# Part A
# A Systematic and Adaptive Management Program for the Coastline

**In this Part**

- Scope and intent of the Coastal Zone Management Plan
    - Council's role and strategic approach
- How the Plan has been prepared, including consultation

# 1.0 Introduction – Scope and Purpose of the Wyong Coastline Management Plan

The Wyong Shire Coastal Zone Management Plan (WSCZMP) is a Plan prepared under the NSW Coasts and Estuaries Program. It sets out Wyong Shire Council's (WSC) strategic approach to managing the risks associated with coastal process hazards to deliver sustainable coastline management for its community. Council's management of coastal process hazards will take into account important natural, cultural, social and economic values.

Public assets and private land and property along the Wyong coastline are threatened now by severe storm wave erosion. Some assets and properties are affected now by landslide hazards. In 2010, the NSW Government identified North Entrance, Cabbage Tree Harbour and Hargraves Beach as coastal erosion hotspots. Detailed hazard studies completed during the preparation of the WSCZMP have confirmed that around 50 residences are within the immediate coastal erosion hazard zone. These residences could be affected by storm erosion at any time.

With predicted climate change and sea level rise, the vulnerability of assets and properties at other beaches along the coast will increase.

The Plan addresses both urgent immediate hazards and planning to minimise long term risks. The NSW Government requires Council to consider coastal process risks for the 2050 and 2100 planning periods.

The Plan sets out strategic actions to be implemented over the next ten years. Once these actions are in place, they will continue to guide coastal use to enhance community benefits and reduce risks, for planning periods of 40 years and longer.

The Plan aims to support:

**Continuing community enjoyment of resilient coastal landscapes in times of change**

The Plan:

- Encourages and supports appropriate development in areas affected by coastal hazards. Planning controls be carefully scheduled, reviewed and updated to allow land use flexibility and prevent unnecessary sterilisation of coastal land.

- Minimises risks associated with coastal processes. Planning controls will require that new development takes coastal erosion hazards properly into account and will allow interim measures to protect existing development.

- Protects important community values of the coastline. Residents and visitors continue to be able to enjoy safe access to an attractive coastal landscape.

- Recognises that communities need clear strategic direction but also need time to adjust to new threats. The Plan will improve certainty be regular reviews of new science and policy responses.

Council will continue to monitor and evaluate progress in implementing the Plan, including performance review and outcome review, so that actions can be adjusted as necessary to get the best results for the community and the coastal environment. This ongoing review

process means that changes to State government policies and regulations such as might occur with a change of government, can be taken into account.

## 1.1 The coastline is a highly valued and dynamic landscape

The coastline of Wyong Shire Council extends approximately 33 kilometres from just south of Catherine Hill Bay to Crackneck Point, incorporating an attractive landscape of sandy beach and coastal dune systems, rock platforms headlands and bluffs (see **Figure 1.1**). The coastline has been a recreational, social, cultural and economic focus for the local community and thousands of visitors for many generations. Like other urbanised coastlines, there has been high investment in homes and community infrastructure right up to the edge of the sea and demand for residential and recreational access to the coastline continues to grow.

The coastline is a dynamic environment, subject to a wide range of wind and wave conditions, including major storms that have in the past caused severe erosion that threatened property and community access (see **Plates 1.1** and **1.2**, which show storm waves eroding Wyong beaches in 1974 and 2009). Predicted sea level rise and other aspects of climate change over the next 100 years and longer, will increase the likelihood of both long term coastal recession and short term severe storm erosion of beaches and dunes. In accordance with NSW government requirements and reflecting the lack of certainty about actual coastal responses to climate patterns, WSC has taken a relatively conservative and risk averse approach to assessing coastal process hazards. Council will review coastal hazard and risk assessments as new information becomes available.

The variations in the intensity and impact of coastal processes are a major challenge for Council, the local community and other land managers. Sustainable adaptation of coastal development, infrastructure and coastal lifestyles to the complex variability of and interactions between natural coastal systems is an overarching goal for the management of the coastline.

Sustainable adaptation of coastal communities to a changing environment means things cannot stay the same as they are now. Changes to land use and land management will be necessary.

The Wyong Shire Coastal Zone Management Plan (WSCZMP) is not a statutory land use plan, and issues such as urban boundaries and urban footprints are not within the scope of coastal sustainability issues that it can address. However, the WSCZMP is concerned with the interaction of coastal development and coastal hazards and with maintaining safe community access to a scenic coastal landscape, promoting community well being and economic success. The final WSCZMP will be certified by the NSW Minister for the Environment and will then have statutory power. **Figure 1.2** provides an overview of the interactions between community change and coastal process changes that are the focus of the WSCZMP.

### 1.1.1 Climate change and the coast

Beaches change continually in response to tides, wave energy, ocean currents, winds, storms, rainfall and runoff. Locally, it is apparent that beaches change daily, weekly and monthly in response to tides and short term weather patterns. The volume of sand and its distribution along the beach also varies with medium term weather patterns such as *el nino/la nina*. These changes can mask longer term trends, occurring over decades, centuries or longer. Sea level rise and fall associated with climate change is one of these longer term trends.


**Source:** LPI NSW (2000)

**Note:** Criteria for inclusion in coastal zone management plan:

- Affected by coastal processes in 100year planning horizon
- Coastal landform or vegetation
- First street landward of the coastline, including Crown, Council and private land
- Visual context of beaches and coastal reserves

FIGURE 1.1

Location and Extent of the Wyong Coastline



FIGURE 1.1b

North Entrance 1941 and1954,
Showing an active transgressive
dune at Curtis Parade

PLATE 1.1a
Hargraves Beach 1974

PLATE 1.1b
North Entrance 1974

PLATE 1.1c
Curtis Parade

PLATE 1.2

Curtis Parade June 2007

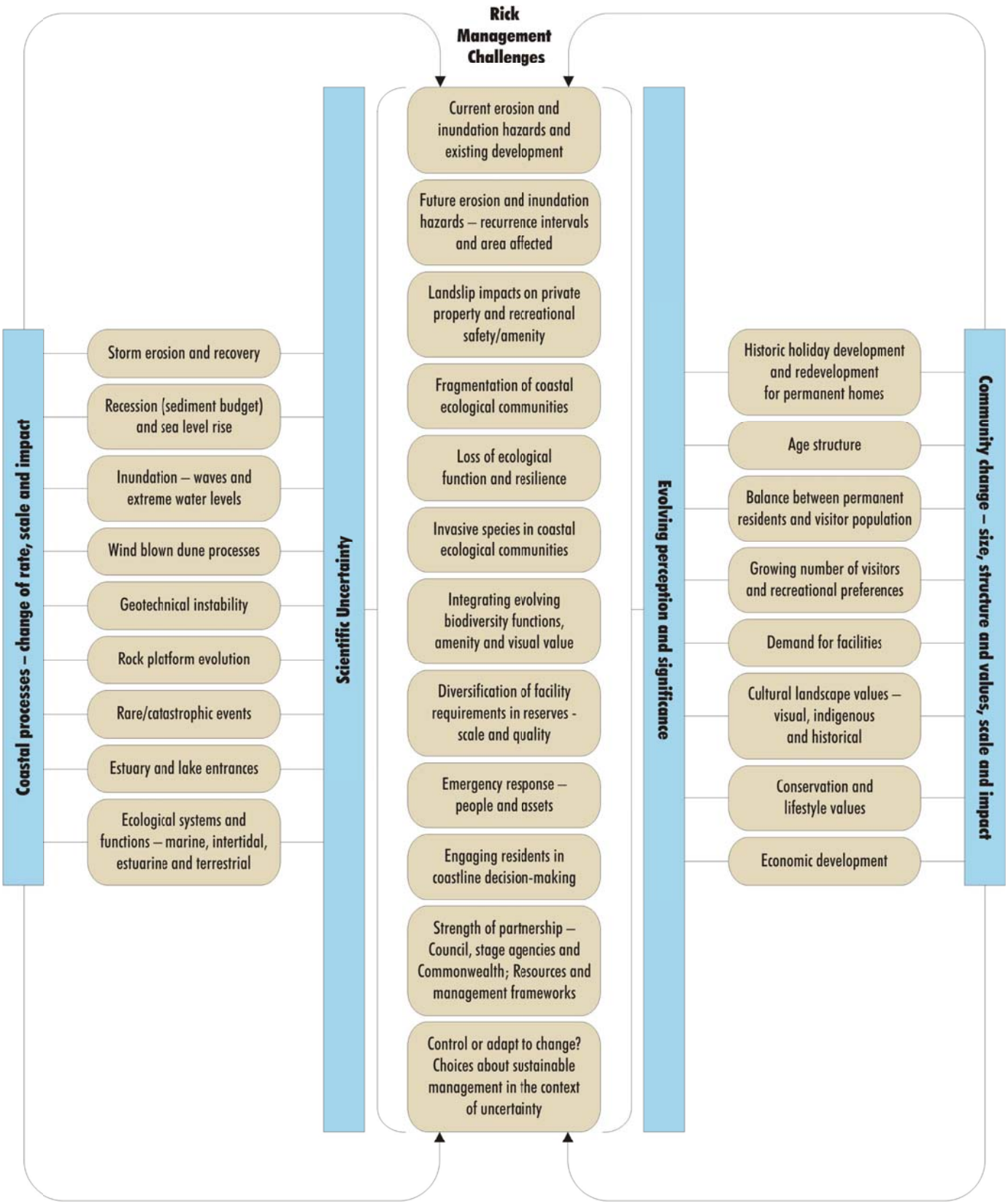



FIGURE 1.2

Managing Coastline Change Through Interactions of Coastal Processes, Community Values and Risk

The biggest changes to the NSW coastline in the last 150,000 years have been associated with climate change (see **Figure 1.3**). Long term climate change is not new, but it continues to influence the shape and stability of the coastline.

Sea level rise is perhaps the most recognised effect of climate change in coastal landscapes, but coastal processes are also affected by other aspects of climate change, such as increased water temperatures; changes to storm frequency, seasonality, type (e.g. cyclone or east coast low) and intensity; warmer winters and more extreme temperature days in summer. **Figure 1.4** summarises the ways in which climate change affects the coast (Short & Colin D. Woodroffe 2009; Department of Climate Change 2009a). Being prepared for these potential changes to already variable coastal processes is a sound approach to managing the risks to Council and community assets and to private property along the coastline.

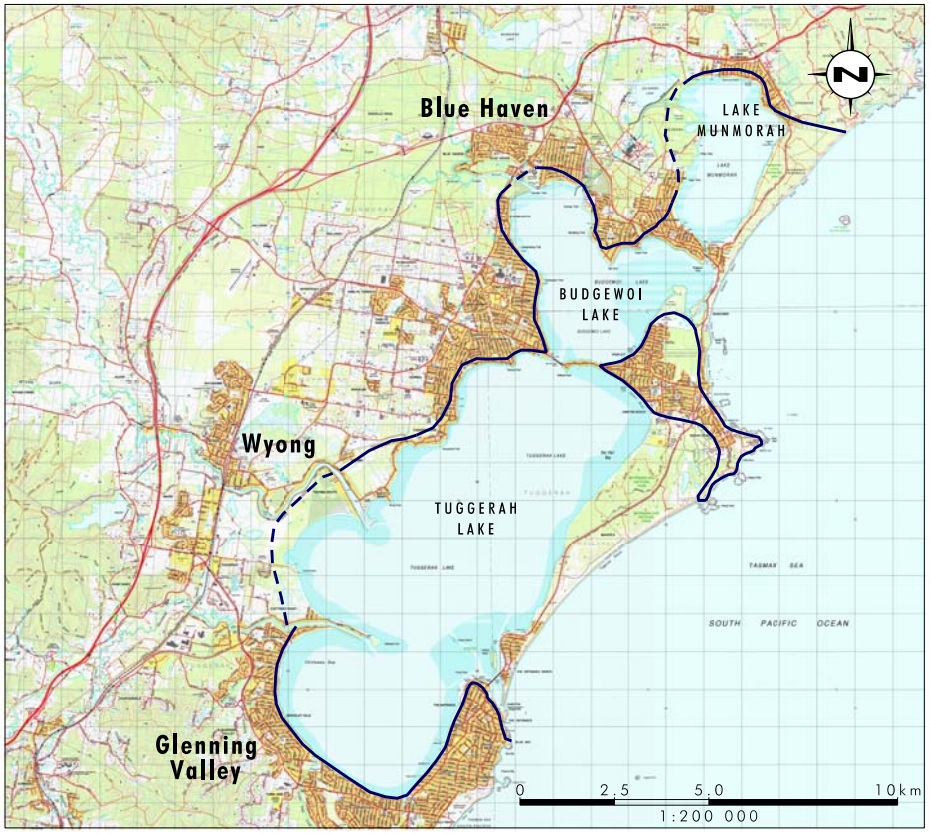
Sea level and tide gauges on Australia's east coast have recorded a clear trend of rising sea level over the last century, increasing in rate over the last 30 years (John A. Church & White 2006). **Figure 1.5** shows the tide records for Fort Denison in Sydney Harbour, which has the longest continuous tidal record in Australia, supplemented by satellite altimeter records. **Figure 1.5** also shows predicted sea level rise for the central part of Australia's east coast, based on the best available science (e.g. John A. Church & White 2006; IPCC 2007).

Over the last decade there have been many different predictions of the future rate of sea level rise and estimates of total sea level rise remain uncertain (Department of Climate Change 2009a). The Intergovernmental Panel on Climate Change (IPCC) has prepared low range, medium range and high range global models of sea level rise. Recent monitoring of sea level indicates that the rate of rise is tracking at the high end of predictions.

CSIRO and Bureau of Meteorology (BOM) (2010) have extended and refined the global models for the eastern Australian context and conclude that for eastern Australia, sea level rise is likely to be greater than the global average.

In 2009 and 2010, the NSW Government released a suite of policies, directions and guidelines to provide direction for effective management of coastal process hazards and risks, in the context of climate change and sea level rise. These include:

- NSW Sea Level Rise Policy Statement (DECCW 2009), which sets sea level rise benchmarks for planning purposes of 40 centimetres above 1990 level by 2050 and 90 centimetres above 1990 levels by 2100.
- Coastal Planning Guideline – Adapting to Sea Level Rise (Department of Planning 2009)
- Amendments (2010) to the NSW *Coastal Protection Act 1979*
- Coastal Risk Management Guide – Incorporating sea level rise benchmarks in coastal risk assessments (DECCW 2010)
- Code of Practice under the *Coastal Protection Act 1979* (DECCW 2011)
- Guide to the Statutory Requirements for Emergency Coastal Protection Works (DECCW 2011)
- Guidelines for Preparing Coastal Zone Management Plans (DECCW 2010)
- Coastal Zone Management Guide Note- Emergency Action Subplans (OEH 2011, Consultation Draft)




Indicative shoreline with last interglacial sea level (up to 5m higher then now) and early Holocene (+1-2 metres), at approximately 6000 years ago. Open bay conditions prior to establishment of Holocene sandy barrier. Norah Head/Toukley area as on island.

Late Quaternary sea level curve based on coral terraces, (after Chappell, 1974, b)

Envelope of relative Holocene sea levels along the NSW coast, (after Thom and Chappell, 1975)

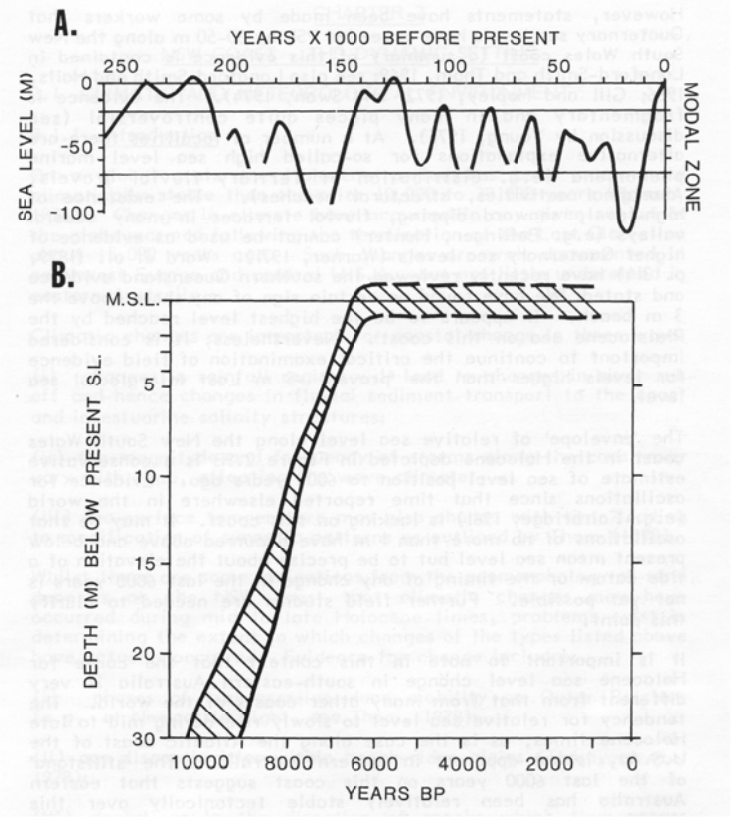



FIGURE 1.3

Long Term Sea Level Patterns and Maximum Past Shoreline Extent

Source: Department of Lands 2006

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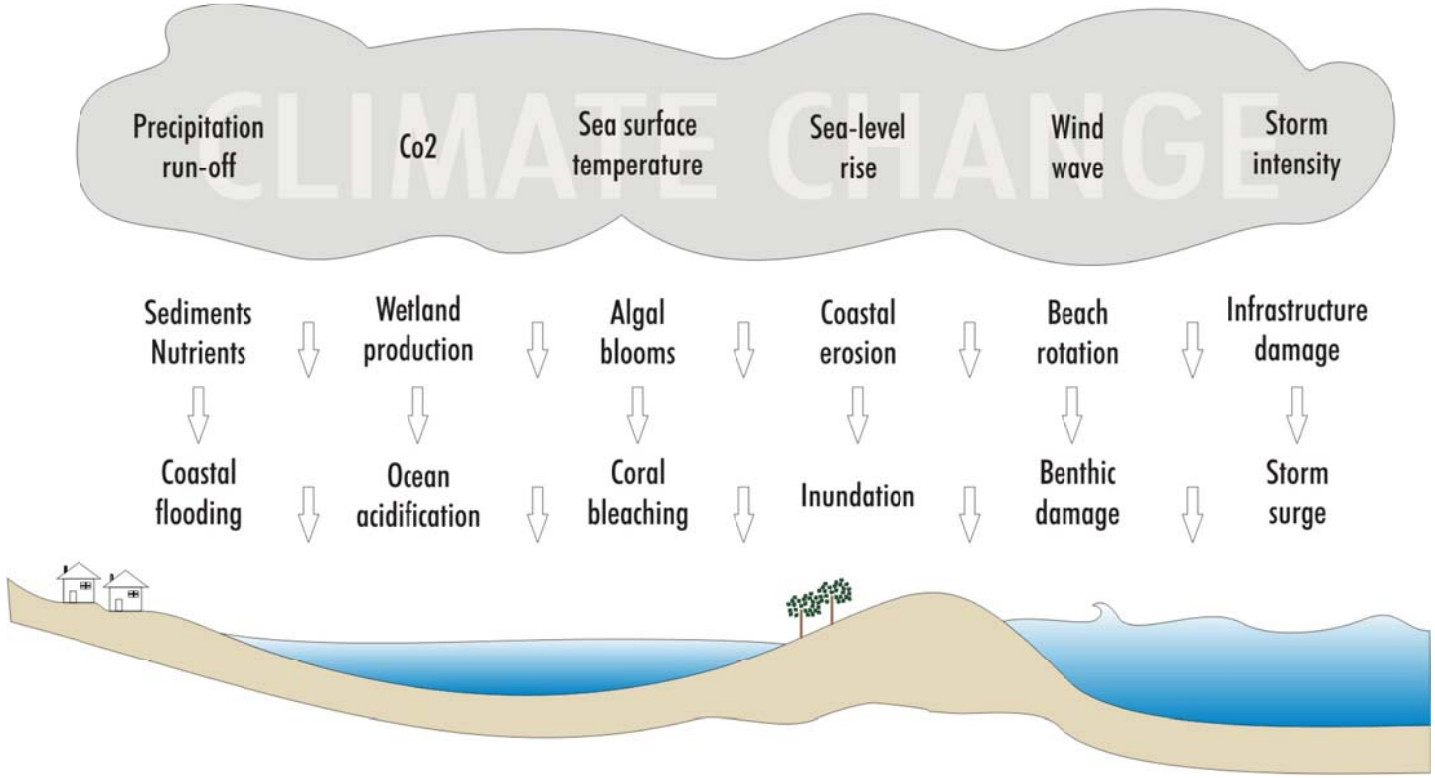
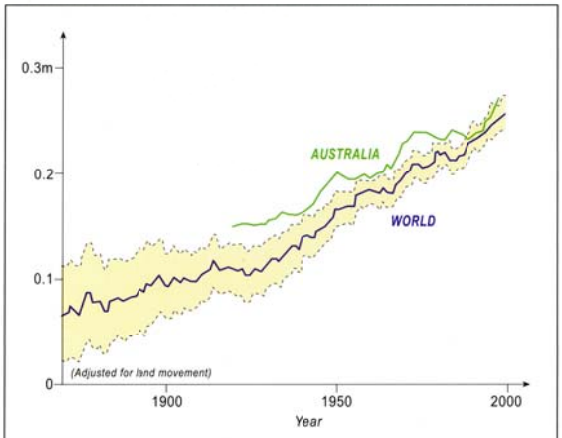



FIGURE 1.4

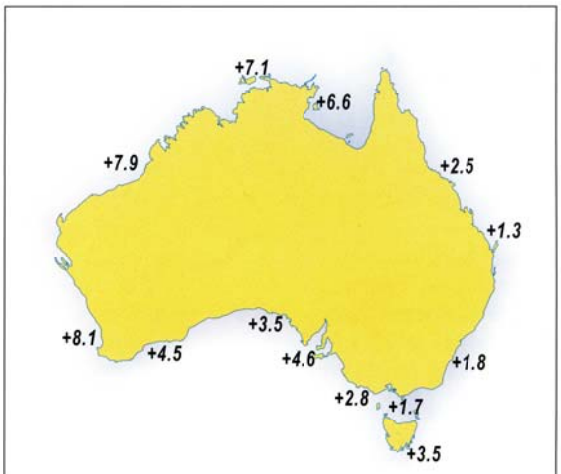
Climate Change Impacts and Drivers on the Coast

**Source:** Short and Woodroffe 2009, as reproduced in DCC 2009

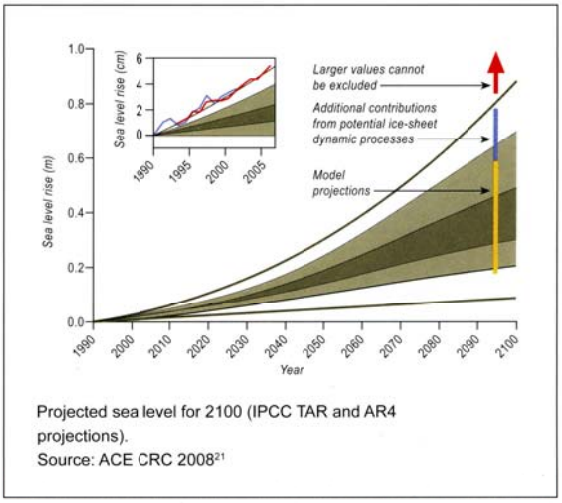
**File Name (A4):** R03_V1/1869_017.dgn




Historical sea-level rise from tide gauges and satellite altimeter data.
Source: Church and White 2006[19]




Local sea-level rise (mm/year) from the early 1990s to 2008.
Source: NTC 2008[20]




Projected sea level for 2100 (IPCC TAR and AR4 projections).
Source: ACE CRC 2008[21]

FIGURE 1.5

Recent and Predicted Sea Level Rise

Source: Church and White 2006 and IPCC, as reproduced in DCC 2009

File Name (A4): R03_V1/1869_018.dgn

Wherever possible, for clarity and efficient management, Council will align its policies and plans with the strategic coastal zone frameworks established by the NSW and Australian governments (see **Section 1.2**). WSC has adopted the NSW Government sea level rise benchmarks for planning purposes (DECCW 2009). These benchmarks are based on the best available science, including measured sea level rise and trends over the last 100 years.

The benchmark figures are 40 centimetres above 1990 levels by 2050 and 90 centimetres above 1990 levels by 2100, with an expected trend of continuing sea level rise after that time. Council has also developed a draft Climate Change Policy (2010) which takes the predicted sea level rise and other climate change factors into account. Council will review the coastal hazard assessments and its policy responses as new information confirming rates of sea level rise and the impact of higher sea levels on the coast becomes available.

Climate change, and particularly sea level rise, has very serious implications for the Wyong coastline. As shown in **Plates 1.1** and **1.2**, some development on the coast is already affected by severe erosion threat. Predicted climate change will make these threats worse.

## 1.2 Council's role in coastal zone management

All levels of government have a role in managing the coast, but local government has a key role in land use planning and on ground works for coastal communities. Local government is required to integrate state and national government policies, priorities and statutory requirements in its local planning decisions, advice to local communities and in managing public land in its control.

**Local government** (such as WSC) has the major implementation role in coastal zone management. Councils plan and do on-ground works for their communities. Councils must properly consider coastal process hazards in their local land use planning, natural resource management and planning and community development planning.

WSC has a central role and a strong commitment to sustainable management of the coastline:

- it gives effect to National, State and regional legislation and policy in its land use and land management decisions and in emergency response for coastal emergencies;
- it has a commitment to sustainability in all its activities
- it is a land manager in its own right;
- it is the government interface for the community; and
- it provides diverse services and facilities for community enjoyment of the coast.

State legislation requires that Wyong Shire Council prepares a coastal zone management plan for its local government area. Local Environmental Plans (LEPs) and Development Control Plans (DCPs) implement strategic land use decisions from the coastal zone management plan. Council owns and/or manages coastal land on behalf of local communities. Council works in partnership with community organisations to manage coastal vegetation and to provide safe and attractive beach access facilities for residents and visitors.

| | |
|---|---|
| The **Australian Government** manages matters of national importance, sets broad policy direction and priorities for Australia's coast, funds and conducts research into coastal process impacts and provides some funding for on-ground works through the Caring for Our Country Program.<br>The current Australian Government framework for coastal zone management is outlined in **Section 15.5** of **PART C**. | The **NSW State Government** sets the statutory and policy context for coastal zone management and for related land use planning, environment protection and natural resource management in NSW. It prepares Guidelines and Directions and sets standards to drive a consistent approach to issues affecting the coastal zone. It provides some funding to local government for the preparation of coastal zone management plans and emergency action sub-plans that are required by the *Coastal Protection Act* and also contributes to funding for on ground works.<br>The current NSW coastal zone planning framework is discussed in **Section 15.4** of **PART C**. |

Diverse sections of Wyong Shire Council have been involved in the preparation of the Coastal Zone Management Plan, and many sections of Council have a role in the implementation of the Plan. The overall implementation process will be managed by Council's Environment and Natural Resources Unit, reporting to the Director of Environment and Planning Services. Policies and strategies across Council will be aligned to provide a clear local scale coastal management framework for the community.

Council does not have the resources or the statutory power to achieve all the changes needed to achieve sustainable management of its coastline. In addition, not all of the proposed changes to land use, land management and asset management are currently funded in Council's budget. Council will consider a number of potential funding sources so that essential risk reduction works can be implemented in a timely manner.

To ensure timely and coordinated delivery of the priority actions in the WSCZMP, Council will foster its partnerships with key State agencies such as Department of Primary Industries (coastal lands, incorporating sections of the former Land and Property Management Authority (LPMA)) and Office of Environment and Heritage (OEH), the Australian Government Department of Sustainability, Environment, Water, Population and Communities (DSEWPC), DCCEE and with land holders and community based organisations along the coast.

### 1.2.1 Role of the WSCZMP

The Plan is designed to guide, integrate and coordinate Council's actions so that:

- Council officers and Councillors are aware of their responsibilities under the relevant NSW legislation and policies and implement those responsibilities in ways that lead to sustainable coastal communities

- State agencies are aware of Council's objectives for the coastline and the principles that Council seeks to implement to protect and enhance the condition of valued coastal assets (including natural environment, biodiversity, vibrant and resilient communities, a robust economy) in its care.

- Local communities and visitors have access to information about coastal processes and the scale and scope of their impact on current and future lifestyles and activities.

- Local communities and visitors understand the rationale for Council's proposed coastline management strategies and priorities and how this rationale influences Council's decisions about land use and development along the coast.

- Local communities have clear direction about Council's requirements for future development along the coastline, where coastal hazards must be taken into account.

- All stakeholders appreciate the consequences of alternative approaches to the management of the coastline in the context of changing environmental and socio-economic conditions. In particular, all stakeholders recognize that the best available science indicates that some management responses have a significantly lower likelihood of delivering measurable protection and improvement of the condition of the coastline than other management responses.

- All stakeholders share an awareness of an adaptive approach to managing the coastline, with regular evaluation and reporting of progress. The details of management responses are adjusted to accommodate new information about the drivers of change, the consequences of management responses and whether expected improvements to the condition of the coastline have been achieved.

## 1.3 Council's policies and strategic approach

Based on the best available information, Council expects that many assets along the Wyong coastline and the natural systems and community systems in which they are set will be vulnerable to coastal processes in coming decades. However, the rates of change to pressures associated with coastal process are still uncertain.

To manage change and uncertainty, Council's coastal strategy has three main components.

### Council's strategic approach to coastal hazard management

- **Monitor actual change** so that Council can use best available real information in its coastal zone management. Keep the community informed of new knowledge about coastal hazards.
- **Allow some interim protection of public and private assets** in immediate hazard zones, to give residents and businesses time to develop adaptive coastal land uses. This will also reduce the risk of sterilizing coastal land unnecessarily.
- In the longer term, **Council favours retreat of assets and infrastructure** out of coastal hazard zones

These three components are set in an **adaptive management framework** (**Section 1.5**). By taking an adaptive management approach, Council acknowledges a quality plan will reflect new knowledge gathered over the life of the Plan and beyond. Regular reviews and updates will take new information into account and ensure that the Plan remains focused and relevant.

### 1.3.1 Council's policies for coastal zone management

Within this broad strategic approach, Council will design responses that are guided by the following policies:

- Council will seek flexible options for managing hazards and risks that facilitate ongoing appropriate use of vulnerable land until risks become unacceptable. Council will not sterilise valuable coastal land unnecessarily. This will require careful monitoring and evaluation of actual change and well understood triggers for action.

- In managing coastal hazard risks, Council will give priority to actions which can be implemented with its own resources and which have the effect of controlling risks in the immediate and longer term timeframes. Planning controls for new development are therefore a priority for the coast.

- Council will use a suite of land use planning tools (LEP and DCP clauses, design guidelines) to ensure that new development does not increase the risks associated with coastal hazards in the 2050 and 2100 planning horizons.

- In general, Council planning controls for the coast will use a 2050 planning period for new residential development on land already appropriately zoned and a 2100 planning period for major infrastructure, new subdivisions and strategic studies.

- Council will inform and consult with residents and landholders about coastal zone management issues affecting their property and their enjoyment of the coast.

- In general, in the longer term, Council will apply adapt or retreat strategies to coastal development and infrastructure. This requires relocation of assets to outside coastal risk zones and/or redesign of assets and infrastructure so that they are more resilient to coastal erosion and recession. Council may approve temporary or short term protection works for public and private assets in immediate hazard zones, to allow landowners time for adapt and retreat strategies to be refined and implemented.

- Council will not approve protection of existing assets or private development where the works would increase risks to other land owners or to community use of the coastal landscape. Council will consider the public and private costs and benefits of protection works, retreat and adapt strategies.

- Council is adopting the NSW Government policy that private landholders should contribute to the cost of constructing and maintaining coastal protection works that benefit them. Council also proposes that in the longer term all Shire landholders should contribute in some way to the costs on managing community infrastructure in coastal hazard zones, so that services (both ecosystem services and infrastructure services) that are broadly enjoyed are able to be maintained.

- Council accepts that to maintain coastal biodiversity, coastal ecological communities must have room to migrate (roll back landward) and adjust to new climate and sea level conditions. Council's policy is to maintain buffers zoned to enhance ecological resilience, wherever practicable. Council will also continue to support projects that enhance the resilience of important coastal ecological communities.

### 1.3.2 Strategic actions

Council has carefully considered a range of potential management responses that could reduce or control the identified issues and risks. The responses that are proposed in the eight **Action Plans** in **PART B** are those expected to effectively and efficiently manage important risks with a minimum of unanticipated side effects. All recommended actions are supported by a clear logical path from current status and trends, to objectives, to anticipated management outcome and ways to measure and evaluate progress, so that Council and its communities can be confident that the Plan will continue to provide a best practice pathway towards a resilient and sustainably managed coastline.

In overview, Council proposes strategic responses within three time frames. The relationship between broad strategic component and implementation time frames is shown in **Table 1.1**. All timeframes are subject to resources being available. Details about actions relevant to each strategy and their implementation are in **PART B**.

## Table 1.1 - Timing and strategy

| Strategy/Timeframe | 2 years (Urgent)<br>**Most actions for this period will use Council funds**<br>**ESTABLISH SYSTEMS AND PLANNING CONTROLS** | 5 years (High priority)<br>**Diversity funding sources for coastal zone management**<br>**IMPLEMENT SYSTEMS AND PLANNING CONTROLS – CONSOLIDATE AND REINFORCE** | 10 years (medium priority)<br>**Maintain and diversity funding sources for coastal zone management**<br>**IMPLEMENT, EVALUATE PROGRESS AND REVIEW THE PLAN** |
|---|---|---|---|
| **Monitor actual change** | • Establish systems for adaptive management<br>• Establish community awareness and communication programs<br>• Secure the role of coastal coordinator | • Collect quality data about climate change, coastal process responses and impacts.<br>• Keep abreast of all relevant new policy and guidelines for coastal zone management<br>• Enhance collaboration with local Aboriginal knowledge holders | • Review assumptions, progress and strategic approaches<br>• Use best available monitoring and change evaluation techniques, such as digital terrain models based on regularly collected LiDAR and LADS data. |
| **Allow some interim protection of public and private assets**<br>This approach includes 'accommodation of change' and 'defence of existing coastal development'.<br>Both strategies involve maintaining existing land uses, at least until certain trigger conditions are met.<br>See **Section 6.1.2** for more information | • Allow interim protection of **existing** assets (in accordance with legislation and guidelines) that are affected by hazards now, so that landholders can prepare for longer term change.<br>• Strengthen the ecological resilience of the coast using beach nourishment, dune enhancement and vegetation management. | • Continue to allow interim structural protection measures, in accordance with legislation and guidelines<br>• Continue to strengthen the ecological resilience of the coastal zone.<br>• Integrate management of coastal processes and flood hazards in the coastal zone | • Evaluate the cost/benefit of alternative sand sources to buffer coastal ecological communities and private assets against climate change induced coastal recession<br>• Evaluate the viability of coastal protection structures |
| **Retreat of assets and infrastructure to outside coastal hazard zones**<br>This strategy is known as 'planned retreat'.<br>See **Section 6.1.2** for more information | • Prepare for planned retreat -Use precautionary planning tools to reduce future coastal hazard risks for **new development**.<br>• Advance planning for coastal recreation facilities such as coast walking track and Plans of management for coastal reserves (with any new facilities located outside of relevant coastal risk areas). | • Implement and monitor LEP and DCP requirements in the coastal zone – planned retreat from receding immediate hazard zone.<br>• Continue to facilitate visitor attracting recreational access infrastructure, outside immediate hazard zones (such as planning for the relocation of priority surf club facilities) | • Implement, monitor and review LEP and DCP requirements in the coastal zone – planned retreat from receding immediate hazard zone.<br>• Continue to facilitate visitor attracting recreational access infrastructure, outside immediate hazard zones (such as relocation of surf clubs) |

## 1.4 How will implementing the plan be different to what happens now?

WSC has diverse responsibilities as a decision maker, landowner and land manager along the coastline. These responsibilities are managed by different sections of Council, and are also shared with different State and National authorities.

The WSCZMP provides a new and consistent framework for managing the coastline, building on and integrating existing programs. The Plan:

- Provides an overarching vision for the future of the Wyong coastline
- Sets out clear objectives for future management, together with targets against which progress can be measured
- Is based on the best available science about coastal processes and the coastal environment
- Is based on a systematic assessment of risks and a range of potential management options that are designed to reduce risks associated with coastal hazards
- Is designed to be reviewed and updated as significant new information becomes available, particularly in relation to climate change and sea level rise
- Will enhance coordination and integration of coastal issue management across all sections of Council
- Informs Council's planning requirements for coastal development so that landholders have clear and accurate advice about where development can occur and relevant controls.
- Provides information about the costs of maintaining coastal infrastructure and other assets for the benefit of the community (including visitors).
- Explains Council's options for raising funds to invest in capital cost and maintenance of coastal protection works and other actions to maintain and improve the condition and function of natural and built assets.
- Will position Council to develop funding partnerships with the State and Australian governments (as has been achieved for the Tuggerah Lakes Estuary for instance)
- Presents a prioritised program for upgrading community assets along the coast, so that safe and appropriate access to the coast is available for everyone to enjoy.

## 1.5 An adaptive approach

The WSCZMP is the result of a systematic analysis of the best available information on coastal hazards as they affect the Wyong coastline now and for planning timeframes of 50 years, 100 years and beyond. The impact of coastal hazards has been used to better understand risks that Council and other stakeholders manage along the coast – risks involving private and public assets, natural and built assets, recreation and employment, risks involving community values and private values.

The Plan sets out a strategy for reducing key risks, by implementing priority actions over the next 10 years. It also recognises significant uncertainty about how changes to coastal hazards will unfold and establishes a framework for adaptive management of the coastline for decades to come. The adaptive framework means that as new knowledge becomes available (or other changes to the management framework, such as new legislation, are introduced), Council will update priority actions in consultation with community and government stakeholders.

**Figure 1.6** (from NSW NRC 2005) shows the components of a quality focussed adaptive management cycle, which aims to continually improve how the coast is managed.

The four step adaptive management framework for ongoing improvement of the WSCZMP is outlined below.

### Step 1: Benchmark current condition (accessing and using the best available information in planning)

Actions that ensure that sufficient data is available to make an informed decision. Establishing data management systems and systems to understand change are also part of Step 1.

The Coastal Knowledge Action Plan (**Section 8.0**) shows how the various studies, monitoring and reporting are connected.

### Step 2: Select and implement actions to reduce risk to property, community assets, safe community recreational access to beaches and Council infrastructure.

Reduction of the risks associated with coastal hazards may involve any of the options outlined in **Section 6.0**. Other risks will be reduced by awareness raising, education or community development activities.

Actions identified as part of Step 2 in each Action Plan are those identified through the evaluation process set out in **Part D** as providing the best benefits relative to costs at the community and landscape scale.

Some actions are locality specific. Some actions apply to the whole of the coast. Actions of different types will contribute to sustainable management. For some issues multiple actions are necessary for effective risk reduction. For instance, a combination of community awareness raising, community capacity building, land use planning, and investment in on ground works may be necessary.

### Step 3: Enhance knowledge and monitor achievements

This step is about keeping track of what has been done and what those actions have achieved, as well as filling critical gaps in knowledge that will make management more effective. For instance:

- Conduct research into specific coastal process issues
- Monitor significant changes in the science underpinning coastal zone management, such as new IPCC (Intergovernmental Panel on Climate Change) reports.
- Data collection and record keeping, such as Council, State government and community monitoring programs (for instance photography and water quality sampling, vegetation assessment). Support Landcare/Coastcare group involvement in on ground works and also in community based monitoring programs.

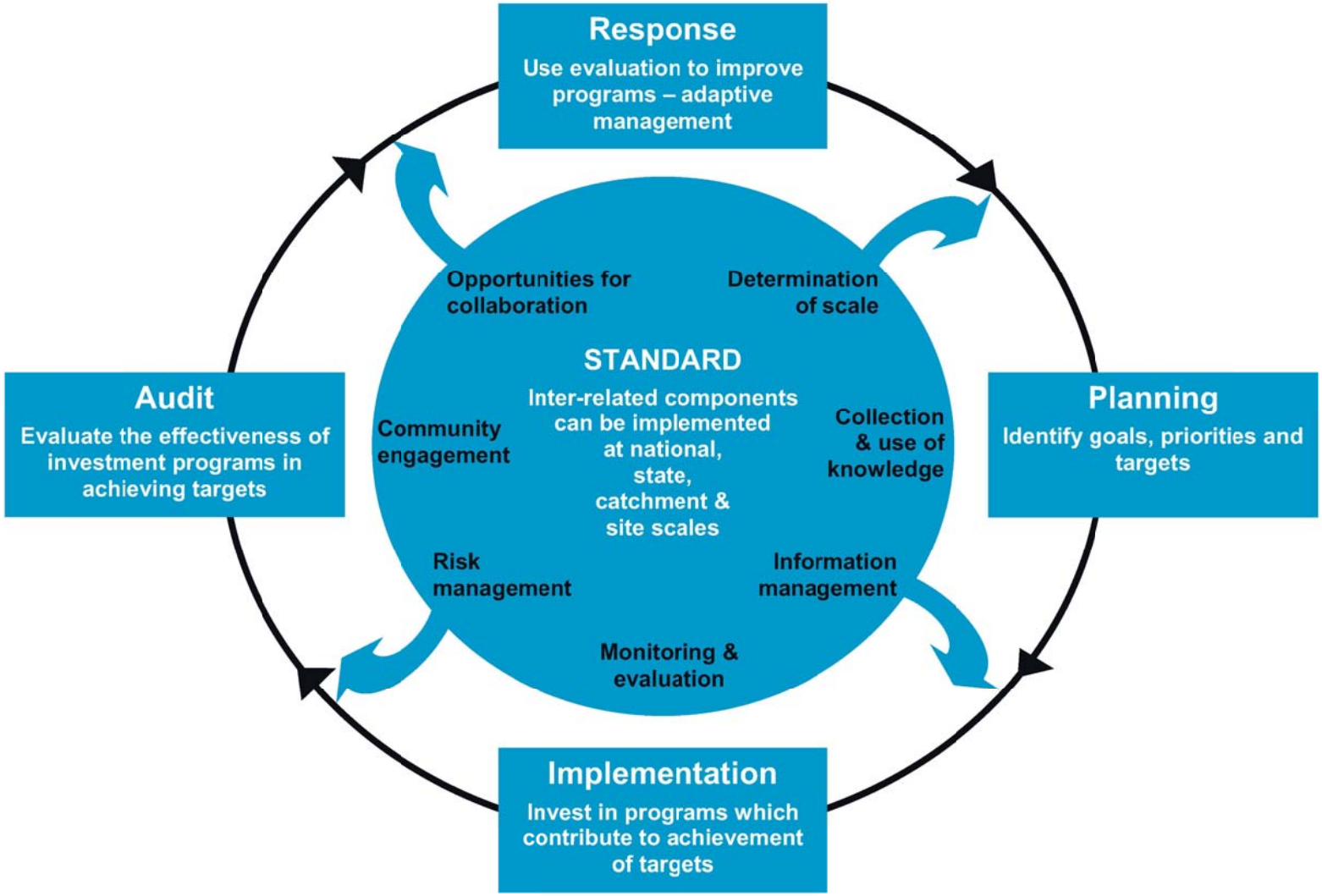



FIGURE 1.6

Adaptive Management Cycle

Source: Natural Resources Commission September 2005

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### Step 4: Status review and progress evaluation, to improve programs

This step is about reflection on whether actions continue to be appropriate and cost effective. Changes can be made to take into account well targeted, local scale knowledge as it accumulates. This step includes:

- Technical review – do the actions reflect quality science?
- Review progress and focus at approximately three to five yearly intervals (align with other Council reporting processes) by Council Coastline Management Committee
- Report progress, achievements and new challenges to the community

# 2.0 Project spatial focus

## 2.1 Where does this Plan apply?

The WSCZMP applies to the **coastline** of Wyong Shire. The coastline is part of the 'coastal zone' (see **Section 2.2**). The Plan uses 'coastline' in the same sense as the NSW Coastal Hazards Policy (NSW Government 1988) and the NSW Sea Level Rise Policy Statement (DECCW 2009). 'Coastline' in this context refers places that are directly impacted by coastal processes such as waves, currents, tides and wind. The landward extent of the coastline is as far inland from the shoreline as the hazard impacts of very large storms and other process threats, taking into account the effects of sea level rise to 2100. These hazards include beach erosion, shoreline recession, coastal entrance instability, vegetation degradation and sand drift, coastal inundation, slope and cliff instability and stormwater erosion.

In preparing the coastal zone management plan, Council commissioned detailed studies of coastal hazards for locations along its coastline where coastal processes were considered likely to impact on existing development or land zoned for development. The hazard studies do not cover the entire coast; for instance the coastal erosion hazard studies do not cover national park or open space where there is no access infrastructure.

The 'primary objective' of the NSW Sea Level Rise Policy statement (which sets sea level rise planning benchmarks to 2100 are beyond) is to *minimise the social disruption, economic costs and environmental impacts resulting from long term sea level rise'*.

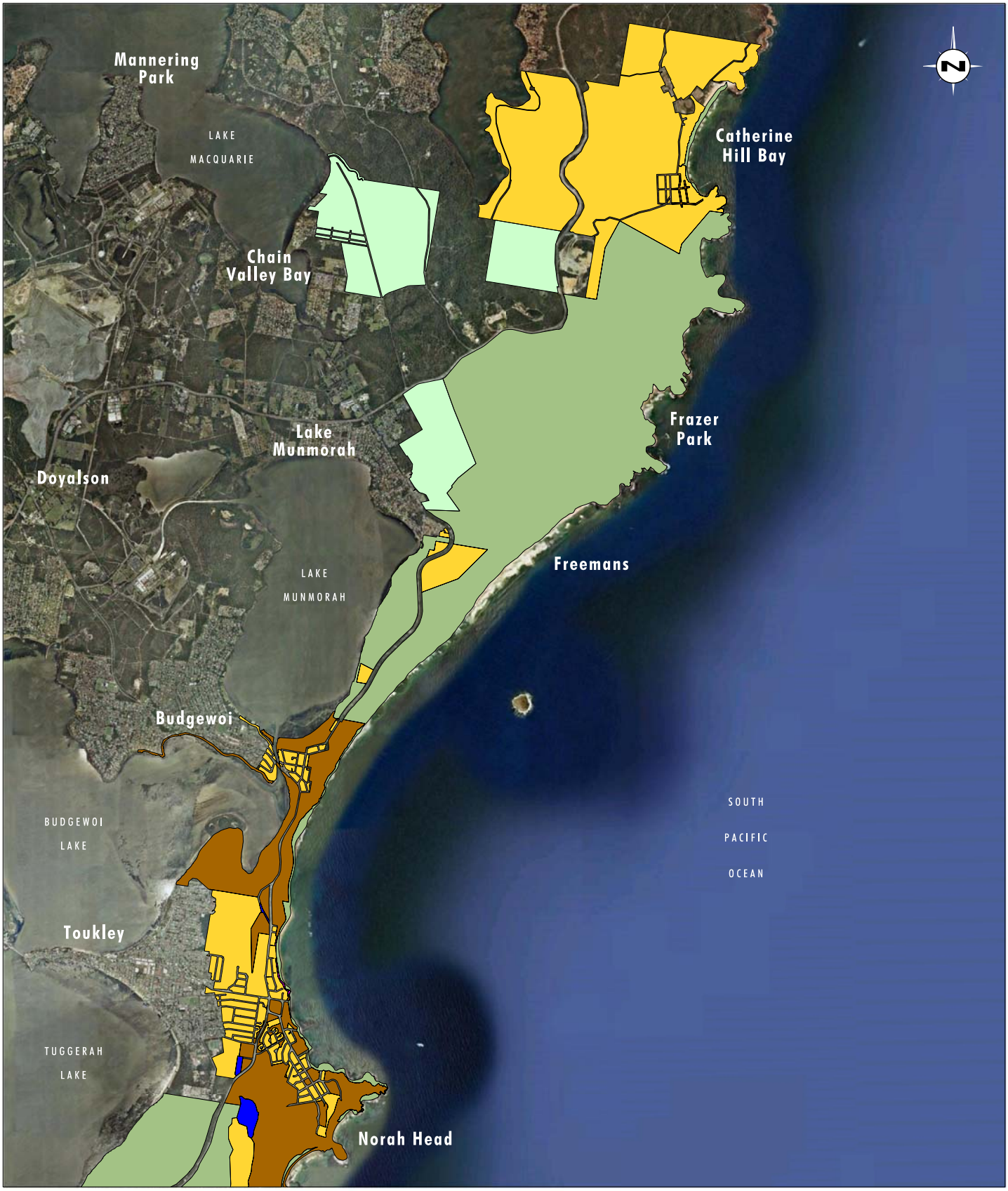
The area considered in the coastline management plan is the area where long term land use or other community value would be affected by sea level rise to the extent that adaptive risk mitigation planning and/or on ground works would be necessary to protect the values of the coastline.

In general, the core area covered by the WSCZMP includes all coastal reserves and the land between Mean High Water and the first street landward of coastal landforms, although in some areas coastal hazards present serious risks and land and property further from the shoreline.

Council shares management of its coastline and its coastal zone with OEH for national parks and with the Department of Primary Industries (former sections of L&PMA) for Crown land (including the ocean floor, State Parks and some coastal reserves). Land and sea managed by these stakeholders is shown in **Figure 2.1**. Where specific amendments to policies or operational activities within Crown land or national parks would be needed for Council to meet the management targets of the WSCMP the WSCMP highlights the inconsistencies and suggests amendments that would support better co-ordinated, sustainable natural resource management along the entire coast of the Local Government Area (LGA).

## 2.2 Distinctive coastal landscapes

The Wyong coastline comprises multiple localities with distinctive character, based on the physical quality of the landscape (e.g. landforms, local relief), the nature of views, the history of use and development, and community identity. The WCZMP recognises these local scale landscapes and communities. The Plan identifies ten planning areas. The rationale for these planning areas is summarised in **Table 2.1**, and further background information can be found in **Section 17.0** in **PART C**. These localities are shown in **Figure 1.1**.




Source: Google Earth

0 1.0 2.0 4km
1:80 000

## Legend

- Crown Land
- Freehold Land
- Local Government Authority
- National Parks and Wildlife Services
- State Conservation
- Other

FIGURE 2.1a

Land Tenure
Public and Private

File Name (A4): R03_V1/1869_147.dgn


Source: Google Earth

0 1.0 2.0 4km
1:80 000

## Legend

- Crown Land
- Freehold Land
- Local Government Authority
- National Parks and Wildlife Services
- Other

FIGURE 2.1b

Land Tenure
Public and Private

In combination, the eight **Action Plans** in **Part B** show how the character and key landscape values of these coastal precincts will be managed.

**Table 2.1 - Wyong coastline – distinctive coastal landscapes**

| Locality | Key defining characteristics |
|---|---|
| *Expansive ocean beach and dunes*<br>*Indigenous cultural heritage*<br>Munmorah State Conservation Area | Managed by OEH<br>Rocky coastline with small embayments.<br>High visual quality<br>Conservation and habitat value of rock platforms and reefs<br>Principally used for low key recreation and conservation.<br>Managed by OEH – NPWS, not Council. |
| *Expansive ocean beach and dunes*<br>Birdie Beach | Approximately 3.5 km open ocean beach, forming the low barrier which encloses Budgewoi Lake and Lake Munmorah.<br>Dunes were formerly mined for mineral sand in the 1960s.<br>Popular for beach fishing.<br>Part in Munmorah State Conservation Area (managed by OEH - NPWS), part Crown land<br>Includes the Lakes Surf Club – very popular recreational beach |
| *Residential coast*<br>Noraville and Cabbage Tree Harbour; Hargraves Beach | Long established residential area on high cliffs; significant local heritage value. Ocean access boat ramp.<br>Coastal erosion hotspot at Cabbage Tree Harbour – geotechnical hazards, exacerbated by future sea level rise.<br>Significant immediate coastal erosion hazard affecting properties at Hargraves Beach. |
| *Residential coast*<br>*Indigenous cultural heritage*<br>Norah Head | Eastern most point in the Shire, heritage and conservation value (rock platform bird habitat).<br>Norah Head Lighthouse<br>Very popular area for low key recreation and tourism |
| *Expansive ocean beach and dunes*<br>Soldiers Beach | Popular recreational beach. No development other than surf club. Caravan park accommodation above beach (important for tourism). Rock platform and reefs have significant habitat value.<br>Severe erosion experienced in 1974 storms. |
| *Expansive ocean beach and dunes*<br>*Indigenous cultural heritage*<br>Tuggerah Beach (part in Wyrrabalong National Park) | Like Birdie Beach, approximately 3.5 km of open ocean beach, forming the barrier which encloses Tuggerah Lake; backed by a stabilised transgressive dune field (at the northern end, in Wyrrabalong National Park – managed by OEH-NPWS).<br>Outside the National Park, the dune system has been heavily disturbed by uses such as former mineral sand mining, waste disposal site. It is now rehabilitated and developed as a golf course and resort. |
| *Residential coast*<br>North Entrance | Residential, tourism and local business centre, with important foreshore reserves on the entrance channel frontage and ocean beach access. Potential for further tourism development (see Wyong Shire Council & Dickson Rothschild Pty Ltd 2009, Precincts 1 and 2). The area includes low lying land subject to inundation. Important view corridors. The ocean frontage has high value properties, often redeveloped within last 10-15 years.<br>Coastal erosion hotspot, severely affected in 1974 and with numerous homes within the immediate coastal hazard area. |

| Locality | Key defining characteristics |
|---|---|
| *Historic to modern recreation and tourism*<br>*Residential coast*<br>The Entrance | Oceanside recreational destination for residents and visitors. Major tourism draw card for the shire. Long history as a coastal tourism destination, with heritage listed ocean baths and surf club buildings. Major commercial development along the coastline. Outstanding coastal views. Strong links between entrance channel area and open coast. See The Entrance Peninsula Planning Strategy, Precincts 4, 9, 10 (Wyong Shire Council & Dickson Rothschild Pty Ltd 2009) |
| *Historic to modern recreation and tourism*<br>*Residential coast*<br>Shelly Beach, Blue Bay, Toowoon Bay and Bateau Bay | Well established residential areas, with some waterfront reserve properties with outstanding ocean views. High value properties, often redeveloped within last ten years.<br>Popular tourist accommodation and popular protected beaches in peak holiday periods. See The Entrance Peninsula Planning Strategy, part Precincts 12 and 16 (Wyong Shire Council & Dickson Rothschild Pty Ltd 2009). |
| *Expansive ocean beach, dunes and cliffs*<br>Wyrrabalong National Park (Crackneck) | Steep bluff and coastal cliffs, extensive rock platform. Major conservation values plus passive recreation. Attracts tourists.<br>Managed by OEH (NPWS), not by Council. |

## 2.3 Coastal Policy definition of the coastal zone

The Wyong Shire coastline is part of the NSW **coastal zone**. The broader coastal zone includes the Tuggerah Lakes system and their catchment, as well as ocean waters and the sea bed. WSC has previously prepared and is implementing a management plan for the Tuggerah Lakes. The WSCZMP is designed to integrate seamlessly with plans for the sustainable management of the broader coastal landscape (see **Section 2.2.1** and **Figure 2.2**).

The NSW **coastal zone** is formally defined by the NSW Coastal Policy (Department of Planning 1997). It is defined on maps prepared by the then Department of Planning and includes:

- Three nautical miles seaward of the mainland and offshore islands;
- One kilometre landward of the open coast high water mark;
- One kilometre around all bays, estuaries, lakes, lagoons and islands;
- The tidal waters of coastal rivers to the tidal limit or to the upstream limit of mangroves.

An even broader concept of the coastal zone is adopted by the Hunter-Central Rivers Catchment Management Authority (HCRCMA) in developing its Catchment Action Plan (CAP) (HCRCMA 2007), incorporating coastal catchments and local government areas to focus attention on the interconnectedness of all parts of the catchment. A broad definition of the coastal zone is also adopted in the NSW State Plan (NSW Government 2006)

### 2.3.1 Integration of coastline and coastal zone

The WSCZMP is one of a suite of strategic management plans to guide management of the Wyong Shire's coastal zone. The relationship between these plans is shown in **Figure 2.2**. All of these plans contribute to achieving the targets for natural resource and community priorities under the NSW State Plan (2010), particularly Priority A4 and Priority A8 (for more details, see **Section 15.4** in **PART C**).

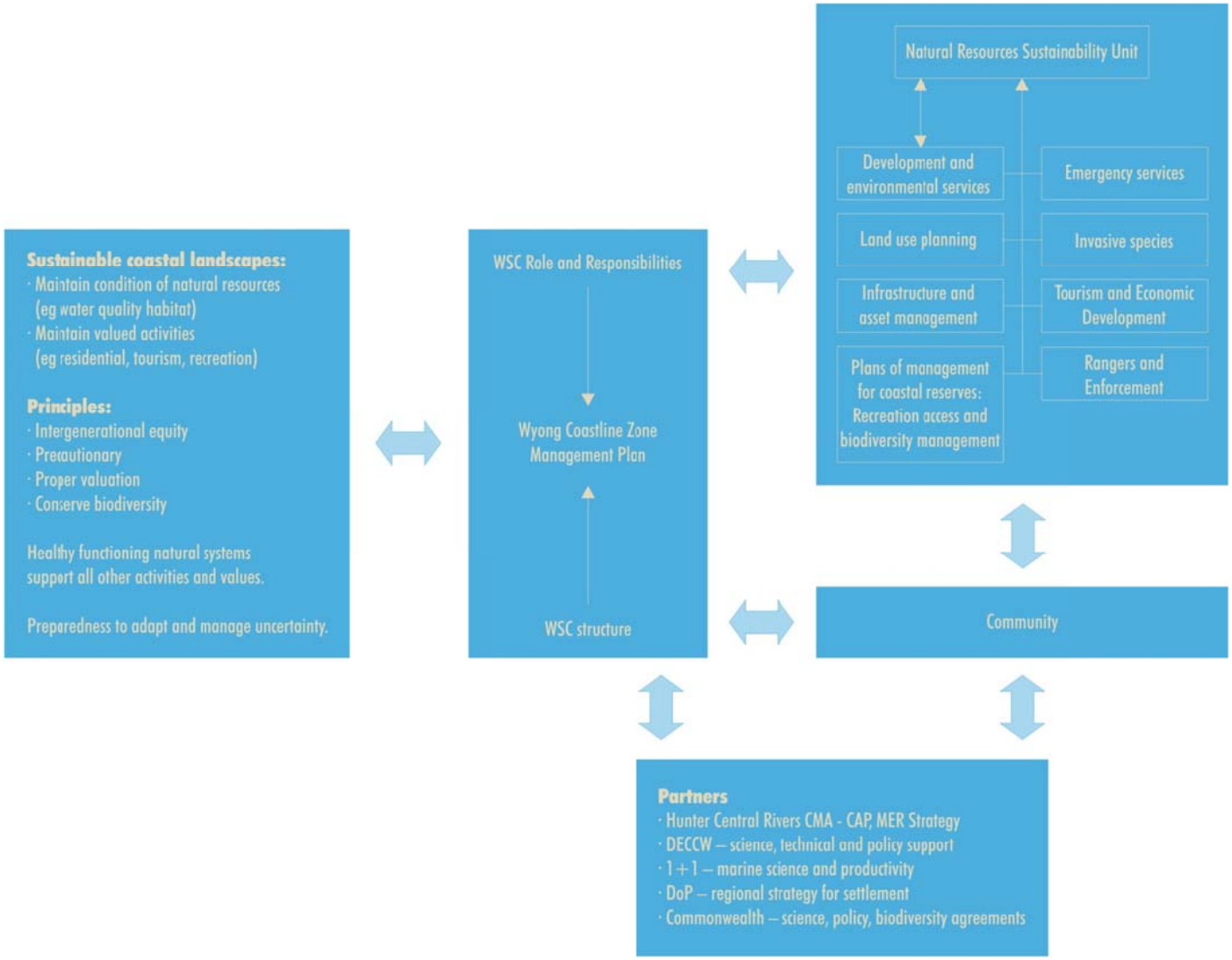



FIGURE 2.2

Related Plans for Coastline Management

Management of the entrance to the Tuggerah Lakes is addressed in both the WSCZMP and the Tuggerah Lakes Estuary Management Plan (Wyong Shire Council 2006) which Council is currently implementing with funding assistance from the State and Australian governments. Issues include inundation of low lying areas by marine waters, shoaling of marine sand in the entrance channel and erosion of the frontal dune system by floodwaters discharging from the lake entrance. The WSCZMP adopts the same approach as the Estuary Management Plan in the way it considers these issues, but provides up to date information about the effects of sea level rise.

Other complementary plans for the coastal zone include floodplain risk management plans, emergency management plans, the Wyong LEP (currently being updated) and detailed special purpose plans such as Plans of Management for foreshore reserves (prepared in consultation with the Land and Property Management Authority), fisheries and recreational boating. Council coordinates its responsibilities for management of the coastal zone by considering its role in the development and implementation of all these plans in the WSCZMP.

In this broader context, the WSCZMP will:

- Provide specific guidance on the sustainable management of risks associated with coastal hazards, as they relate to biodiversity, coastal development, safe recreational access, infrastructure and other natural and cultural coastal assets.

- Complement the estuary management plan and entrance management strategy that has been prepared for the Shire's coastal lakes, which are also part of the coastal zone.

- Contribute to improvements in the health of marine waters and habitats that interact with the coastal hazard zone (i.e. potentially to the full three nautical mile width of the coastal zone). This supports Priority A4 of the NSW State Plan (2010).

- Contribute to the resilient coastal ecosystems that underpin sustainable ongoing population growth and economic development in the Council area. This is consistent with Priority A4 of the NSW State Plan (2010).

- Contribute to the maintenance of coastal landscapes and coastal access for recreation, in keeping with Priority A8 of the NSW State Plan (2010).

- Contribute to the implementation of the HCRCMA CAP (2007) and the Lower Hunter Regional Strategy (LHRS) (Department of Planning 2006) as their priorities relate to Wyong Shire Council.

- Be consistent with the Central coast Regional Strategy and specific local area settlement strategies such as for The Entrance.

# 3.0 Preparing the Coastal Zone Management Plan

## 3.1 Background

WSC has recognised the importance of an integrated approach to the management of the Shire's coastline for more than a decade. An evaluation of coastal erosion hazards along the Wyong coastline was completed in 1996 (AWACS 1995). It provided the scientific basis for the current Development Control Plan (DCP) 77 (Wyong Shire Council 2005b).

Since 1996 the population of WSC has increased, investment in coastal residential property has continued to grow, and community use of beaches has continued to be a major recreational activity which also brings employment and wealth to the local community.

Significant changes to coastal science and to the policy framework for coastal zone management in NSW have occurred over the last 10 to 15 years. Important examples include:

- The magnitude of climate change risks, and particularly sea level rise, for coastal landscapes and community assets has been revised upwards several times as the science of climate change is refined. WSC has now adopted the NSW Sea Level Rise Policy Statement (DECCW 2009) for it coastal zone planning. The policy sets benchmarks for sea level at 40 centimetres above 1990 levels for 2050 and 90 centimetres above 1990 levels for 2100. These figures, based on recent science, require planning for about twice as much sea level rise as was commonly accepted a decade ago. The NSW sea level rise policy statement also notes that higher rates of rise are possible and that sea level will continue to rise after 2100. Partner or supporting policy documents, designed to assist local government and communities by providing clear direction and risk management advice (DECCW 2010a; 2010b; Department of Planning 2010). This policy framework is discussed in **PART C**, **Section 15.4.2**.

- In response to evidence of current and future climate change, both the NSW government and the Australian government have invested in studies to refine understanding of specific processes which will help planners to understand which coastal landforms, landscapes and communities are most vulnerable to climate change impacts. This research is ongoing. In late 2009, the Australian Government released its first pass assessment of the vulnerability of Australia's coast to climate change (Department of Climate Change 2009a). This research identifies Wyong Shire as one of the most vulnerable in NSW to coastal erosion, in terms of the number of residential buildings at risk. The research has driven a strengthened emphasis on risk based coastal management.

- Concurrent with research on processes and impacts, State, Australian government and regional scale natural resource management organisations have invested in studies and guidelines about adaptation responses.

- The Australian government released an extensive report of the House of Representatives standing Committee on Climate Change, Water, Environment and the Arts – Managing our Coastal Zone in a Changing Climate in October 2009 which makes 47 recommendations (House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts 2009). The Australian government is already acting on some of these recommendations which have the potential to change the governance arrangements and the policy framework for the coastal zone. In February 2010, the Australian government released preliminary conclusions from the deliberations of the Coast and Climate Change Council and also released a new Position Paper *Adapting to Climate Change in Australia* (Department of Climate Change 2010)

Both of these documents make it clear that past assumptions about the stability of the coastline, about a stable sea level and about patterns of storms are no longer valid. The Australian government's position is that management of climate change risks is mainstream business that all individuals, businesses and governments need to take into account. Climate change risks will vary from one locality to another and in most places they exacerbate erosion and inundation risks that were already present.

- At the State level, responsibility for climate change and coastal zone management is shared in NSW between OEH, which is currently responsible for climate change research, sea level rise policy and coastal management guidelines (see **PART C**, **Sections 15.4.2** to **15.4.4**) and DP&I, which is currently responsible for the NSW Coastal Policy 1997 (Department of Planning 1997), SEPP No. 71 – *Coastal Protection* and coastal design guidelines and the NSW Coastal Planning Guidelines: Adapting to Sea Level Rise (Department of Planning 2010) (see **PART C**, **Section 15.4.5**). OEH has also introduced amendments to the *Coastal Protection Act 1979* and *Local Government Act 1993* (October 2010), linked to proposed changes to the Infrastructure SEPP (DoP, 2010). These amendments clarify the circumstances in which Councils and private landholders may construct coastal protection works and also clarify how the costs of construction and maintenance, including maintaining beach amenity, can be recovered.

  In October 2009, the NSW Government released preliminary policy guidance on the management of coastal erosion, with a particular focus on high risk sites. Two of the nineteen high risk sites (Coastal Erosion Hotspots) recognised in this announcement are on the Wyong Coastline: Cabbage Tree Harbour and North Entrance.

  In November 2009, the NSW Government released new risk management guidelines and coastline planning guidelines. These new policy documents supersede much of the Coastal Hazards Policy 1988 and parts of the Coastline Management Manual 1990.

- In 2006, the role of Catchment Management Authorities in coastal zone management was clarified and strategies to enhance natural resource management along the coast were included in Catchment Action Plans. The Hunter-Central Rivers Catchment Management Authority (HCRCMA) has developed specific objectives and management targets for coastal natural resources, consistent with the NSW State Plan, and is currently implementing programs to improve awareness, understanding and management of natural resource assets in the coastal zone (HCRCMA 2007). Features of this program of works include on-ground works to enhance/rehabilitate coastal areas, studies of rock platforms, including shorebird habitats and community learning activities. The principles and objectives of the HCRCMA Catchment Action Plan (CAP) have been taken into account on developing Council's objectives and targets for the future management of the Wyong coastline.

- Several Regional Organisations of Councils and the Local Government and Shires Association have collaborated to commission region-specific studies of climate change risks and general adaptation principles. Adaptation principles describe how communities can reduce their exposure to climate change risks and can increase the resilience of social and economic assets. Whilst detailed guidance on effective adaptation measures is still developing, an adaptive approach is the best way for local communities and local councils to deal with uncertainty about change.

**Table 3.1** shows the time line of WSC coastal zone management projects since the mid 1990s and the concurrent changes to coastal science and policy that have influenced the local coastal planning process.

**Table 3.1 - Local coastal planning in an evolving science and policy context**

| Science and policy framework | Year | WSC coastline planning activity |
|---|---|---|
| • *Coastal Protection Act 1979*<br>• *Environmental Planning and Assessment Act 1979*<br>• *National Parks and Wildlife Act 1974* | 1996 | • AWACS (1995) study of coastal hazards completed for Wyong urban beaches: Coastline Hazard Definition Study: The Entrance North and Noraville. This complements *Toowoon and Blue Bays Historical Beach Behaviour* (Wyong Shire Council Public Works Department 1992). |
| • NSW Coastal Policy (Department of Planning 1997)<br>• SEPP No. 14 - *Coastal Wetlands* and SEPP No. 26 - *Littoral Rainforests* | 1997 | • Preliminary steps towards preparation of coastline management study, suspended 1998 |
| | 1998 | |
| | 1999 | • DCP No. 77 - *Coastal Hazards* |
| | 2000 | |
| • IPCC 2001 report with sea level rise predictions (IPCC 2001) | 2001 | |
| • NSW Coastal Protection Package (Department of Planning 2002)<br>• SEPP No. 71 - *Coastal Protection*<br>• *EPBC Act 1999* (Australian Government) | 2002 | |
| • Studies commissioned and completed for NSW Comprehensive Coastal Assessment (Department of Planning 2003) e.g. cultural landscapes, coastal erosion hazard | 2003 | • WSC obtains State funding and commissions new coastal hazard assessments, management studies and plan. |
| • Studies commissioned and completed for NSW Comprehensive Coastal Assessment | 2004 | • Draft geotechnical and coastal erosion hazard assessments completed.<br>• Initial community consultation about coastal values and issues. |
| • Studies commissioned and completed for NSW Comprehensive Coastal Assessment<br>• Commencement of CMAs and introduction of coastal natural resource management issues in CAPs. | 2005 | • OEH review of hazard assessments and ongoing discussion about appropriate risk management approaches |
| • SEPP No. 71 - *Coastal Protection* provisions included in Part 3A changes to *Environmental Planning and Assessment Act 1979*<br>• Department of Planning template for standardised LEPs for all Councils and requirements for new LEPs within set timeframes. | 2006 | • OEH review of hazard assessments and ongoing discussion about appropriate risk management approaches |

| Science and policy framework | Year | WSC coastline planning activity |
|---|---|---|
| • IPCC 2007 Report on climate change with increased estimates of the rate of sea level rise (IPCC 2007).<br>• CSIRO and UNSW studies on coastal process impacts completed for OEH.<br>• NSW Government LiDAR project for first pass climate change (sea level rise) risk assessment for central coast and lower Hunter.<br>• SEPP *(Infrastructure) 2007*<br>• Australian government Department of Climate Change created, with specific Minister. | 2007 | • OEH review of hazard assessments and ongoing discussion about appropriate risk management approaches<br>• WSC commences preparation of new LEP.<br>• Tuggerah Lakes Estuary Management Plan completed and adopted (Wyong Shire Council 2006).<br>• Significant erosion and inundation at North Entrance June 2007 |
| • Sydney Coastal Councils, Hunter Councils and others prepare detailed local scale case studies and risk analysis.<br>• Sydney Coastal Councils commissions study of the feasibility of offshore sand extraction for beach nourishment (AECOM 2009).<br>• Central Coast Regional Strategy released (Department of Planning 2008).<br>• Lower Hunter Regional Strategy released, with Conservation Plan (Department of Planning 2006)<br>• OEH community meetings and briefings on regional climate change parameters and implications. | 2008 | • Negotiation about new scope of work and funding for coastal hazard assessments, coastline management studies and Plan to incorporate new sea level parameters and other changes to the planning framework.<br>• WSC secures major funding for implementation of the Tuggerah Lakes Estuary Management Plan. |
| • NSW Sea Level Rise Policy Statement, Coastal Erosion Hotspots and supporting technical information, superseding the NSW Coastal Hazards Policy and parts of the Coastline Management Manual (DECCW 2009; 2010a)<br>• NSW coastal guidelines, replacing the NSW Coastline Management Manual (Department of Planning 2010)<br>• NSW DP&I Planning Guidelines to incorporate climate change<br>• First Pass National Assessment on climate change risks to Australia's coast (Department of Climate Change 2009a)<br>• Australian Government House of Representatives Inquiry into Managing our Coastal Zone in a Changing Climate. (House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts 2009)<br>• Further case studies on coastal vulnerability to climate change at state, regional and local scales.<br>• Australian Government sponsored research groups addressing vulnerability and adaption priorities, including emergency response and land use planning | 2009 | • WSC prepares draft sustainability policy (2009) and draft climate change policy (2010).<br>• WSC Strategic Vision<br>• The Entrance Peninsula Planning Strategy released (Wyong Shire Council & Dickson Rothschild Pty Ltd 2009).<br>• New coastal hazard studies completed.<br>• New community consultation about coastal values and issues.<br>• Application for funding for construction of a toe drainage structure at Cabbage Tree Harbour to protect Council assets and stabilise slope in poorly consolidated sand<br>• Two coastal erosion 'hotspots' were initially highlighted along Wyong coastline. The July 2010 amendments to proposed changes to the *Coastal Protection Act 1979* revised beaches considered to be priorities for emergency coastal protection works, but two beaches along the Wyong coastline are still identified as 'Authorised Locations' (see **Sections 8.0** and **9.0** in **PART B** and **Section 15.0** in **PART C** for details) |

| Science and policy framework | Year | WSC coastline planning activity |
|---|---|---|
| • Finalised NSW coastal planning guidelines with sea level rise<br>• OEH code for emergency actions – coastal emergencies<br>• Amendments to *Coastal Protection Act 1979*, Local Government Act and EP&A Act to clarify and streamline regulation, approval and funding of coastal protection works.<br>• New Coastal Zone Management Guidelines released December 2010<br>• Australian Government response to the House of Representatives Inquiry into the Coastal Zone released in November 2010. | 2010 | |

## 3.2 Key steps in preparing the WSCZMP

Coastal zone planning in NSW has been guided by the *Coastal Protection Act 1979* and Coastal Hazards Policy 1988 (NSW Government 1988), supported by the NSW Coastline Management Manual since 1990 (NSW Government 1990) and the NSW Coastal Policy since 1997 (Department of Planning 1997).

The NSW Coastline Management Manual (NSW Government 1990) sets out a seven step process to be followed by local councils when preparing coastal zone management plans, which are plans under the *Coastal Protection Act 1979*.

As noted in **Section 1.0**, this single document includes the information from the coastal hazards study, coastline management study and coastline management plan steps of the process.

Plan making steps which guided the preparation of the WSCZMP are summarised in **Figure 3.1**. Announcements in late 2009 and in 2010 foreshadow some changes to these key steps. OEH released new Guidelines for preparing Coastal Zone management plans in December 2010. Recent amendments to the *Coastal Protection Act 1979* and associated regulations, directions and guidelines clarify State and local government objectives and powers in relation to the management of coastal erosion. Amendments to the *Coastal Protection Act* passed through t*he NSW Parliament in O*ctober 2010, and will commence early in 2011.

Details about the new elements of the framework for coastal zone management are in **PART C**, **Section 15.0**, but are still evolving. The new framework elements will change the process of preparing a coastal zone management plan (in terms of the information required, consultation with coastal communities and matters to be considered), increasing the focus on risk based planning and modifying the statutory powers available to implement actions in the coastal zone management plan.

As far as is possible, WSC has incorporated the requirements of the new NSW coastal zone planning framework, including the December 2010 Guidelines, into the preparation of the WSCZMP.

### 3.2.1 Certification of the WSCZMP

Since 1990, where a council has prepared and adopted a Plan made in accordance with the Coastline Management Manual, it is afforded 'good faith' liability protection by the NSW government. Coastal Zone Management plans could be gazetted by the NSW Government, but very few have been through this process.

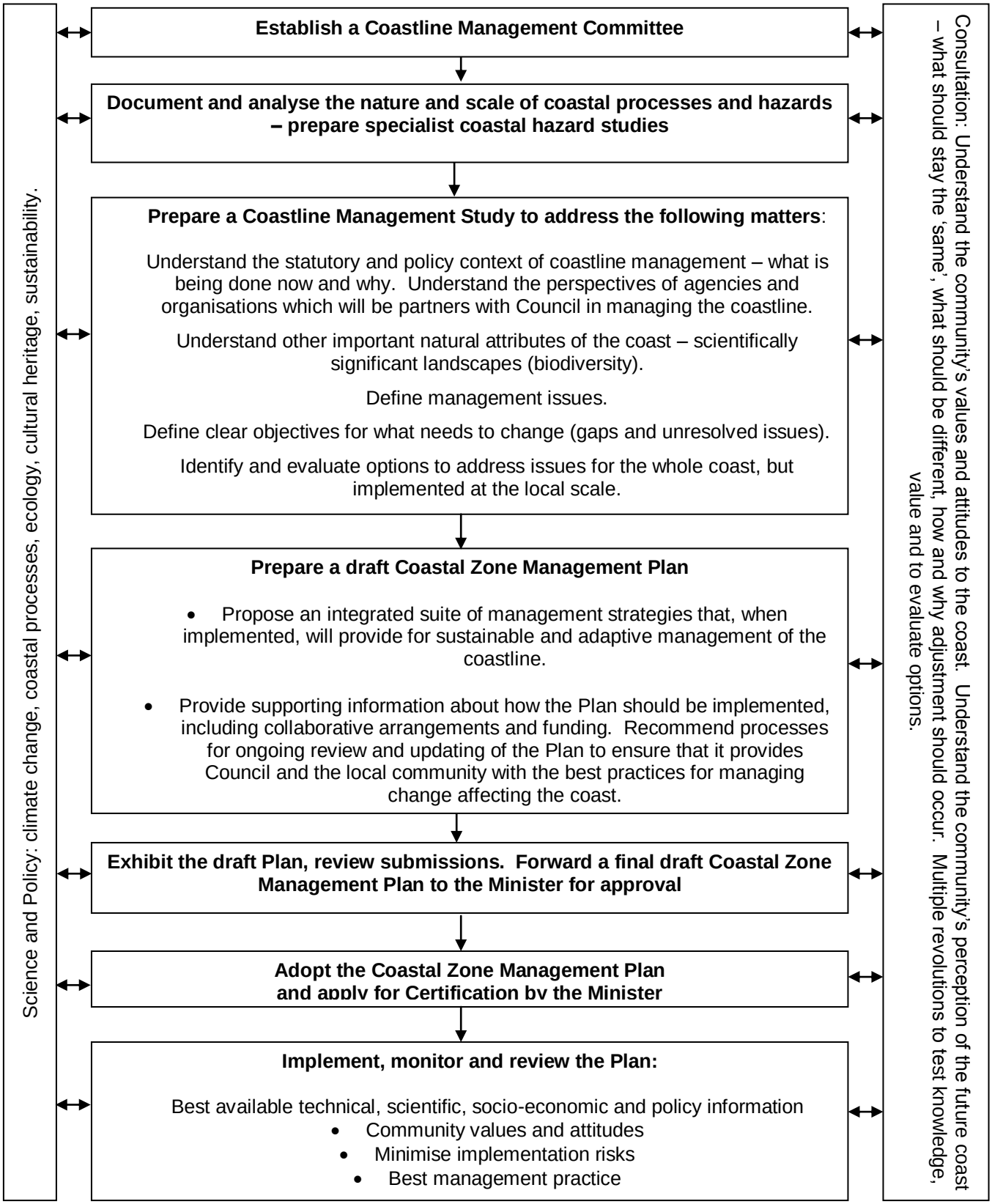
The most recent amendments to the *Coastal Protection Act 1979* include a new provision (replacing gazettal) that Coastal Zone Management Plans can be certified by the Minister for the Environment as having been prepared in accordance with the *Coastal Protection Act 1979* and the Minister's Guidelines. Councils may seek certification of plans for individual beaches (such as Authorised Locations) or for the whole of the coastline in their local government area. When a Plan has been certified by the Minister, Council is indemnified against a range of issues.

In addition, when a council has a certified Coastal Zone Management Plan, then the council is the consent authority for applications for long term coastal protection works within the area covered by the certified Plan.

**WSC will apply for certification of the final WSCZMP for the entire coastline of the Shire.**

**Volumes 1 and 2 of the Supporting Information provide the background and rationale for measures that are included in the final WSCZMP, which is a separate stand alone document. These documents show how the final WSCZMP is based on information required by the NSW Government Guideline for Preparing Coastal Zone Management Plans 2010.**

**Figure 3.1 - Steps in preparing and implementing an adaptive coastal zone management plan (based on approach in the NSW Coastline Management Manual 1990)**



## 3.3 Community and stakeholder engagement

As shown in **Figure 3.1** and set out in the principles and objectives of sustainable coastline planning (**PART B**, **Section 5.0**), stakeholder and community engagement and active involvement in planning and decision making is an essential part of effective coastline management.

The coastline is a focal point for the lifestyle of many residents of the Central Coast. The Central Coast beaches also attract large numbers of visitors over summer weekends and peak holiday periods (see **PART C**, **Section 16.0**). All these individuals have an interest in how the coastline is managed.

**Table 3.2** summarises the types of stakeholders with an interest in the future management of the Wyong coastline and the scope of that interest.

**Section 3.3.1** discusses opportunities for Council and agency stakeholders to contribute to the development of the WSCZMP.

**Section 3.3.2** outlines opportunities for the community to contribute to the preparation of the coastline management plan and **Section 3.3.3** presents comments made by community representatives at a range of community meetings held during the preparation of the WSCZMP.

**Table 3.2 - Stakeholders and broad areas of interest**

| Who? | Scope of interest and responsibility |
|---|---|
| Council – Environment and Planning Services, Corporate Services, Community and Recreation Services, Infrastructure management Departments. (see **Section 15.3** in **PART C**) | Strategic planning and leadership<br>Coastal land use planning<br>Coastal asset management (e.g. sewer and water infrastructure, sea walls, stairways, ramps, swimming pools etc.)<br>Emergency response during coastal storms<br>Protection of important ecological communities<br>Protect significant cultural places<br>Safe community access to and usage of beaches, rock platforms and headlands<br>Support economic development and employment<br>Provide recreational spaces and facilities suitable for diverse users<br>Keep local communities informed about risks and about Council decisions or actions<br>Support and encourage sustainable coastal communities<br>Research and monitoring at the local scale<br>Reporting on environmental condition at the local scale |

| Who? | Scope of interest and responsibility |
|---|---|
| NSW Government, including OEH, DP&I, NSW Maritime Authority, DTIRIS, DPI (relevant sections of former L&PMA) and HCRCMA (see **Section 15.4 in PART C**) | Set objectives and targets for natural resource management and for community development in the coastal zone, through the NSW State Plan and Catchment Action Plans.<br>Whole of coastline guidance on important coastal processes, policy responses and best practice management responses (e.g. sea level rise, climate change and appropriate planning requirements)<br>Technical advice on coastal processes<br>Encourage transparent and risk based decision making by local government<br>Manage Crown land (including the sea bed) and National Parks, Nature Reserves and State Conservation/Recreation Areas.<br>Provide targeted funding for management actions under relevant state programs<br>Provide guidance and support for effective responses to coastal emergencies<br>Identify and set frameworks for protection of important coastal ecological communities and heritage places (ecological communities and heritage places of State significance)<br>Manage and maintain key coastal infrastructure such as ports (e.g. roads, power supply, breakwalls)<br>Set statutory requirements for performance of coastal infrastructure such as sewage treatment plants and discharge points/processes<br>Set standards and benchmarks for environmental quality, development quality and community health<br>Funding of projects to encourage sustainable communities<br>Conduct research and monitoring programs at scale not achievable by local councils. |
| Australian government (see **Section 15.5** in **PART C**) | National scale research and reporting on the impacts of climate change on coastal communities – vulnerability and preparedness<br>Research on coastal adaptation to climate change, including emergency management<br>Protection of natural and cultural assets of national significance (i.e. items on the National Heritage lists or identified in schedules of EPBC Act)<br>Funding to State and local organisations for projects that address National natural resource priorities<br>Set National Standards and benchmarks for environmental quality |
| Non Government Organisations (Peak – National, State and regional scale) (See **Section 15.1** in **PART C**) | Highlight important conservation and sustainability issues<br>Support local community groups to become engaged in decision making and management<br>Conduct research and provide information on issues<br>Lobby for changes to statutory and policy frameworks |
| Local community organisations – environmental and community development (see **Section 15.1** in **PART C**) | Assist with documentation of the condition of community assets (built and natural) in local areas<br>Identify and describe coastal values such as scenic amenity, attachment to place etc.<br>Provide advice on the type of development in local communities – scope of acceptable change<br>Access to beaches and headlands and guidelines for use (e.g. dog exercise areas)<br>Direct involvement in restoring ecological communities, removing weeds etc. – improve or maintain coastal vegetation and habitats. |

| Who? | Scope of interest and responsibility |
|---|---|
| Chambers of Commerce and local businesses | Coastal development requirements<br>Tourism opportunities and support (including public facilities)<br>Economic development and employment opportunities<br>Risks to coastal assets |
| Insurance industry | Coastal hazards and related risk profiles for development on coastal dunes, low lying coastal land and headlands<br>Risk profiles for beach users (safety of beaches and rock platforms that are open to the public) |
| Landholders (see **Section 3.3.3** for a summary of the issues raised and comments made by landholders), including those in the project area and those Wyong residents who live away from the coastline, but benefit from access to the coastline. | Property values<br>Development and redevelopment opportunities and constraints on private ocean frontage land or land affected by other coastal hazards<br>Lifestyle – access to beaches and headlands, visual quality, environmental quality, access to other community facilities, security, quality of life<br>Protection of coastal scenery and access to socially valued places such as long favoured family holiday locations.<br>Recreational uses – boating, surfing, swimming, fishing, walking, jogging, bird watching etc. |
| Indigenous residents | Protection of coastal places of cultural heritage value, including Aboriginal heritage sites, gazetted places, places associated with stories and traditional knowledge, places which illustrate the resources utilised by traditional Aboriginal people in the past and still used by Aboriginal people today. |
| Tourists/visitors. | Quality of facilities for recreation and tourism<br>Scenic amenity<br>Safe beach access to beaches, dunes, headlands and rock platforms for users with a variety of capacities (age/health etc.) and for a range of recreation uses, such as fishing, swimming, boating, surfing, walking, jogging etc – as for residents.<br>Value for money of holiday opportunities |

## 3.3.1 Council and agency stakeholder participation and perspectives

### 3.3.1.1 How have Council and agencies contributed to the Plan?

Multiple NSW government agencies have an interest in the future management of the coastline (see **Section 15.3** in **PART C** for details of statutory responsibilities, policies and plans). Key agencies are included in the membership of the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee (see **Section 3.3.2.1**) and support the committee with technical advice about advances in coastal science, coastal management and new policy or statutory controls.

Agency representatives have contributed to discussion about the draft WSCZMP as part of the Committee.

During the preparation of the coastline management plan all relevant agencies were also invited, in writing, to contribute information about key issues from their perspective, as well as current or upcoming management initiatives. Information from State agencies, provided in response to these invitations, is included in **Section 15.3** in **PART C**.

OEH has assisted Council with technical review of coastal hazard studies, to ensure that data and methods are in accordance with NSW standards. OEH has also assisted Council with advice and feedback about potential planning responses to climate change risks.

A wide range of Council planning staff have participated in discussion of how Council can best manage risks to its existing assets and to public land (Crown land and community land) for which it is responsible along the coastline. Council officers have also provided input about planning responses to manage development proposals for public infrastructure and for private residential or commercial development in coastal risk areas.

Implementation of the WSCZMP will require commitment from diverse sections of Council, to deliver integrated risk management and to ensure that Council benefits from the opportunities flowing from sustainable management of the coastline.

More information about Council's responsibilities and current management approach is in **PART A**, **Section 2.1** and in **Section 15.2** of **Part C**.

### 3.3.2 Community engagement

WSC values the input of residents, ratepayers and community groups in the preparation of the WSCZMP. Community involvement provides two way benefits, such as:

- Increased awareness and understanding of coastal processes and how they shape the coastal landscape at different time scales.
- Contributing information that helps to define coastal values – what's important to the community, what should be protected for future generations and why.
- Helping to 'ground truth' – hazard studies with experience of coastal condition after past storms, where other evidence, such as suitable timed aerial photos is not available.
- Contributing to the process of setting objectives for the future of the coastline in their local area.
- Contributing ideas about how the coast should be managed and how specific issues should be addressed.
- Contributing information which helps to sort effective management responses from less effective management responses.
- Implementing actions – community involvement in Landcare, Coastcare and Waterwatch activities are examples, as well as actions that require communities to modify their behaviour (such as in relation to vehicles on beaches or access tracks across dunes).
- Contributing to monitoring of progress, review of the effectiveness of the plan in delivering agreed objectives and reshaping priorities if necessary.

**Section 3.3.2.1** discusses how WSC has involved the local and regional community in the preparation of the WSCZMP.

#### 3.3.2.1 Opportunities for involvement

WSC established the Tuggerah Lakes Estuary, Coastline and Floodplain Management Committee (TLEC&FMC) more than 15 years ago. Committee members represent Council, agencies, local community organisations and landholders. The Committee is a key mechanism for Council to work with its community on a range of issues affecting the coastal zone (i.e. the coastline and the Tuggerah Lakes estuary). The Committee meets monthly. Members helped develop the scope of work for the preparation of the WSCZMP and the Committee is regularly briefed about progress.

At the commencement of the coastline planning project in late 2003, Council and consultants used a project launch event, press releases and a project web site to invite community input about variable coastal processes, coastal landforms, coastal activities and coastal values.

Information about the project launch is included in **Appendix 1**. Following the Project Launch event, 22 community group representatives attended an initial project briefing and field day. This included a briefing session at The Lakes Surf Club and inspections of several important locations (chosen by residents), such as Budgewoi dunes and North Entrance area with local residents. Interest groups attending included Coastcare, Precinct Committees, Progress Associations, Fishing Clubs, Surfrider Foundation, Dunecare, Residents and Ratepayers Association, Bushcare, SES, Norah Head Search and Rescue and Norah Head Lighthouse Community Trust.

Issues and comments from this introductory community day are included in **Appendix 1**.

In November 2004, following the completion of preliminary draft coastal hazard studies, residents affected by coastal hazards were invited to attend a briefing. The presentation included geotechnical issues and coastal erosion issues. About 50 people attended this presentation at Long Jetty Senior Citizens Club. The draft coastal erosion studies discussed at this meeting were based on Intergovernmental Panel on Climate Change (IPCC) 2001 sea level rise predictions and modelling using 'sBeach'. A workshop style component of this meeting allowed residents to comment on coastal values and how they could be affected by the predicted coastal hazard scenarios. Most resident attention was focused on the impacts of coastal processes on homes and property values. A summary of comments made at this meeting is provided in **Appendix 1**.

Due to the rapidly evolving scientific, technical and policy context for coastal zone management, WSC placed the coastline project on hold until 2007, but continued to progress its estuary management planning process.

The coastline planning process was fully reinstated as a project in mid 2009. Council invited residents to attend a briefing and workshop in November 2009. The project web site was also reinstated at this time. This workshop was used as an opportunity to brief residents about the many changes to coastal zone science and the management framework which would now influence the development of the Coastal Zone Management Plan. The workshop was also a new opportunity for residents to provide comments about coastal land uses, coastal values and coastal issues. Comments made at the briefing are summarised in **Section 3.3.3**.

Council held a second community meeting in March 2010. Approximately 60 people attended this meeting. At this meeting, OEH provided a briefing about sea level rise and why it is a significant issue for the NSW coast. Council's consultants provided a briefing about the types of responses that are available for managing risks associated with coastal process hazards and discussed some of the aspects of these options that make them effective for certain applications and impractical for other applications. Attendees then had an opportunity to discuss in small groups how the various management options could be applied to the Wyong coastline. Notes from the discussion are included in **Appendix 1**. A brief summary of the community comments about the merits of various management options is included in **Section 3.3.4**.

#### 3.3.2.2 Other consultation opportunities

Since 2009, residents and ratepayers have been able to contribute comments about coastline management in Wyong Shire via Council's web site and blog.

Separately to consultation about the WSCZMP, Council has consulted residents and ratepayers about the preparation of its Climate Change Policy (Wyong Shire Council 2010). Because of the vulnerability of coastal property to aspects of climate change, there is some cross over between the issues considered in the two processes.

Council's natural resources and sustainability officers have made a number of presentations to precinct committees about issues considered and progress towards both the climate change policy (Wyong Shire Council 2010) and the CZMP. **Section 3.3.5** outlines the results of discussion at these meetings.

#### 3.3.2.3 Exhibition of draft hazard studies, management study and Plan

After review by Council's Coast, Estuary and Floodplain Committee and approval by Council, the draft WSCZMP will be exhibited for approximately ten weeks. Council will conduct community information sessions during the exhibition period and will welcome comments in writing – by email, letter or on the Council blog.

All feedback will be collated and reviewed, for discussion with the TLEC&FMC, and will be included in a new appendix to the Plan.

Preparation of a final draft of the Coastal Zone Management Plan will follow endorsement of proposed amendments to the exhibition draft by the TLEC&FMC and OEH.

The final draft Plan, endorsed by the Committee, will be recommended for adoption by Council.

### 3.3.3 Consultation about the coastline management plan - issues

This section summarises the key issues and themes from community comments made during initial consultation about the coastline management plan in 2004 and more recent consultation in 2009. **Appendix 1** contains copies of community brochures and presentations made during the preparation of the WSCMP. Also in **Appendix 1** are detailed notes of comments made by community representatives at meetings, field days and briefings from 2004 to 2010.

Key issues and themes of concern to residents and coastline users are:

**Coastal erosion and inundation threaten private property**

- Homes and properties at North Entrance are threatened by coastal erosion, which is predicted to become more severe. What will Council do to help landowners protect their assets?

- Homes and properties at Cabbage Tree Harbour are affected by landslip issues. What will Council do to help people protect their assets?

- What will happen to the value of property and people's assets if erosion is not controlled?

- Some properties on low lying land are predicted to be affected by lake and ocean flooding as sea level rises. Predicted hazards are greater than when land owners first acquired

these properties. Landowners are concerned that policies set to address climate change hazard will constrain the use of their land.

- The need for Council and agencies to take coastal erosion hazards seriously and to manage impacts on both public and private land

- The quality of sand and the merit of placing sand dredged from the lake entrance on North Entrance or The Entrance Beaches

**Climate change science**

- What is the evidence that climate change is affecting the Wyong coastline? Some residents were distrustful of reported climate change science. In particular, some land owners are distrustful of predicted sea level rise and of reports of sea level rise and temperature change that has occurred over the last century. Some residents are also concerned that the methods used to assess coastal erosion and recession hazards have significant error margins and lead to conservative assessments of coastal risks that they regard as misleading for land holders.

**Community contributions to coastline management**

- Residents and long term visitors have a strong attachment to the coast, across multiple generations in some families. They want to feel that this sense of attachment is respected in the planning process.

- The valuable contribution of community groups to the management of the coastline, in terms of submissions about important issues, keeping agencies accountable, and long term commitment to on ground works (e.g. Dunecare and Bushcare) and the level of support provided by agencies and Council. See **Section 15.1** in **PART C** for examples of on ground projects.

**Development and natural landscapes**

- The importance of balancing the development, commercial, recreational and social values of the coastline with its natural and conservation values. For instance, threatened species such as Little Terns nest on some beaches.

**Coordinated and accountable management**

- The need for a close partnership between agencies with responsibilities for managing the coastline – particularly between WSC and the Land and Property Management Authority

**Recreational uses and amenity**

- The importance of maintaining safe, quality, robust and integrated facilities, such as steps, ramps, seating, playground facilities, shade, toilets, fish cleaning tables, boat ramps to the ocean etc., particularly in popular and high usage locations.

- The value of surf club facilities to the community and the diverse social, safety, communication and economic roles of these facilities.

- Appropriate landscaping for coastal reserves – for instance, are Norfolk Pines the right species? Where and how should bitou bush be removed and what should replace it?

- Potential conflicts between different beach users such as commercial fishers and walkers/swimmers.

- The impact of beach access ways on dune stability (blowouts).
- The importance of maintaining safe beach access – for instance the need for robust access ways or rapid reinstatement after storm erosion.
- Sewage pump stations on coastal dunes sometimes overflow, and may impact on water quality. Stormwater can also affect water quality and exacerbate erosion problems.
- The importance of safe access to the coast for community well being.
- The importance of an attractive, safe and well maintained coastline to well being and economic prosperity.
- The importance of maintaining public access to beaches and dunes, as the coast recedes with sea level rise.

### 3.3.4 Community comments - options

At the community meeting on 31 March 2010, participants were able to question Council, OEH officers and Council's consultants about all aspects of coastal science, climate change and potential management responses.

Small groups of participants discussed a range of generic management options for the coastline. Each group considered the locations along the Wyong coastline where the various management options could be applied. The groups also discussed the sustainability of the various options, from environmental, social and economic perspectives. The comments provided by participants are summarised in **Table 3.3**. The results of this discussion have been considered in evaluating the full range of options for managing the coastline (**PART D**). **PART D** considers appropriate locations for applying various options; risk reduction benefits; policy, statutory and cost constraints; as well as the likelihood of community acceptance and support for the action as a way to reduce risks in the coastal context.

## Table 3.3 - Community responses for the sustainability of management options, March 2010

| | Where could it be applied? | ENVIRONMENTAL SUSTAINABILITY | SOCIAL SUSTAINABILITY | ECONOMIC SUSTAINABILITY |
|---|---|---|---|---|
| **Beach Nourishment**<br><br>Note: Should be done in conjunction with vegetation management | • Bateau Bay<br>• Shelley Beach<br>• The Entrance (including near the channel)<br>• North Entrance (beach near Curtis Pde)<br>• Cabbage Tree Harbour<br>• Soldiers Beach<br>• Lakes Beach (SLSC)<br>• Blue Lagoon<br>• Hargreaves Beach<br>• Jenny Dixon Beach | **STRENGTHS:**<br>• Generally replicates existing environment<br>• Opportunities to refine, correct and adapt process<br><br>**WEAKNESSES:**<br>• Potential impact on beach ecology<br>• Potential Acid Sulphate Soils<br>• Potential impact on offshore ecology<br>• Impacts on source/mining area's ecology | **STRENGTHS:**<br>• Safety, i.e. covering exposed dangerous items<br>• Delays impacts so other options can be considered<br>• Maintains beach use amenity<br><br>**WEAKNESSES:**<br>• Dredging and nourishment can affect short term use<br>• May not get community acceptance | **STRENGTHS:**<br>• Minimise potential need for property acquisition<br>• Retains beach amenity for local tourism economy etc<br>• Mutual benefit in dredging sand from channel to reduce risk and increase amenity<br>• Protects property and assets<br><br>**WEAKNESSES:**<br>• Only temporary, therefore ongoing expenditure<br>• Not cost effective to use for most areas on Wyong's coastline<br>• Costly (transport and extraction) |
| **Coastal Vegetation Management** | • North Entrance<br>• Budgewoi<br>• Tacoma<br>• South Tacoma<br>• Lake Foreshores (Lake Munmorah, Budgewoi)<br>• River Banks<br>• All river mouths (Wyong, Tumbi and Wallorah Creek)<br>• Riparian Zones | **STRENGTHS:**<br>• Protect property<br>• Habitat for flora and fauna<br>• Increased ecology<br>• Protect biodiversity<br>• Improved micro-climate<br><br>**WEAKNESSES:**<br>• Cost to homeowners<br>• Loss of species<br>• Pollution | **STRENGTHS:**<br>• Improved aesthetics of vegetation<br><br>**WEAKNESSES:**<br>• Loss of access<br>• Amenity loss<br>• Could diminish way of life | **STRENGTHS:**<br>• Preservation of species and biodiversity for future human needs<br><br>**WEAKNESSES:**<br>• Property loss to vegetation encroachment<br>• Devalue property (loss of views etc.) |

| | Where could it be applied? | ENVIRONMENTAL SUSTAINABILITY | SOCIAL SUSTAINABILITY | ECONOMIC SUSTAINABILITY |
|---|---|---|---|---|
| **Sea Walls and Other Structures** | • South Entrance<br>• North Entrance<br>• Cabbage Tree Harbour | **STRENGTHS:**<br>• Protect biodiversity behind wall<br>• Training walls can help keep the lakes entrance open and flushed<br>• Artificial reefs and headlands can encourage biodiversity<br><br>**WEAKNESSES:**<br>• Loss of beach due to erosion in front of wall<br>• Change to natural sand movement<br>• Environmental effects of structure falls apart or not properly maintained<br>• Disruption to sand dunes and vegetation during construction phase<br>• Increased erosion longshore or in other areas from seawalls | **STRENGTHS:**<br>• Protect private property as well as council infrastructure and other assets<br>• Protect highly developed areas<br>• Artificial reefs can improve surfing breaks<br><br>**WEAKNESSES:**<br>• Loss of natural appeal<br>• Loss of beach width | **STRENGTHS:**<br>• Protect valuable assets<br>• Job creation in construction and ongoing maintenance<br><br>**WEAKNESSES:**<br>• Very expensive<br>• Liability issues if structure fails or causes damage somewhere else |
| **Planned retreat** | • Anywhere under the 1/100 flood line that is depicted for 2100 using OEH benchmarks<br>• Large new developments | **STRENGTHS:**<br><br>**WEAKNESSES:**<br>• Loss of amenity<br>• 'Run out' of land | **STRENGTHS:**<br>• Reduce risk of flooding<br>• Stay in preferred location/lifestyle<br>• Opportunity for landowners further back to become new waterfront property<br><br>**WEAKNESSES:**<br>• Loss of local communities<br>• Loss of everything due to lack of insurance for landowners when a natural disaster occurs<br>• Legal problems | **STRENGTHS:**<br>• Potential cost of removing/relocating may be less than trying to "stop" the water and erosion<br><br>**WEAKNESSES:**<br>• Cost for future owners<br>• Possible devaluing of land<br>• Reduced number of land owners could reduce rates base thereby increasing rates for rest of community<br>• Increased insurance costs<br>• Legal mine field |

| | Where could it be applied? | ENVIRONMENTAL SUSTAINABILITY | SOCIAL SUSTAINABILITY | ECONOMIC SUSTAINABILITY |
|---|---|---|---|---|
| **Compulsory and Voluntary Acquisition** | • Low Lying Areas<br>• Cliff Faces<br>• Chittaway Bay<br>• Rocky Point<br>• Hargreaves Beach<br>• Jenny Dixon Beach<br>• Cabbage Tree Harbour | **STRENGTHS:**<br>• Land may be used for environmental protection<br>• Increased biodiversity<br><br>**WEAKNESSES:**<br>• Reduced funding available for environmental initiatives | **STRENGTHS:**<br>• Includes owners in decision making process (in voluntary acquisition), and other owners may follow suit.<br>• Allows owners to move on<br>• Reduces liability<br><br>**WEAKNESSES:**<br>• Loss of home<br>• Social upheaval consequences (incl. stress and depression)<br>• Litigation<br>• People have sentimental value of home (which they may lose) | **STRENGTHS:**<br>• Reduces ongoing liabilities<br>• Could be more cost effective over a long period of time<br>• Voluntary acquisition reduces litigation costs<br><br>**WEAKNESSES:**<br>• Could be very expensive<br>• Reduced number of land owners could reduce rates base thereby increasing rates for rest of community |
| **Do Nothing** | Everywhere | **STRENGTHS:**<br>• Development tendencies would change because of risk so people would build on higher ground<br>• It would avoid the impacts of 'coastal works' and continued maintenance<br><br>**WEAKNESSES:**<br>• Vulnerability<br>• Loss of biodiversity<br>• Lack of planning<br>• Potential for catastrophic disasters<br>• Neglecting responsibility | **STRENGTHS:**<br>• Avoid conflict in the short term between government, landowners and other stakeholders<br><br>**WEAKNESSES:**<br>• Loss of beach amenity Liability (I.e. council not acting in good faith)<br>• Increased threat to life and property | **STRENGTHS:**<br>• Cheap in the short term<br><br>**WEAKNESSES:**<br>• Depleted land value<br>• Loss of infrastructure<br>• Loss of tourist income<br>• Reduction in opportunities<br>• Increased insurance or losing ability to insure<br>• Mortgage impacts |

### 3.3.5 Other community meetings and briefings

During the preparation of the draft Plan, Council met with local community progress associations and precinct committees, providing each group with some background about the project, and how technical, policy and community input have been integrated to identify the management direction and priority actions set out in the draft WSCZMP. Community organisations were invited to provide feedback and a number of issues were raised, including the following:

- How Management Plans for the Tuggerah Lakes and the coastline are related.

  **Information**: WSC adopted an Estuary Management Plan for the Tuggerah Lakes about five years ago and has been implementing that Plan using special funding obtained from the Australian government. The Estuary Management Plan covers issues inside the entrance of Tuggerah Lakes.

  The Coastal Zone Management Plan, when adopted, will focus on issues caused by the interaction of coastal processes (ocean waves, tides and currents, water level) and coastal landforms and land uses. These processes apply outside the entrance to Tuggerah Lakes. The Coastal Zone Plan considers impacts on the Tuggerah Lakes system for those situations when coastal processes affect the form and health of the lake system, including dredging of The Entrance as a source of sand for beach nourishment.

- What do the sea level rise benchmarks adopted in the NSW Sea Level Rise Policy Statement mean for residents living around the lake shore and the ocean frontage?

  **Information**: For details about how the NSW Government Sea Level Rise Policy Statement affects the assessment of risks along the coast, see **Section 15.3.2** in **PART C** of this report. For details about how the Sea Level Rise Policy Statement could affect people living around the shores of Tuggerah Lakes (i.e. properties that could be affected by higher lake levels), see the estuary management section of WSC's web site.

- How coastal hazard lines will change from what is currently available when the new coastal zone management plan is adopted.

  **Information**: The coastal hazard lines adopted with the WSCZMP will reflect the most up to date information and assessment of oceanic water levels, storm waves and storm erosion, now and for 50 and 100 year planning horizons. The hazard lines could be amended in the future as new information becomes available.

- A number of questions about dredging the entrance to the Tuggerah Lakes.

  **Information**: Dredging within the Tuggerah Lakes for the purpose of maintaining tidal exchange is managed under the Estuary Management Plan. The WSCZMP recommends that dredging of the tidal delta just inside the entrance should continue, with the sand being placed on North Entrance or The Entrance Beaches, to help maintain beach volume. Over time, the dredging protocol will need to be reviewed, to maintain the best approach as sea level rises and entrance processes respond accordingly.

- Windblown sand from North Entrance Beach that ends up in Curtis Parade is currently classed as 'contaminated' and cannot be placed back on the beach. What volume of sand is being lost in this way?

  **Information**: Council will investigate the reasons for classifying this sand as contaminated and the volume of sand that may be involved.

- Will changes in State policy and legislation affect the validity of the Plan?

  **Information**: The WSCZMP is being prepared in consultation with the NSW Government – particularly OEH, DPI (relevant sections of former L&PMA) and DP&I. It reflects the most up to date State policy and legislation. As necessary, the adopted Plan can and will be updated if significant changes to the policy context occur over the next ten years.

- Safety issues at Cabbage Tree Harbour, concerning both the boat ramp, rubbish on the beach and signage about potential land slip.

  **Information**: WSC is continually reviewing its management of areas of Cabbage Tree Harbour that are affected by geotechnical hazards, in the light of expert advice. Options to improve the safety of the Cabbage Tree Harbour boat ramp, which is the only formed, open ocean access ramp in the Shire, are considered in **Section 19.7** of **PART D**.

- There were also questions about the timing of construction of proposed toe protection works at Cabbage Tree Harbour.

  **Information**: Council will fund this construction 50/50 with the NSW Government. Council has submitted detailed plans and funding applications to the NSW Government. Construction will commence as soon as the necessary funding is approved. Details about the proposed structure and cost implications are in **Section 19.0** of **PART D**.

- Stormwater erosion at Soldiers Beach

  **Information**: The WSCZMP considers the effects of storm water erosion on beaches, bluffs and rock platforms at several locations. However, stormwater erosion is a minor contribution to sand loss from open coast beaches during storms and in comparison to the predicted loss of beach volume due to sea level rise drive coastal recession.

# 4.0 Overview of key issues for the Wyong coastline

Council has identified the issues that are discussed in this section from community input (see **Section 3.3.3**), from the experience of its staff, from input from Government agencies and from specialist review of the best available science of coastal processes and coastal condition.

The major issues for the sustainable management of the Wyong coastline fall into two main themes:

- Coastal process impacts on the future of current coastal values (**Section 4.1**)
- Population growth and increasing community demand for access to coastal 'services', such as recreation, relaxation, scenic landscape, open space (**Section 4.2**).

A consolidated list of issues is presented in **Sections 4.1** and **4.2**.

These issues set the scope of the Plan. More detail about the background to these issues is in **PART C Sections 15.0**, **16.0** and **17.0**. **Section 17.0** in **PART C** uses the available information to assess the key sustainability risks associated with the various issues. By understanding the extent of the risk, Council has determined which issues require urgent attention and the types of responses which are most effective for reducing risks to an acceptable level.

## 4.1 The impact of coastal processes on valued coastal landscapes

Coastal process impacts are related to beach and dune erosion by waves, inundation of low lying land by raised sea levels and landslips on cliffs and bluffs. Some of these processes are already having a significant impact on coastal values; others will increase or become more severe as climate changes and sea level rises over the next century. This time frame is within the expected life of existing buildings and infrastructure.

The intensity of coastal processes is naturally variable. In the medium to long term, predicted sea level rise and other aspects of climate change will affect the variability of coastal processes. For instance, sea level rise affects the frequency of events associated with extreme water levels, such as wave overtopping of the low sandy barrier, as well as driving coastal recession.

A broad range of impacts and issues is noted in this section to highlight the scope of concerns to be addressed in planning for a sustainable coastline. Details about coastal processes, predicted changes in their intensity and impact and an evaluation of the significance of associated risks are in **Section 16.0** (**PART C**). Multiple possible options for reducing risks associated with these processes are evaluated in **PART D**.

**Coastal erosion and inundation processes**

Issues include the following:

- loss of structural integrity of existing residences which are located within the zone of wave impact, zone of slope adjustment or zone of reduced foundation capacity, either now or in the longer term;
- erosion of private land and loss of land value, often from current 'prestige' properties;

- reduced diversity of future land use opportunities on coastal dunes, time constraints for some land uses;
- loss of structural integrity of surf club buildings which are within coastal erosion zones;
- loss of serviceability of beach access ways after storm erosion events and increased ongoing maintenance costs (see **Plate 4.1**);
- reduced scenic amenity of the coastline, affecting residents and visitors;
- reduced beach amenity and safety for swimmers and walkers with loss of beach area, beach sand volume and high erosion scarps;
- reduced accommodation capacity of coastal caravan park sites (such as Blue Lagoon) as coastal recession proceeds;
- loss or degradation of coastal vegetation communities (on dunes);
- storm erosion and beach recession impacts on public infrastructure such as sewerage lines, pump stations and water pipes, roads and footpaths;
- loss of structural integrity of existing sea walls (such as at The Entrance), with raised sea levels and storm wave conditions;
- reduced area of land available for recreational facilities such as paths, picnic shelters etc. and increased maintenance costs;
- reduced tourism marketability through reduced image of safe and easily accessed beaches;
- changes to entrance processes for the Tuggerah Lakes and increases in entrance maintenance costs, with flow on effects for other aspects of lake management;
- inundation of properties at North Entrance and other locations during storms and in the longer term during high spring tides (see **Plate 4.2**);
- reduced drainage efficiency of the storm water system in low lying areas;
- degradation of the ecology of Budgewoi Lake (e.g. sea grass beds) with wave overtopping of the barrier in storm conditions – likely to be more frequent and persistent;
- damage to roads and loss of road access along the Budgewoi peninsula in storm conditions;
- reduced habitat for (migratory) shore birds, many of which are listed under international conservation agreements;
- undermining of heritage buildings/structures on the dunes or rock platform, mostly at The Entrance;
- capacity of NSW and local policy and planning frameworks to deal effectively with climate change impacts; and
- reduced perception of community well being.


PLATE 4.1a
North Entrance 2004

PLATE 4.1b
Hargaraves Beach 1974


PLATE 4.2
North Entrance June 2007
Inundation behind the frontal dune from high lake levels

**Ongoing geotechnical instability of coastal bluffs and headlands**.

Specific locations such as Cabbage Tree Harbour, Norah Head and Blue Bay are affected by landslip, slumping and rock fall. Aspects of this issue include:

- loss of structural integrity of existing houses or commercial buildings, decks and other domestic structures;
- reduced property area and loss of land value for affected properties;
- reduced safety of some existing public access facilities (viewing platforms, stairs and ramps) on steep slopes on cliffs and bluffs;
- significant changes required to existing stormwater drainage systems at high cost;
- threats to the integrity of public infrastructure such as roads, sewerage systems;
- uncertainty about interactions of geotechnical processes with local climate change impacts such as rainfall intensity and seasonality and high sea levels in extreme events; and
- risks to the safety of people using rock platforms below the unstable cliff or bluff.

**Other climate change impacts**

Predicted climate change impacts include increased extreme summer temperature events, changes to rainfall intensity and seasonality and increasing winter storm frequency associated with east coast low pressure systems. Regional scale research on these climate variables is discussed in **Section 16.2.4** in **PART C**. Potential impacts on coastal processes and values include:

- insufficient storm water system capacity to prevent flooding during intense rainfall events;
- increased groundwater flows affecting landslip hazard and increased wave impact on differentially weathered cliffs and bluffs;
- increases risk of stormwater erosion across beaches and impacts on storm water systems on headlands;
- changes to the entrance processes for the Tuggerah Lakes associated with different balances between lake and ocean water levels;
- increased risk of heat impacts on the health of beach users;
- increased risk of storm erosion on beaches and dunes, associated with the southern tracking of tropical cyclones or more winter storms;
- changes to the distribution of coastal habitat, for instance loss of habitat for species at the northern limit of their range and extension southward of habitat for other species;
- potential increases in bushfire hazards for coastal properties; and
- reduced perception of community well being, associated with uncertainty and rates of change.

Climate change also has multiple implications for the Tuggerah Lakes system. These issues are addressed in the Tuggerah Lakes Estuary Management Plan (Wyong Shire Council

2006). Only those matters which are caused by coastal processes increasing their impact on the estuary are specifically addressed in the Coastal Zone Management Plan.

## 4.2 Increasing population and demand for access to coastal 'services'

The Central Coast, of which the Wyong coastline is a key landscape element is a recognised population growth area in NSW settlement planning. The Central Coast Regional Strategy (Department of Planning 2008) covers the Gosford and Wyong local government areas. It proposes a population increase of just under one per cent per year (or about 4000 people a year) over the next 25 years, so that by 2031, the population of the region will grow by 100,000 people to more than 400,000 people.

Over the last decade, the population of the Central Coast has grown by 2.5 per cent per year, or 7000 people a year, presenting major challenges for all aspects of community infrastructure and services. In addition, the Central Coast currently has a relatively high number of unoccupied dwellings (principally holiday homes), reflecting its history as a holiday centre of Sydney people. Occupancy rates are expected to increase as these holiday homes become the permanent homes of retirees.

The close proximity of the Central Coast to both the Sydney Metropolitan Area and the major urban centres of the lower Hunter means that the potential number of day recreation visitors and regional tourists is high. The Lower Hunter Regional Strategy has identified Morisset, in the southern part of Lake Macquarie LGA, as a major growth centre. The nearest access to the coastline for south Lake Macquarie residents is at Wyong beaches, so growth in the lower Hunter can be expected to increase recreation demand along the Wyong coastline.

The scope of issues associated with increased population growth and recreational demand is noted below. More detail about these issues and a discussion of significance is in **PART C**, **Sections 17.2** and **18.0**. Options for reducing risks associated with increasing community demands on coastal landscapes and resources are considered in **PART D**.

Issues include:

- increased requirements for the capacity of surf club facilities and for beach patrol, including extended season and hours;
- increased safety risks with more people potentially using unpatrolled sections of the coast;
- demand for increased range, capacity and sophistication of facilities in coastal reserves, including parking, kiosks, paths, picnic tables, seating, signage, lookouts, playgrounds, shade, signage etc. Issues include up front capital for construction of new facilities and ongoing high maintenance costs;
- need to improve links between beach front reserves and local commercial centres, for instance at The Entrance, Budgewoi, and Bateau Bay;
- increased demand for parking and beach access ways away from the main patrolled beaches;
- conflicts with residents about parking in residential streets near popular beaches;
- conflicts between users, such as people walking dogs, recreational anglers, bird watchers, off road vehicles surfers and swimmers;

- demand for off beach coastal recreation facilities such as along coast walking paths;
- impacts of large numbers of coast users on coastal habitats such as dune vegetation, vegetation in headland reserves, habitat for shore birds and harvesting of rock platform species;
- interactions of increased demand for facilities and increased risks of coastal erosion;
- increased demand for higher density or higher quality housing in coastal locations, on dunes, headlands and nearby locations with ocean views. This is already apparent at Noraville, The Entrance, North Entrance, Blue Bay and Toowoon Bay;
- interactions of development planning and climate change risks to coastal locations, affecting land prices, design standards and insurance risks; and
- increased demand on beach species such as pipi and rock platform species that are used for bait by recreational anglers.