 4).

We have also looked at past actions to help better achieve outcomes from the Coastal Management Program (Section 9.5). Port Stephens Council has endorsed and implemented a number of management plans; however the complex nature of the coastal zone and lack of resources has meant there are in some circumstances outstanding actions related to current management. Council will use these as a basis to learn from for future stages of the Coastal Management Program.

Coastal Threats Definitions

An overview of the key threats to the Port Stephens Coastal Zone can be found below (Table 6). These threats were determined through the review of existing coastal management documents such as the *Estuary Management Plan and Foreshore Plan*, and through

discussion with stakeholders using internal and external workshops with agency staff and the Port Stephens / Myall Lakes Estuary and Coastal Zone Consultative Committee. These threats are considered the primary drivers of key coastal management challenges for the Port Stephens Coastal Zone. Threats can be unique to the coastal zone or originate from activities within the catchment.

Table 6 Key Coastal Threats

Threat	Description	Stressor
Beach Erosion	The wearing away of sand material by wave action, tidal currents, and/or stormwater drainage that generally returns over time.	Physical disturbance, water pollution
Shoreline Recession	A net landward movement of the shoreline.	Physical disturbance, water pollution
Inundation (tidal, coastal and estuary)	Temporary and permanent flooding of a portion of land by seawater within the coastal zone through tides, waves, and/or catchment influences.	Flooding, water pollution
Aeolian Sand Inundation	Movement of sand by the wind over an area to smothering existing landscape / asset.	Physical disturbance
Marine Sand Inundation	Movement of marine sand by currents, tides and wave action.	Physical disturbance
Cliff or Slope Instability	-	Physical disturbance
Land contamination	Substances in or under the land as a direct or indirect result of human activity that are potentially hazardous to human health or the environment, this includes illegal dumping (Asbestos, building waste) and per- and poly-fluroalkyl substances (PFAS).	Water pollution
Urban stormwater	Chemical and biological inputs including influxes of freshwater and sediment from public and private properties within urban areas.	Water pollution
Agricultural run off	Adverse water quality inputs (sediment, fertiliser etc.) from poor rural land and river management practices including gravel roads and creek crossings.	Water pollution
Failure of Onsite Sewage Management Systems (OSMS)	Transport of pollutants offsite from OSMS.	Water pollution
Acid Sulphate Soil run-off	Oxidation of acid sulphate soils, leading to discharges of low pH water into the estuary	Water pollution
Point source discharge	Discharge from marinas, slipways, boating (black water), sewage infrastructure (treatment plants, pump stations and pipes), industry and aquaculture.	Water pollution
Marine debris	Littering and gross marine debris from both direct deposition, urban stormwater and boating	Water pollution, wildlife disturbance

Biosecurity threats	Weeds, pests and disease	Marine & terrestrial habitat loss
Land Clearing	The legal and illegal clearing of native vegetation for development, agriculture, views and public safety.	Marine & terrestrial habitat loss
Boating Pressures	Infrastructure (moorings, availability & suitability of facilities), behaviour (anchoring procedures, antisocial behaviour).	Physical disturbance, water pollution, wildlife disturbance
Encroachment onto Public land	Private infrastructure and management that extents onto public land (seawalls, boat ramps, stairs gardens etc.)	Physical disturbance, loss of access
Mining & Extractive Industries	Sand Mining Fishing	Physical disturbance, water pollution Resource depletion

9.1 Coastal Vulnerability Area

The land identified by the Coastal Management SEPP to be the coastal vulnerability area for the purposes of the CM Act, is land subject to coastal hazards. At present, no Coastal Vulnerability Map has been adopted in the SEPP and therefore no coastal vulnerability area has been formally identified. Coastal hazards are defined in s4 (1) of the CM Act; those that are applicable to Port Stephens are listed below (also see Table 6).

- Beach erosion
- Shoreline recession
- Coastal inundation (including tidal inundation)
- Coastal cliff or slope instability
- Erosion and inundation of foreshores caused by tidal waters and the action of waves, including the interaction of those waters with catchment floodwater
- Aeolian Sand Inundation[4]

The potential for coastal hazards to have a negative impact on the coastal character of the study area is significant. Port Stephens has the highest number of properties within 55m of soft shorelines and the second highest number of properties within 110m of soft shorelines in NSW (Figure 10; Department of Climate Change, 2009). However the level of detail available on the exposure and consequence of coastal hazards on natural and built assets is limited to inundation (including tidal, coastal and estuary inundation) and site specific information as outlined Table 7 in areas of erosion concern such as Jimmys Beach, Shoal Bay and Sandy Point, Corlette.

[4] Aeolian sand inundation has been added to the above list due to the existence of the Stockton Bight sand dune system. At 32km long and with dunes over 40m in height the area represents the largest moving sand dune system in the southern hemisphere. This offers a unique additional coastal hazard for consideration in Port Stephens as sand drift presents a significant management challenge for surrounding assets.

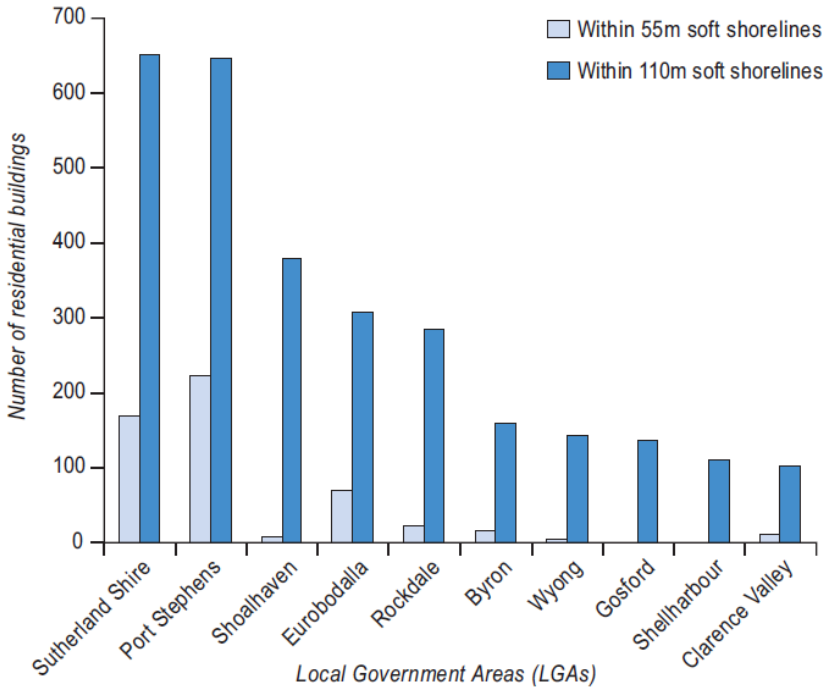

Figure 10 Number of residential buildings within close proximity to sandy shores in NSW (Dept. of Climate Change, 2009)

Additionally there is limited community awareness as to the current or future impact of coastal hazards. Reactionary public and private works and often unauthorised event based management has become common practice and in the past has led to examples of increased erosion pressures elsewhere. Greater understanding of the level of risk is required to develop proactive management responses to reduce the exposure of the coastal assets (built and natural) to coastal hazards.

Beach Erosion & Shoreline Recession

CoastAdapt is a decision support framework that is helping to deliver information and guidance in understanding the impacts of climate change and the responses available to manage these impacts. Recent CoastAdapt mapping has categorised the erodibility of the sandy shores along the open coast as very high, with hard rock shores classified as low. The majority of the area has a sensitivity rating of 4 in that it does not currently show evidence of long-term recession but is likely to begin receding with continuing sea-level rise. Areas of Fingal Bay have been identified as a 5 rating as documented historical shoreline shifts have demonstrated that shoreline recession is occurring now. The beach consists of a receded barrier on which tree stumps have been exposed following erosion at the western end (Thom et al, 1992). Event based beach erosion has been experienced across all open coast beaches.

Beach erosion and recession has been a high profile issue in the Outer Port of Port Stephens for many decades. Significant erosion has been experienced at Jimmys Beach, Shoal Bay and Sandy Point / Conroy Park (Umwelt Pty Limited, 2009). Historical changes such as the growth and destruction of the Myall Point / Winda Woppa spit indicate the vulnerable and dynamic nature of the Port's shoreline (Thom et al, 1992). The tombolo linking Hawks Nest to the headland has been overtopped by storm waves in historic times but has recovered into a

foreshore dune complex[5]. The CoastAdapt sensitivity rating for the Port Stephens Estuary is 4 indicating recession is likely to begin with sea-level rise. The active shoreline recession experienced by Jimmys Beach is recognised with a rating of 5. The introduction of the Sand Transfer System (back passing) solution to renourish the beach is expected to only be viable for the next 20 years, demonstrating the need for longer term solutions. Certified Coastal Zone Management Plans (CZMPs) exist for Jimmys Beach and Sandy Point / Conroy Park (refer to Section 9.5).

An overview of existing current management plans or strategies is contained within Table 7.

Table 7 Existing Management Tools for Beach Erosion & Shoreline Recession

Plan / Strategy	Overview	Agency
Tanilba Bay Foreshore Erosion Management Plan (2011)	Seeks to address foreshore erosion along Tanilba Bay between Sunrise Point and Rookes Point	PSC
Shoal Bay Coastline Management Study (1999)	Considers all feasible management options whilst also assessing the social, economic, aesthetic, recreational and ecological issues associated with land use of the area.	PSC
Sandy Point/Conroy Park CZMP – Foreshore Erosion and Drainage Management Plan (2016)	Seeks to address erosion issues through formalising ad hoc seawalls along the Sandy Point/Conroy foreshore to minimise impact to both public and private infrastructure.	PSC
Great Lakes CZMP (2016)	Covers the area immediately to the north of the study area. Implementation details for the recommended management actions for managing coastal risks in the former Great Lakes LGA. Targets assets at immediate risk from coastal hazards and references actions for managing community use and ecological health in the coastal zone of Great Lakes.	MCC
Jimmys Beach CZMP (2015)	Focuses on managing risk associated with coastal hazards, such as erosion, recession and wave overtopping. It aims to set out broad strategies for managing these risks in a timely and cost effective manner while maintaining the values that are important to the community. The CZMP includes an Emergency Sub-Management Plan which outlines potential public agency responses to significant erosion events.	MCC
Pindimar and Bundabah Foreshore Erosion Study (2011)	Findings of the Foreshore Erosion Study for Lower Pindimar, Pindimar, Upper Pindimar and Bundabah foreshores, on the northern shoreline of Port Stephens. Includes outcomes of the background data review, community consultation activities and outcomes, the methodology and outcomes for assessing foreshore erosion, and recommended actions to manage and treat foreshore erosion in the area.	MCC

Inundation including tidal, coastal and estuary

Due to its river systems and the low lying topography of the Port Stephens area inundation/flooding represents a significant issue for current and future management of the coastal zone, affecting life and property, recreational potential and ecosystem distribution. The extent of inundation is influenced by a combination of catchment influences, weather

[5] https://coastadapt.com.au/tools/coastadapt-datasets

conditions and tide levels. Catchment influences include the flooding of creeks, rivers and stormwater drainage.

Flood Hazard Maps have been compiled from various flood studies. The extent of inundation for the Port Stephens Estuary has been modelled for 1% Annual Exceedance Probability (AEP) and 5% AEP flood levels and extreme (PMF – probable maximum flood), for current day, 2050 and 2100; this includes tidal inundation from projected sea level rise. Inundation has been identified as knowledge gap as part of the scoping study and will therefore be more adequately addressed in Stage 2.

Tidal inundation of low lying areas particularly around Bob's Farm is becoming an increasing occurrence, where roads and local resident properties are being impacted by water. In some cases, this has resulted in limited access for those affected. Based on broad scale coastal inundation mapping, impacts are projected to progressively increase over forward planning horizons. Sea level rise of 0.2m is projected to result in increased impacts in this area, with effects remaining relatively localised around the Marsh Road area. Sea level rise of 0.5m (approximately 2050 timeframe) is projected to have across a more widespread area of Bob's farm but also potentially around Williamtown and Salt Ash. Sea level rise of 0.9m (approximately 2100 timeframe) is project to have more extensive impacts throughout the low lying areas around Tilligerry Creek including the locations above as well as low lying parts of Anna Bay and Taylors Beach. Coastal inundation around Tea Gardens is also predicted, however this is projected to be less extensive compared with the areas around Tilligerry Creek.

Existing management plans and strategies that relate to Coastal Inundation are included in Table 8.

Table 8 Existing Management Tools for Coastal Inundation

Plan / Strategy	Overview	Agency
Anna Bay and Tilligerry Creek Flood Study (2017)	The purpose of the study is to investigate the existing and future flood risks in the study area.	PSC
Anna Bay Catchment Drainage/Flood Study Master Plan (2004)	Identifies the trunk drainage infrastructure required to mitigate potential impacts of future development on existing drainage and flooding in the study area	PSC
Anna Bay North Structure Plan Drainage (1995)	Provides a framework for planning and implementation of trunk drainage, flood mitigation and water quality control measures in the catchment.	PSC
Port Stephens Design Flood Levels – Climate Change Review (2010)	Provides solutions to existing flooding problems in rural and urban areas, as well as providing a means of ensuring that any new development is compatible with the flood hazard and does not create additional flooding problems in other areas.	PSC
Shoal Bay Drainage Study (2016)	Identifies the existing drainage deficiencies to the ongoing drainage problems being experienced at Shoal Bay.	PSC
Williamtown Salt Ash Floodplain Risk Management Study and Plan (2017)	Defines the flood behaviour of the Williamtown/Salt Ash area.	PSC
Williamtown Salt Ash Flood Study Climate Change Review (2012)	Defines the existing flood behaviour between Raymond Terrace and Salt Ash and establish the basis for subsequent floodplain management activities.	PSC
Williamtown Salt Ash Flood Study (2005)	Describes and defines the existing flood behaviour and establishes the basis for floodplain management activities in the future.	PSC

Karuah River Flood Study – Final Report (2010)	To provide flood information for establishment of a floodplain risk management plan for the Karuah River.	MCC
Myall River Floodplain Risk Management Plan for Bulahdelah (2003)	Investigated the extent of flood problems from the Myall River and assessed potential management measures.	Depart' of Infrastructure for GLC

Council has identified the major management challenges in regard to coastal hazards affecting the Coastal Vulnerability Area (Table 9). Management challenges have been identified across all the coastal management areas (CMA) as defined under the Coastal Management SEPP. These will act as a reference for the development of management actions in Stage 3 of the Coastal Management Program development process; and have been used in conjunction with the risk assessment to aid in the identification of information gaps or uncertainties outlined in Section 10.

Table 9 refers to management challenges for all identified coastal hazards.

Management Challenges
Coastal Planning

• Identification of areas of existing and increasing coastal hazards.
• No mapped Coastal Vulnerability Area under the Coastal Management SEPP.
• Inclusion of coastal risks/threats and consideration of coastal values in planning instruments/tools to provide guidance for appropriate development (location, type);
  ○ Consistency of LEP with *Coastal Management Act 2016* (CM Act);
  ○ Inclusion of Coastal Management Areas in land use management tools – LEP and DCP etc. (in lieu of full mapping, identification and assessment in accordance with the Coastal Management SEPP) additional specific guidance may be needed for DCP when working/developing in the coastal zone;
  ○ Alignment of coastal management with existing Plans of Management and Strategic Plans (Nelson Bay Foreshore, Anna Bay etc.) and Local Government Act requirements;
  ○ Guidance on appropriate and inappropriate development in DCP (e.g. coastal hazards, water quality management) and how that should be applied to different localities (e.g. preservation of coastal community values) and;
  ○ Development of LEP and DCP for MCC. MCC presently has three different LEP and DCP's based on former Gloucester, Great Lakes and Greater Taree local government areas
• Understanding of the economic impact of coastal inundation, erosion and recession with consideration of climate change/sea level rise.
• Adaptation, where appropriate of existing development and historical development applications exposed to increasing coastal hazards.
• Event modelling currently based on limited historical data that may not be representative of true future conditions.
• The existing PSC policy position with regard to coastal hazards is limited to flooding
• Availability of ongoing funding/resourcing arrangements and opportunities for coastal adaptation works including an assessment of public versus private benefit.
• Lack of an Emergency Response Plan for coastal hazards.
• Possibility of future legal challenges for Council that are yet to be identified.

Erosion & Recession

- Guidance and triggers for proactive adaptation to foreshore recession of both public and private property – available for internal and external parties (incl. community groups and residents).
- Management and compliance of foreshore structures (authorised and unauthorised)
- Integration of the gazetted CZMP's into the CMP framework – Conroy Park/Sandy Point and Jimmys Beach.
- No regular monitoring is undertaken of priority areas.
- Lack of incorporation of long-term modelling of erosion hot spots in current plans/strategies that determine how asset may be affected.

Marine Sand Inundation

- A strategic approach to dredging that balances environmental, economic and social demands.

Aeolian Sand Inundation

- Management of existing and new development and industry (sand extraction) in and adjacent to the Stockton sand dune system.
- Aeolian sand inundation is not recognised as a coastal hazard under the CM Act.
- Coastal Hazards (including Aeolian) not represented in Emergency Response Plan.
- Consideration of other legislative and management requirements and partnership with other authorities including Worimi Conservation Lands.

Coastal Inundation

- No inundation planning level (equivalent to flood planning level) for the open coast
- No Risk Management Plan for Anna Bay floodplain or Shoal Bay.
- Guidance and triggers for proactive management responses to inundation of both public and private property.

9.2 Coastal Wetland and Littoral Rainforest

The land identified by the Coastal Management SEPP to be Coastal Wetland and Rainforest for the purposes of the CM Act, is land that displays the hydrological and floristic characteristics of coastal wetlands or littoral rainforest and land adjoining those features.

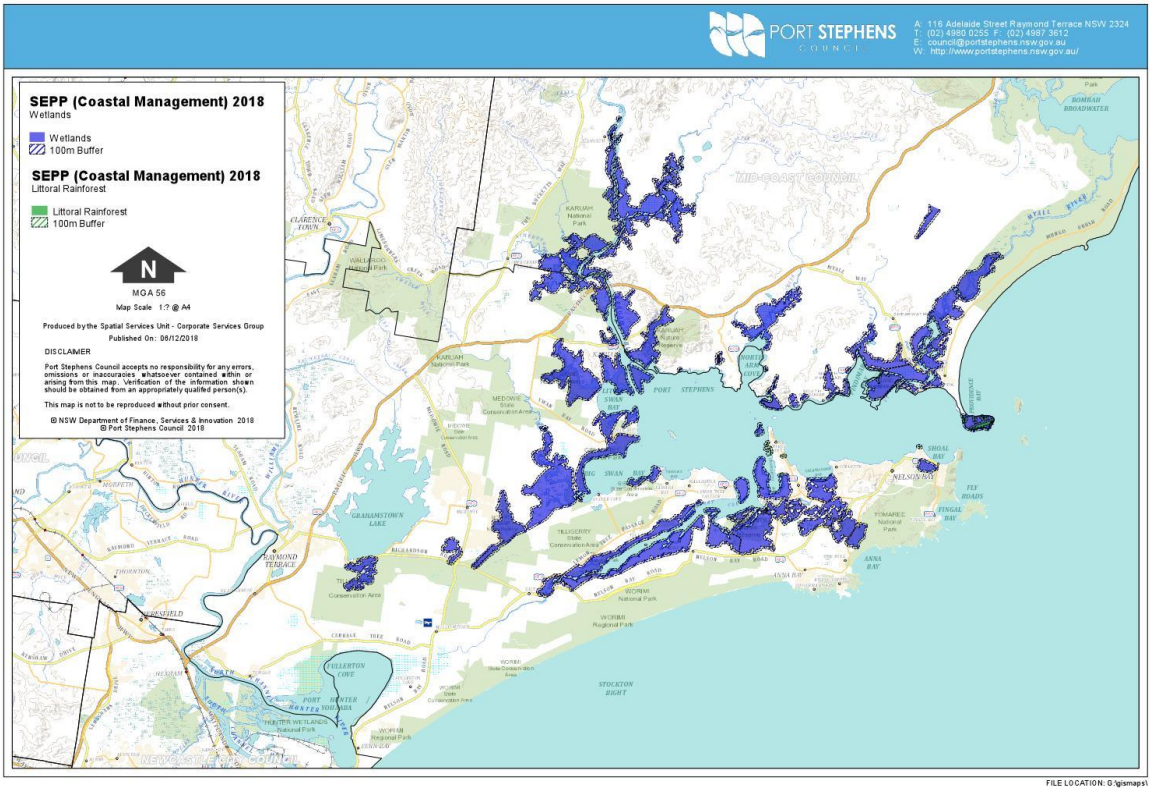

Figure 11 Coastal Wetland & Littoral Rainforest

The Port Stephens estuary has significant areas of coastal wetlands and is in close proximity to the Ramsar listed Hunter Estuary Wetlands and Myall Lakes (Figure 11). The Port Stephens Estuary is listed on the Directory of Important Wetlands in recognition of the significant wetland habitats it supports.

A number of littoral rainforests have been identified throughout the LGA, however only a small number have been mapped. The sites mapped include pockets around the Soldiers Point Peninsula and Little Beach. Other identified sites that have not been mapped include Lemon Tree Passage and Karuah. Mapping of these sites and additional sites not currently known will occur over the next 18 months with the help of an Environmental Trust Grant.

The major pressures to a site's ecological characters include:

- Changes in tidal range due to dredging, drainage works and the installation and operation of flood mitigation structures. Changes in the tidal range and to the freshwater/saltwater balance have resulted in an expansion of mangroves and a decrease in saltmarsh, affecting important foraging and roosting habitat for migratory shorebirds;
- Changes in the freshwater/saltwater balance due to drainage works;
- Introduced animals such as dogs, foxes, cats and black rats, all of which prey on native birds;
- Introduced plants such as bitou bush, alligator weed, water hyacinth and pampas grass; and
- Domestic and Industrial development within the catchment.

Management Tools and Challenges that apply to Coastal Wetlands and Littoral Rainforest are covered in Section 9.3 Coastal Environment Area (Table 10, 11).

9.3 Coastal Environment Area

The land identified by the Coastal Management SEPP to be Coastal Environment for the purposes of the CM Act, is land that contains coastal features such as the coastal water of the State, estuaries, coastal lakes, coastal lagoons and land adjoining those features, including headlands and rock platforms (Figure 12).

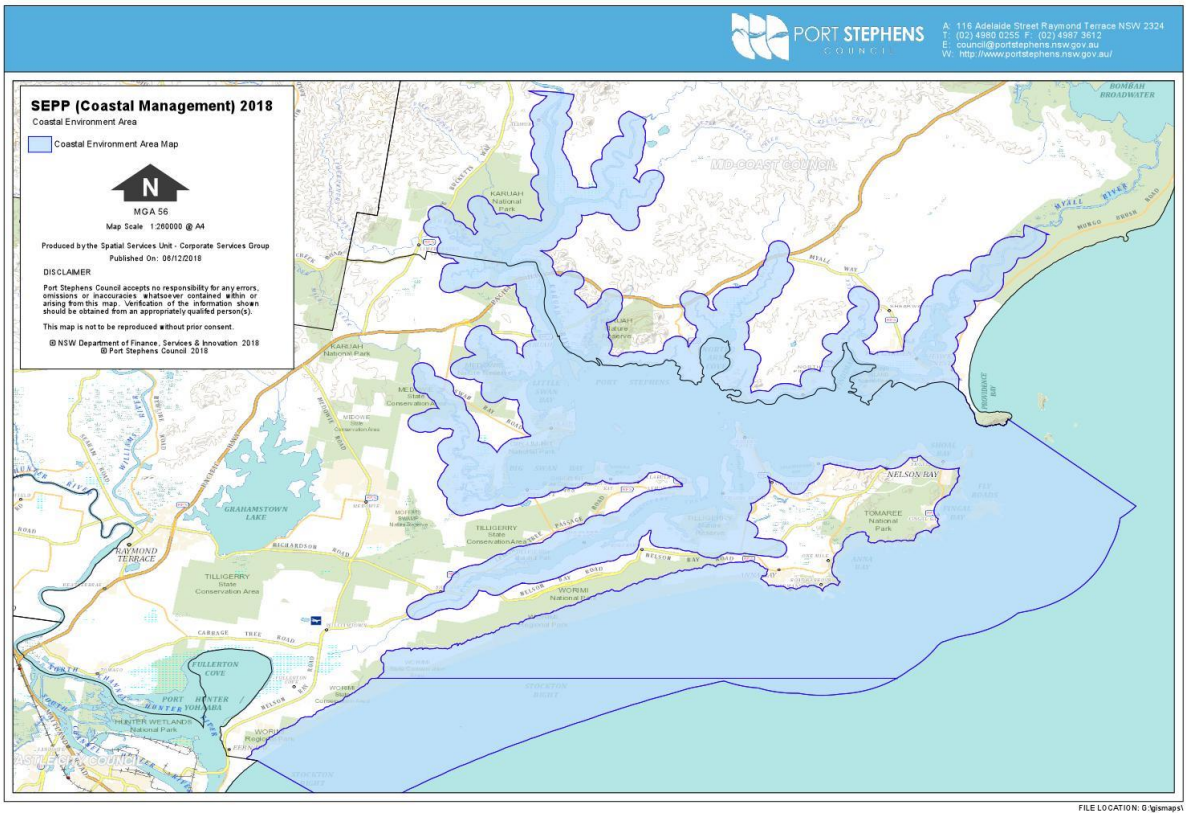

Figure 12 Coastal Environment Area

All areas of the Port Stephens LGA have been classified by Port Stephens Council's Conservation Assessment Tool which provides a desktop assessment of conservation value. Approximately 50% of the Port Stephens LGA has been classified as having either High or Very High condition ratings. Meaning it has little or no disturbance, diverse ranges of native plants, regeneration present, weed/pest absent, structural diversity with the addition for high conservation areas of connection to other remnant bush and minimal edge effects. The Conservation Assessment ranking takes into account mapped attributes such as fauna, flora, ecology, biodiversity, and corridor values.

The number of species listed under State/Federal threatened species legislation and known to occur in Port Stephens has more than doubled from 90 to 184 in 4 years. Within the LGA 37% of mammals, 24% of birds, 17% of amphibians, 10% of reptiles, 4% of plants and 6% of insects that exist are listed under threatened species legislation (SOE Report, 2016). It is estimated Port Stephens supports 21 per cent of NSW's mangroves, 13 per cent of saltmarsh and 5 per cent of seagrasses (West, et al 1985). There are 36 vegetation communities occurring within the foreshore area, demonstrating the high biodiversity the area supports.

High priority conservation areas that have been identified within the Coastal Environment Area include:

- Bagnalls Beach Reserve
- Fly Point Reserve
- Mambo Wetlands Reserve
- Stony Ridge Reserve
- Cromarty Bay foreshore
- Tanilba Bay foreshore
- Myall Lakes National Park (Fame Cove/Point).
- Corrie Island Nature Reserve
- Reedy Creek
- Twelve Mile Creek
- Tilligerry Nature Reserve and Tilligerry Creek
- northern foreshore between Karuah and Hawks Nest

There are five Endangered Ecological Communities (EECs) which occur within the Port Stephens Foreshore area:

- Swamp Sclerophyll forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-East Corner Bioregions;
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South-east Corner Bioregions;
- Littoral Rainforest in the NSW North Coast, Sydney Basin and South-east Corner Bioregions;
- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-east Corner Bioregions; and
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South-east Corner Bioregions.

Water quality is a major environmental, economic and social value for the Port Stephens Coastal Environment Area. The adjoining catchments of the Karuah and Myall Rivers and Tilligerry Creek have influence on the Port. Land and river management practices throughout these catchments can have significant downstream effects. A decrease in water quality would have a significant detrimental effect as the local economy is closely linked to nature based tourism and the oyster/fishing industry. Refer to Section 7 Monitoring and Appendix 15.2 for more information on water quality.

Key threats to the Coastal Environment Area include;

- land clearing in non-urban areas,
- intensification and expansion of existing development - residential, industrial and intensive agricultural activities,
- introduced species and tree poisoning and,
- Reduced water quality through urban stormwater, agricultural runoff, septic systems, point source discharge and marine debris.
- Habitat disturbance and reduction in biodiversity.
- Resource use pressures.

A number of these key threats are expected to progressively increase over future planning timeframes (for example by 2050 or 2100) as a result of factors including increased development, population growth and climate change. For example, an increased population living within the region would be expected to lead to increased urban stormwater discharge and future development to accommodate the greater population. As such, consideration and appropriate management of these key threats is required (along with ongoing improvement to current management practices) to ensure the environmental values of the Port Stephens region are maintained into the future.

Existing current management plans or strategies that relate to the management of the Coastal Environment Area will need to be considered when implementing the Coastal Management Program (Table 10).

Table 10 Existing Management Tools for the Coastal Environment Area

Plan / Strategy	Overview	Agency
Port Stephens / Myall Lakes Estuary Management Plan (2000)	Provides strategic policy framework for ecological sustainable development and environmental protection	PSC / MCC
Port Stephens Great Lakes Marine Park (2010)	The PSGLMP Operational Plan details management actions being undertaken by DPI. These actions focus on meeting key objectives related to the conservation of marine biodiversity, maintenance of ecological processes and the provision of opportunities for ecologically sustainable use, public appreciation, enjoyment and understanding of the marine park.	DPI
Karuah Catchment Plan (2015)	Maintain and improve the health of the Karuah River and its Catchment	MCC
Tilligerry Creek Catchment Management Plan (2008)	To achieve a sustainable ecosystem that enhances the economic and social values of Port Stephens.	PSC
Comprehensive Koala Plan of Management (2002)	The report assists Council in managing the balance between the conservation of natural resources and the ongoing community development.	PSC
Recovery Plan: Hawks Nest and Tea Gardens Endangered Koala Population (July 2003)	This plan identifies the actions to be taken to ensure the long term viability of the population.	Depart' Environment & Conservation
Development Control Plan provisions for Hawks Nest Village – including Koala and greenspace management controls (2019)	Applies controls to the commercial precinct, village precinct and beachfront precinct of Hawks Nest. Includes greenspace and urban Koala habitat controls	MCC
Urban Stormwater & Rural Water Quality Management Plan (2003)	To guide priority works for improving stormwater quality. Work currently underway to incorporate into a wider stormwater management manual	PSC
MidCoast Council Stormwater Management Strategy (July 2017)	To maintain or improve the quality of stormwater run-off from development.	MCC
North Arm Cove Stormwater Management Plan (2014)	Outlines a stormwater management plan for North Arm Cove including consideration of the existing village and potential future development areas. Also manages water quantity and sediment loads to the Port	MCC
Bulahdelah stormwater plan (2018)	To address quantity issues currently being developed.	MCC
Water Quality Improvement Plan (2009)	Identified key actions in the Myall Catchment to reduce diffuse agricultural pollution and highlighted the need for water sensitive design controls for urban areas	MCC
MidCoast Council On-Site Sewage Development Assessment Framework (DRAFT)	Pending - sets out minimum standards for sewage management in unsewered areas - including hazard classification, minimum lot size requirements and deemed-to-satisfy management solutions.	MCC
Hunter Regional Strategic Weed & Pest Plans 2017-2022	Guiding document for priority species and programs	LLS

Bushland Enhancement Process	Uses Bushland Assessment Tool to rank the health and significance of the site, implement programs and measure changes over time.	PSC
Port Stephens Conservation Assessment Tool (2010)	Decision support tool that ranks and maps parcels of land based on their conservation value (desktop assessment).	PSC

Council has identified the major management challenges in regard to coastal hazards affecting the Coastal Environment Area (Table 11).

Table 11 Management Challenges for the Coastal Environment Area

Management Challenges
Biodiversity / Ecology
• Lack of direction on priority areas for conservation to guide a Biodiversity Strategy and local offsetting policy; • Lack of controls to assess cumulative impact of land clearing; • Planning principles for ecological considerations not based on risk decision making matrix; • Rigor of environmental assessment affected by inaccuracies in Coastal Wetland & Littoral Rainforest Coastal SEPP Mapping; • Resourcing capacity for weeds and pest control is beyond existing budgets • Collaborative delivery of environmental education programs across agencies – marine (including fauna), weeds, water quality etc. • Lack of recognition of the importance/understanding of the marine environment in environmental assessment. • Management of seagrass rack. • Management and conservation of seagrass beds and other sensitive benthic habitats i.e.: *P. Australis*. • Oyster reef rehabilitation. • Ecological impact of existing moorings and the assessment rigor regarding the approval process for new moorings. (type, location) • Ability of significant ecosystems to migrate under climate change. • Ecological impacts of bushfire management.
Stormwater
• Water pollution impacts from greenfield and infill development. • To provide guidance on best practice for stormwater management in Port Stephens that incorporates industries standards and correct Australian Rainfall and runoff date (2016). • Lack of a catchment wide stormwater management strategy identifying targets and priority works. • Reactive limited enforcement of sediment and erosion control (PSC & MCC) • Designing urban development that meets Water Sensitive Urban Design Standards. • Effective water quality monitoring program. • Audit program to address maintenance of raingardens on single dwellings in Hawks Nest, Tea Gardens. • Stormwater discharge at conflict with beach nourishment and sand movement.
Catchment Planning – Agricultural Runoff
• No catchment plans for the Myall Lakes only a water quality improvement plan. • Funding and resourcing for the implementation and review of initiatives from the draft Karuah River Catchment Plan and Tilligerry Creek Catchment Plan

Acid Sulphate Soils
• Implementation of public & private drain maintenance best practice.
Onsite Sewage Management Systems (OSMS)
• Assessment consistency with Flood Planning Level AEP; • Consistency in the risk rating approach between the inspection program and installation assessment. (OSMS DAF Hazard Class); • Legacy Issues - historical systems that are not appropriate to the area; • Determining the optimum inspection frequency in relation to the assigned risk rating.
Point Source Pollution
• Impact of commercial and industrial facilities; • Limited compliance ability on boating discharge; • Limited understanding of the impacts on ground water.

9.4 Coastal Use Area

The land identified by the Coastal Management SEPP to be the Coastal Use Area for the purposes of the CM Act, is land that is adjacent to coastal waters, estuaries, coastal lakes and lagoons where development is or may be carried at present or in the future (Figure 13).

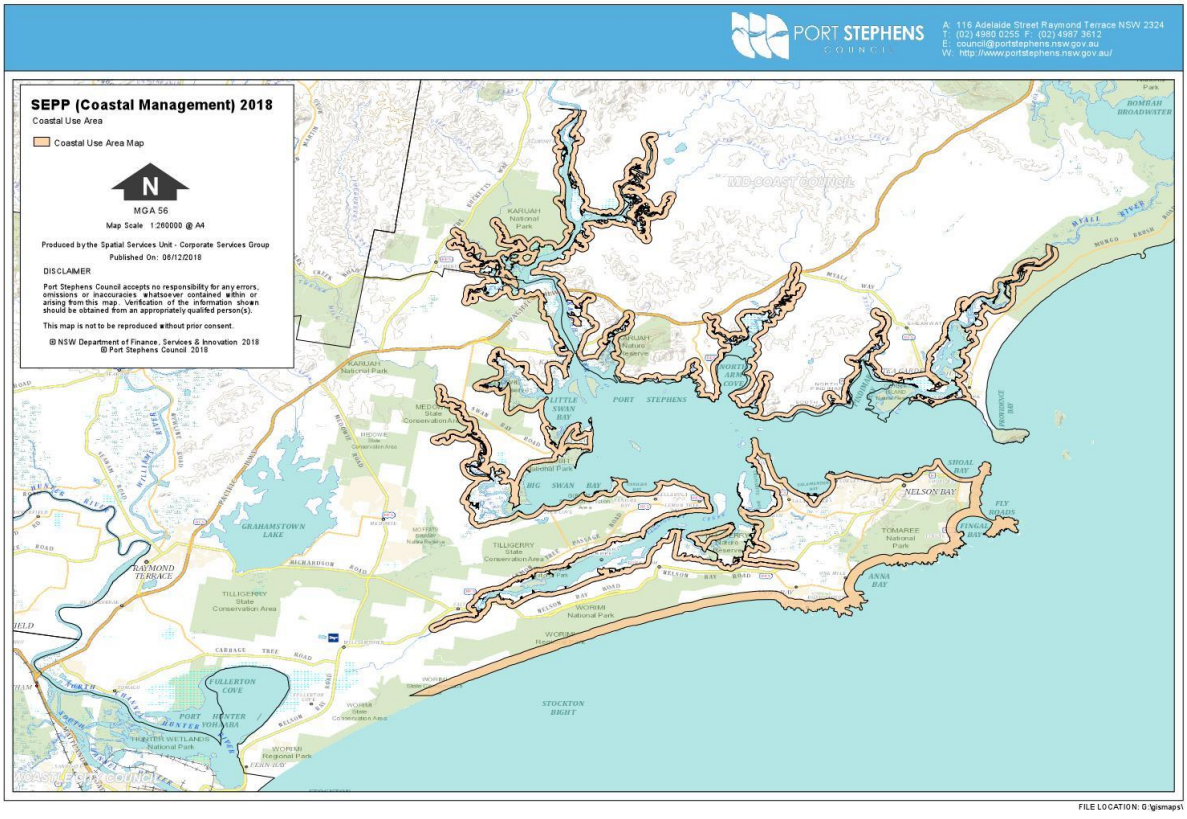

Figure 13 Coastal Use Area.

Port Stephens is home to many picturesque public reserves. There are numerous playgrounds, skate parks, public amenities, open spaces and picnic facilities across the region making the area a perfect place to live or visit.

Waterways

Port Stephens has a variety of beautiful beaches, foreshores and reserves on offer with large patrolled beaches ideally suited for surfing and small enclosed beaches perfect for a family picnic or get together. Port Stephens Council contracts professional lifeguards from Surf Life Saving Services NSW to provide seasonal weekly patrols for Birubi Beach and Fingal Beaches with a 7 day per week patrol (including public holidays) at One Mile Beach. A number of safety rings are located along the rocky coastline between Fingal Bay and Birubi Point.

Port Stephens has two swimming enclosures located in the Inner Port, at Karuah and Lemon Tree Passage. There is also a designated swimming area at Little Beach. None of these designated swimming areas are patrolled. A disabled access mat has been installed at Fingal Beach and a multi-access ramp is located at Little Beach.

Boating

Boating of all types is popular in the Port. Behavior, accessibility activities/management rules apply to different areas regulated by Roads & Maritime Services and the NSW Department of Primary Industries (DPI). Due to the popularity of the activity, particularly over the summer season, has historically resulted in conflicts within and between the boating community and other coastal users. One example is the use of Personal Watercraft (PWC).

There are a number of boat ramps located within the Port Stephens LGA. These boat ramps can be grouped into three categories, regional-urban, local-rural and private as per the facility scale set out in the NSW Boat Ramp Facility Guidelines (Table 12).

Table 12 Boat Ramp Categorisation for Port Stephens

Regional- Urban	Local-Rural	Private
Shoal Bay	Robinson Reserve, Anna Bay	Nelson Bay Marina
Little Beach	Fisherman's Bay	Tanilba Bay Sailing Club
Soldiers Point	Boat Harbour	Oyster Cove
Lemon Tree Passage	Fingal Bay	
Tea Gardens	Salamander Bay	
Karuah	Taylors Beach	
	Lilli Pilli (Beach Rd) – Lemon Tree Passage	
	Mallabula	
	Caswell Park	
	Tanilba Bay	
	Salt Ash	
	Pindimar	
	Bundabah	
	Swan Bay	
	Hawks Nest (river side)	
	Winda Woppa (river side)	

Additional boating infrastructures are the three privately owned slipways located in the Port that accommodate and service boats of various types and sizes. These are located at; Nelson Bay Marina, Lemon Tree Passage Marina (Albatross), Oyster Cove Marina. There is currently concern amongst the boating community that access to these facilities is being compromised through marine sand inundation of the navigational channels.

Recreation

Council has approximately 50km of shared paths throughout the community, thus making it ideal for cycling with the area, catering from serious mountain biker's right through to families who enjoy a safe and scenic bike ride. These pathways consist of links between recreation areas, schools, business centres and community facilities.

Beach and dune driving is one of the most popular activities for visitors to the Worimi Conservation Lands. The park offers 19km of four-wheel driving along Stockton Beach in the Worimi Conservation Lands and 350 hectares of dune driving in the Recreational Vehicle Area, south of Lavis Lane 4WD entry. All vehicles in the park must be registered and display a valid WCL vehicle permit. A number of commercial activities are conducted in the Worimi Conservation Lands including: sandboarding, quadbike tours, camel rides, horse rides and 4WD tours.

An overview of existing current management plans or strategies relating to the Coastal Use Area is contained within Table 13.

Table 13 Existing Management Tools for the Coastal Use Area

Plan / Strategy	Overview	Agency
Port Stephens Councils Climate Change Risk Assessment and Adaptation Action Plan (2009)	Assessment of climate change risks and identification of adaption actions for high priority risks relevant to Port Stephens Council	PSC
Living on the Edge – A Foreshore Management Plan for Port Stephens (2009)	The plan aims to address the sustainable use of the foreshore that supports commercial and recreational activities while still preserving ecological values for generations.	PSC MCC
Port Stephens Cultural Plan 2015–2018	Articulates Council's commitment to ensuring access to and participation in local cultural activity incorporating the arts and creativity, Aboriginal culture, heritage and history, architecture and design, festivals and events.	PSC
Anna Bay Strategy and Town Plan (2008)	Guides the management of future population growth and the building of neighbourhoods in Anna Bay.	PSC
Karuah Growth Strategy (2011)	Provides strategic level guidance for the future development of Karuah	PSC
Nelson Bay Strategy (2018)	To guide Nelson Bay towards becoming more attractive to tourists, the business community and residents.	PSC
Hunter Estuary CZMP (2016)	To guide future decision-making regarding the short and long-term management of the Hunter Estuary, its foreshores and its broader catchment area.	PSC
NSW Marine Estate Management Strategy 2018-2028	Strategic approach to the coordination and management of the marine environment. Identifies management initiatives to address priority threats and seeks to balance economic growth, use and conservation of the marine estate.	Marine Estate Management Authority
Port Stephens Recreation Strategy (2018)	Outlines parks hierarchy and subsequent service delivery	PSC
Generic Plans of Management – Foreshores, Community Use, Natural Areas, Coastal Parks	A strategic framework which will provide direction for both the current and future management of recreation.	PSC
Port Stephens Pathway Plans (2016)	Shows existing footpaths and shared pathways as well as identifying locations for future pathways connections.	PSC

Illegal Waste Program	Whole of Council approach to reducing the impacts of illegal dumping through identified prevention and rehabilitation actions.	PSC
Apex Park – Master Plan (2018)	A conceptual layout to guide the future of Apex Park in Nelson Bay.	PSC
Aboriginal Place Plans of Management: Birubi Point 2018, Soldiers Point 2015)	Provide a clear and transparent management framework in how the Aboriginal Place will be managed over the next 10 years to protect and respect its value and significance to the Worimi people.	PSC
Holiday Park Plan of Managements (Fingal Bay, Shoal Bay, Halifax, Jimmys Beach) (2013)	Establish objectives, strategies and performance targets for the management of the Holiday Park.	Crown Lands
Nelson Bay Foreshore Plan of Management (2008)	Seeks to realise the potential of the foreshore as a sustainable social, environmental and economic hub that will cater for the future needs of the permanent population of Nelson Bay and its visitors, including maritime users.	Crown Lands
The NSW Maritime Infrastructure Plan (2018)	The Plan aims to deliver better outcomes across the State for residents, businesses and visitors by facilitating public and private sector investment in maritime infrastructure and facilities that best support the needs of commercial and recreational boaters, and enables broader economic and social benefits for communities. Port Stephens is extremely popular for recreational boating and fishing, commercial cruising or sightseeing, and also supports a significant commercial fishing fleet and aquaculture industry and as such has been identified as a key investment location in the Plan	RMS/Crown Lands
Plans of Management (2006-) (Tomaree National Park, John Gould-Boondelbah Nature Reserves and Protected Areas, Worimi Conservation Lands, Karuah-Medowie-Wallaroo Group, Hunter Wetlands National Park, Myall Lakes National Park, Little Broughton Island and Stormpetrel Nature Reserves)	The conservation of the natural and cultural heritage values of the planning area whilst ensuring that people have the opportunity to visit and enjoy the park.	NPWS
Statement of Management (Bushy Island, Corrie Island, One Tree Island and Snapper Island nature reserves, Moffats Swamp nature reserve, Tilligerry nature reserve, Tilligerry National Park, Tilligerry State Conservation Area)	Outlines the main values, issues and management directions that will guide the management of the nature reserves until a plan of management has been prepared.	NPWS
NSW Coastal Dredging Strategy (2017)	As dredging is not a legislative responsibility, the Coastal Dredging Strategy has been developed and is coordinated by the Department of Industry (DoI)—Lands being the responsible agency for the state-owned maritime assets and for Crown land in NSW which includes the bed of the sea, estuaries, river entrances, coastal lakes and lagoons and some coastal wetlands.	Crown Lands; DoI

Port Stephens Local Environmental Plan 2013 (LEP)	The aim of the LEP is to provide the statutory framework for planning within the Port Stephens local government area. It provides planning and environmental control over the use and development of land, in order to uphold and promote the objectives of the EP&A Act.	PSC
Port Stephens Development Control Plan 2014 (the DCP)	The DCP was adopted by Port Stephens Council on Tuesday, 14 July 2015 and became effective on Thursday, 6 August 2015. The DCP provides further guidance to LEP.	PSC
Port Stephens – Great Lakes Marine Park Operational Plan (2010)	The PSGLMP Operational Plan details management actions being undertaken by DPI. These actions focus on meeting key objectives related to the conservation of marine biodiversity, maintenance of ecological processes and the provision of opportunities for ecologically sustainable use, public appreciation, and the enjoyment and understanding of the marine park.	DPI

Identified management challenges in relation to the Coastal Use Area (Table 14)

Table 14 Management Challenges for the Coastal Use Area

Management Challenges
Coastal Planning
• Understanding of local character to provide localised context to the values identified within the Community Strategic Plan and Section Error! Reference source not found.3. • Understanding and incorporation of climate change risk adaptation into the planning and design of all management tools and decisions (strategic planning, local environmental plan/SEPP assessment controls, DCP objectives and controls, Building Code of Australia (building design life), engineering design). • Utilisation of best practice coastal design principles • Resourcing, budgeting and organisation priorities affecting the review or implementation of key management plans and strategies i.e.: stormwater plans, catchment plans, local plans, Comprehensive Koala Plan of Management etc. • Understanding relevant legislation changes (Coastal & Biodiversity Reforms) • Recognition and conservation/preservation/protection of Aboriginal Heritage • Consistency of Planning Timeframes 10yrs, 20yrs, 50yrs, 100yrs and beyond • Outstanding and/or future claims made under the Aboriginal Land Right Act.
Coastal Use e.g. recreation

- Recognition of natural assets (i.e. beaches and bushland) in the asset management systems and open space management
- Connectivity of town centres, open spaces, natural areas and community facilities through cycle ways and pedestrian access
- Provision of infrastructure that facilitates tourism
- Management of Illegal and primitive camping
- Management of commercial fishing on public reserves i.e. Hauling equipment left on beaches, fishing vehicles accessing beaches, fishing activities adjacent to flagged area.
- Boating management and conflict between user groups i.e. Jet skis, anchored boats etc. and issues relating to facilitating safe navigation of commercial and recreational vessels, including ensuring that there is sufficient and well maintained maritime infrastructure and related facilities to meet the boating demand into the future for both local and visiting vessels (through consideration of the Maritime Infrastructure Plan).
- Maintenance of heritage items
- Consolidation and consistency of signage
- Private encroachment on public land
- Understanding and planning for particular demographic (elderly)
- Conflict between public use demands/expectations and the environmental and cultural values of a site e.g. 4 wheel driving, dog walking (impacts on shorebirds),

Governance

- Clarification of roles and responsibilities and cooperation between agencies and within Council
- No formal integration of existing management plans with the IP & R framework
- Regulatory boundaries may not match local catchment boundaries
- Increase in Councils risk profile
- Compliance (resourcing, agency cooperation)
- Shared management responsibilities over foreshore stretches i.e.: One Mile/Fingal Beach –PSC and NPWS
- Changes in political agendas and priorities

9.5 Review of Current Coastal Management

The previous sections provided an overview of the wide range of existing management tools and associated challenges and opportunities for each coastal management area. At a more localised level, a number of management plans have been reviewed:

- Sandy Point Coastal Zone Management Plan
- Jimmys Beach Coastal Zone Management Plan
- Foreshore Management Plan for Port Stephens
- Tanilba Bay Foreshore Management Plan
- Port Stephen And Myall Lakes Estuary Management Plan
- Tilligerry Creek Catchment Management Plan
- Karuah River Catchment Management Plan

Matters considered in reviewing these key existing management arrangements include how the coast is currently being managed and the adequacy of plans to address potential future challenges, their performance in terms of outcomes achieved and delivery of key actions, and any lessons learnt to inform effective future management.

Jimmys Beach Coastal Zone Management Plan

Great Lakes Council (now MidCoast Council) completed the Jimmys Beach Coastal Zone Management Plan in 2016. The plan was informed by a number of technical studies including:

- *Great Lakes Coastal Hazard Study Appendix E – Jimmys Beach Coastal Hazard Study* (SMEC 2013)
- *Jimmys Beach Sand Nourishment Assessment* (BMT WBM 2012)
- *Sediment and Hydrodynamic Assessment of the Lower Myall River Estuary and Preparation of Management Recommendations* (BMT WBM 2011).
- *Jimmys Beach Emergency Action Sub-Plan EASP* (Great Lakes Council 2011).

The plan recommended management actions to address coastal hazards impacting on the beach and foreshore road. Based on the recommendations in the plan, Council adopted a permanent sand transfer system strategy to provide a medium-term solution (approximately 20 years). As of April 2019, construction of the sand transfer system has been completed with the system currently undergoing final testing and commissioning. The system is designed to allow sand to be discharged from 10 different locations along the shoreline to provide an on-demand buffer against storm erosion, with sand sourced from the Winda Woppa spit and maintenance dredging of the lower Myall River.

Implementation of the sand transfer system was the key action from this management plan. Having delivered this key action, MidCoast Council have established a beach monitoring program using survey to assess the effectiveness of the current management arrangements at Jimmys Beach over time. At present, the effectiveness of the sand transfer system in managing coastal hazards is yet to be fully tested. However, given the approximately 20 year design life of the strategy, the Jimmys Beach CZMP is considered to be adequate for managing existing coastal assets and infrastructure in the short to medium-term. MidCoast Council will continue to monitor Jimmys Beach and will review the effectiveness of their management strategy at regular intervals. MidCoast Council will be responsible for developing a long-term management strategy to address projected sea level rise impacts at Jimmys Beach before the design life of the current management strategy is reached.

Sandy Point/Conroy Park Coastal Zone Management Plan

The CZMP was developed in 2016 and certified under the former *Coastal Protection Act 1979* in September 2018. The Plan aims to identify foreshore management actions for the shoreline between The Anchorage Marina and Bagnalls Beach in Corlette, and gives balanced consideration to the environmental, social and economic demands on the coastline.

The plan was developed using a multi-criteria analysis approach to short list preferable management options across each precinct within the study area. Seven key actions were recommended for implementation and provided in priority order across the precincts considered, with the first three priority actions including:

- Beach nourishment in front of Conroy Park
- Reconstruction and realignment of a revetment with a shared pathway at Sandy Point
- Pedestrian management works (pathway and fencing) to improve public safety

As the plan has only been certified for 7 months limited progress has been made on implementation to date. Council has submitted an application for grant funding to the Office of Environmental Heritage Coast and Estuary Grants Program to implement the highest priority action of sand nourishment in front of Conroy Park. The proposed commencement of sand nourishment works is September 2019 (pending all required approvals and award of grant

funding) with completion of this phase of the works proposed for May 2020. Council intend to undertake post nourishment surveys initially for a 12 month period to June 2021; however it is anticipated that ongoing monitoring will likely be required. Council's intention is to incorporate any outstanding management actions from the Sandy Point/Conroy Park CZMP into this Coastal Management Program. Implementation of remaining actions will be dependent on Council's funding and resource constraints.

Foreshore Management Plan for Port Stephens

The Foreshore Management Plan was adopted by both Port Stephens Council and Great Lakes Council (now MidCoast Council) in April and July 2009. Council has completed a range of management actions as a result of the Foreshore Management Plan. A review of the actions from the plan was conducted in 2017. Currently underway is the investigation of the feasibility of reconstructing foreshore protection structures in accordance with standard coastal engineering principles. This will form part of a program of foreshore rehabilitation that considers public access, and other issues such as landscaping. Some Capital Works projects have been completed however now with development of the Coastal Management Program this will encompass and progress many of the original objectives of the Foreshore Management Plan along with the incorporation of other management issues pertaining to the coastal zone. The actions implemented from the plan have generally been considered by Council and the community to have been successful, with further works and management responses being limited by Council's available budget for foreshore management.

Tanilba Bay Foreshore Erosion Management Plan

Council obtained funding in 2011 to develop the Tanilba Bay Foreshore Erosion Plan. This plan looked predominantly at coastal erosion and suggested different concept management options for consideration. Following consultation, community feedback and consideration of the budgetary constraints for implementation, a staged low-cost foreshore stabilisation strategy was proposed.

Stage 1 was completed in 2014 with works including the design and construction of a low cost sloped rock revetment seawall incorporating pockets of vegetated revetment and utilising existing structures where possible, in part of the western part of the bay. This work was a first for Port Stephens and an example of best practice for foreshore erosion control, with previous foreshore protection works within Port Stephens being undertaken in a largely ad-hoc fashion. Stage 2 – detailed design of an optimised sloped rock revetment seawall with incorporated pocket beaches along Peace Park in Tanilba Bay - was completed in June 2016. The works supported those from Stage 1 and increased erosion control in the area. The following outcomes were achieved:

- Long-term foreshore stability
- Reduction of ongoing maintenance costs
- Historic erosion protection measures were removed which also reduced debris littering the beach i.e. car tyres
- Reduction of foreshore erosion

Stages 3 and 4 of the Tanilba Bay Management Plan, which includes sand nourishment and further foreshore stabilisation works, have yet to be undertaken. There is an opportunity for these outstanding actions to be incorporated into the management actions of the Coastal Management Program. The general aims of consolidating existing ad-hoc and failed foreshore protections works (replaced with engineered designs) with consideration given to local coastal processes and environmental and social values of the area is considered to have been

successful to date and is consistent with the aims of the Coastal Management Program being developed.

Port Stephens and Myall Lakes estuary management plan

The purpose of the Port Stephens and Myall Lakes Estuary Management Plan (EMP) is to provide strategic policy framework for ecological sustainable development and environmental protection. Since its development 2000, the Port Stephens/Myall Lakes Estuary and Coastal Zone Management Committee have overseen its implementation. Due to the plans recommendations extending across two Local Government Areas (LGA) and State agencies often the status of an action is different between each council area due to differences in resourcing and priorities. Where this is the case a status rating has been given for each LGA thus there are 136 status reports over the 134 actions. Of the remaining 18 actions still to be implemented only 3 are the responsibilities of local councils, with the other 15 all falling within the jurisdiction of government authorities.

The current program for PSC was reviewed in 2013 for better efficiency with the intention to include more event monitoring. As part of the EMP a Foreshore Management Plan (see above) was developed in 2007. Foreshore improvements are ongoing and it is likely remaining management actions from that plan will be incorporated into the Coastal Management Program.

Tilligerry Creek Catchment Management plan

The aim of the Tilligerry Creek Catchment Management Plan is to create a sustainable ecosystem. The plan identifies and investigates the issues within the Tilligerry Creek Catchment and has developed priority recommendations and management actions. This plan was adopted on 24 February 2009. The study found that ongoing land-use pressures have resulted in impacts on water quality, biodiversity and adversely affected recreational and commercial activities.

Recommendations included:

- Repairing and upgrading selected floodgates
- Installing trash racks, wetlands and pollutant traps
- Auditing catchment activities
- Improved management of vegetation along creek banks
- Weed control and revegetation of degraded areas
- Improved management of stock
- Investigation of the revision of certain policies including Local Environmental Plans.

As with the other management plans reviewed in this section, implementation of actions has been largely dependent on budget and resource constraints. Monitoring of the effectiveness of actions has historically been relatively limited, with difficulties in determining the effectiveness of individual actions across a large area with multiple interacting processes. Any remaining actions will be considered when prioritising management approaches to be included in the Coastal Management Program.

Karuah River Catchment Management plan

The Karuah Catchment Management Plan was prepared by Great Lakes Council (now MidCoast) in 2015 with a ten year term to 2025. The purpose of the plan is to maintain and improve the health of the Karuah River Catchment. The Catchment Management Plan identified that habitat fragmentation is reducing the resilience of ecosystems within the

catchment and that poor water quality is impacting the health of the river and wider Port Stephens Estuary.

Overall the plan recommended 73 management actions, some of which have been implemented as of April 2019. MidCoast Council is presently in the planning phase for the development of a large scale riparian restoration project in partnership with Landcare Australia Ltd, Hunter Local Land Services and Karuah Great Lakes Landcare. In addition Council has been exploring, in collaboration with land owners in The Branch sub-catchment, the feasibility of establishing biodiversity stewardship sites on their land.

These and further management actions could be incorporated under the Coastal Management Program if deemed appropriate. A more detailed mid-term partial review of the plan is due in 2020, with a full review and update to be completed at the end of the current term in 2025. The final review proposes to utilise information available from monitoring and evaluation activities and adaptive management principles as part of a cycle of continuous improvement.

Summary

As is evident from the review of existing coastal management arrangements above, a considerable body of work exists for many areas across the Port Stephens coastal zone. While specific monitoring information on the effectiveness of individual actions is often lacking, it is generally considered that those actions that have been implemented have been beneficial. To assist in providing data to evaluate the effectiveness of future management actions, appropriate monitoring should be incorporated and prioritised in futures works programs developed as part of this Coastal Management Program. In some instances (for example to Jimmys Beach CZMP) monitoring data is proposed to be collected, however due to the short timeframe since the commencement of implementation work, the effectiveness of actions cannot yet be readily determined.

A common theme evident across all plans is the constraints on budget and resources available to implement all recommended management actions. This Coastal Management Program will aim to prioritise management actions and will provide a business plan outlining the key components of a funding strategy, including the expected costs of implementing actions, proposed cost-sharing arrangements and other viable funding mechanisms. The intention of this Coastal Management Program is to build on the existing work presented in previous management plans to allow continual improvement in outcomes for the community.

10. Preliminary Risk Assessment

A preliminary risk assessment was conducted using the threats identified in Table 6 (Coastal Management Areas) using existing scientific and local knowledge to;

1. Identify the residual risk and provide an indication as to the adequacy of the current management within the identified Port Stephens areas for consideration;
2. Identify whether the risk is likely to change into the future and;
3. Identify areas of uncertainty.

The purpose was to identify the priority threats that require improved management responses in the open coast, inner port and outer port, and areas where additional detailed investigation is required. Therefore, allowing a more accurate assessment of risk now and into the future.

It is not within the scope to review the risk of management responses such as dredging but to establish whether the original threat; such as marine sand inundation presents a significant enough socio-economic or environmental risk to warrant a response.

The Process

The risk assessment process utilised for this study was adapted from the Australian Standard Risk Management Principles and Guidelines ISO 31000:2009. This approach is consistent with that undertaken by the Marine Estate Threat & Risk Assessment and where possible terminology was kept consistent.

Threat	An activity, event or process that has the potential to create a negative impact on an environmental/built asset or social or economic value.
Stressor	The element of an activity that causes an impact on an environmental/built asset or social or economic value (e.g. water pollution)
Impact	The outcome of the threat to an environmental, socio- economic asset or value (e.g. loss of seagrass)
Likelihood	The probability or frequency of an impact occurring.
Consequence	The extent/scale of the impact if/when it eventuates.
Residual Risk	The remaining probability of an impact occurring and the consequence upon an asset or value with consideration of current management tools.

Port Stephens Council's Corporate Risk Matrix was adapted with additional descriptors to enable consistency in the assessment of the risk to the wider community. A copy of the risk matrix is included in Appendix 15.1

Many threats are not uniform in their impact across the whole area and occur at different places to different degrees. As noted earlier this variability is recognised on a broad level through the consideration of threats across three areas of consideration; open coast, outer port and inner port (Figure 4). The delineation of these three areas was made in recognition of the differences in coastal process and land uses that define them and there is overlap in these areas in relation to the land identified by the Coastal Management SEPP as defined in Section 9. A finer scale risk assessment will be undertaken for priority threats in Stage 2.

The risk level for many threats is heavily dependent on weather/climatic conditions both now and in the future. Where applicable the risk assessment was undertaken with consideration of the following scenarios;

- **Current Average Annual Conditions**

- **Weather Events** – includes consideration of events such as a 1% AEP rainfall event, extreme coastal storms and extreme tides as appropriate
- **Future Residual Risk** – includes consideration of climate change to 2058 and 2100 as sourced from the Port Stephens Council Climate Change Risk Assessment (refer to Section 8) and population increase. The Climate Change Risk Assessment process created a new risk level termed "very high" to enable a degree of differentiation between the significant numbers of high risks identified using PSC corporate risk matrix. Original participants were asked to nominate the ten 'high' risks they thought presented the greatest potential issue. Risks that a large proportion of respondents found to be the greatest potential issue were described as "very high" (Haines et al 2009).

The risk assessment was undertaken on the impact of the threat across the following risk categories;

- **Environmental** – impact resulting in harm to ecosystems, loss of biodiversity and unsustainable use of natural resources.
- **Socio-economic –** impacts to community services, liveability, culture and well-being, businesses, employment, property values, visitor economy.

Documented information was used in conjunction with local knowledge to assign a risk level. Risk assessment results were reviewed by local knowledge holders within relevant agencies and the Port Stephens / Myall Lakes Estuary & Coastal Zone Consultative Committee. Areas of uncertainty in the data were recorded and highlighted in Table 15.

NSW Marine Estate Statewide Threat and Risk Assessment

The NSW Marine Estate Statewide Threat and Risk Assessment (TARA) undertook a thorough risk assessment process that considered and prioritised the social, economic and environmental threats to the community benefits or values of the marine estate (Section 5.3). Threats and their associated risks were assessed at a state and regional scale. The regions include:

- North region (from Tweed Heads to Stockton)
- Central region (from Newcastle to Shellharbour, includes the Hawkesbury Shelf marine bioregion)
- South region (from Shellharbour to NSW/Vic border).

The Marine Estate and the Coastal Zone are intimately linked. The Marine Estate landward boundary includes coastal and estuarine water to the limit of tidal influence and includes adjoining and catchment land use and activities that could affect the marine estate. The risk assessment results for the TARA have been considered in the interpretation of the risk for the Port Stephens area, however application of the Central region results is limited as they are not necessarily representative of the local conditions.

10.1 Priority Threats & Uncertainties

To determine the overall risk level for each threat, environmental and socio-economic risks were considered of equal importance. Table 15 outlines the highest level of residual risk (environmental/socio-economic) for each threat across the three different focus areas. Current conditions set out in the Table 15 are representative of the risk at this present point in time for each threat inclusive of weather events. Future risk is inclusive of weather events and projected changes to the current residual risk as a result of climate change and population growth. The ratings assigned for future risk are based on generalised expectations of changes to the current risk and do not relate to a specific timeframe, although potential impacts to 2100 and beyond have been considered. For more detailed risk assessment results refer to Appendix 15.2

Table 15 Priority Threats & Uncertainties

*Areas of uncertainty represent information that is still required to understand the likelihood or consequence of the risk.

	Current Conditions			Future	Areas of uncertainty*
	Inner Port	Outer Port	Open Coast	Overall	
Coastal Hazards / Process					
Beach Erosion	Low	High	Medium	Very High	Uncertainty over extent under weather and climate change scenarios
Shoreline Recession	Low	High	Low	Very High	Uncertainty over extent under weather and climate change scenarios
Coastal Inundation	High	High	Low	Extreme	Uncertainty regarding consequence on private & public infrastructure Point at which critical infrastructure (council & utilities) will be impacted. Environmental tolerance to tidal inundation under climate change scenarios
Cliff or Slope Instability	Low	NA	Medium	Medium	
Marine Sand Inundation	Medium	High	Low	Unknown	
Aeolian Sand Inundation	Low	Low	High	Increasing	Unknown area of future impact of Stockton Dunes
Water Quality[1]					
Urban stormwater	High	High	Low	Very High	Quality of stormwater inputs and identification of high risk catchments
Acid Sulphate Soil run-off	High	Low	Low	High	
Agricultural run off	High	Low	Low	High	
Point source discharge	Low	High	Low	Very High	
Failure of OSMS	High	Low	Low	Very High	
Marine debris	Medium	Medium	Medium	Medium	
Other					
Biosecurity Threats	High	High	High	High	
Land Clearing	High	High	High	High	Gaps in littoral rainforest mapping. Boundary inaccuracies in coastal wetland mapping
Obstruction to Public Amenity / Use	Low	High	Low	High	Assessment of safety, ownership and suitability of existing structures in relation to coastal vulnerability projections
Land contamination	High	Medium	Medium	Unknown	Ongoing impact of PFAS & other new and emerging chemicals of concerns and contaminants

Mining & Extractive Industries	Low	NA	Low	Low	
Boating Pressures	Medium	High	Low	Increasing	

[1] Broad category of water quality includes whole of catchment influences through the main Port Stephens tributaries including the Myall, Karuah, and Tilligerry. In addressing water quality issues the CMP will consider Improvement of land and river management practices in the identified catchments.

10.2 Additional Uncertainties

There are significant identified and potential impacts on environmental values across all the identified threats. However there is a degree of uncertainty regarding the ecological impacts in Port Stephens due to the lack of understanding of priority areas for conservation in regard to wildlife corridors and future vegetation migration areas in the event of sea level rise.

Many of the risks identified in Table 15 occur in different locations and are not threats uniformly presented across the whole system or section. A more exact assessment of risk location and the prioritisation of associated management will be identified through a more detailed risk assessment once the areas of uncertainty have been addressed.

The assessment of climate change risk is based on the Port Stephens Councils Climate Change Risk Assessment and Adaptation Action Plan which was completed in 2009. It is scheduled for review in 2019. Projections for the impact of weather and climate change are an evolving field as new data becomes available. Therefore, the incorporation of new data into existing monitoring must be an ongoing process.

10.3 Priority Threats

Priority threats are those that received a risk rating of high or more on at least 2 occasions (Table 16). These represent key risks with the greatest potential to negatively affect the unique values of the coast or that have a high degree of uncertainty (e.g. Aeolian Sand Inundation). All the priority threats have opportunities for significant process improvements to address the identified management challenges as outlined in Section 9. However it is not the role of the Coastal Management Program to identify all the solutions. General opportunities for improvement will be identified but the specific focus of the Coastal Management Program will be providing adaptation pathways with respect to Beach Erosion, Shoreline Recession and Aeolian Sand Inundation as these threats represent a significant increasing risk area for which there are extensive uncertainties and management gaps. Coastal inundation will be incorporated as it relates to erosion and recession to build on the existing flood hazard work.

Table 16 Priority Threats & level of focus of the Coastal Management Program

Priority Threats	Existing Management	Level of Focus	How
Beach Erosion	Very limited	Primary	Direct management actions
Shoreline Recession	Very limited	Primary	Direct management actions
Aeolian Sand Inundation*	Very limited	Primary	Direct management actions
Coastal Inundation	Yes	Primary	Filling management gaps as interaction with other hazards is understood.
Urban Stormwater	Yes	Secondary	Identify areas of improvement
Acid Sulphate Soil run-off	Yes	Secondary	Identify areas of improvement
Agricultural run off	Yes	Secondary	Identify areas of improvement
Point source discharge	Yes	Secondary	Identify areas of improvement
Failure OSMS	Yes	Secondary	Identify areas of improvement
Biosecurity Threats	Yes	Secondary	Identify areas of improvement
Land Clearing	Yes	Secondary	Identify areas of improvement
Obstruction to Public Amenity / Use	Limited	Primary	As it relates to the management of erosion & recession

*This threat has been identified as needing direct management actions from Council due to sand migration. Further consideration of this issue will be addressed in Stage 2 of the CMP.

11. Forward Works Program

As outlined in Section 1 the Coastal Management Program is to be completed following a staged process (Figure 2). Guidance for this process along with key requirements for each stage is outlined in The NSW Coastal Management Manual Part A and Part B (the Manual). As such the key requirements represented in the Manual will be followed by Council when working through the staged process for the Coastal Management Program (Appendix 15.5). The tasks scheduled for Stage 2 represent the areas of uncertainty in the understanding of extent of the risk for priority threats. Consideration of all priority threats will be made during Stage 3. Knowledge gaps identified as potential inclusions in Stage 5 are studies that are not critical to understanding the current level of risk but will enable improved management of threats in the future. Understanding of local character has been included in Stage 2 as gathering this information ensures that management actions reflect how the identified coastal values apply to each area. We have outlined the key requirements for each stage in Appendix 15.5

The Forward Works Program (Table 17) provides a clear and achievable pathway to develop a Coastal Management Program. Details in Table 17 are indicative of the activities that are expected to be required, with detailed scopes to be developed for each task during Stages 2 and 3. Initial cost estimates for each remaining stage of the Coastal Management Program are provided along with the necessary deliverables for the Stage 2-4 process of the framework. The forward works program indicates appropriate funding options, indicative costs and essential studies required to effectively complete each stage of the Coastal Management Program. The Forward Works Program moves through Stages 2-4 in accordance with the Manual.

Details and requirements for Stages 3 and 4 within the Forward Works Program are a starting point for actions to be assessed. Not all priority threats require immediate further investigation. The forward works program may continue to evolve as Council works through Stage 2 as the Coastal Management Program will enable Council to access resources and funding to further define studies and identify other actions required over its preparation.

Table 17 Coastal Management Program Forward Works Program. Timeframes are from the successful endorsement of the Scoping Study by OEH.

Deliverables	Tasks / Studies Needed	Threat	Timeframe	Who/ Enablers /Partners	Indicative Cost	Funding Options	Details
Stage 2 - Understanding the risk							**Completed December 2019**
2.1 Priority Investigations							
Understanding of local character	To provide localised context to the broad values statements for the coastal zone and guide all management responses to be developed in Stage 3.	All	12 months	PSC, MCC	$30,000	OEH Coast & Estuary Grants Program/PSC	This work will complement and be closely linked to the requirement for Local Character Statements as per the Local Strategic Planning Statement and Local Housing Strategy.
	Tourism values survey to better understand the needs of this sector	All	Late 2019	PSC	Included in other PSC programs	PSC	Designed to be an ongoing source of information to capture changing trends. Works already scheduled with the PSC Economic Development, Tourism and Events Unit.
Coastal Processes and Hazard Assessment	Coastal hazard assessment and mapping for 20, 50, and 100 year and beyond timeframes that incorporates the climate change parameters of projected sea level rise, and potential increases in storm frequency & intensity.	Erosion, shoreline recession, Coastal Inundation, Aeolian sand inundation.	3-6 months	PSC & MCC Coastal Engineering Consultant	$100,000	OEH Coast & Estuary Grants Program/PSC	Hazard mapping to inform Planning proposal for Coastal Vulnerability Area. Consideration of sediment budget, climatic variability, interaction between coastal and catchment flooding and large scale, low probability weather events. Potentially including further geo-technical investigation if necessary. May also consider coastal cliff instability.
	Inundation mapping for the open coast						Presently a gap to be investigated in Stage 2
	Area of encroachment of the Stockton Dunes 20, 50, and 100 year and beyond timeframes			NPWS / Worimi LALC			Estimate timeframes and rate of transgressive dune encroachment
Coastal Inundation Impacts	Determination of the tolerance of critical infrastructure (council & utilities) and significant ecosystems to both coastal storm and tidal inundation under present day and projected climate change scenarios. This	Coastal Inundation	3 months	PSC, MCC Hunter Water Coastal/Flood Engineering Consultant	$30,000	OEH Coast & Estuary Grants Program/PSC/Hunter Water Corporation	Covers both storm related inundation due to elevated coastal water levels and tidal inundation impacts (including the coincidence of both).

Deliverables	Tasks / Studies Needed	Threat	Timeframe	Who/ Enablers /Partners	Indicative Cost	Funding Options	Details
	would include consideration of floor level data of private assets.						Floor level survey of properties to better define risk levels to people and property from inundation
Suitability of foreshore protection structures	Update audit of existing foreshore structures	Obstruction to public amenity/use	1-3 months	PSC, MCC Coastal/ Geotechnical Engineering Consultant	$15,000	OEH Coast & Estuary Grants Program/PSC	Preliminary determination of condition and suitability of existing foreshore structure. May be combined with Coastal Processes and Hazard Assessment.
2.2 Complementary works to be undertaken through other programs							
Coastal Wetland & Littoral Rainforest Mapping	Survey/map known areas of littoral rainforest Desktop review aerial photography coastal wetlands and survey areas of inconstancy.	Land clearing	2-3 months	PSC, MCC Ecologist	$30,000	NSW Environmental Trust	Detail spatial extent of coastal wetland and littoral rainforest and identify any inconsistency with existing Coastal Management SEPP maps. Any changes through a planning proposal
Urban stormwater high risks areas	Update rainfall data including temporal patterns in MUSIC	Urban stormwater	2-3 months	PSC	$15,000	OEH Coast & Estuary Grants Program/PSC	Scheduled to be undertaken for PSC in 2019
Understanding of priority areas for conservation	Gap analysis of PSC biodiversity mapping and policy	All	12 months	PSC	$50,000	PSC/NSW Environmental Trust	To refine priorities for further investment and management tools. Work to be undertaken by Port Stephens Council separate to the CMP process. Strong links with requirements under Biodiversity Reforms thus work needs to be completed at a LGA scale.
PFAS Impacts	EPA, Expert Panel and Water Working Group will continue to review any reports released by the Department of Defence, to ensure they are scientifically sound, and that the Williamtown Management Area Map and precautionary advice remain appropriate.	Land Contamination	ongoing	EPA, Department Defence	-	-	Undertaken separately to the CMP process
2.3 Community Engagement (Raising Awareness)	General community awareness raising regarding the CMP process and the outcomes of the associated studies	All	12 months	PSC, MCC, OEH	$100,000	OEH Coast & Estuary Grants Program/PSC	This work is additional to the local character work. Engagement with the community throughout Stage 2 will allow for meaningful collaboration and empowerment in later stages. Refer to the Stakeholder Engagement Strategy for further detail
2.4 Review of Risk Assessment	Identification of any threats that need to be considered as "priorities" in this iteration of the CMP.	Erosion, shoreline recession, Coastal Inundation, Aeolian sand inundation,	2 months	Stakeholder Reference Group	-	PSC	To be completed once additional investigations have been undertaken to better quantify the extent of the risk
2.5 Grant Application for Stage 3	Further resourcing is required for the completion of Stage 3	- -	Due end of June 2019 1 month	PSC, Stakeholder Reference Group	- -	- -	Based on the current estimates the existing Coast & Estuary Grant will only enable completion to the end of stage 2. Further funding must be made available for the completion of stages 3 & 4.

Deliverables	Tasks / Studies Needed	Threat	Timeframe	Who/ Enablers /Partners	Indicative Cost	Funding Options	Details
Review Budget	Stakeholder review of budget in light of risk assessment results			Stakeholder Reference Group			
Stage 3 – Identify & evaluate options							**Completed October 2020**
Management Options Assessment	Identify options and determine their feasibility in managing risks. Development of concept designs and the identification of triggers for implementation (Where do we defend and when)	All Erosion, recession, inundation	6 months	PSC, Stakeholder Reference Group	$50,000	OEH Coast & Estuary Grants Program	Where relevant support the initiatives of the Marine Estate Management Strategy Identification of adaptation pathways for the management of coastal hazards on public reserves and private land Consideration of the risk management hierarchy to ensure solutions are integrated and strategic Ongoing review of LEP and DCP provisions (in conjunction with CMP timeframes) to ensure planning controls are adaptive and responsive to hazards over time
Review of Existing CZMPs	Review management solutions for existing CZMPs for Jimmys Beach and Sandy Point	Coastal Hazards	1-2 months	PSC, OEH	-	PSC	In light of hazard assessment work and a review of longevity of current solutions, identify actions for incorporation into the CMP and any further works required.
Develop Emergency Response Plan	Outline the roles and responsibilities of all public authorities immediately preceding, during or after erosion events.	Coastal Hazards	6 months	PSC, MCC, SES	-	In-house (PSC)	To feed into the Local Disaster Plan
Cost Benefit Analysis	Economic Assessment of the selected feasible options to determine viability. May include distributional analysis of the expected costs and benefits between different stakeholders.	All	3 months	PSC, Economic Consultant	$30,000	OEH Coast & Estuary Grants Program	Must consider indirectly affected coastal community and the environment
Planning Proposals	*Coastal Vulnerability Area - Coastal Processes and Hazard Assessment to provide the information required to develop a Planning Proposal* *Coastal Wetland & Littoral Rainforest – Planning Proposal to be made to modify the existing mapping*	Coastal Hazards	TBC	PSC, MCC	-	-	Coastal Processes and Hazard Assessment to be completed as stage 2 of this process and used to determine the extent of the proposed Coastal Vulnerability Area Littoral Rainforest mapping for PSC is scheduled to be completed as part of an existing Environment Trust. Timing will be confirmed once the studies are completed
Community Engagement (Consultation)	Community and Stakeholder engagement to determine acceptability of options	All	12 months	PSC	$30,000	OEH Coast + Estuaries Program	Including willingness to contribute to management costs, fairness and equity.
Prepare Business Plan	BP will identify priority works and funding arrangements and assess when these should be undertaken.	-	TBC	PSC	-	PSC	Cost of the actions and the proposed cost-sharing arrangements and other viable funding mechanisms. As described by the Manual
Stage 4 – Prepare, exhibit, finalise, certify & adopt the CMP							**Completed December 2020**
Prepare & exhibit draft	Collate all information into draft plan		2 months	TBC	-	-	-

Deliverables	Tasks / Studies Needed	Threat	Timeframe	Who/ Enablers /Partners	Indicative Cost	Funding Options	Details
Review, finalise and certify CMP	All tasks for adoption by Council and certification by Minister		2 months	All	-	-	-
Incorporate into revision IP & R Framework		-	October 2020 – March 2021	PSC, MCC	-	PSC, MCC	To align with the commencement of the new council.
Stage 5 – Implement, monitor, evaluate and report							**From 2021 Onwards**
Council to implement and report on CMP actions and investigations through IP&R framework, EP&A framework (LEP and DCP) and CM SEPP if necessary. Agency implementation through relevant work programs							Document review period 10 years. Reporting on priority actions through the IP & R framework.

**Indicative costs are to be considered as preliminary estimates only and are subject to the development of a detailed scope of works for each item.*

Potential investigations for consideration as management actions for implementation in Stage 5

- Urban stormwater high risk areas (in partner with PSC, MCC, DPI, OEH, Hunter Water)Identification of key parameters and targets for different areas of LGA which are reflective of the receiving water sensitivity
  - Identification of high risk water quality urban catchments
  - Preliminary works are underway in this area.
  - Priority for PSC is Medowie/Campvale due to its impact on the Grahamstown Dam drinking water catchment.
- Seagrass and other sensitive and/or unique benthic habitats e.g. sponge, soft corals.
  - Investigation into identified long-term trends on seagrass loss
- Improved understanding of Coastal Use
  - Audit program of existing infrastructure (service levels, usage projections, condition and capacity)
  - Data collection of illegal camping sites
  - Commercial fishermen user group survey
  - Audit of existing signage
- Understanding dredging feasibility (in partner with RMS, Lands, Boating Industry Association, Boat Owners Association)
  - Hydrosurvey and Hydrodynamic assessment of navigational channels
  - Cost / benefit analysis of any potential dredging works as identified by above
- Shoreline Recession rate 9in partner with PSC, MCC, OEH)
  - Ongoing monitoring of beach and shoreline behaviour and condition
  - Opportunities to utilise OEH coastal and marine LIDAR mapping
- Commercial & industrial impact on water quality
  - Auditing of commercial and industrial facilities regarding water quality impacts
- Land Contamination
  - Continuous consideration of emerging data regarding PFAS & other new and emerging chemicals of concerns and contaminants

12. Preliminary Business Case

The Port Stephens coastal zone contains diverse habitats (beaches, rocky headlands, saltmarsh, mangrove, wetland, etc.), is affected by a range of physical processes (wave run-up, erosion, sea level rise, etc.), and is a focus of development activity and recreational usage. It has many unique natural, cultural, social and economic values which attract residents and visitors in ever increasing numbers (Section 4). The increasing residential and tourist population that utilises the area has resulted in growing pressures on the natural environment. This combination of process sensitivity and escalating natural and socio-economic stressors makes the coastal zone highly vulnerable to change over time and could contribute to the loss of highly valued foreshore attributes.

There is also scientific understanding to support the implementation of appropriate coastal management. A Coastal Management Program requires a detailed risk assessment and cost benefit analysis to be performed. These processes can be used to determine the most suitable management options. As a result if Council were to remain with no Coastal Management Program in place, some of the identified risks may include:

- limited understanding of the true long term risk exposure to coastal hazards leading to;
    - Inadequate representation in management tools and guiding documents such as LEP/DCP, increasing the community's current and future risk exposure and creating future management problems, financial burden and public safety risks.
    - Continuation of reactionary ad hoc protection works which could result in negative impacts on public safety, loss of beach access and amenity and other environmental and tourism related impacts.
    - Frustration within community and agencies as to a lack of guidance for appropriate coastal management works.
- Poor understanding of future risk leading to possible loss of the “good faith” legal protection in managing coastal assets afforded to Councils who show due diligence.
- Minister can direct Councils to create one.
- Reduced access to funding sources for future capital works.
- Limitations to future government and external funding opportunities.
- Port Stephens is susceptible to permanent inundation with sea level rise and therefore the cost of "doing nothing" may be more significant than if no Coastal Management Program was prepared.

12.1 Proposed Methodology and Outcomes

Council proposes to develop one Coastal Management Program that would encompass the entire area covered by this scoping study (Figure 4). Within the Coastal Management Program would be location specific sub-plans that would address areas of identified significant risk from coastal processes. These may include but not be limited to certified Coastal Zone Management Plans for Jimmys Beach and Sandy Point, Corlette or the northern end of the Stockton Sand Dunes.

The Coastal Management Program will identify any proposed amendments to be made to the mapping of Coastal Management Areas and the evidence to support such amendments. Council proposes to prepare a Planning Proposal to amend Council’s Local Environment Plan(s) to include any updated boundaries for coastal management areas. Specifically to include the Coastal Vulnerability Area maps that are developed, in Council’s LEP(s) and the Coastal Management SEPP.

The key benefits of implementing a Coastal Management Program for Port Stephens are:

- Clear guidance on current and future actions and cost sharing arrangements
- Preservation of key community coastal values
- Standardized processes/documentation and fewer activities or projects that duplicate one another.
- Collaboration with adjacent Councils and other agencies which provides better knowledge transfer;
- Identification of risks and management responses for adaptation to coastal processes, both now and into the future. Development of actions for adapting coastal hazard risks over time.
- Identification of improvements in land-use and infrastructure planning.
- Improved grant funding opportunities, resource sharing and streamlined procurement processes.
- Collaboration with emergency agencies to develop emergency action sub-plans specific to coastal hazard management.
- Identification of recipients of proposed works in order to explore potential cost-share arrangements including private owners and investor sector financiers.
- Compliance with the planning process outlined within the *NSW Coastal Management Manual* and fulfillment of the good faith provisions of the *Local Government Act 1993* i.e. Council does not incur any liability in terms of the advice provided as a result of the Coastal Management Program.
- A strong, defendable strategic basis for management decisions affecting the coastal zone.
- A consistent and transparent process for identifying coastal management issues that is underpinned by a risk-based framework.
- Identification of areas suited to future sustainable development.
- Support for a resilient regional economy into the future.

12.2 Program Risks and Responsibilities

The key risks and challenges associated with the development of a Coastal Management Program are;

Resourcing

- Ongoing allocation of resources; financial and staffing from Councils, agencies and authorities. Based on current estimates funding only exists to enable delivery to the completion of Stage 2. Further grant funding is essential to enable completion of Stage 3 and 4.
- Co-ordination and ongoing involvement and meaningful commitment of multiple agencies during development and implementation
- Costs for subsequent development stages are a preliminary estimate only

Expectations

- Expectations of stakeholders (agencies, authorities and community) not aligning with priorities (keeping everyone happy)
- Community opinion of "yet another plan"
- Outcomes of coastal hazard assessment unpalatable to certain members of the community (insurance and perceived declined property value).

Development

- Adequate incorporation of existing CZMPs (Jimmys Beach & Sandy Point) into broader Coastal Management Program but the legislated timeframe of December 2020. (CM Act)
- Adequate representation of isolated locally significant issues

- Delays in the review and update of a suite of management tools including LEP, DCP which regulate development and local council community strategic plans, resourcing strategies, delivery programs and operational plans as Coastal Management Program is being developed.

Delivery

- Alignment of proposed management responses & land use planning tools across LGA boundaries
- Failure to deliver and integrate with Councils IP & R Framework and other authorities management tools
- Grant funding opportunities are not available to implement the actions or the costs more than initially predicted.
- Once completed the document has no ownership and resourcing and funding is not allocated.
- The next review of the IP & R framework is scheduled for October 2020 – March 2021. If the development of Coastal Management Program is delayed this will impact its efficient incorporation in to the framework

Ultimately, the process of preparing the Coastal Management Program, including Coastal Processes and Hazard Assessment modelling in stage 2, Stage 3 risk assessments and CBA, and Stage 4 preparation of the Coastal Management Action Plan outweigh the key risks and challenges. The Coastal Management Program will be highly beneficial for determining the severity of risks for the Port Stephens LGA and will outline a long term mitigation and management plan for these risks.

12.3 IP & R Framework

Incorporating coastal management into the IP&R Framework is a high priority. In the 2018-2021 Port Stephens Community Strategic Plan, the Port Stephens Coastal Management Program has been nominated as a key priority for Port Stephens Council. This nomination is significant as it reflects coastal management as a priority to the Port Stephens community and Councillors.

The itemised Key Delivery Program objectives are:

E3.1 Encourage community resilience to coastal hazards.

P3.1 Provide land use plans, tools and advice that sustainably support the community

E1.1 Protect and enhance the local natural environment.

When the Coastal Management Program is complete, we envisage it will be a key Strategic Plan within the integrated framework (Figure 9). The proposed timeline for the completion of the Coastal Management Program aligns with the review of the IP&R framework which coincides with the appointment of a new council. This will allow for direct incorporation of prioritised actions.

12.4 Costs and funding options[6]

Council has decided to do whole LGA Coastal Management Program due to the economies of scale. As we will be conducting relevant studies simultaneously through the Port Stephens

[6] Total cost from forward works, cost sharing arrangements (Table 17, Table 18)

study area (inner and out ports, open coast), it was economically beneficial to do an LGA-wide program. By doing so, we will enable cost savings for both Council and State government funding partners and other resourcing options (see below).

Funding Opportunities

Council will be eligible for funding support through the NSW Government. Major reforms have been undertaken recently in order to support coastal management and management of the marine estate. Council will apply for three funding packages to support the preparation of our Coastal Management Program.

Council will also be eligible for coast sharing arrangements with OEH and will apply for dollar for dollar funding through the NSW Coastal Management Program competitive grant program. Council will budget for this expenditure internally according to our needs (Table 18).

Table 18 Example of the cost sharing arrangements for the preparation of the Port Stephens Coastal Management Program. Costs are estimated and in-depth details and comments for funding required for each Coastal Management Program stage can be found in Table 17

CMP Stage	Description	Cost – Council	Cost – OEH Coast and Estuary Grants Program	Funding through other sources	Total ($)
All Stages	Community and Stakeholder Engagement	65,000	65,000	-	130,000
Stage 2	Determine risks, vulnerabilities and opportunities	140,000	95,000	45,000	280,000
Stage 3	Identify and Evaluate Options	40,000	40,000	-	80,000
Stage 4	Prepare, exhibit, finalise and certify CMP.	10,000	10,000	10,000	30,000
TOTAL Fee					**520,000**

The resources from other agencies could also be used including in-kind support not just monetary. In-kind support could also be provided through community participation in certain projects or collaboration with research institutions and universities (Table 17, Table 18).

Once the Coastal Management Program has been finalised at Stage 5, Council will be eligible to apply for funding under a range of other grant programs to resource the management actions required within our Coastal Management Program. This could include funding through the Environmental Trust, MEMA and DPI.

13. Community and Stakeholder Engagement Plan

Our community and stakeholder engagement plan involves consulting with both internal Council staff and key external stakeholders including the general community, Local Youth Panels and Council Committees including the Estuary Committee and Aboriginal Strategic

Committee (Aboriginal Land Councils). A stakeholder engagement plan is required to clarify messaging and distribute communications responsibilities accordingly. The engagement plan will include the consultation required for the preparation of a planning proposal for proposed amendments to the mapping of coastal management areas.

Throughout Stage 2 and 3 the plan will evolve, with the objectives for Stage 2 and 3 updating slightly according to the Coastal Management Program framework. The key components of the engagement program will be using these groups to collect the values and characteristics of Port Stephens, to raise the profile of the Coastal Management Program and determine the acceptability of management options for affected areas.

Further details of our stakeholder engagement plan can be found in Appendix 15.3.

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