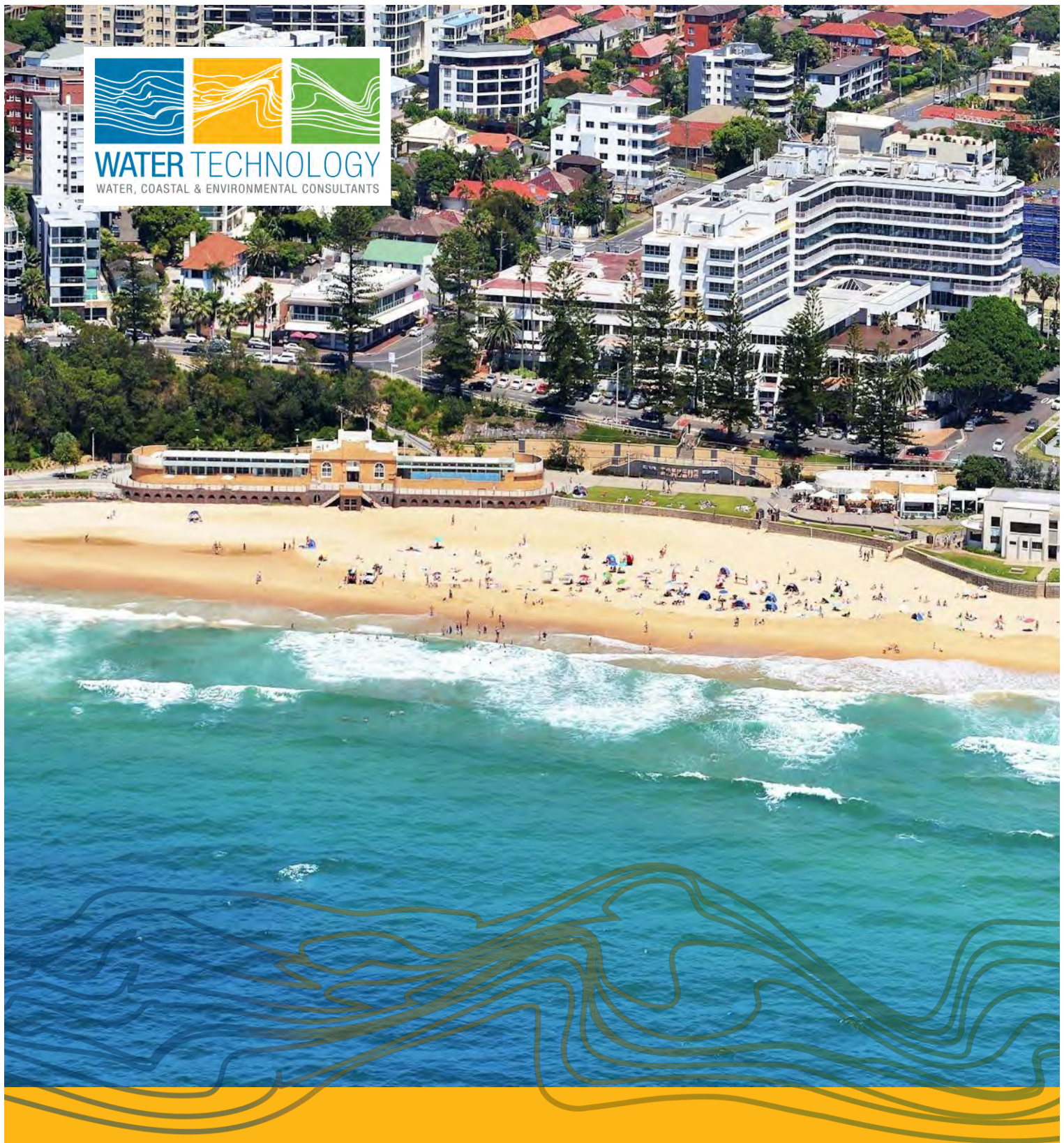




Stage 2 Social and Environmental Risk Assessment

Wollongong Coastal Management Program

Wollongong City Council

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City of Wollongong

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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.



Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.

The symbolism in the artwork includes:

- Seven circles representing each of the States and Territories in Australia where we do our work
- Blue dots between each circle representing the waterways that connect us
- The animals that rely on healthy waterways for their home
- Black and white dots representing all the different communities that we visit in our work
- Hands that are for the people we help on our journey



EXECUTIVE SUMMARY

Overview

Wollongong City Council (WCC) is preparing the Wollongong Coastal Management Program (CMP) to establish an integrated, 10-year framework for the coordinated management of the Wollongong Local Government Area (LGA) coastal zone. The CMP is being prepared in accordance with the NSW Coastal Management Framework, including the statutory requirements of the *Coastal Management Act 2016* (CM Act) and the mandatory provisions of the NSW Coastal Management Manual. The program is supported by funding and technical assistance from the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW).

This report forms part of Stage 2 of the CMP and presents the social and environmental risk assessment for the Wollongong LGA open coast. It builds on the Stage 1 Scoping Study completed in 2023 (Salients, 2023) and provides a more detailed evidence base to support the development of management actions in Stages 3 and 4. The assessment focuses on a suite of key stressors identified during Stage 1, which have been grouped into 4 management themes:



Coastal Ecosystem Management



Water Quality and Pollution



Public Recreation, Assets, and Safety



Strategic Planning

The assessment has been undertaken using a structured risk-based framework consistent with the NSW Coastal Management Manual (OEH, 2018a; OEH, 2018b; OEH, 2018c), ISO 31000 (2018), Council's Organisational Risk Management Plan (Wollongong City Council, 2025), and other relevant risk assessment guidance. Each stressor was assessed based on its likelihood and consequence, with consequence considered across a range of categories including people, environment, service delivery, financial sustainability, reputation, and community expectations. Risks were assessed for both present-day conditions and future planning horizons to 2045, 2075 and 2125, allowing consideration of how they may evolve over time (with consideration of population growth and climate change).

The assessment considers both localised risks at a precinct scale and broader strategic planning risks that apply across the coastal zone as a whole. To support a practical management focus, the coastline was grouped into 10 reporting areas, consolidating the 27 hazard divisions previously used in the coastal hazard risk assessment (Salients, 2026). This provides a more practical spatial framework for identifying and developing management responses in later CMP stages. In parallel, broader governance, planning and policy risks that apply across multiple reporting areas, or the LGA as a whole, have been assessed separately at a strategic scale.

Risk Assessment Workshops

A dedicated Stage 2 Risk Assessment Workshop was held on 15 December 2025 to refine the assessment and incorporate operational knowledge from Council staff and relevant State agencies. The workshop involved



participants from a broad cross-section of Council functions, including environmental planning, land use planning, infrastructure planning, open space, community engagement, regulation and enforcement, and city works, together with agency representatives from NSW DCCEEW, DPHI-Crown Lands and DPIRD Fisheries.

A separate workshop was also undertaken with the NSW National Parks and Wildlife Service (NPWS) to capture key social, environmental and cultural risks affecting the NPWS-managed coastline, including Royal National Park and the Five Islands Nature Reserve.

These workshops played an important role in validating the risk framework, identifying spatial hotspots, clarifying local drivers of risk, and exploring how risks may evolve over time. They also provided an opportunity to capture practical insights from those involved in the day-to-day management of the coast. These inputs have been incorporated throughout the assessment.

Outcomes

The risk assessment identified a number of strong recurring themes across the Wollongong coastline.

Within the coastal ecosystem management theme, the most consistent high-priority risks relate to the degradation of dune systems, wetlands and coastal vegetation communities through invasive species, habitat loss, vegetation vandalism, informal access, limited ecological buffers, and limited wetland migration space. These pressures are particularly evident in sensitive locations such as Royal National Park, Bellambi Lagoon, Sandon Point, Fairy Creek, Towradgi Creek, Coomaditchie Lagoon and the Five Islands Nature Reserve.

Within the water quality and pollution theme, most beaches continue to achieve Good or Very Good Beachwatch grades, indicating that broad-scale recreational water quality remains generally sound. However, historical estuary water quality monitoring (DCCEEW, 2026a; DCCEEW, 2026b) indicates that several estuaries within urbanised catchments experience poorer conditions, including elevated contaminant loads and high levels of microplastics. Examples include Bellambi Gully, Bellambi Lagoon, Fairy Creek and Towradgi Creek. Data availability is more limited for a number of other lagoons, creeks and small estuarine systems across the LGA, meaning comparable issues may be present but are not yet well quantified. This highlights the value of continued monitoring and targeted investigations to better understand water quality risks across the broader coastline.

A number of localised risks remain important, particularly those associated with legacy landfill contamination / buried anthropogenic waste. These risks are most pronounced in urbanised and industrially influenced settings, including Wollongong Harbour, Corrimal to North Wollongong, Port Kembla and parts of the northern suburbs.

The public recreation, assets and safety theme emerged as one of the strongest and most spatially widespread. The risks most consistently assessed as High or Extreme relate to loss of safe beach access, loss of safe beach width due to erosion and scarping, wave overtopping and public safety, lifeguard limitations, and the long-term exposure of surf life saving clubs (SLSCs) and ocean pools to coastal hazards. Key hotspot locations include the Figure Eight Pools and Royal National Park coastline, Wollongong Harbour breakwaters, Hill 60 rock platforms, narrow pocket beaches such as Coalcliff, Werrong, Bulgo and Little Austinmer, and major recreational assets such as ocean pools and SLSC facilities throughout the LGA.

In addition to these place-based risks, the assessment identifies a range of strategic planning risks that influence Council's ability to effectively manage the coastline over time. These include complex land tenure and governance arrangements, gaps between strategic planning and on-ground implementation, inconsistent policy direction, land use planning pressure, climate adaptation uncertainty, the management of historic heritage, protection of Aboriginal cultural heritage, and limited community awareness of coastal ecosystem values. These risks are particularly important because they shape how effectively the physical and environmental risks identified in the reporting area assessments can be addressed in later stages of the CMP.



Overall, the assessment finds that the Wollongong coastline is subject to a diverse but identifiable set of risks that are already evident under present-day conditions and are expected to intensify in many locations under future climate change. Some risks are chronic and ongoing, such as ecosystem degradation or governance complexity, while others are episodic but have high consequence, such as wave overtopping and public safety. The risk assessment does not seek to produce a strict numerical ranking between all stressors but instead provides a transparent framework for identifying where management attention is most needed and where future adaptation pathways will be required.

Next Steps

The findings of this report provide an important evidence base for Stage 3 of the CMP, which will identify and assess potential management actions to address the highest-priority risks across the Wollongong coastline. The outcomes of this assessment will be considered alongside the broader suite of Stage 2 technical investigations, including studies relating to coastal hazards, coastal processes, cliff instability, cultural heritage, coastal wetland and littoral rainforest mapping, and coastal entrance and foreshore erosion processes.

Together, these investigations provide a comprehensive understanding of coastal hazards, environmental values, infrastructure exposure and community use patterns across the LGA. This combined evidence base will guide the development of targeted management responses during Stage 3, helping identify practical actions to address priority risks. These actions will then be refined in Stage 4, where delivery responsibilities, implementation pathways, agency commitments and potential funding mechanisms will be established to support implementation of the final CMP.



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GLOSSARY AND ABBREVIATIONS

Term	Definition
Acceptable risk	A risk that, following an understanding of the likelihood and consequences, is sufficiently low to require no new treatments or actions to reduce risk further. Individuals and society can live with this risk without feeling the necessity to reduce risks further. Positive and negative risks are negligible or so small that no risk treatments are needed.
ACH	Aboriginal Cultural Heritage.
Annual Exceedance Probability (AEP)	The probability (expressed as a percentage) of an exceedance (e.g., large wave height or high water level) in a given year.
Asset	Something of value and may be environmental, economic, social, recreational or a piece of built infrastructure.
Astronomical tides	The regular rise and fall in sea level in response to the gravitational attraction of the Sun, Moon, and Earth – excluding any meteorological effects.
Aquatic habitat	Typical submerged communities extending from near sea, river, or lake level down several feet, such as tidal flats, oyster beds, clam flats, seagrass beds, or fishing reefs.
Back beach or back shore	The zone of the shore or beach lying between the foreshore and the coastline comprising the berm or berms and acted upon by waves only during severe storms, especially when combined with exceptionally high water.
Beach	The CM Act defines beach as an area that is generally composed of sand or pebbles or similar sediment that extends landward from the lowest astronomical tide to the line of vegetation or bedrock or structure.
Beach erosion	Refers to landward movement of the shoreline and/or a reduction in beach volume, usually associated with storm events or a series of events, which occurs within the beach fluctuation zone. Beach erosion occurs due to one or more process drivers; wind, waves, tides, currents, ocean water level, and downslope movement of material due to gravity.
Beach system	The CM Act defines as ‘the processes that produce the beach fluctuation zone and the incipient foredunes and foredunes landward of the relevant beach’. In general, this means coastal lands, composed of sand, gravel or shell, between a seaward limit of 40 metres depth in the State coastal waters and a landward limit at the lee side of the dunes.
Biodiversity	The variety and variability of wildlife (both plants and animals) and habitats. Biodiversity is typically a measure of variation at the genetic, species, and ecosystem level.
Buffer area	A parcel or strip of land that is designed and designated to permanently remain vegetated in an undisturbed and natural condition to protect an adjacent aquatic or wetland site from upland impacts, to provide habitat for wildlife and to afford limited public access.
Cliff	A high, steep face of rock; a precipice.
Climate change	The long-term change (decades or longer) in pattern of weather, and related changes in oceans, land surfaces and ice sheets.
CM Act	<i>NSW Coastal Management Act 2016.</i>
CM Manual	The NSW Coastal Management Manual.

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Term	Definition
CMP	Coastal Management Program – a long-term strategy for the coordinated management of land within the coastal zone, prepared and adopted under Part 3 of the CM Act.
Coast	A strip of land of variable width that extends from the shoreline inland to the first significant landform that is not influenced by coastal processes (such as waves, tides and associated currents).
Coastal cliff and slope instability	Geotechnical instabilities on coastal cliffs and bluffs, including rock falls, slumps, and landslides.
Coastal dune	Vegetated and unvegetated sand ridges built-up at the back of a beach. They comprise dry beach sand that has been blown landward and trapped by plants or other obstructions. Stable sand dunes act as a buffer against wave damage during storms, protecting the land behind from salt water intrusion, sea spray and strong winds. Coastal dunes also act as a reservoir of sand to replenish and maintain the beach at times of erosion.
Coastal hazard	Defined in the CM Act to mean the following: ▪ beach erosion ▪ shoreline recession ▪ coastal lake or watercourse entrance instability ▪ coastal inundation ▪ coastal cliff and slope instability ▪ tidal inundation ▪ erosion and inundation of foreshores caused by tidal waters and the action of waves, including the interaction of those waters with catchment floodwaters
Coastal inundation	Coastal inundation occurs when a combination of marine and atmospheric processes raises the water level at the coast above normal elevations, causing land that is usually 'dry' to become inundated by sea water. Alternatively, the elevated water level may result in wave run-up and overtopping of natural or built shoreline structures (e.g., dunes, seawalls).
Coastal lake or watercourse entrance instability	Refers to the variety of potential hazards and risks associated with the dynamic nature of both natural and trained entrances. Coastal lake and watercourse entrances are highly active environments with their shape constantly changing in response to processes such as alongshore sediment transport, tidal flows, storms and catchment flooding.
Coastal protection works (CPW)	The CM Act defines coastal protection works as: <i>a) beach nourishment</i> <i>b) activities or works to reduce the impact of coastal hazards on land adjacent to tidal waters, including (but not limited to) seawalls, revetments and groynes.</i>
Coastal wetland	Wetlands are areas that are inundated cyclically, intermittently or permanently with fresh, brackish or saline water and have soils, plants and animals in them that are adapted to, and depend on, moist conditions for at least part of their lifecycle. Coastal wetlands include marshes, mangroves, swamps, melaleuca forests, casuarina forests, sedgeland, brackish and freshwater swamps and wet meadows.
Coastal zone	As defined in the CM Act and R&H SEPP: the area of land comprised of the following coastal management areas: the coastal wetlands and littoral rainforest area, the coastal vulnerability area, the coastal environment area and the coastal use area.

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Term	Definition
Crown Land	In NSW, crown land refers to land that is owned by the NSW government and managed by various government agencies. In relation to this CMP, Crown lands include submerged Crown land, seabed and subsoil to 3 nautical miles from the coastline of NSW that is within the limits of the coastal waters of the State.
CZMP	Coastal Zone Management Plan – a plan for managing the coastal zone developed under the old (now superseded) coastal management framework for NSW. Now replaced by CMPs.
DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
DPIRD	The NSW Department of Primary Industries and Regional Development
DPHI	The NSW Department of Planning, Housing and Infrastructure.
East Coast Low (ECL)	An intense low-pressure system that occurs off the east coast of Australia, bringing storms, high waves and heavy rain. East coast lows generally occur in autumn and winter off NSW, southern Queensland, and eastern Victoria.
Ecosystem	The living organisms and the non-living environment interacting in an area, encompassing the relationships between biological, geochemical, and geophysical systems; or a community and its environment including living and non-living components.
TEC	Threatened Ecological Communities. In NSW, TECs are defined as naturally occurring groups of native plants, animals, and other organisms living in unique habitats. These communities are vital for their survival and provide essential ecological functions such as clean air and water, nutrient support for soil, and protection against erosion. An ecological community may be at risk of extinction due to significant habitat degradation or fragmentation, and it can be listed as vulnerable, endangered, or critically endangered under the <i>NSW Biodiversity Conservation Act 2016</i> , depending on the level of threat.
Entrance management	Includes artificial opening of estuary entrances, managing the configuration, height, or location of the beach to enable entrance opening at a level lower than the natural range.
Erosion	The removal of land by natural forces such as waves, tidal currents and / or littoral currents.
Estuary	The section of a river affected by tidal activity where fresh water from the river mixes with saltwater from the ocean.
Foredune	The larger and more mature dune lying between the incipient dune and the hind dune area. Foredune vegetation is characterised by grasses and shrubs. Foredunes provide an essential reserve of sand to meet the erosion demand during storm conditions. During storm events, the foredune can be eroded back to produce a pronounced dune scarp.
Foreshore	The area of shore between low and high tide marks and land adjacent thereto.
Geomorphology	A branch of physical geography encompassing the formation of the earth's surface, including the distribution of land and water.
GSC	Geotextile Sand Container. A sand filled container made out of a synthetic geotextile synthetic fabric which may be woven or non woven.
HAT	Highest Astronomical Tide. This is the highest tide level which can be predicted to occur under average meteorological conditions and any combination of astronomical conditions.



Term	Definition
Hydrodynamic	Relates to the specific scientific principles that deal with the motion of fluids and the forces acting on solid bodies immersed in fluids, and in motion relative to them.
ICOLL	Intermittently Closed and Open Lakes and Lagoons. Coastal lakes and lagoons where the entrance may be closed to the sea from time to time and for varying periods, by accretion of a berm. ICOLLs have sensitive water quality because they accumulate loads of sediment and nutrients from the catchment and may have poor water circulation and flushing.
Impacts	Include damage, harm or losses to exposed communities, property, services, livelihoods, access, use and amenity, heritage, ecosystems and the environment because of exposure and sensitivity. Impacts may also be positive.
Incipient dune	The most seaward and immature dune of the dune system. Vegetation characterised by grasses such as spinifex. On an accreting coastline, the incipient dune will develop into a foredune.
Intertidal zone	The region of the foreshore that is above the water at LAT but submerged at HAT.
IPCC	Intergovernmental Panel on Climate Change. A scientific and intergovernmental body under the auspices of the United Nations, set up at the request of member governments, dedicated to the task of providing the world with an objective, scientific view of climate change and its political and economic impacts.
IP&R	NSW Integrated Planning and Reporting Framework.
LALC	A Local Aboriginal Land Council (LALC) in New South Wales, Australia, is a statutory body established under the New South Wales <i>Aboriginal Land Rights Act 1983</i> . These councils are created to represent the interests and needs of the local Aboriginal communities within their respective areas. The primary purpose of Local Aboriginal Land Councils is to acquire, hold, and manage land on behalf of the Aboriginal people in their local areas.
LGA	Local Government Area.
Littoral	Of or pertaining to a shore, especially of the sea. Often used as a general term for the coastal zone influenced by wave action, or, more specifically, the shore zone between the high and low water marks.
Littoral rainforest	A closed forest ecological community recognised by its close proximity to the ocean (generally <2km) and closed canopy (i.e., ~70% of the sky obscured by tree leaves and limbs). Listed as an endangered ecological community under the <i>NSW Biodiversity Conservation Act 2016</i> . Littoral rainforest areas are mapped with coastal wetlands in the R&H SEPP, to form the coastal wetlands and littoral rainforests management area. Development controls apply to the management area and a proximity area which is also mapped.
MSL	Mean Sea Level. The mean level of the sea over a long period (preferably 18.6 years) or the mean level which would exist in the absence of tides.
Neap tides	Tides with the smallest range in a monthly cycle. Neap tides occur during the time of first and last quarter of the moon, when the sun and moon lie at right angles relative to the earth (with the gravitational effects of the moon and sun acting in opposition to one another).
NPWS	NSW National Parks and Wildlife Service.
NSW	New South Wales.



Term	Definition
Resilience	The ability of a system (in this case natural systems and states, and human systems along the coast) to 'bounce back' after a hazard or threatening event, returning to some quasi-stable state and maintaining functions, processes, and services.
R&H SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021.
Risk	Chance of something happening that will have an impact. It is measured in terms of consequences and likelihood.
Shoal	A sandbank or sand bar in the bed of a body of water, especially one that is exposed above the surface of the water at low tide.
Seawall	A wall built parallel to the shoreline to limit shoreline recession.
SLSC	Surf Life Saving Club
SLR	Sea level rise
Spring tides	Tides with the greatest range in a monthly cycle, which occurs during full and new moon when the sun, moon and earth are in alignment (with the gravitational effects of the moon and sun act in concert on the ocean).
Storm surge	The increase in coastal water levels caused by the barometric and wind set-up effects of storms. Barometric set-up refers to the increase in coastal water levels associated with the lower atmospheric pressures characteristic of storms. Wind set-up refers to the increase in coastal water levels caused by an onshore wind driving water shorewards and piling it up against the coast.
Storm tides	The total observed sea level during a storm, which is the combination of storm surge and normal astronomical tide.
Storm tide inundation	Flooding of coastal land due to inundation from storm tides. Inundation generally persists for the duration of a high tide, though it may persist longer in extreme cases.
TfNSW	Transport for NSW.
Tide	The periodic rise and fall of the water of oceans, seas, bays, etc., caused mainly by the gravitational interactions between the Earth, Moon, and Sun.
WCC	Wollongong City Council
Wave overtopping	The process where waves run up and flow over a coastal structure, seawall, rock platform, cliff edge, or natural shoreline, allowing water to pass beyond the crest or edge of the feature. Wave overtopping can pose safety risks to people and may cause flooding, erosion, or damage to infrastructure located behind the shoreline.
WoNS	Weeds of National Significance (WoNS) - Invasive plant species identified as having significant environmental, economic, and social impacts in Australia, and prioritised nationally for coordinated management and control.



1 INTRODUCTION

1.1 Project Background

Wollongong City Council (WCC) is currently preparing the *Wollongong Coastal Management Program (CMP)*, which will establish an integrated, 10-year framework for the coordinated management of the Wollongong Local Government Area (LGA) coastal zone. The CMP aims to address key coastal issues while preserving and enhancing the area's social, cultural, economic, and environmental values.

The CMP is being developed in line with the NSW Coastal Management Framework, including the statutory requirements of the *NSW Coastal Management Act 2016* (CM Act) and the mandatory provisions outlined in the *NSW Coastal Management Manual* (OEH, 2018a), hereafter referred to as the CM Manual. The program is supported by funding and technical assistance from the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW).

The CMP will be prepared through a 5-stage risk management process set out in the CM Manual and depicted in Figure 1.1 (OEH, 2018b).

Stage 1 of the CMP was completed in 2023, with the adoption of the Stage 1 Scoping Study Report (Salients, 2023). This foundational stage included a review of existing information, a preliminary risk assessment, identification of key data gaps, and the development of a forward work program to guide subsequent stages of the CMP.

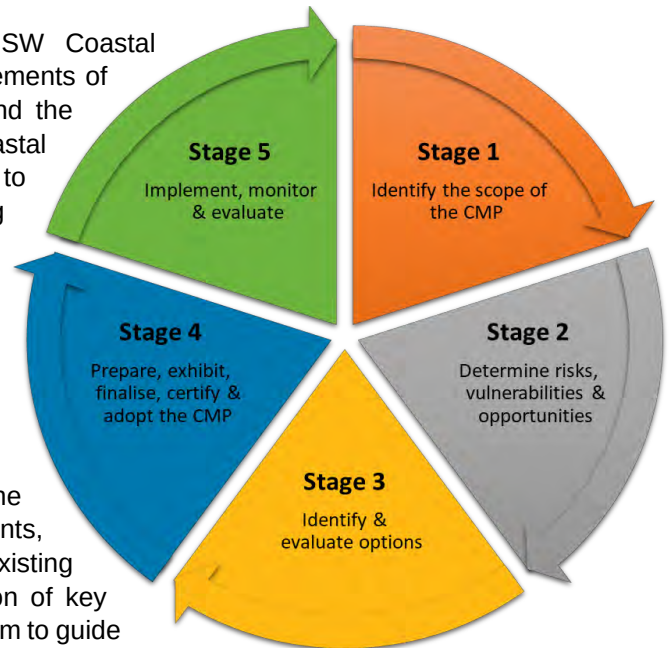


Figure 1.1 The CMP process

This report forms part of Stage 2 of the CMP and has been prepared to meet the Stage 2 requirements of the CM Manual (OEH, 2018c). It identifies and evaluates **social and environmental risks** affecting the Wollongong open coast, including stressors relating to coastal ecosystems, public recreation and safety, water quality, and strategic planning and governance. The assessment applies a structured risk-based framework to determine the likelihood and consequence of these stressors over multiple planning horizons. The findings will inform the prioritisation and development of management actions in Stages 3 and 4 of the CMP.

1.2 CMP Study Area

1.2.1 Geographical Extent

The CMP study area covers the Wollongong LGA open coastline, extending approximately 50 km from the southern end of Garie Beach at the northern LGA boundary to the entrance of Lake Illawarra at the southern boundary (Salients, 2023). The coastline is characterised by a sequence of embayed sandy beaches bounded by headlands or rock platforms, and separated by sections of sandstone cliffs. These beach embayments vary in length and exposure, creating a diverse coastal landscape that includes pocket beaches in the north and longer sandy beaches in the south (Cardno Lawson Treloar, 2010).

The Illawarra Escarpment runs broadly parallel to the coast along the length of the LGA and strongly influences the form and development pattern of the coastal zone. In the northern part of the LGA, the escarpment lies close to the shoreline, resulting in a more constrained coastal strip dominated by rocky cliffs and smaller beach



compartments. Further south, the escarpment is set further inland, allowing for wider coastal plains and the development of longer sandy beaches and more extensive foreshore areas.

A number of coastal creeks discharge across the open coast, forming intermittently open or permanently open entrances and locally influencing beach morphology and water quality. The southern boundary of the study area adjoins Lake Illawarra, a large barrier estuary with a trained entrance, which influences coastal processes at the southern extent of the open coast.

In total, the open coast study area comprises 29 beaches and 24 coastal waterways, reflecting a highly compartmentalised coastline shaped by headlands, escarpment controls and creek systems.

The CMP study area does not include the following areas:

- The coastal zone around Lake Illawarra – which is presently managed under the Lake Illawarra CMP (BMT WBM, 2020)
- The Port Kembla port area – which is managed under a separate statutory framework (SEPP (Transport and Infrastructure) 2021, Chapter 5).

1.2.2 Coastal Management Areas

In accordance with the CM Act, the CMP will give effect to the management objectives for the 4 coastal management areas (CMAs) that define the coastal zone of the study area. Each CMA has different characteristics and objectives, and the areas may overlap. The CM Act provides the definition and objectives for each of the management areas. The State Environmental Planning Policy (Resilience and Hazards) 2021 (R&H SEPP) provides development controls for each of the management areas, and state-wide mapping of 3 of the 4 areas. The 4 coastal management areas as defined by the CM Act are:

- **Coastal environment area (CEA):** Land containing coastal features such as the coastal waters of the state, estuaries, coastal lakes, coastal lagoons, and land adjoining those features including headlands and rock platforms. Beaches, dunes, and foreshores are included in this area.
- **Coastal use area (CUA):** Land adjacent to coastal waters, estuaries, coastal lakes and lagoons where development is or may be carried out (at present or in the future) and impacts of development on the scenic and cultural values and use and enjoyment of the beaches, foreshores, dunes, headlands, rock platforms, estuaries, lakes and the ocean need to be considered.
- **Coastal wetlands and littoral rainforests area (CWLR):** Land which displays the hydrological and floristic characteristics of coastal wetlands or littoral rainforests, as well as a surrounding proximity area to manage impacts of adjacent development.
- **Coastal vulnerability area (CVA):** Land which is subject to any of the coastal hazards listed in the CM Act, including beach erosion, shoreline recession, coastal lake or watercourse entrance instability, coastal inundation, tidal inundation, coastal cliff and slope instability. Mapping for the coastal vulnerability area has not been provided from the R&H SEPP, and no such coastal vulnerability area (CVA) map yet exists for the study area. Nonetheless, it is recognised that the study area is subject to coastal hazards and that the scope of this CMP also covers managing coastal vulnerability.

The study area for the CMP therefore comprises the envelope extent of these CMAs across the Wollongong LGA, noting the exclusions identified in Section 1.2.1.

1.3 Associated CMP Stage 2 Assessments

Stage 2 of the Wollongong CMP represents a substantial body of parallel technical investigations undertaken to establish a comprehensive evidence base for risk-based coastal management. These studies address coastal processes, hazard exposure, environmental values, cultural heritage, infrastructure vulnerability and



ecological condition across the LGA. Together, they provide the technical foundation required to support informed and defensible decision-making in later CMP stages.

This report is one of 8 specialist assessments being undertaken in Stage 2, including:

- Aboriginal Coastal Cultural Values Report (ILALC, 2024)
- Inundation, Beach Erosion and Recession Study (JBP, 2025)
- Coastal Cliff Instability Study (Tetra Tech Coffey, 2025)
- Coastal and Estuary Process Study (Salients, 2025a)
- Coastal Entrance and Estuarine Foreshore Erosion Hazard Study (Salients, 2025b)
- Coastal Hazard Risk Assessment (Salients, 2026)
- Coastal Wetland and Littoral Rainforest Mapping Review (Biosis, 2025)

Collectively, these studies establish a comprehensive technical evidence base describing coastal hazards, processes, assets, and values across the LGA.

While the supporting Stage 2 investigations define coastal hazards, processes, assets and environmental values, the present assessment focuses specifically on social and environmental risk. It synthesises relevant findings from those studies and evaluates how identified stressors interact with ecological systems, community use patterns, infrastructure, and governance settings across the coastal zone. By assessing the likelihood and consequence of these stressors within a consistent risk framework, the report establishes a transparent basis for identifying priority issues and shaping targeted management responses in subsequent CMP stages.

1.4 Report Structure and Spatial Framework for the Assessment

Given the size and diversity of the Wollongong LGA coastal zone, this assessment adopts a precinct-based approach to support reporting at a scale that is useful for identifying and developing management actions in Stage 3.

The Stage 2 Coastal Hazard Risk Assessment (Salients, 2026) divides the coastline into 27 local divisions to assess hazard risks to assets. For social and environmental stressors, key drivers often operate across broader spatial scales, reflecting the extent of ecological systems (for example, creek corridors, wetlands and dune compartments), patterns of community access and use, and the way management responses are planned and delivered across adjoining beaches and reserves.

Accordingly, the 27 hazard divisions have been consolidated into 10 “reporting areas” for this assessment – as summarised in Table 1.1 and Figure 1.2. Risk summaries for each reporting area are provided in Section 3.

Some stressors apply across the entire coastal zone or are not strongly spatial in character, particularly those relating to governance and policy settings. These broader stressors are considered separately in Section 4.

A summary of all stressors and associated risk ratings is provided in Appendix A.



Table 1.1 Spatial Framework used for this Assessment

Reporting Area	Division (Salients, 2026)
A - Royal National Park (NPWS managed land)	01 - Little Garie to Burning Palms 02 - Burning Palms to Werrong 03 - Bulgo Beach 04 - Stanwell Tops
B - Stanwell Park to Clifton	05 - Stanwell Park 06 - Coalcliff 07 - Clifton
C - Scarborough to Coledale	08 - Scarborough-Wombarra 09 - Coledale
D - Sharky to Austinmer	10 - Sharky Beach 11 - Little Austinmer Beach 12 - Austinmer
E - Thirroul to McCauleys	13 - Thirroul Beach 14 - McCauleys Beach
F - Sandon Point to Bulli	15 - Sandon Point Beach 16 - Bulli Beach
G – Woonona to Bellambi	17 - Woonona Beach 18 - Bellambi
H – Corrimal to North Wollongong	19 - Corrimal Beach 20 - Towradgi 21 - Fairy Meadow 22 - North Wollongong
I – Wollongong City	23 - Wollongong Central 24 - City Beach
J – MM Beach to Windang (partly NPWS managed land)	25 - Hill 60 - Red Point (including Five Islands Nature Reserve) 26 - Port Kembla 27 - Windang



Data sources:
Contains SIXMAPS
Information © State of
NSW 202

0 1 2 3 4 5 km

Figure 1-2
Risk Assessment Study Area





2 RISK ASSESSMENT APPROACH

2.1 Overview

2.2 Application of a Risk Based Framework

Section 21 (3) (b) of the CM Act requires local councils to follow a risk management process when preparing their CMPs and identifying where management actions are required. This includes identifying and assessing risks and benefits to environmental, social, and economic values and evaluating and selecting management actions to address those risks. In line with this legislative requirement, this assessment applies a structured and transparent approach consistent with the industry standards and guidelines.

The AS/NZS ISO 31000: Risk Management – Principles and Guidelines (ISO, 2018) outlines a process for risk management and defines many of the common terms associated with risk management practice (see Figure 2.1). Risk is identified as the product of the likelihood and consequence of an event impacting on an asset or objective.

‘Risk Management’ is the term applied to a logical and systematic method of establishing the context, identifying, analysing, evaluating, treating, monitoring and communicating the risks associated with any activity, function or process in a way that will enable organisations to minimise losses and maximise opportunities (ISO, 2018).

A First Pass Risk Assessment (FPRA) was undertaken during the Stage 1 Scoping Study (Salients, 2023), and this assessment identified a range of existing and future emerging issues likely to affect the study area. The approach remains conceptually similar to that of the FPRA but has been broadened to apply a framework that is consistent with those applied in:

- Wollongong City Council’s Organisational Risk Management Plan (Wollongong City Council, 2025).
- The NSW Marine Estate Threat and Risk Assessment (TARA) (BMT WBM, 2017).

The framework also draws upon the following national standards and guidelines:

- ISO 31000:2018 Risk management – Principles and guidelines, provides principles, framework, and a process for managing risk (ISO, 2018) – see Figure 2.1.
- AS 5334:2013 Climate change adaptation for settlements and infrastructure – a risk-based approach (Standards Australia, 2013).
- The NCCARF Local government framework for coastal risk assessment in Australia (Wainwright & Verdon-Kidd, 2016).
- The NSW Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions (OEH, 2017)

The purpose of this Risk Assessment, as outlined in the CM Manual, is to highlight priorities for management actions while recognising the uncertainties associated with natural systems and future scenarios.

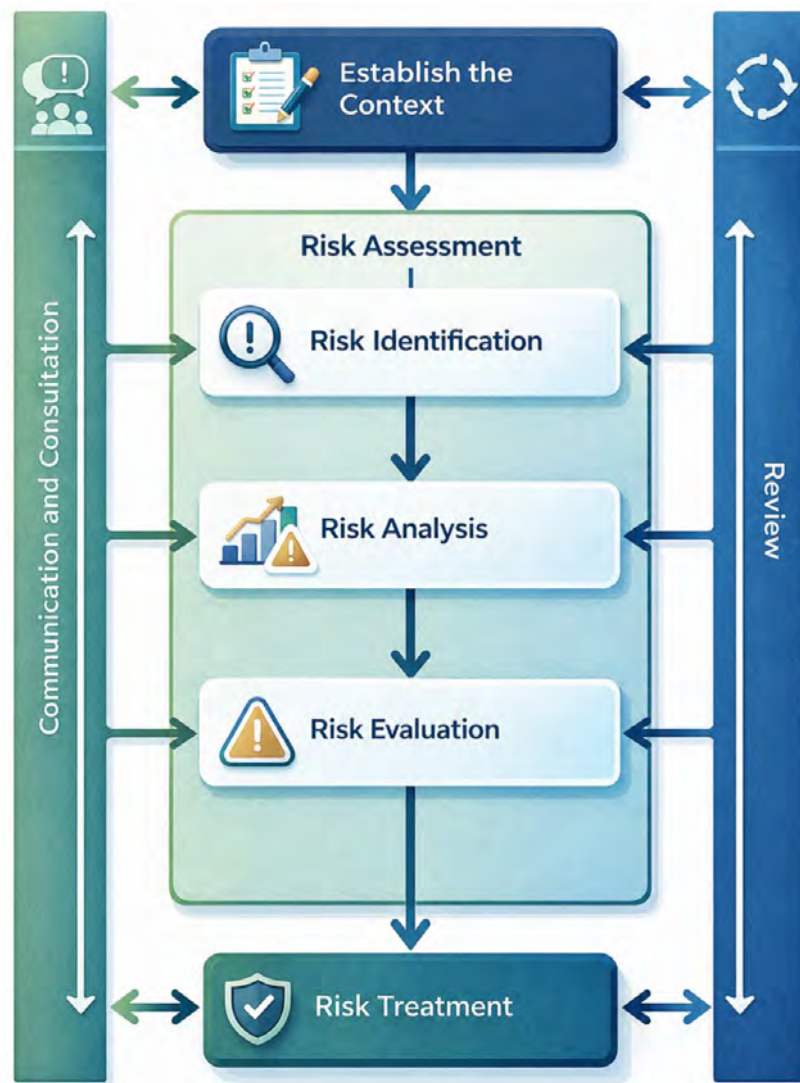


Figure 2.1 Risk assessment guidelines. Image source: ISO31000:2018.

2.3 Framework Parameters

2.3.1 Likelihood Scale

Robust risk assessment relies on the application of clear, logical, and context-appropriate likelihood and consequence scales to support consistency, transparency, and repeatability across all stressors considered. Within coastal environments, likelihood scales must be sufficiently flexible to capture the behaviour of physical hazard processes (such as coastal erosion, shoreline recession, and inundation), while also accommodating broader environmental, social, and amenity-related risks that may manifest over different temporal and spatial scales.

The likelihood scale adopted for this assessment is drawn from Council's corporate risk management framework and policy (Wollongong City Council, 2025), providing alignment with Council's broader enterprise risk management approach. Application of the corporate framework also supports integration of coastal risks into Council's wider governance, planning, and decision-making processes. The adopted scale, presented in Table 2.1, ranges from *Rare* to *Almost Certain*. Each category is supported by indicative probability ranges and frequency descriptors, alongside project-specific interpretation guidance. This dual framing allows the

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scale to be applied consistently across both long-term coastal hazard processes and shorter-term project or operational risks relevant to CMP implementation.

Table 2.1 Likelihood scale for risk assessment (Wollongong City Council, 2025)

Descriptor	General Description	Project Risk Interpretation
Almost Certain	- Event is expected to occur in over 95% of occasions. - The risk event will occur multiple times a year. - The risk event will occur in most circumstances.	Could be expected to occur more than once during the study or project delivery.
Likely	- The risk event will occur in 75% - 90% of occasions. - The risk event will occur once every year. - The risk event will probably occur on most occasions.	Could easily be incurred and has generally occurred in similar studies or projects.
Possible	- The risk event will occur in 30% - 75% of occasions. - The risk event will occur once every 1 to 5 years. - The risk event will likely occur at some time.	Incurred in a minority of similar studies or projects.
Unlikely	- The risk event will occur in 10% - 30% of occasions. - The risk event will occur once every 5 to 10 years. - The risk event may occur at some time.	Known to happen, but only rarely.
Rare	- The risk event will occur in 0% - 10% of occasions. - The risk event may occur greater than every 10 years. - The risk event would only occur in exceptional circumstances.	Has not occurred in similar studies or projects. Conceivable but only in extreme circumstances.

2.3.2 Consequence Scale

For the qualitative risk assessment developed in this report, consequence scales adopted for this assessment are drawn from Council's corporate risk management framework and policy (Wollongong City Council, 2025). The consequence framework adopted for this assessment spans six primary risk categories. Collectively, these categories capture the breadth of potential impacts arising from external stressors affecting the coastal zone.



People: Considers risks to the health, safety, and wellbeing of staff, contractors, and the public. This includes physical injury, psychological harm, workforce capability, and organisational culture factors such as morale, retention, and conduct.



Reputation and Community Expectations: Captures risks to Council's public standing, stakeholder relationships, and community confidence. This includes media exposure, complaints, political scrutiny, and the perceived effectiveness and transparency of coastal management actions.



Child Safety: Addresses risks to children and young people associated with Council services, programs, facilities, and project delivery. This includes physical safety, psychological wellbeing, safeguarding compliance, and duty of care obligations.



Financial Sustainability: Considers the financial implications of coastal risks and management responses, including direct losses, budget impacts, recovery timeframes, and disruption to planned service delivery or capital programs.



Environment: Captures impacts to ecological systems, habitats, biodiversity, and heritage values. This includes both temporary and permanent environmental damage, regulatory breaches, and impacts to sensitive coastal ecosystems and cultural heritage assets.



Service Delivery: Addresses risks to Council's ability to maintain essential services, infrastructure, and community functions. This includes asset damage, operational disruption, workforce availability, and continuity of public-facing facilities and programs.

The likelihood scales are provided in Table 2.2. Each type of risk was assessed across each consequence category, with the critical consequence rating applied to the assessment.



Table 2.2 Consequence scale for risk assessment (Wollongong City Council, 2025)

Risk Category	Insignificant	Minor	Medium	Major	Catastrophic
People	- Minor injury, e.g. cuts, abrasions, resulting in no lost time. - Isolated minor incidents where individual staff are unaware of the roles and responsibilities in relation to code of conduct or ethical behaviour. - Isolated incidents of temporary decline in individual staff morale and/or absenteeism.	- Minor injury where first aid treatment is required. - Difficulty (but not inability) in attracting and retaining key personnel. - Limited understanding by multiple staff in relation to code of conduct or ethical behaviour. - Short term decline in staff confidence and morale and/or absenteeism.	- Injury or illness requiring treatment by a medical practitioner or short-term hospital visit. - Inability to attract and retain key personnel. - Limited understanding by several staff in relation to code of conduct or ethical behaviour. - Medium term decline in staff morale identified.	- Severe injury resulting in long-term hospitalisation. - Long-term partial disability. - Long term mental health impacts. - Any notifiable event relating to safety to WorkSafe NSW or other regulatory bodies. - Widespread lack of understanding in relation to code of conduct or ethical behaviour. - Low retention of key personnel along with inability to attract. - Medium term decline in staff morale identified and escalating across the organisation.	- Death/Life threatening event. - Permanent Disability. - Significant loss of several key personnel. - Significant levels of non-compliance with a code of conduct, or a high likelihood of corrupt/unethical conduct. - Significant levels of ongoing lack of staff confidence and low staff morale across the organisation.
Reputation & Community Expectations	- One off (no more than 24 hours) negative local media publicity. - Some attention from minor stakeholders which are able to be resolved through routine management processes. - Positive reputation maintained with community and media stakeholders. Isolated complaints from individual members of the community. - Minimal negative feedback. Minimal impact on cultural safety and accessibility to staff and our community.	- Short term (several days) local adverse publicity. - Limited damage to Council's reputation. - May cause some social media or formal complaints (justified or unjustified). - Positive relationship with media stakeholders maintained. - Complaints from a group in the community which is escalating into the public arena. - Minor impact on cultural safety and accessibility on an individual.	- Some negative publicity or short-term damage to Council's reputation at local or state media level. - Disruption to some core Council services resulting in the potential loss of public confidence in Council's processes. - Sustained reputation variances in the community. Relationships with media stakeholders may be strained. - Significant social media and/or formal complaints. - Moderate impact on cultural safety and accessibility on an individual or group within our community.	- Significant adverse Local and State media coverage. - Disruption to major council services resulting in loss of confidence in council processes. - Escalating community concerns and complaints. - Impacts requiring long-term damage to reputational standing and political standing. - Major compliance/ethics investigation of Council by oversight agency or regulator. - Significant impact on cultural safety and accessibility on an individual or group causing lasting relationship damage.	- Appointment of administrator or Ministerial Intervention. - Significant adverse Major State or National Media Coverage. - Media scrutiny severely impacts service delivery. - Negative Publicity leads to major staff resignations or sustained long term loss in public confidence in Council processes. - Ongoing exposure may lead to audit, inquiry or legal proceedings. "Viral" adverse social media coverage. - Irreversible political damage to brand and reputation.
Child Safety	- Minor physical or mental health first aid required no future impact on child. E.g. cut, scrapes, abrasions. - E.g., Concerning behaviour or compliance failure that has caused no direct impact on the child but may be indicative of where risk management controls should be reviewed.	- Medical treatment for minor mental injury or trauma. - Peer support required to stress or trauma event. - E.g., One-off event of poor behaviour by an adult, such as belittling the child.	- Hospital treatment (outpatient), less than 7 days lost time. - Stress or trauma event requiring professional support for the child, with a trauma impact period estimated to be less than 6 months. - Failure to implement/comply with child safe requirements or working with children checks. - Failure to obtain consent for child participation or photography. - E.g., Bullying, intimidation, failing to provide an environment that prevents injury.	- Long term ongoing serious effects on a child's physical and mental wellbeing. - Possible partial disability. - Stress or trauma event requiring medium to long term clinical support for the child, with a significant period of trauma impact. - Failure to securely store information and images relating to children. - E.g., Sexual misconduct, grooming behaviour, physical assault, more than one episode of neglect or emotional abuse and failure to reduce or remove the risk of a child becoming a victim of abuse/failure to report.	- Death or permanent disability of the child. - Stress or trauma event requiring extensive and ongoing clinical support for one or multiple individuals, with potential lifelong trauma impact. - E.g., Sexual assault or abuse or serious physical assault, sustained neglect or emotional abuse, and actively concealing child abuse.



Risk Category	Insignificant	Minor	Medium	Major	Catastrophic
Financial Sustainability	- Loss of less than 1% of Divisional operational budget. - Loss of less than \$50,000. - Budget variation manageable short term. Minor disruptions to delivery of products, services, or systems.	- Loss of 1% to 5% of Divisional operational budget. - Loss of \$50,000 to \$250,000. - Budget variation manageable, absorbed over current financial year. - Temporary disruptions to delivery of products, services, or systems.	- Loss of 5% to 10% of Divisional operational budget. - Loss of \$250,000 to \$750,000. - Impact on budget beyond current financial year, but manageable within the next financial year. - Restriction or disruptions to delivery of products, services, or systems over a short period less than 6 months.	- Loss of 10% to 20% of Divisional operational budget. - Loss of \$750,000 to \$15mil. - Impact on budget with recovery over proceeding 3 financial years. - Severe delays or restriction to key products, services, or systems over a sustained period over 12 months.	- Loss of more than 20% of Divisional operational budget. - Loss of more than \$15mil. - Impact on budget with recovery over proceeding 3 or more financial years. - Non delivery or loss of critical products, services, or systems over a sustained period over 12 months.
Environment	- Minor breach of Council policy or procedures. - Negligible event (e.g. street, precinct) with minimal environmental damage and no ongoing effect.	- Minor event with localised impact (e.g. street, precinct) which is easily remediated. - Minor environmental damage is immediately remediated with minimal resources.	- Medium-term, moderate-scale damage to habitat, heritage or environment able to be contained with specialist assistance. - Moderate impact on the environment: no long term or irreversible damage. - May incur cautionary notice or infringement notice. - Potential damage to identified indigenous heritage area or item.	- Severe Medium-term, moderate-scale damage to habitat, heritage or environment. - Environmental incident under investigation by regulatory bodies. - Severe impact requiring remedial action and review of processes to prevent reoccurrence. Penalties and/or direction or compliance order incurred. - Significant but repairable damage to indigenous heritage area or item.	- Long-Term, large-scale damage to habitat, heritage or environment. - Serious repeated breaches of legislation/licence conditions. - Cancellation of licence and/or prosecution in relation to environmental matters. - Total destruction or loss.
Service Delivery	- Minor issues with communication, information systems, technology, assets. - Negligible impact on delivery of key service to the community. - Negligible impact on external customers. - Negligible impact on meeting Council objectives.	- Temporary restriction of access or disruption to essential services or business functions for less than one day. - Slight or minor damage to assets/property or facilities. - Localised workforce availability issues. - Ad hoc impacts or restrictions on accessibility to assets, programs or services impacting only a very small portion of the population.	- Restriction of access or disruption to essential services or business functions for less than 3 days. - Multiple sites impacted workforce availability issues. - Moderate delays or impacts to delivery of key service to the community. - Moderate, but temporary, damage to assets, property, facilities. - Moderate impacts or restrictions on accessibility to assets, programs or services impacting only a very small portion of the population.	- Restriction of access or disruption to essential services or business functions for 2 to 5 days. - Multiple sites impacted by significant workforce availability issues. - Some important objectives of the organisation cannot be met. - Sustained damage to assets or property/facilities lasting many months. Temporary closure of a public facing facility or service. - Ongoing impacts or restrictions on accessibility to assets, programs or services impacting a portion of the population.	- Loss of access or disruption to essential services or critical business functions for more than 5 days. - Ongoing, significant workforce availability issues at multiple sites. - Council's key objectives cannot be met. - Crisis Management Plan enacted. - Long Term or permanent loss of critical assets or property/facilities. - Long-term closure a public facing facility or service.



2.3.3 Risk Matrix

The risk for each stressor within the coastal zone is evaluated by application of a risk matrix which draws upon both the likelihood factors and the consequence ratings that are discussed in sections 2.3.1 and 2.3.2. The risk matrix is displayed in Table 2.3 based on Council's corporate risk management framework and policy (Wollongong City Council, 2025).

Table 2.3 Risk Matrix applied to evaluate risk

Likelihood	Consequences				
	Catastrophic	Major	Medium	Minor	Insignificant
Almost Certain	Extreme	Extreme	Extreme	High	Moderate
Likely	Extreme	Extreme	High	Moderate	Low
Possible	High	High	Moderate	Moderate	Low
Unlikely	High	Moderate	Moderate	Low	Low
Rare	Moderate	Low	Low	Low	Low

It is important to note that the risk ratings presented in this assessment are not intended to function as a strict ordinal ranking between all stressors. Each risk has been evaluated independently using a consistent likelihood and consequence framework, but against its own evidence base, impact pathways, spatial expression and dominant consequence categories. As a result, differences in rating trajectories between stressors are expected and reflect the distinct mechanisms, timing and reversibility of each process rather than inconsistency in application of the framework.

Some stressors are characterised by chronic, system-wide pressures with already realised consequences, while others are episodic, spatially localised, or subject to partial natural recovery and management intervention. In addition, certain hazards exhibit threshold or non-linear escalation over time, particularly those strongly linked to projected sea level rise, whereas geomorphic and ecological processes may evolve more gradually. The framework therefore aims to maintain methodological consistency rather than produce full numerical normalisation across unrelated hazard types. The relative hierarchy of risks should be interpreted in the context of their individual narratives, evidence sources and temporal behaviour, rather than as direct one-to-one comparisons between all stressors.

2.4 Temporal Scale of the Assessment

Whilst the CMP will largely focus on implementing management actions over the coming 10-year management horizon, it is important to consider the evolution of the various threats and stressors facing the study area over longer timeframes. For this reason, the NSW Coastal Management Manual (OEH, 2018c) requires that risk should be assessed over a range of future management horizons (Mandatory Requirement #2), including:

- **Present Day (~2025)** – representing current system condition and management context.
- **20 Years (~2045)** - representing the typical planning horizon for Council assets and capital works programs.
- **50 Years (~2075)** – capturing mid-to-late century climate projections and generational shifts in land use and policy.
- **100 Years (~2125)** – representing a high-range, long-term scenario used primarily for stress-testing strategic planning and infrastructure resilience.



This requires consideration of:



Potential climate change impacts such as sea-level rise, altered rainfall patterns, and temperature-driven ecosystem change. Climate change impacts have been based on the technical information provided in the IPCC Sixth Assessment Report (IPCC, 2021) - referred to herein as 6AR. Specific consideration has been given to 6AR projections of the Shared Socio-economic Pathway (SSP) 5-8.5. This scenario has been formally adopted by Council for the purposes of coastal management and planning (Salients, 2023).



Population growth which is expected to increase pressure on coastal systems through higher stormwater volumes and pollutant loads, greater demand for beach access and recreational facilities, and increased use of foreshore infrastructure. These pressures may compound existing environmental stressors and amplify exposure of public assets and community values. Population projections from 2026 to 2046 for the study area have been sourced from the Wollongong CommunityID portal (idcommunity, 2026).



Ongoing development and land-use change within the coastal zone and contributing catchments, including urban intensification and changes to land management practices. Such changes may alter runoff characteristics, reduce available buffer areas, constrain natural coastal processes and increase the number and value of assets exposed to coastal hazards over time.

This temporal framing is intended to guide practical decision-making rather than predict precise future states. It helps identify where immediate actions can meaningfully reduce current risks, and where longer-term adaptation pathways may be required. For example:

- If a risk remains low across all horizons, short-term operational responses may suffice.
- If a risk escalates markedly by 2075 or 2125, the focus can shift toward progressive adaptation measures, planning controls, or monitoring triggers to inform future CMP updates.

By explicitly linking timeframes to the scale and reversibility of each issue, the assessment provides a clear and pragmatic basis for prioritising management responses in Stage 3, balancing what is actionable now against what requires staged planning, ongoing observation, or policy adjustment in future cycles.

2.5 Stressors and Associated Management Themes

The Stage 1 FPRA prepared as part of the CMP Scoping Study (Salients, 2023) identified a range of social and environmental stressors affecting the Wollongong LGA coastal zone. This Stage 2 assessment builds on the FPRA to provide a more detailed and decision-ready evidence base to support the identification, evaluation and prioritisation of management options in Stage 3. In effect, it strengthens the “bridge” between risk identification and the development of practical management responses.

This is achieved by:

- **Providing spatial granularity** – identifying where stressors are occurring, the assets and values they affect, and how their expression varies along the coastline.
- **Assessing risk over longer planning horizons** – extending the FPRA’s present-day focus to consider how risks may evolve over 20-, 50- and 100-year timeframes.

In total, 34 stressors have been assessed in this report, expanding on the stressors considered in the Stage 1 Scoping Study and reflecting the broader scope required to support CMP action development.

Drawing on the outcomes of the Stage 1 Scoping Study (Salients, 2023), this assessment has identified 4 primary management themes through which social and environmental stressors affecting the coastal zone can be meaningfully grouped and evaluated. These themes provide a structured lens for organising risk, recognising that many individual stressors are interconnected and often require coordinated, cross-disciplinary



management responses. Grouping stressors in this way also supports clearer linkage between risk identification (Stage 2) and the development of targeted management actions in subsequent CMP stages.

The use of management themes also assists in distinguishing between location-specific pressures and broader systemic issues. Some stressors primarily affect ecological condition or public safety within discrete areas of the coastline, while others relate to governance settings, policy clarity or institutional capacity across the LGA as a whole. Organising stressors under thematic headings enables the assessment to identify patterns of risk concentration, clarify responsibility across Council functions, and highlight opportunities for integrated management responses rather than isolated interventions.

The 4 management themes and their associated stressors are summarised in Table 2.4.

Table 2.4 Stressors and Categories

Management Theme	Description	Stressors
1. Coastal Ecosystem Management 	Stressors relating to the condition, resilience, and ecological function of coastal habitats and biodiversity values, including pressures affecting dunes, wetlands, rock platforms, and threatened ecological communities (TECs).	A. Impact of invasive species – fauna B. Impact of invasive species – flora C. Habitat loss and impacts on native fauna (including shorebirds) D. Habitat loss and impacts on native flora E. Vegetation vandalism F. Informal pedestrian and vehicle access damage G. Wind-blown sand drift and impacts on dune vegetation H. Harvesting and walking on rock platforms I. Inadequate vegetation buffers for threatened ecological communities (TECs) and areas of wetland migration
2. Water Quality and Pollution 	Stressors relating to coastal and estuarine water quality, contamination pathways, and pollutant sources that may impact ecological health, recreational use, and public safety.	A. Water quality for primary contact recreation B. Water quality for secondary contact recreation C. Urban stormwater and sewer pollutants D. Buried anthropogenic waste
3. Public Recreation, Assets, and Safety 	Stressors relating to public use of the coastal zone, including beach safety, recreational access, amenity, and the condition and functionality of public infrastructure and facilities.	A. Lifeguard services and unpatrolled beaches B. Loss of lifeguard sight lines C. Loss of safe beach/foreshore access D. Loss of safe beach width (and scarping) E. User group conflicts F. Dogs on beaches conflicts G. Wind-blown sand drift impacting recreational amenity H. Wave overtopping and public safety I. Loss or rationalisation of rock pools J. Loss or rationalisation of Surf Life Saving Clubs (SLSCs)

Management Theme	Description	Stressors
4. Strategic Planning 	Stressors relating to governance, policy alignment, land use planning, and institutional capacity influencing the long-term management of the coastal zone.	A. Complex land tenure and governance arrangements B. Gap between strategic planning and on-ground implementation C. Inconsistent strategic direction across council D. Lack of policy direction for coastal hazard management E. Insufficient strategic direction for climate change adaptation F. Lack of understanding of legislative requirements across all levels of council G. Management of historic heritage in the coastal zone H. Protection of Aboriginal cultural heritage I. Land use planning pressures in the coastal zone J. Lack of community awareness of the importance of coastal ecosystems, habitat values and TECs K. Environmental data gaps

2.6 Stakeholder Engagement

2.6.1 Risk Assessment Workshop

A Risk Assessment Workshop was held on 15 December 2025 to support the development of this assessment. The workshop formed a key step in refining the understanding of social and environmental risks affecting the Wollongong coastal zone and building on the preliminary risk identification undertaken during Stage 1 of the CMP process.

The purpose of the workshop was to draw on the local knowledge, operational experience and strategic insight of Council staff and relevant agencies to further develop and validate the risk framework being applied in Stage 2 of the CMP. The workshop focused specifically on 4 management themes associated with this assessment:

- Coastal Ecosystem Management
- Water Quality and Pollution
- Public Recreation, Assets, and Safety
- Strategic Planning

This ensured that the risk assessment incorporated both technical evidence and practical insights from those responsible for managing and using the coastal zone.

The workshop involved participants from a broad cross-section of WCC departments, reflecting the wide range of Council functions that interact with or influence the coastal environment. Attendees included representatives from WCC teams such as Environmental Planning, Land Use Planning, Infrastructure Planning, Open Space and Environmental Services, Sport and Recreation, Property, City Works, Regulation and Enforcement, and Community Engagement.

Representatives from relevant State agencies, including NSW DCCEEW, DPHI-Crown Lands and DPIRD-Fisheries, were also invited to contribute their perspectives. This diverse representation helped capture a wide range of operational and policy insights into how risks manifest along the Wollongong coastline.



The workshop was designed as a highly interactive session, structured around a series of collaborative activities aimed at exploring risks in greater detail. Participants worked in small interdisciplinary groups, each supported by a facilitator, and focused on risks most relevant to their areas of expertise.

The first activity focused on risk granularity and spatial distribution. Large format maps of the Wollongong coastline were used to identify specific locations where each risk is most evident. Participants used colour-coded markers to identify “hotspots” along the coast, supported by a worksheet used to record additional information about the local drivers of risk and how those risks may evolve over time. This exercise helped translate the higher-level risks identified in Stage 1 into specific locations, assets, environmental features and community uses along the coast.

The second activity focused on early risk treatment ideas. Participants discussed current management practices, operational responses and potential future actions that may help reduce or manage each risk. The intention of this exercise was not to develop detailed solutions, but rather to capture practical insights and potential management approaches that could inform the Stage 3 options development process.

The workshop provided an important opportunity to validate the risk framework, incorporate operational knowledge and identify spatial hotspots for key risks along the Wollongong coastline. The outcomes of the session have been used to refine the risk descriptions presented in this report and to guide the development of potential management actions under subsequent stages of the CMP.

2.6.2 Engagement with NSW National Parks and Wildlife Service

A workshop was held on 21 January 2026 with key representatives of the NSW National Parks and Wildlife Service. The purpose of the workshop was to obtain early input on the key social, environmental and cultural risks affecting the NPWS-managed coastline, including areas within Royal National Park and Five Islands Nature Reserve.

Discussions covered coastal access and public safety, along with risks to recreational amenity and emergency response associated with erosion and sea-level rise. The workshop also considered management challenges affecting the State Heritage-listed cabin communities within Royal National Park, including Burning Palms, Era and Little Garie.

Environmental matters included biodiversity protection, weed and pest management, and habitat restoration. Particular attention was given to seabird habitat, biosecurity risks, and the challenges posed by short-term funding cycles. Aboriginal cultural values, ongoing cultural values mapping, and the implications of native title claims were also identified as important considerations.

The outcomes of this workshop have been used in the development of this report – particularly for those Sections relating to Royal National Park and Five Islands Nature Reserve.



3 LOCAL RISK SUMMARIES

3.1 Introduction to Reporting Area Risk Summaries

While many of the stressors affecting the Wollongong coastline operate at a strategic or LGA-wide scale, the way these risks manifest can vary significantly between locations. Differences in coastal morphology, ecological systems, patterns of public access, and the distribution of assets and infrastructure mean that the nature and severity of risks are often highly location-specific.

To support a more practical and spatially meaningful assessment, the Wollongong coastline has been divided into ten reporting areas for the purposes of this analysis. These reporting areas consolidate the 27 coastal hazard divisions used in the Stage 2 Coastal Hazard Risk Assessment (Salients, 2026) into broader coastal reporting areas that reflect natural coastal compartments, patterns of land use, and management boundaries. The adopted spatial framework for these reporting areas is presented in Figure 1.2 and Table 1.1.

The following sections summarise the key social and environmental stressors identified within each reporting area, drawing on the outcomes of the Stage 2 risk assessment, supporting technical studies, and insights from the stakeholder risk assessment workshop. This spatial perspective complements the broader strategic planning risks discussed in Section 4 and provides important context for the development of targeted management actions in Stage 3 of the CMP.

Each reporting area summary follows a consistent structure. A brief overview of the local coastal setting and key assets is provided, followed by a summary of the key stressors affecting that area, grouped under the local management themes used throughout this assessment:

- Coastal ecosystem management
- Water quality and pollution
- Public recreation, assets, and safety

Each section also includes a risk register summarising the assessed likelihood and consequence of the identified stressors, along with a risk hotspot map highlighting locations where these issues are most evident. Collectively, these summaries provide a concise snapshot of the dominant issues affecting each coastal precinct and help inform the development of targeted management responses in later stages of the CMP.



3.2 Area A - Royal National Park

3.2.1 Area Overview

Environmental Assets

The northernmost section of the Wollongong LGA lies within Royal National Park, encompassing approximately 10 km of coastline characterised by steep sandstone cliffs, rocky headlands and a series of small, embayed beaches. This section of coastline represents one of the most natural and least modified coastal environments within the LGA and forms part of a nationally significant protected landscape managed by NPWS.

The northern division of this area includes Little Garie Beach, North Era Beach, South Era Beach (see Figure 3.1) and Burning Palms Beach. These beaches occur as small pocket embayments bounded by rocky headlands and extensive intertidal rock platforms. The coastline between the beaches is dominated by steep cliffs and rocky slopes, with bluffs rising sharply landward from the shoreline. These steep landforms create a rugged coastal setting and support a range of native vegetation communities. The beaches are typically backed by steep slopes or narrow coastal flats, with creeks and gullies draining through the coastal escarpment and discharging across the beaches. Notable drainage lines include Era Gully, which enters the rear of Era Beach. These small catchments contribute to the hydrology of the coastal environment and support sheltered vegetation communities within gullies and lower slopes.

South of Burning Palms lies the central division of the National Park coastline, extending to Werrong Beach. This section is characterised by dramatic cliff-lined coastline with limited accessible beaches. Werrong Beach, locally known as “Hell Hole”, forms a small, embayed beach bounded by rock platforms and steep coastal cliffs to the north and south. Littoral rainforest communities occur in sheltered areas behind the cliffs and along the upper slopes of the escarpment.

The southern portion of the Royal National Park coastline within the Wollongong LGA includes Bulgo Beach, located approximately 2 km south of Werrong Beach. Bulgo Beach is a narrow embayed beach backed by steep coastal slopes and cliffs. The beach itself consists of a shallow accumulation of sand overlying a rock platform and is highly constrained between the steep escarpment slopes landward and the rocky intertidal platform seaward. Littoral rainforest communities occur along sections of the upper slopes and cliff tops within this area.

At the southernmost extent of the Royal National Park coastline within the LGA lies the Stanwell Tops section, which comprises approximately 1.5 km of sandstone cliffs overlooking the ocean north of Stanwell Park Beach. The Illawarra escarpment is very close to the coastline in this location, creating dramatic vertical cliffs and limited access to the shoreline. Much of this section of coast remains largely undeveloped and retains significant natural landscape and ecological values.

The Royal National Park represents one of the most biodiverse landscapes in temperate Australia. The Park supports more than 1,000 plant species and 347 animal species, including 12 threatened ecological communities, 16 threatened plant species and 45 threatened animal species. The national significance of these biodiversity values has been formally recognised through the inclusion of Royal National Park (along with the Garawarra State Conservation Area) on Australia’s National Heritage List, which identifies places of outstanding heritage value to the nation (NPWS, 2022).

Within the coastal zone, these biodiversity values are particularly evident through the presence of extensive TECs. Themeda Grasslands occur on exposed coastal headlands and cliff-top environments, while Littoral Rainforest communities mapped under the R&H SEPP are found within sheltered gullies and protected coastal slopes. These vegetation communities form an important component of the coastal ecosystem, supporting native fauna habitat, contributing to landscape connectivity, and reinforcing the ecological significance of the Royal National Park coastline (NPWS, 2022).



Social and Recreational Values

Despite its relatively remote and undeveloped character, the Royal National Park coastline supports a wide range of recreational, and visitor uses and is one of the most iconic coastal landscapes within the region. Recreation is closely tied to the area's scenic setting, natural character, heritage values and walking access.

Given the park's proximity to Greater Sydney, ongoing metropolitan population growth is also likely to increase visitation pressure over time. This is expected to drive higher demand for day trips, walking experiences, scenic lookouts and beach-based recreation, particularly during weekends, holidays and periods of favourable weather. As visitation grows, pressure on access tracks, parking, visitor facilities and safety management is also likely to increase.

A defining feature of this coastline is the Coast Track, which follows the coast from the northern boundary of the Wollongong LGA south to Werrong Point. The track is a major regional asset supporting recreational walking, tourism, guided walks and broader visitor access through the National Park. Associated NPWS-managed assets include walking tracks, steps, bridges, visitor nodes, small buildings, sewage systems and related infrastructure. The Coast Track is also important from an operational perspective, supporting access for land management and emergency response in otherwise remote locations (NPWS, 2026).

The northern beaches at Little Garie, Era and Burning Palms contain long-established heritage shack communities, with around 200 cabins in total, most dating from the 1930s to 1950s. These communities are State heritage listed and form a distinctive part of the recreational and cultural history of Royal National Park.

This part of the National Park also includes surf lifesaving facilities at Era and Burning Palms. These clubs provide an important community safety role, but their operation is shaped by the remote and constrained nature of the coastline, including walk-in access and limited service coverage. Era SLSC is located adjacent to the entrance of Era Gully, placing it in close proximity to both creek processes and beach use areas.

The Figure 8 Pools – located 700 m south of Burning Palms Beach - and adjacent rock platforms are a particularly high-profile recreational destination within this area (see Figure 3.2). They are widely recognised for their scenic and social value and attract very high levels of visitor and recreational usage.

Further south, Werrong Beach provides a more remote and niche recreational experience. It is recognised for its distinctive social value, including its status as a clothing-optional beach. Access is difficult and occurs via walking tracks from Lady Wakehurst Drive at Otford, reinforcing the isolated and low-infrastructure character of the site.

At Bulgo Beach, another heritage shack community remains, comprising 53 heritage-listed fishing huts, many dating from the 1930s (see Figure 3.3). Some remain occupied while others are used only occasionally. The beach also contains Bulgo Beach Ocean Pool, constructed in 1960 within the intertidal rock platform and retaining much of the natural rock form. This contributes to the recreational and heritage value of the site.

The southern Royal National Park coastline near Stanwell Tops and Bald Hill is also significant for sightseeing and passive recreation. These elevated lookout areas provide panoramic coastal views and attract substantial visitor numbers, including walkers and hang-gliding spectators.

Snapshot

Table 3.1 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Royal National Park reporting area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3.



Table 3.1 Risk Context Snapshot – Royal National Park

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Little Garie Beach, Era Beach, Burning Palms Beach, Werrong Beach, Bulgo Beach	Coastal dune systems at each beach R&H SEPP Littoral Rainforests Themeda Grassland (TECs).	
Waterways	Era and Cutty Gully		
Social / Community Nodes			
Surf Clubs	Era SLSC, Burning Palms SLSC		
Ocean Pools	Figure Eight Tidal Pools, Bulgo Beach Ocean Pool		
Access Nodes	The Royal National Park Coast track		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Helensburgh, Lilyvale, Otford	6,950	6,880	-1.0%



Figure 3.1 North Era Beach (image source: NPWS)



Figure 3.2 The Figure 8 Pools (image source: NPWS)



Figure 3.3 Bulgo Beach Shacks (image source: Illawarra Flame)

3.2.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Impact of invasive species – fauna:** The Royal National Park Plan of Management identifies feral cats, foxes and deer as key invasive fauna species within the park. These species are present across the coastal zone and can adversely affect native fauna and vegetation communities through predation, grazing and habitat disturbance. Their presence poses an ongoing pressure on coastal ecological values, including threatened ecological communities and sensitive dune and headland vegetation. Given their widespread occurrence and ongoing ecological effects, the present-day risk is assessed as High, and is expected to remain High across future planning horizons.
- **Habitat loss and impacts on native fauna (including shorebirds):** Coastal change may affect a range of habitats relied upon by native fauna across the Royal National Park coastline. Increased exposure to storm events, wave run-up, wind erosion and shoreline recession may degrade or reduce nesting, roosting and foraging areas used by shorebirds and other coastal species. Changes to creek entrances and drainage pathways, including systems such as Era Creek and Cutty Gully, may also alter salinity, tidal exchange and habitat connectivity, affecting aquatic and semi-aquatic fauna. Progressive modification of intertidal areas, including local rockpool habitat, may further reduce habitat availability for specialised marine fauna. While impacts at individual sites may be localised, cumulative effects over time may become more significant. The present-day risk is assessed as Moderate, increasing across future planning horizons.
- **Habitat loss and impacts on native flora:** Native flora communities along the Royal National Park coastline may be affected by erosion, storm damage, altered hydrology and ongoing coastal recession. Increased wave run-up and wind erosion may disturb dune, cliff-top and foreshore vegetation, reducing vegetation cover and resilience in exposed areas. Where creek systems such as Era Creek and Cutty Gully are modified by sea level rise, changes to freshwater inflows, salinity regimes and drainage patterns may also affect riparian and wetland vegetation communities. Shifts in the intertidal zone may further alter



conditions for algae, salt-tolerant vegetation and other plant communities associated with rocky shore and estuarine margins. The present-day risk is assessed as Moderate, increasing over future planning horizons where adaptive capacity is limited.

- **Vegetation vandalism:** Localised vegetation disturbance occurs in areas surrounding the Era and Burning Palms shack communities, where informal clearing and trimming of coastal vegetation has occurred historically. While typically small in scale, these disturbances can reduce vegetation stability and resilience in already constrained coastal environments. The overall consequence is relatively limited at a regional scale, and the present-day risk is assessed as Moderate, with similar Moderate risk levels expected into the future.
- **Informal pedestrian and vehicle access damage:** A number of informal access paths occur between the shack communities and the beach. These tracks can result in localised trampling of dune vegetation and foreshore habitats, particularly where access routes become concentrated. While these pathways largely reflect established patterns of use, they can contribute to gradual vegetation disturbance and dune destabilisation. The risk associated with these activities is assessed as Moderate under present-day conditions and is expected to remain Moderate into the future.
- **Wind-blown sand drift and impacts on dune vegetation:** Wind-driven sand movement occurs in several locations along the Royal National Park coastline, particularly at Era Beach and around the Era Gully entrance, where strong southerly and south-easterly winds periodically generate small dune blowouts. While these blowouts seem to be relatively stable based on aerial imagery, they may expand if vegetation cover is reduced or destabilised. The present-day risk is assessed as Low, increasing to Moderate over the medium term and High in the long term if dune stability declines.

Water Quality and Pollution

- **Water quality for primary contact recreation:** Formal Beachwatch monitoring data are not available for the Royal National Park beaches. However, the largely undeveloped catchments, absence of urban runoff and the well-flushed coastal environment mean that water quality has historically been regarded as Very Good. No persistent contamination sources have been identified, and the present-day risk associated with microbial water quality is assessed as Low, remaining Low across future planning horizons.
- **Buried anthropogenic waste:** Several legacy contamination sources are present within the Royal National Park coastline that may create environmental and public safety risks if exposed or mobilised by erosion, storm damage or shoreline recession. The shacks at Bulgo Beach contain ageing building materials and may present a contamination risk, including potential release of demolition waste or asbestos-containing materials, if damaged or destroyed during a coastal hazard event. Cabin communities at Little Garie South and Bulgo also rely on pit toilet systems, creating a potential risk of nightsoil contamination where inundation, erosion or structural failure occurs. In addition, parts of the Royal National Park are affected by mapped unexploded ordnance (UXO) from historical defence activities. While UXO is not primarily a water quality issue, it represents an important legacy hazard with implications for public safety, land management and recreational amenity if exposed through coastal change processes. The present-day risk is assessed as High, increasing across future planning horizons where erosion and asset exposure intensify.

Public Recreation, Assets, and Safety

- **Lifeguard services and unpatrolled beaches:** Much of the Royal National Park coastline comprises unpatrolled beaches, including Era Gully, Werrong Beach and Bulgo Beach. In addition, highly visited rock platform locations such as the Figure 8 Pools attract large numbers of visitors despite the absence of patrol services. These locations are exposed to hazardous coastal conditions and emergency response can be challenging due to the remote setting. As a result, the present-day risk is assessed as High, and is expected to remain High into the future.



- **Loss of safe beach/foreshore/waterway access:** Access to some beaches within the National Park can become difficult following storm events due to beach scarping, narrow beach profiles and shifting creek entrances. At Werrong Beach, the steep and narrow nature of the beach means that erosion or scarping events can temporarily restrict safe access between the beach and surrounding walking tracks. The present-day risk is assessed as High, increasing to Extreme under future planning horizons as shoreline recession and coastal hazards intensify.
- **Loss of safe beach width (and scarping):** Bulgo Beach (see Figure 3.3) and Werrong Beach (see Figure 3.4) are both naturally narrow beaches, often consisting of a shallow accumulation of sand overlying rock platform. Following storm events these beaches can lose much of their usable width, temporarily reducing recreational access and amenity. While beaches generally recover under present-day conditions, long-term shoreline recession associated with sea level rise is expected to progressively reduce available beach width. The present-day risk is assessed as High, increasing to Extreme under future conditions.
- **Wave overtopping and public safety:** The Figure 8 Pools and surrounding rock platforms present one of the most widely recognised coastal safety hazards within the Royal National Park coastline. The site is highly exposed to wave overtopping and swell energy, with safe access limited to narrow tidal and wave windows that can change rapidly. The location has been associated with numerous incidents, including a fatality in 2019, and continues to attract large visitor numbers due to its popularity on social media. With sea level rise expected to increase overtopping frequency and further reduce safe access windows, the risk associated with wave overtopping and public safety is assessed as Extreme under present-day conditions and remains Extreme into the future.
- **Loss or rationalisation of rock pools:** Rock pools within the Royal National Park section of coastline may become increasingly affected by sea level rise and wave exposure. In addition to the Figure 8 Pools area, the Bulgo Beach ocean pool is situated at a relatively low elevation within the intertidal rock platform (see Figure 3.6) and is already subject to wave overtopping and periodic sand infilling. Increasing water levels and wave exposure may progressively affect the functionality and safety of this facility over time. The present-day risk is assessed as Moderate, increasing to High and eventually Extreme under future planning horizons.
- **Loss or rationalisation of SLSCs:** Surf lifesaving facilities are located at Burning Palms and Era Beaches. The Burning Palms SLSC is relatively well set back from the active beach system. In contrast, Era SLSC is located within a dynamic coastal setting, adjacent to the Era Gully creek entrance and within the active beach zone. This exposes the building to coastal processes including shoreline change and creek migration. While the present-day risk is Low, this is expected to increase to Medium, High and ultimately Extreme over longer planning horizons if coastal hazards intensify.



Figure 3.4 Narrow beach width at Werrong (image source: Salients, 2026)



Figure 3.5 Wave overtopping at the figure 8 rock pools (image source: Daily Telegraph)

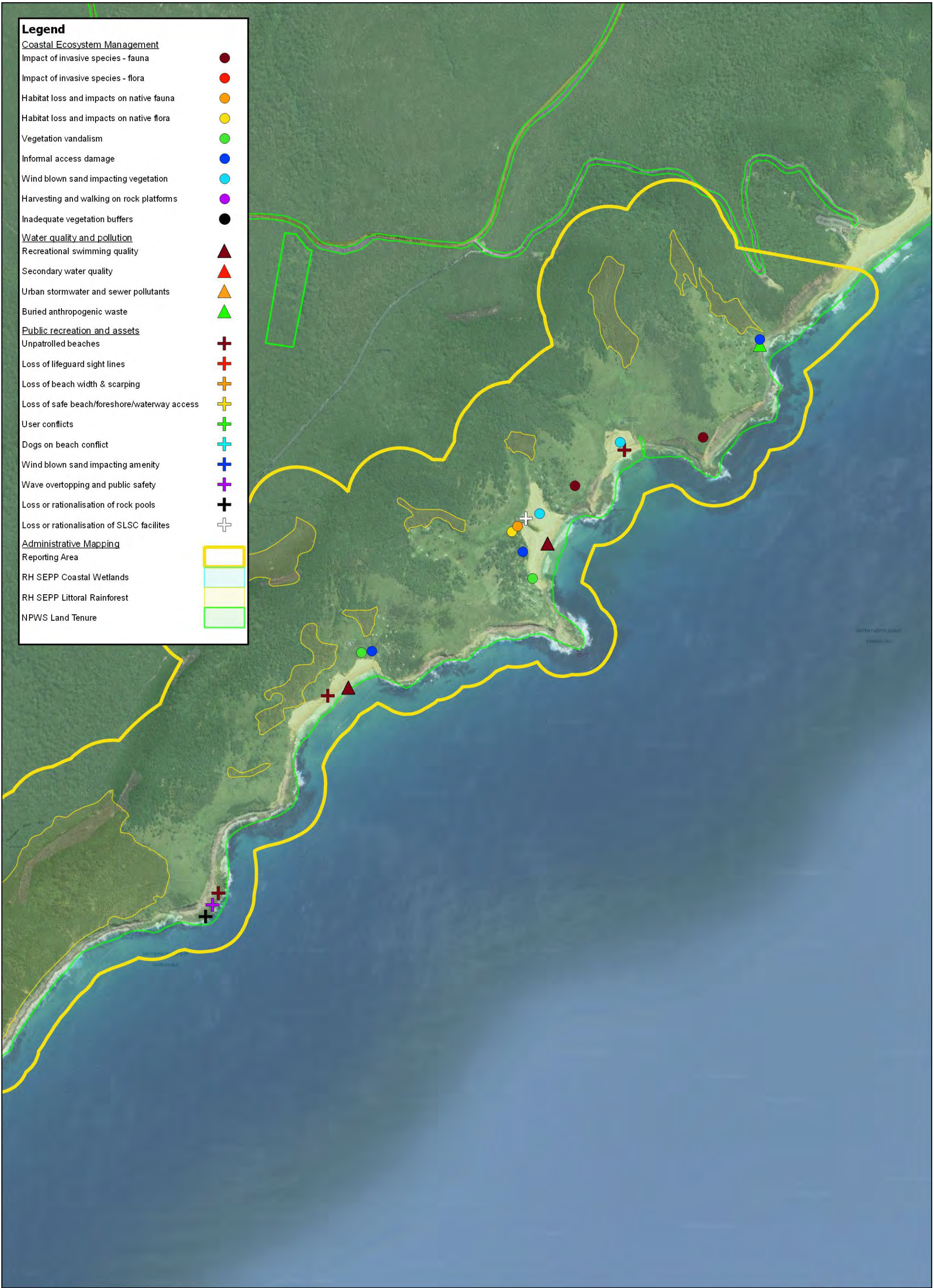


Figure 3.6 The low lying Bulgo ocean pool (image source: OceanPoolsNSW)



Table 3.2 Social and Environmental Risk Summary – Royal National Park

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1A	Impact of invasive species – fauna	Almost Certain	Minor	High	High	High	High
1C	Habitat loss and impacts on native fauna (including shorebirds)	Unlikely	Major	Moderate	Moderate	High	High
1D	Habitat loss and impacts on native flora	Unlikely	Major	Moderate	Moderate	High	High
1E	Vegetation vandalism	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
1F	Informal pedestrian and vehicle access damage	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
1G	Wind-blown sand drift and impacts on dune vegetation	Likely	Insignificant	Low	Moderate	Moderate	High
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Low	Low
2C	Buried anthropogenic waste	Unlikely	Major	Moderate	Moderate	High	High
	Public Recreation, Assets, and Safety						
3A	Lifeguard services and unpatrolled beaches	Possible	Major	High	High	Extreme	Extreme
3C	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	Extreme	Extreme
3D	Loss of safe beach width (and scarping)	Almost Certain	Minor	High	High	Extreme	Extreme
3H	Wave overtopping and public safety	Likely	Major	Extreme	Extreme	Extreme	Extreme
3I	Loss or rationalisation of rock pools	Unlikely	Major	Moderate	High	Extreme	Extreme
3J	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme



Legend

Coastal Ecosystem Management

- Impact of invasive species - fauna
- Impact of invasive species - flora
- Habitat loss and impacts on native fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Informal access damage
- Wind blown sand impacting vegetation
- Harvesting and walking on rock platforms
- Inadequate vegetation buffers

Water quality and pollution

- Recreational swimming quality
- Secondary water quality
- Urban stormwater and sewer pollutants
- Buried anthropogenic waste

Public recreation and assets

- Unpatrolled beaches
- Loss of lifeguard sight lines
- Loss of beach width & scarping
- Loss of safe beach/foreshore/waterway access
- User conflicts
- Dogs on beach conflict
- Wind blown sand impacting amenity
- Wave overtopping and public safety
- Loss or rationalisation of rock pools
- Loss or rationalisation of SLSC facilities

Administrative Mapping

- Reporting Area
- RH SEPP Coastal Wetlands
- RH SEPP Littoral Rainforest
- NPWS Land Tenure



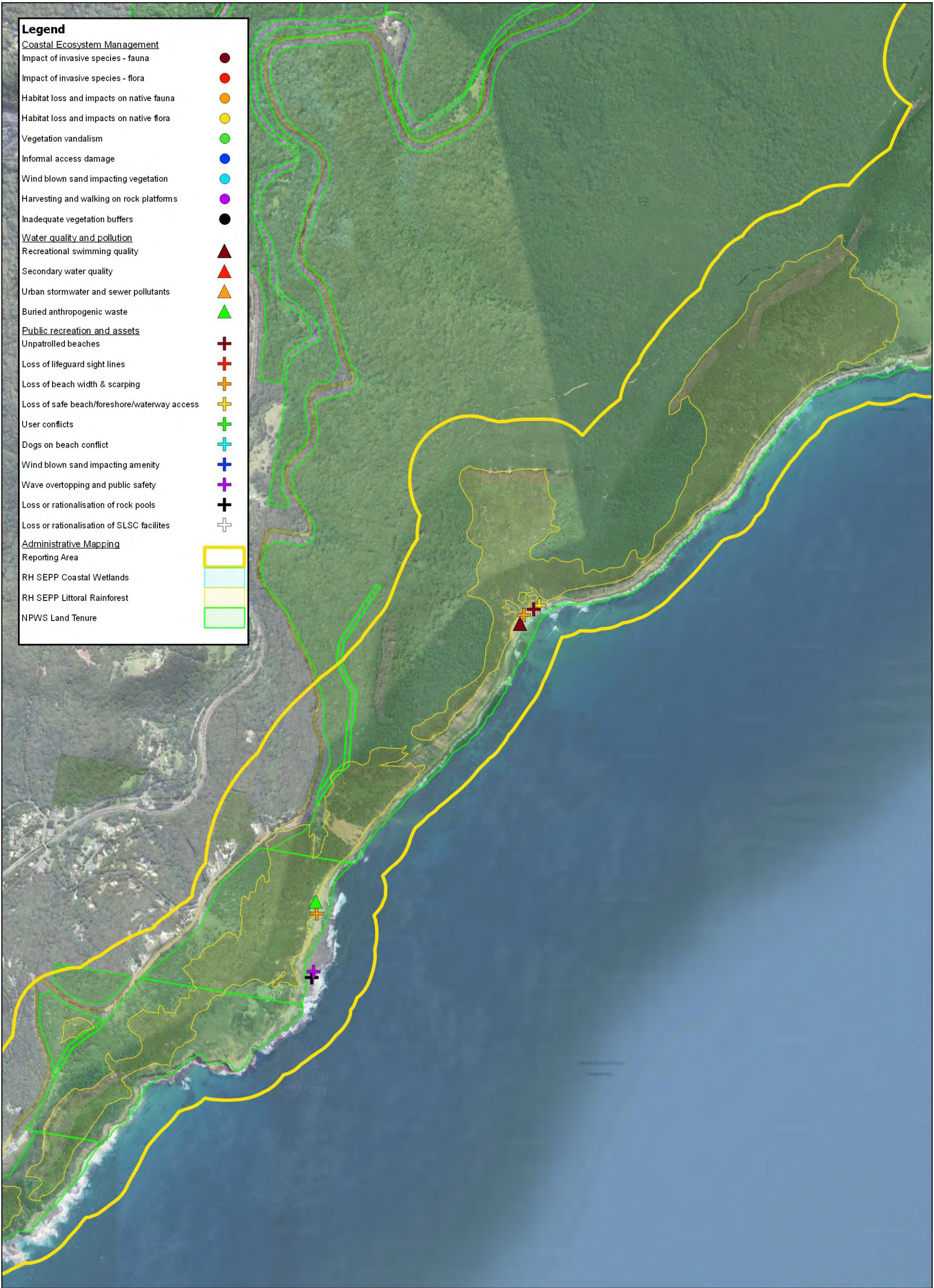
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0 250 500 m

Figure 3-7
Royal National Park (North) - Risk
Summary



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Legend

Coastal Ecosystem Management

- Impact of invasive species - fauna
- Impact of invasive species - flora
- Habitat loss and impacts on native fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Informal access damage
- Wind blown sand impacting vegetation
- Harvesting and walking on rock platforms
- Inadequate vegetation buffers

Water quality and pollution

- Recreational swimming quality
- Secondary water quality
- Urban stormwater and sewer pollutants
- Buried anthropogenic waste

Public recreation and assets

- Unpatrolled beaches
- Loss of lifeguard sight lines
- Loss of beach width & scarping
- Loss of safe beach/foreshore/waterway access
- User conflicts
- Dogs on beach conflict
- Wind blown sand impacting amenity
- Wave overtopping and public safety
- Loss or rationalisation of rock pools
- Loss or rationalisation of SLSC facilities

Administrative Mapping

- Reporting Area
- RH SEPP Coastal Wetlands
- RH SEPP Littoral Rainforest
- NPWS Land Tenure



Contains SIXMAPS Information
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0 250 500 m

Figure 3-8
Royal National Park (South) - Risk
Summary





3.3 Area B - Stanwell Park to Clifton

3.3.1 Area Overview

Environmental Assets

The Stanwell Park to Clifton reporting area includes a series of embayed beaches and rocky shoreline segments set within steep coastal valleys along the northern Illawarra coastline. The area is characterised by dramatic topography, with the Illawarra escarpment and forested slopes rising steeply behind the coastline. These steep slopes and cliffs form an amphitheatre-like landscape around Stanwell Park and continue south toward Coalcliff and Clifton.

Stanwell Park Beach is approximately 850 m long and sits within a broad coastal valley framed by forested slopes rising to around 300 m in elevation (see Figure 3.9). The beach is bounded by sandstone cliffs at both its northern and southern ends. A vegetated dune system occurs along the central section of the beach and provides an important buffer between the shoreline and the surrounding reserve areas. There are two key estuaries located at this beach - Hargraves Creek near the northern end and Stanwell Creek near the southern end. These creeks are classified as ICOLLs and form small estuarine entrances across the beach (see Figure 3.10). Much of the Stanwell Creek waterbody is mapped as R&H SEPP Coastal Wetlands, while the fringing floodplain of Hargraves Creek is mapped as R&H SEPP Littoral Rainforest.

Around 1,500 m to the south of Stanwell Park lies Coalcliff Beach (see Figure 3.11), a smaller embayed beach approximately 500 m long situated at the base of a narrow coastal valley. The beach is bounded by steep cliffs to the north and a rock platform to the south. The Stony Creek estuary is a small ICOLL that drains across the southern end of the beach and forms the primary drainage outlet for the Coalcliff catchment. The surrounding nearshore environment includes a mix of sandy seabed and rock reefs which contribute to the marine habitat of the area.

Further south, the coastline transitions into the Clifton section, which extends for approximately 2 km between Coalcliff and the township of Clifton. In this section, the Illawarra escarpment sits particularly close to the coastline, with steep cliffs descending directly to the sea. As a result, there are no substantial sandy beaches along much of this stretch of coast, and the shoreline is dominated by rock platforms and cliff-lined coastal edges.

The tops of these coastal cliffs and slopes across this reporting area support important vegetation communities, including the TECs of Littoral Rainforest and Themeda Grasslands. These areas contribute to the ecological significance and scenic character of the coastline within this reporting area.

Social and Recreational Values

The Stanwell Park to Clifton reporting area supports a range of coastal recreation activities including swimming, surfing, fishing, walking and sightseeing. The area is highly valued by the community and visitors for its scenic coastal setting, beaches and lookout points along the escarpment.

Stanwell Park Beach is the primary recreational beach within the reporting area and is widely used for swimming, surfing and beach-based recreation. The beach is serviced by the Helensburgh–Stanwell Park SLSC, located toward the southern half of the beach. Surrounding foreshore areas include open space, car parking and beach access points that support recreational use. The beach is also well known for its scenic setting and proximity to the Stanwell Park township and nearby coastal lookouts.

Further south, Coalcliff Beach provides another important recreational beach within the reporting area. The beach is serviced by Coalcliff SLSC, located near the centre of the beach compartment, adjacent to the Coalcliff Beach Reserve. The reserve provides open space and recreational facilities that support beach visitation and community use – and is protected by a geotextile sand container (GCS) seawall structure. The



Coalcliff Rockpool, constructed in 1923 on the southern rock platform, provides a partially sheltered ocean swimming facility that is widely used by residents and visitors.

The southern part of the reporting area near Clifton is characterised by dramatic coastal scenery and cliff-lined shoreline. One of the most recognisable features of this section of coastline is the Sea Cliff Bridge, which carries Lawrence Hargrave Drive across the ocean at the base of the escarpment (see Figure 3.12). The bridge has become a major tourism and sightseeing destination, attracting visitors for walking, cycling and coastal viewing.

Snapshot

Table 3.3 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Stanwell Park to Clifton reporting area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3.

Table 3.3 Risk Context Snapshot – Stanwell Park to Clifton

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Stanwell Park Beach Coalcliff Beach	Coastal dune systems at Stanwell Park R&H SEPP Littoral Rainforests and Themeda Grasslands (TECs) along coastal slopes	
Waterways	Hargraves Creek Stanwell Creek Stony Creek	R&H SEPP Coastal Wetlands at Stanwell Creek. ICOLL ecosystems (Hargraves Creek, Stanwell Creek, Stony Creek)	
Social / Community Nodes			
Surf Clubs	Helensburgh-Stanwell Park SLSC, Coalcliff SLSC		
Ocean Pools	Coalcliff Ocean Pool		
Access Nodes	Sea Cliff Bridge		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Stanwell Park, Stanwell Tops, Coalcliff	2,390	2,390	0%



Figure 3.9 Stanwell Park Beach (image source: Visit NSW)



Figure 3.10 The entrance to Stanwell Creek at Stanwell Park Beach (image source: WCC)



Figure 3.11 Coalcliff Beach (image source: WCC)



Figure 3.12 The Sea Cliff Bridge (image source: Visit NSW)



3.3.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Impact of invasive species – flora:** Several Weeds of National Significance (WoNS) occur within the dune systems at Stanwell Park Beach, including Bitou Bush, Lantana, Bridal Creeper, Asparagus Fern, Fireweed, Madeira Vine and Prickly Pear (Wollongong City Council, 2018). The issue is particularly important given the proximity of R&H SEPP Littoral Rainforest communities occurring nearby within the coastal environment. The present-day risk is assessed as High, remaining elevated across future planning horizons without continued management.
- **Wind-blown sand drift and impacts on dune vegetation:** At Stanwell Park Beach, sections of the dune system are subject to wind-driven sand movement, particularly during strong southerly wind conditions. These winds have resulted in small blowouts and localised northward sand transport within parts of the dune system (see Figure 3.13). While currently limited in extent, unmanaged wind erosion may expand over time and reduce dune vegetation stability. The present-day risk is assessed as Low, increasing gradually across future planning horizons.
- **Inadequate buffers for TECs and areas of wetland migration:** Coastal wetlands and Littoral rainforest communities occur along sections of Hargraves Creek and Stanwell Creek. In several locations, these ecological communities occur close to existing development and infrastructure, leaving limited space for natural landward migration in response to coastal processes and sea level rise. The present-day risk is assessed as Low, increasing to Extreme across longer planning horizons as coastal pressures intensify.

Water Quality and Pollution

- **Water quality for primary contact recreation:** Beachwatch water quality grades for the last 5 years for Stanwell Park Beach are provided in Table 3.4, which indicates that Stanwell Park Beach consistently achieves a “Very Good” annual water quality grade. Microbial water quality is considered suitable for swimming almost all of the time, with few significant sources of faecal contamination (DCCEEW, 2024). The risk is assessed as Low under present-day conditions.
- **Urban stormwater and sewer pollutants:** Several creeks and stormwater outlets discharge runoff from surrounding catchments into the nearshore waters of this reporting area. Key drainage inputs include Hargraves Creek and Stanwell Creek at Stanwell Park Beach, and Stony Creek at Coalcliff Beach. While the small estuarine and creek systems in the area are likely to experience temporary water quality impacts following rainfall, no dedicated estuarine water quality dataset is currently available to confirm the extent or frequency of those impacts. However, Beachwatch water quality monitoring indicates that coastal water quality generally remains good on the adjacent open coastline. Stormwater discharges may temporarily elevate pollutant levels following rainfall events; however, with only modest population growth expected in the catchment, the present-day risk is assessed as Low and is likely to remain Low to Moderate across future planning horizons.

Table 3.4 Beachwatch Water Quality Grades – Stanwell Park Beach

Annual WQ Grades	Stanwell Park Beach
2025	Very Good
2024	Very Good
2023	Very Good
2022	Very Good
2021	Very Good



Public Recreation, Assets, and Safety

- **Lifeguard services and unpatrolled beaches:** While the central portion of Stanwell Park Beach is patrolled by the Helensburgh–Stanwell Park SLSC, the northern end of the beach lies outside the primary patrol area. Beach users entering the water in these unpatrolled sections may therefore face increased safety risks, particularly during periods of strong rip activity. The present-day risk is assessed as High.
- **Loss of lifeguard sight lines:** At Stanwell Park Beach, the SLSC building is positioned landward of the primary dune system. The setback of the building, together with dune vegetation and beach morphology, can partially restrict sight lines to some sections of the beach, particularly toward the northern end. The present-day risk is assessed as High.
- **Loss of safe beach/foreshore access:** The entrances of Stanwell Creek and Hargraves Creek periodically migrate across Stanwell Park Beach, which can disrupt pedestrian access along the shoreline and reduce safe crossing points. At Coalcliff Beach, the condition of the geotextile sand container (GSC) seawall protecting the reserve and infrastructure may also affect safe access along parts of the foreshore if deterioration continues. The present-day risk is assessed as High, increasing across future planning horizons.
- **Loss of safe beach width (and scarping):** Coalcliff Beach is relatively narrow and constrained by surrounding cliffs and coastal infrastructure. Following storm events, the beach can experience significant erosion and scarping, resulting in very limited usable beach width. While conditions at Stanwell Park Beach are generally less constrained, storm erosion can still temporarily reduce beach amenity. The present-day risk is assessed as Moderate, increasing to Extreme across later planning horizons.
- **Wave overtopping and public safety:** The Coalcliff ocean pool is located on an exposed rock platform and can experience wave overtopping during periods of elevated swell and high tide (see Figure 3.14). While this is not currently a major safety concern under most conditions, increasing sea levels may increase the frequency and magnitude of overtopping events. The present-day risk is assessed as Low, increasing across future planning horizons.
- **Loss or rationalisation of rock pools:** The Coalcliff ocean pool sits directly on the rock shelf and has relatively low pool wall elevations (see Figure 3.14). As sea levels rise, the pool may experience more frequent overtopping and tidal inundation, which may affect its long-term functionality and require adaptation or modification. The present-day risk is assessed as Moderate, increasing to Extreme across later planning horizons.
- **Loss or rationalisation of SLSCs:** The Coalcliff SLSC is currently protected by the adjacent GSC coastal protection structure; however, sections of this structure show signs of deterioration. If the structure continues to degrade without maintenance or renewal, exposure of the SLSC and surrounding reserve infrastructure to coastal hazards may increase over time. The present-day risk is assessed as Low, increasing across longer planning horizons.



Figure 3.13 Incipient dune blowout at the Stanwell Park dunes



Figure 3.14 Coalcliff ocean pool (image source: WCC)



Figure 3.15 GSC seawall structure (image source: Salients, 2026)



Table 3.5 Social and Environmental Risk Summary – Stanwell Park to Clifton

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1D	Impact of invasive species – flora	Almost Certain	Minor	High	High	High	High
1G	Wind-blown sand drift and impacts on dune vegetation	Almost Certain	Insignificant	Low	Moderate	Moderate	High
1I	Inadequate buffers for TECs and areas of wetland migration	Rare	Major	Low	Moderate	High	Extreme
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Low	Low
2C	Urban stormwater and sewer pollutants	Unlikely	Minor	Low	Low	Low	Moderate
	Public Recreation, Assets, and Safety						
3A	Lifeguard services and unpatrolled beaches	Possible	Major	High	High	High	High
3B	Loss of lifeguard sight lines	Possible	Major	High	High	High	High
3C	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	Extreme	Extreme
3D	Loss of safe beach width (and scarping)	Likely	Minor	Moderate	High	Extreme	Extreme
3H	Wave overtopping and public safety	Rare	Major	Low	Low	Moderate	High
3I	Loss or rationalisation of rock pools	Unlikely	Major	Moderate	High	Extreme	Extreme
3J	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme





3.4 Area C - Scarborough to Coledale

3.4.1 Area Overview

Environmental Assets

The Scarborough to Coledale reporting area comprises a sequence of small, embayed beaches separated by rocky headlands and extensive intertidal rock platforms. The coastline in this area is characterised by steep vegetated slopes, coastal cliffs and narrow pocket beaches, with several small coastal creeks discharging across the shoreline.

At the northern end of the reporting area lies Scarborough North Beach, a small beach approximately 250 m long situated at the base of steep coastal cliffs rising up to around 60 m in height. Rock platforms bound the beach at both ends and provide intertidal habitat and marine ecological values. The beach is relatively isolated and exposed to occasional rockfall from the adjacent cliffs.

Immediately south lies Scarborough Beach (see Figure 3.17), which extends for approximately 750 m before transitioning into Wombarra Beach further south. The beach is backed by steep vegetated slopes that rise toward residential areas and local open space. These slopes contain significant areas of R&H SEPP mapped Littoral Rainforest. Two creeks discharge across this section of shoreline, including an unnamed drainage line north of the Scarborough-Wombarra SLSC and Horse Creek, which drains a catchment of approximately 90 ha before discharging near the southern end of the beach – commonly meandering southwards along the beach (see Figure 3.17). These drainage systems contribute to local hydrological processes and support small riparian corridors within the coastal landscape.

Wombarra Beach forms a smaller section of the embayment, consisting of a narrow sand and cobble beach backed by rocky slopes and boulder fields (see Figure 3.18). The beach is fronted by extensive rock platforms, which limit direct access to the open ocean and contribute to the ecological diversity of the shoreline. Reeces Creek drains through the suburb of Wombarra and discharges across the northern end of the beach, providing another small estuarine drainage feature within the reporting area. The northern end of the beach comprises largely natural foreshore, while the southern 120 m of beach front is backed by a vertical concrete seawall, car park and amenities. Between Wombarra Beach and Coledale Beach lies a 700 m long coastal cliff escarpment that includes the TEC of Themeda Grasslands.

Further south lies Coledale Beach, a small, embayed beach approximately 300 m long bounded by rocky headlands and extensive rock platforms at both ends (see Figure 3.19). Several drainage lines intersect the beach, including Stockyard Creek, Dalys Creek, and Carricks Creek, which discharge across the shoreline and contribute to the hydrological character of the area. The beach is backed by a highly modified foreshore system that has been historically altered through fill placement associated with the development of the Coledale Camping Reserve. A small remnant of the original dune system remains at the northern end of the beach.

The southern end of the reporting area contains an extensive rock platform extending approximately 700 m offshore. These rocky reefs and intertidal platforms support marine habitat and contribute to the ecological diversity of the coastline within this reporting area.

Social and Recreational Values

Scarborough Beach forms the primary recreational beach within the northern section of the reporting area and is serviced by the Scarborough-Wombarra SLSC, located near the centre of the beach. The surrounding open space areas and nearby sporting oval provide recreational facilities for both beach users and the local community.



Further south, Wombarra Beach provides a smaller and more sheltered coastal setting used for swimming, fishing and informal recreation. The beach contains a small amenities area and is also home to the Wombarra ocean pool, constructed in 1937 on the adjacent rock platform (see Figure 3.18). The rockpool provides a sheltered ocean swimming facility for the local community.

At the southern end of the reporting area, Coledale Beach forms another important recreational beach. The beach is backed by the Coledale Camping Reserve, which extends along the full length of the beach and provides camping and holiday accommodation facilities. The reserve contains open space areas, amenities and coastal access points that support beach recreation.

Coledale SLSC is located toward the southern end of the beach, providing patrol services and supporting beach safety. Adjacent to the southern rock platform lies the Coledale ocean pool, constructed in 1921, which provides a sheltered ocean swimming facility and is widely used for recreational lap swimming (see Figure 3.20).

Snapshot

Table 3.6 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Scarborough to Coledale reporting area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3

Table 3.6 Risk Context Snapshot – Scarborough to Coledale

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Scarborough North Beach Scarborough Beach Wombarra Beach Coledale Beach	R&H SEPP Littoral Rainforests TECs of Themeda Grasslands	
Waterways	Horses Creek Reeces Creek Stockyard Creek Carricks Creek	No waterways contain areas of R&H SEPP Coastal Wetlands	
Social / Community Nodes			
Surf Clubs	Scarborough-Wombarra SLSC, Coledale SLSC		
Ocean Pools	Wombarra Ocean Pool, Coledale Ocean Pool		
Access Nodes	Coledale Camping Reserve		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Wombarra, Coledale, Scarborough	2,730	2,770	1.5%



Figure 3.17 Scarborough Beach (image source: VisitNSW)



Figure 3.18 Wombarra Beach and Rockpool (image source: WCC)



Figure 3.19 Coledale Beach (image source: VisitNSW)



Figure 3.20 Coledale Ocean Pool (image source: WCC)



3.4.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Habitat loss and impacts on native flora:** Sections of the foreshore at Wombarra Beach and Coledale Beach have been heavily modified over time through the construction of recreational facilities, coastal protection works and camping infrastructure. As a result, much of the original dune system and associated native vegetation has been removed or significantly altered. Only small remnants of the historic dune system remain in isolated locations, reducing habitat availability for native coastal flora and limiting opportunities for natural vegetation recovery. The present-day risk is assessed as High, remaining elevated across future planning horizons
- **Vegetation vandalism:** Localised vegetation disturbance occurs at several locations within the reporting area. Minor vegetation vandalism has been observed along sections of the Wombarra foreshore, although much of this area is already highly modified. Additional disturbance occurs on the coastal slopes above Scarborough Beach, particularly near Haig Street and Monash Street, where clearing of vegetation can occur. The present-day risk is assessed as Moderate, remaining relatively consistent across future planning horizons.
- **Inadequate vegetation buffers for TECs and areas of wetland migration:** Threatened ecological communities including Littoral Rainforest and Themeda Grasslands occur along the tops of coastal cliffs within the reporting area. In several locations, these communities occur close to residential development and other infrastructure, leaving limited vegetated buffer and little capacity for landward migration in response to coastal recession and cliff instability. The present-day risk is assessed as Moderate, increasing to Extreme across later planning horizons.

Water Quality and Pollution

- **Water quality for primary contact recreation:** Beachwatch water quality grades for the last 5 years for Coledale Beach are provided in Table 3.10, which indicates that Coledale Beach consistently achieves a “Very Good” annual water quality grade. Microbial water quality is considered suitable for swimming almost all of the time, with few significant sources of faecal contamination. (DCCEEW, 2024). The risk is assessed as Low under present-day conditions.
- **Urban stormwater and sewer pollutants:** Several creeks and stormwater drainage outlets discharge runoff from surrounding urban catchments into the local coastal and estuarine environment – including Horses Creek, Reeces Creek, Stockyard Creek, and Carricks Creek. Given the partially urbanised nature of the contributing catchments, these discharges represent a potential pathway for pollutants entering coastal waters following rainfall events. While the small estuarine and creek systems in the area are likely to experience temporary water quality impacts following rainfall, no dedicated estuarine water quality dataset is currently available to confirm the extent or frequency of those impacts. However, historical Beachwatch water quality monitoring indicates that overall water quality in the adjacent open coast waters remains generally good. With limited population growth anticipated over coming decades, the present-day risk is assessed as Moderate and is expected to remain Moderate across future planning horizons.

Table 3.7 Beachwatch Water Quality Grades – Coledale Beach

Annual WQ Grades	Coledale Beach
2025	Very Good
2024	Very Good
2023	Very Good
2022	Very Good
2021	Very Good



Public Recreation, Assets, and Safety

- **Loss of safe beach/foreshore/waterway access:** At Coledale Beach, the entrances of Stockyard Creek and Dalys Creek periodically shift and meander across the beach following rainfall events. These drainage outlets can scour the beach surface and create uneven or waterlogged conditions that reduce safe pedestrian access along the beach. The present-day risk is assessed as High, remaining elevated across future planning horizons.
- **Loss of safe beach width (and scarping):** Wombarra Beach is a particularly narrow beach bounded by rock platforms and coastal infrastructure. During storm events the beach can temporarily lose much of its usable width due to erosion and scarping, reducing recreational amenity and limiting safe access to the water. While the beach may recover under calmer conditions, storm-driven erosion periodically restricts available beach space. The present-day risk is assessed as Moderate, increasing to Extreme across later planning horizons due to the potential impacts of long term shoreline recession, which may result on a long term loss of usable beach width.
- **User group conflicts:** The shared coastal reserve and pathway between Scarborough and Wombarra supports a range of users including pedestrians, dog walkers and cyclists. While conflicts are typically minor, increasing visitation and use of e-bikes may contribute to occasional user group conflicts within these shared spaces. The present-day risk is assessed as Low, increasing slightly across future planning horizons.
- **Wave overtopping and public safety:** The Wombarra and Coledale ocean pools, together with the adjacent rock platforms, are highly exposed to open ocean wave energy, particularly during periods of elevated swell from the east to southeast. These locations are popular for both ocean swimming and recreational rock fishing, but wave overtopping and surging across the platforms can create hazardous conditions. The present-day risk is assessed as Moderate, increasing across future planning horizons as coastal water levels rise and overtopping becomes more frequent.
- **Loss or rationalisation of rock pools:** The Wombarra and Coledale ocean pools are both located on exposed rock platforms and are subject to wave overtopping and tidal inundation during energetic ocean conditions. These processes can result in increased maintenance requirements and may progressively affect the long-term functionality of the pools. The present-day risk is assessed as Moderate, increasing across future planning horizons.
- **Loss or rationalisation of SLSCs:** The Scarborough-Wombarra SLSC is currently protected by coastal protection works but may be exposed to risks associated with coastal slope or cliff instability in the surrounding area. Coledale SLSC is also located behind existing coastal protection works, although changes to coastal processes or deterioration of these structures could increase exposure over time. The present-day risk is assessed as Low, increasing across longer planning horizons



Table 3.8 Social and Environmental Risk Summary – Scarborough to Coledale

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1D	Habitat loss and impacts on native flora	Almost Certain	Minor	High	High	High	High
1E	Vegetation vandalism	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
1I	Inadequate buffers for TECs and areas of wetland migration	Likely	Minor	Moderate	High	Extreme	Extreme
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Low	Low
2C	Urban stormwater and sewer pollutants	Likely	Minor	Moderate	Moderate	Moderate	Moderate
	Public Recreation, Assets, and Safety						
3C	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	High	High
3D	Loss of safe beach width (and scarping)	Likely	Minor	Moderate	High	Extreme	Extreme
3E	User group conflicts	Likely	Insignificant	Low	Low	Moderate	Moderate
3H	Wave overtopping and public safety	Unlikely	Major	Moderate	Moderate	High	Extreme
3I	Loss or rationalisation of rock pools	Unlikely	Major	Moderate	High	Extreme	Extreme
3J	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme



3.5 Area D - Sharky to Austinmer

3.5.1 Area Overview

Environmental Assets

The Sharky to Austinmer reporting area extends along the northern Wollongong coastline from Sharky Beach south to Austinmer Beach, incorporating several small, embayed beaches separated by rocky headlands and intertidal platforms. Compared with other parts of the Wollongong LGA, the foreshore within this area is generally highly modified, with roads, car parks and other infrastructure located close to the shoreline.

At the northern end of the reporting area lies Sharky Beach, a relatively small beach approximately 600 m long bounded by rock platforms at both ends and an offshore reef extending along the northern section (see Figure 3.22). These rocky features support intertidal habitat and contribute to the marine ecological diversity of the area. The northern half of the beach contains minimal vegetated foredune, with the adjacent car park located very close to the shoreline. Further south, dune vegetation becomes denser and more stable. Several small drainage lines intersect the beach, including Wards Gully, an unnamed drainage outlet approximately 80 m to the south near Park Street, and Jacky Jones Gully, which discharge across the beach and contribute to local hydrological and ecological processes.

Immediately south of Sharky Beach lies Brickyard Point Beach, also known as Austinmer Boat Harbour, a small pocket beach approximately 160 m long situated between a rock platform to the north and Brickyard Point (Long Point) to the south. The beach is highly modified, with a boat ramp and car park located along the back of the beach and protected by a buried seawall, leaving little space for natural dune vegetation. TECs of Themeda Grasslands are located behind Brickyard Beach and the adjacent slopes.

Further south, Little Austinmer Beach extends approximately 400 m between Brickyard Point and Bells Point, with rock platforms present at both ends of the beach that contribute to intertidal habitat and shape the character of the embayment. The northern half of the beach is heavily modified, with parking facilities located directly behind the shoreline and little remaining natural dune system.

The Austinmer Beach area is highly modified (see Figure 3.24). The northern half of the beach is backed by parking facilities that extend close to the shoreline, while the southern section is backed by foreshore parkland and recreational facilities. As a result, little to no natural dune system or native dune vegetation remains along the Austinmer foreshore.

Social and Recreational Values

The Sharky to Austinmer reporting area supports a range of coastal recreation activities including swimming, surfing, fishing, boating, walking and cycling. The area is valued by both the local community and visitors for its accessible beaches, coastal parks and scenic headlands.

Sharky Beach provides informal recreation opportunities including swimming, fishing and beach access, with a car park located behind the northern section of the beach. Lawrence Hargrave Drive runs parallel to the coastline through much of the reporting area and provides the primary access route to the beaches and surrounding coastal reserves.

Immediately south, Brickyard Point Beach (Austinmer Boat Harbour) supports small-scale boating and fishing activities. A boat ramp and adjacent parking area provide access for launching small vessels and recreational boating (see Figure 3.25). This is last ocean boat ramp for 35 km heading north towards Port Hacking (TfNSW).

Further south, Little Austinmer Beach is backed by Tuckerman Park, which includes public open space and parking facilities overlooking the beach. The park and surrounding slopes provide informal recreational areas and coastal viewing opportunities.



At the southern end of the reporting area, Austinmer Beach forms the primary recreational beach within the area. The beach is serviced by Austinmer SLSC and associated foreshore facilities including the Austinmer Beach Pavilion, Austinmer War Memorial, and surrounding coastal reserve areas. The Austinmer Rock Pools, constructed in 1921 on the southern rock platform, provide a sheltered ocean swimming facility and are a well-known recreational and heritage feature of the area (Salients, 2023).

Snapshot

Table 3.9 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Sharky to Austinmer reporting area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3

Table 3.9 Risk Context Snapshot – Sharky to Austinmer

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Sharky Beach Brickyard Point Beach Little Austinmer Beach Austinmer Beach	Intertidal rock reefs at Bells Point and Brickyard Point TECs of Themeda Grasslands	
Waterways	Wards Gully Park Street Outlet Jack Jones Gully Little Austinmer Beach Outlet	No waterways contain areas of R&H SEPP Coastal Wetlands	
Social / Community Nodes			
Surf Clubs	Austinmer SLSC		
Ocean Pools	Austinmer Ocean Pool		
Access Nodes	Austinmer Pavillion, Knox Park Playground, Austinmer Boat Harbour		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Austinmer	2,770	2,770	0%



Figure 3.22 Sharky Beach (image source: Salients, 2026)



Figure 3.23 Austinmer (centre) and Little Austinmer (right) beaches (image source: Visit NSW)



Figure 3.24 Austinmer Beach (image source: Visit NSW)



Figure 3.25 Brickyard Beach boat ramp (image source: Beaches Searcher)



3.5.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Habitat loss and impacts on native flora:** Large sections of the foreshore within the Sharky to Austinmer reporting area have been heavily modified over time through the construction of roads, car parks, coastal protection structures and recreational facilities. As a result, natural dune systems and associated native vegetation have been largely removed or constrained at Sharky Beach, Brickyard Point Beach and Austinmer Beach. The limited space available for dune development reduces habitat availability for native coastal flora and restricts opportunities for natural vegetation recovery. The present-day risk is assessed as High, remaining elevated across future planning horizons.
- **Vegetation Vandalism:** Vegetation disturbance and vandalism occurs at several headland locations within the reporting area, including Brickyard Point, Bells Point and the Austinmer headland. These areas are subject to informal access, trampling and clearing of vegetation, which can reduce vegetation cover and contribute to localised instability of coastal slopes and headland environments. The present-day risk is assessed as Moderate, remaining elevated across future planning horizons without ongoing management.

Water Quality and Pollution

- **Water quality for primary contact recreation:** Beachwatch water quality grades for the last 5 years for Austinmer Beach are provided in Table 3.10, which indicates that Austinmer Beach consistently achieves a “Very Good” annual water quality grade. Microbial water quality is considered suitable for swimming almost all of the time, with few significant sources of faecal contamination (DCCEEW, 2024). The risk is assessed as Low under present-day conditions.
- **Urban stormwater and sewer pollutants:** Several creeks and stormwater drainage outlets discharge runoff from surrounding urban catchments into the nearshore environment at Sharky, Brickyard Point and Austinmer beaches. Given the highly urbanised nature of the contributing catchments, these discharges represent a potential pathway for pollutants entering coastal waters following rainfall events. While the small estuarine and creek systems in the area are likely to experience temporary water quality impacts following rainfall, no dedicated estuarine water quality dataset is currently available to confirm the extent or frequency of those impacts. However, historical Beachwatch water quality monitoring indicates that overall water quality across the adjacent open coast waters remains generally good. With limited population growth anticipated within the Austinmer catchment over coming decades, the present-day risk is assessed as Low, and is expected to remain Low to Moderate across future planning horizons.

Table 3.10 Beachwatch Water Quality Grades – Austinmer Beach

Annual WQ Grades	Austinmer Beach
2025	Very Good
2024	Very Good
2023	Very Good
2022	Very Good
2021	Very Good

Public Recreation, Assets, and Safety

- **Loss of safe beach/foreshore/waterway access:** Access to Little Austinmer Beach can be steep and constrained near the car park and foreshore edge, creating potential safety risks for beach users, particularly during following storm erosion. At Brickyard Point (Austinmer Boat Harbour), ocean swell can create hazardous conditions for launching and retrieving vessels at the boat ramp. The present-day risk



is assessed as High, remaining elevated across future planning horizons with population expected to remain steady.

- **Loss of safe beach width (and scarping):** Little Austinmer Beach and Brickyard Point Beach are narrow pocket beaches that can temporarily lose usable beach width following storm erosion and dune scarping (see Figure 3.26). During these events, the beaches may reduce to very limited areas of usable sand. While the beaches generally recover under calmer conditions, storm-driven erosion can periodically reduce recreational amenity. The present-day risk is assessed as High, increasing to Extreme across later planning horizons.
- **User group conflicts:** The shared coastal pathway leading to Brickyard Point experiences occasional conflicts between different user groups, including pedestrians, dog walkers, cyclists and e-bike users. While these interactions are typically minor, increasing visitation may contribute to a gradual increase in user conflicts over time. The present-day risk is assessed as Low, increasing to Moderate across future planning horizons.
- **Dogs on beaches conflicts:** Dog walking occurs at Sharky and Little Austinmer Beaches, occasionally leading to minor conflicts between dog owners and other beach users. While generally well managed, increasing visitation may contribute to occasional conflicts between user groups. The present-day risk is assessed as Low, increasing slightly over time.
- **Wind-blown sand drift impacting recreational amenity:** Wind-blown sand drift periodically affects Sharky Beach and the Austinmer Beach car parks, resulting in sand accumulation on accessways, parking areas and surrounding public spaces. This can reduce visitor amenity, create minor maintenance and access issues, and increase the need for ongoing cleaning and management. The present-day risk is assessed as Moderate, increasing over time with changing coastal conditions and continued recreational use.
- **Wave overtopping and public safety:** Rocky headlands throughout the reporting area are popular for recreational fishing but can be exposed to energetic wave conditions, creating significant safety hazards during periods of elevated swell. The Austinmer Ocean Pool, located on the southern rock platform, is also frequently overtopped by waves and can become hazardous during energetic conditions (see Figure 3.27). Due to its exposure and relatively low wall heights, the pool is considered among the more hazardous ocean pools along the Wollongong coastline. The present-day risk is assessed as High, increasing to Extreme across future planning horizons.
- **Loss or rationalisation of rock pools:** The Austinmer Ocean Pool is one of the lowest ocean pools within the Wollongong LGA and already experiences frequent wave overtopping and tidal inundation (see above and Figure 3.27). The low pool walls and active sand movement across the adjacent beach result in periodic sand infilling, requiring ongoing clearance to maintain functionality. With projected sea level rise and increasing overtopping, the pool may require modification or raising of the walls to maintain long-term use. The present-day risk is assessed as Moderate, increasing across future planning horizons.
- **Loss or rationalisation of SLSCs:** The Austinmer SLSC and associated facilities are protected by existing coastal protection works. Loss or relocation of these assets would only become a significant risk if these protection structures were to fail or become inadequate under future coastal conditions. The present-day risk is assessed as Low, increasing gradually over longer planning horizons.



Figure 3.26 Loss of beach width at Little Austinmer beach after a storm event



Figure 3.27 Wave overtopping of the Austinmer ocean pool (image source: WCC)



Table 3.11 Social and Environmental Risk Summary – Sharky to Austinmer

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1D	Habitat loss and impacts on native flora	Almost Certain	Minor	High	High	High	High
1E	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Low	Low
2C	Urban stormwater and sewer pollutants	Unlikely	Minor	Low	Low	Low	Moderate
	Public Recreation, Assets, and Safety						
3C	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	High	High
3D	Loss of safe beach width (and scarping)	Almost Certain	Minor	High	High	Extreme	Extreme
3E	User group conflicts	Likely	Insignificant	Low	Low	Moderate	Moderate
3F	Dogs on beaches conflicts	Likely	Insignificant	Low	Low	Moderate	Moderate
3G	Wind-blown sand drift impacting recreational amenity	Likely	Minor	Moderate	Moderate	High	High
3H	Wave overtopping and public safety	Possible	Major	High	Extreme	Extreme	Extreme
3I	Loss or rationalisation of rock pools	Rare	Major	Moderate	High	Extreme	Extreme
3J	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme



Legend

Coastal Ecosystem Management

- Impact of invasive species - fauna
- Impact of invasive species - flora
- Habitat loss and impacts on native fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Informal access damage
- Wind blown sand impacting vegetation
- Harvesting and walking on rock platforms
- Inadequate vegetation buffers

Water quality and pollution

- Recreational swimming quality
- Secondary water quality
- Urban stormwater and sewer pollutants
- Buried anthropogenic waste

Public recreation and assets

- Unpatrolled beaches
- Loss of lifeguard sight lines
- Loss of beach width & scarping
- Loss of safe beach/foreshore/waterway access
- User conflicts
- Dogs on beach conflict
- Wind blown sand impacting amenity
- Wave overtopping and public safety
- Loss or rationalisation of rock pools
- Loss or rationalisation of SLSC facilities

Administrative Mapping

- Reporting Area
- RH SEPP Coastal Wetlands
- RH SEPP Littoral Rainforest
- NPWS Land Tenure



Contains SIXMAPS Information
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Figure 3-28
Sharky to Austinmer - Risk Summary





3.6 Area E - Thirroul to McCauleys

3.6.1 Area Overview

Environmental Assets

The Thirroul to McCauleys reporting area extends from the rocky headland north of Thirroul Beach to Sandon Point, encompassing both Thirroul Beach and McCauleys Beach.

Thirroul Beach extends for approximately 1 km between the rocky headland separating it from Austinmer Beach in the north and a coastal bluff at its southern end that divides it from McCauleys Beach (see Figure 3.29). North of the SLSC and Pavilion, the foreshore is backed by a vegetated dune system that provides an important habitat and natural buffer between the beach and surrounding land uses. South of this area, the dune system becomes increasingly modified, with limited native dune vegetation remaining where the beach is backed by hard coastal infrastructure and, further south, residential development.

Several drainage features intersect the beach, including a stormwater outlet near the northern end and the entrance to Flanagans Creek approximately 180 m to the south. These watercourses contribute to local ecological values and influence the character of the beach and adjacent coastal reserve.

The southern section of Thirroul Beach includes wide intertidal rock platforms associated with the adjacent headland, which provide marine habitat and contribute to the environmental diversity of this section of coastline. South of Thirroul Beach, the coastline transitions into McCauleys Beach, which extends approximately 750 m between a coastal bluff to the north and Sandon Point to the south.

McCauleys beach is narrower than Thirroul Beach and is backed in places by steep coastal slopes and cliffs that separate the shoreline from residential development above (see Figure 3.30). This section of coastline remains largely undeveloped and forms part of a coastal reserve. The vegetation within the reserve includes mapped areas of R&H SEPP Coastal Wetlands including the TECs of Swamp Oak Floodplain Forest and Swamp Sclerophyll Forest (Wollongong City Council, 2014).

Two coastal creeks cross McCauleys Beach: Hewitts Creek near the northern end and Tramway Creek closer to the centre of the beach. These creeks form small estuarine entrances that periodically migrate across the beach. A 500 m stretch at the northern end of McCauleys Beach contains a highly dynamic area where the entrances of Hewitts Creek and Tramway Creek interact. The creeks are classified as ICOLLS.

Social and Recreational Values

Thirroul Beach is a major recreational beach within the northern Wollongong area and supports swimming, surfing and a range of beach-based activities. The beach is serviced by the Thirroul SLSC, while the Thirroul Ocean Pool provides a sheltered ocean swimming facility that is widely used by residents and visitors. The adjacent Thirroul Beach Pavilion and surrounding foreshore reserve provide supporting amenities, open space and car parking for beach users. These facilities are located at the back of the beach and are protected by a low concrete seawall that extends along this section of shoreline (Cardno Lawson Treloar, 2010). Stormwater infrastructure and intake pipelines associated with the ocean pool are also located within this part of the foreshore.

The continuous grassed reserve behind Thirroul Beach provides an important recreational space for informal activities such as walking, picnicking and community gatherings (BMT WBM, 2017). The reserve also forms part of the regional coastal pathway network, supporting pedestrian and cycling access along the coastline.

Further south, McCauleys Beach provides a more natural and less developed coastal setting. The beach is commonly used for walking, surfing and fishing, while the surrounding cliffs and headlands provide scenic coastal views.



The southern portion of McCauleys Beach forms part of the Sandon Point Aboriginal Place (Wollongong City Council, 2026), a culturally significant area extending from Hewitts Creek to Sandon Point. This section contains rocky shoreline areas and coastal slopes that support both environmental and cultural values.

Sandon Point is a well-known and highly valued surf break, particularly on the northern side of the headland, and is an important recreational asset that attracts local surfers and visitors from across the region. The area around Sandon Point also contains historical features associated with the former Bulli Colliery jetty, reflecting the industrial heritage of the region. This also includes the Sandon Point Boat Sheds (see Figure 3.31), which are located at the base of the cliff near the southern end of McCauleys Beach. The sheds date back to the early 1900s and continue to support local recreational boating and fishing activities.

Snapshot

Table 3.12 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Thirroul to McCauleys reporting area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3

Table 3.12 Risk Context Snapshot – Thirroul to McCauleys

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Thirroul Beach McCauleys Beach	Coastal dune systems at Thirroul and McCauley's beaches Intertidal rock reef at Sandon Point	
Waterways	Flanagans Creek Hewitts Creek Tramway Creek	ICOLL ecosystems R&H SEPP Coastal Wetlands at Hewitts Creek and Tramway Creek – including TECs of Swamp Oak Floodplain Forest and Swamp Sclerophyll Forest.	
Social / Community Nodes			
Surf Clubs	Thirroul SLSC		
Ocean Pools	Thirroul Community Pool		
Access Nodes	Thirroul Beach Pavillion, Coastal Cycleway		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Thirroul	6,310	6,460	+2.3%



Figure 3.29 Thirroul Beach (image source: Visit NSW)



Figure 3.30 Southern end of McCauleys Beach (image source: Salients, 2026)



Figure 3.31 The Sandon Point Boat Sheds (image source: M Roberts)

3.6.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Impact of invasive species – flora:** Along the McCauleys Beach foreshore reserve, vegetation along the margins of the alluvial and estuarine communities is heavily influenced by weed species. Low-lying areas adjacent to the creek systems are characterised by a mix of invasive grasses, blackberry and lantana thickets, which have established in disturbed areas of the coastal reserve (Wollongong City Council, 2014). Ongoing management is required to control these species and support native vegetation recovery. The present-day risk is assessed as High.
- **Habitat loss and impacts on native flora:** At Thirroul Beach, much of the historical dune vegetation has been removed over time to accommodate foreshore infrastructure and recreational facilities, including the SLSC, beach pavilion and associated public amenities. As a result, only limited areas of natural dune vegetation remain along parts of the beach. The present-day risk is assessed as High.
- **Vegetation vandalism:** Vegetation vandalism has been observed along the southern extent of McCauleys Beach, particularly along the coastal slopes and foreshore reserve areas. These disturbances contribute to localised degradation of vegetation cover and can reduce the stability of the coastal slope where vegetation is removed. The present-day risk is assessed as Moderate.
- **Inadequate buffers for TECs and areas of wetland migration:** The upper and middle reaches of Tramway Creek and Hewitts Creek occur adjacent to established urban development, limiting opportunities for upslope migration of estuarine and wetland habitats. While downstream areas remain relatively unconstrained, sections of these systems have limited buffer areas available for future wetland migration. The present-day risk is assessed as Moderate, increasing across future planning horizons.



Water Quality and Pollution

- **Water quality for primary contact recreation:** Beachwatch water quality grades for the last 5 years for Thirroul Beach are provided in Table 3.13, which indicates that Thirroul Beach consistently achieves a “Good” annual water quality grade. Microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination, including discharge from stormwater network and from Flanagans Creek (DCCEEW, 2024). The risk is assessed as Low under present-day conditions, reflecting episodic but predictable storm-driven impacts, and remains relatively Low to Moderate across future planning horizons in the absence of significant local population growth and catchment change.
- **Urban stormwater and sewer pollutants:** Stormwater outlets and drainage lines along Thirroul Beach discharge runoff from surrounding urban catchments into the nearshore environment. Key sources include local stormwater outlets as well as flows associated with Tramway Creek, Hewitts Creek and Flanagans Creek. During rainfall events, these inputs may convey sediments, nutrients, hydrocarbons and other urban contaminants during rainfall events. Given the highly urbanised nature of the contributing catchments, stormwater discharges represent an ongoing source of pollutants entering coastal waters. While nearby estuarine and creek systems are likely to experience short-term water quality impacts after rain, no dedicated estuarine water quality dataset is currently available to quantify the extent or frequency of those impacts. However, available Beachwatch water quality indicates that the open coast water quality is generally suitable under typical conditions, with temporary rainfall-related declines. The present-day risk is assessed as Moderate.

Table 3.13 Beachwatch Water Quality Grades – Thirroul Beach

Annual WQ Grades	Thirroul Beach
2025	Good
2024	Good
2023	Good
2022	Good
2021	Good

- **Buried anthropogenic waste:** Areas of buried anthropogenic waste have been identified within sections of Thirroul Beach and McCauleys Beach, reflecting historical land use and disposal practices. These materials are managed under Wollongong City Council's Thirroul Beach Asbestos Management Plan, which includes monitoring and management procedures to minimise potential exposure risks. The present-day risk is assessed as High.

Public Recreation, Assets, and Safety

- **Loss of safe beach/foreshore access:** Beach access can be affected near the entrances of Hewitts Creek at the northern end of McCauleys Beach and Flanagans Creek at Thirroul Beach. At McCauleys Beach, the dynamic entrance to Hewitts Creek has historically shifted across the beach, affecting pedestrian access along the foreshore (see Figure 3.32). Similar issues occur at the entrance to Flanagans Creek, where channel migration can temporarily interrupt beach access routes. The present-day risk is assessed as High.
- **Loss of safe beach width (and scarping):** The southern section of McCauleys Beach is relatively narrow and prone to erosion and dune scarping during storm events. These processes can temporarily reduce available beach width and affect adjacent assets including the Sandon Point boat sheds (see Figure 3.31) and parts of the Sandon Point Aboriginal Place. The present-day risk is assessed as High, increasing to Extreme across future planning horizons.

- **Dogs on beaches conflicts:** The off-leash dog exercise area located at McCauleys Beach attracts high levels of use. While generally well managed, interactions between dog walkers and other beach users can occasionally lead to user conflicts, particularly during peak visitation periods. This issue is also known to occur in the vicinity of the Sandon Point Aboriginal Place, and unmanaged dog activity may also create risks to cultural values and the respectful use of the site. The present-day risk is assessed as Moderate.
- **Wave overtopping and public safety:** The seawall and promenade area at Thirrour Beach are relatively low-lying and may experience wave run-up and overtopping during energetic storm events (see Figure 3.33), particularly when elevated water levels coincide with strong southeast swell (Cardno Lawson Treloar, 2010). These areas are frequently used by pedestrians and beachgoers, and overtopping can create hazardous conditions during severe weather (Salients, 2025b). The present-day risk is assessed as Moderate, increasing across future planning horizons.
- **Loss or rationalisation of SLSCs:** The Thirrour SLSC and associated foreshore infrastructure are located directly landward of the beach and rely on the existing seawall for protection from coastal erosion. The risk to these assets becomes significant if the seawall does not maintain sufficient structural integrity to withstand future storm conditions. In addition, increasing coastal water levels may expose the site to greater inundation risk over time (Salients, 2026). The present-day risk is assessed as Moderate, increasing to High by 2045 and Extreme in later planning horizons without adaptation or upgrades to coastal protection measures.



Figure 3.32 Entrance instability at Hewitts Creek impacting safe beach access. Image taken November 2025.



Figure 3.33 Sand deposited at Thirroul promenade by high wave energy in April 2025



Table 3.14 Social and Environmental Risk Summary - Thirroul to McCauleys

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1B	Impact of invasive species – flora	Almost Certain	Minor	High	High	High	High
1D	Habitat loss and impacts on native flora	Almost Certain	Minor	High	High	High	High
1E	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
1I	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Moderate	Moderate
2C	Urban stormwater and sewer pollutants	Possible	Minor	Moderate	Moderate	Moderate	Moderate
2D	Buried anthropogenic waste	Possible	Major	High	High	High	High
	Public Recreation, Assets, and Safety						
3C	Loss of safe beach/foreshore access	Almost Certain	Minor	High	High	High	High
3D	Loss of safe beach width (and scarping)	Almost Certain	Minor	High	Extreme	Extreme	Extreme
3F	Dogs on beaches conflicts	Likely	Minor	Moderate	Moderate	Moderate	Moderate
3H	Wave overtopping and public safety	Possible	Medium	Moderate	High	High	Extreme
3J	Loss or rationalisation of SLSCs	Unlikely	Major	Moderate	High	Extreme	Extreme



Legend

Coastal Ecosystem Management

- Impact of invasive species - fauna
- Impact of invasive species - flora
- Habitat loss and impacts on native fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Informal access damage
- Wind blown sand impacting vegetation
- Harvesting and walking on rock platforms
- Inadequate vegetation buffers

Water quality and pollution

- Recreational swimming quality
- Secondary water quality
- Urban stormwater and sewer pollutants
- Buried anthropogenic waste

Public recreation and assets

- Unpatrolled beaches
- Loss of lifeguard sight lines
- Loss of beach width & scarping
- Loss of safe beach/foreshore/waterway access
- User conflicts
- Dogs on beach conflict
- Wind blown sand impacting amenity
- Wave overtopping and public safety
- Loss or rationalisation of rock pools
- Loss or rationalisation of SLSC facilities

Administrative Mapping

- Reporting Area
- RH SEPP Coastal Wetlands
- RH SEPP Littoral Rainforest
- NPWS Land Tenure



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Figure 3-34
Thirroul to McCauleys - Risk Summary



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3.7 Area F - Sandon Point to Bulli

3.7.1 Area Overview

Environmental Assets

The Sandon Point to Bulli reporting area extends from Sandon Point south to Collins Point, encompassing Sandon Point Beach and Bulli Beach. At the northern end of the reporting area, Sandon Point forms a prominent rocky headland that transitions into Sandon Point Beach, which extends south for approximately 1 km to Waniora Point (see Figure 3.35).

The northern half of the beach is backed by a relatively narrow (approximately 25 m wide) vegetated dune system and foreshore reserve that provides an important buffer between the shoreline and surrounding development. Slacky Creek crosses the beach near its centre, forming a small estuarine entrance that periodically meanders and discharges across the beach (Roper, et al., 2011). South of Slacky Creek, the vegetated dune system narrows and transitions to rock-armoured coastal protection works that protect the adjacent road and coastline cycleway. At Waniora Point, intertidal rock reefs extend offshore, contributing to marine habitat and shaping the character of the southern end of the beach.

South of Waniora Point lies Bulli Beach, a sandy beach approximately 900 m long bounded by rocky outcrops at Waniora Point in the north and Collins Point in the south (see Figure 3.36). The shoreline is backed by a continuous vegetated dune system that varies in width (approximately 15–50 m) along the beach. Dune vegetation was established during the mid-1980s and has gradually expanded seaward over time, helping stabilise the dunes and supporting coastal habitat (Salients, 2023).

Several coastal creeks intersect the Bulli Beach system. Whartons Creek, a small ICOLL, enters the northern half of the beach and typically discharges across Bulli Beach south of Waniora Point. The entrance to Whartons Creek is partially constrained by rock-armoured coastal protection works to reduce entrance instability and protect adjacent coastal reserve areas.

Toward the southern end of Bulli Beach, Collins Creek enters the shoreline near Collins Point. Also, an ICOLL, Collins Creek can meander southwards when open, occasionally migrating toward the Woonona Rock Pool and nearby car park facilities (Roper, et al., 2011; Salients, 2026). The mid-reaches of Collins Creek also include areas mapped as R&H SEPP Coastal Wetlands (containing the TECs of Swamp Oak Floodplain Forest), contributing to the ecological significance of the area.

Social and Recreational Values

The Sandon Point to Bulli reporting area supports a wide range of coastal recreation activities including surfing, swimming, walking, fishing and cycling. The area is highly valued by both the local community and visitors for its accessible beaches, coastal reserves and scenic headlands.

Sandon Point Beach is a popular recreational beach and is serviced by the Sandon Point SLSC, located at the northern end of the beach. The surrounding foreshore includes open grass reserves that support informal recreation, community gatherings and beach access. Landward of the beach, coastal open space areas and reserves extend along much of the shoreline. Toward the southern end of Sandon Point Beach, the coastal reserve narrows, with low-lying residential properties and recreation fields occurring closer to the shoreline.

Further south, Bulli Beach is another major recreational beach within the Wollongong LGA and supports surfing, swimming and beach-based recreation. The beach is serviced by the Bulli SLSC and associated facilities located near Waniora Point. The Bulli Rockpool, constructed in 1903 within the adjacent rock platform at Waniora Point, provides a sheltered ocean swimming facility popular with both residents and visitors.



Landward of the dunes, the Bulli Beach Tourist Park occupies a significant portion of the coastal reserve and provides accommodation and holiday facilities that attract seasonal visitation. The surrounding foreshore areas and coastal pathway support walking, cycling and passive recreation along the length of the beach.

The Coastline Cycleway runs behind Sandon Point Beach and Bulli Beach, forming part of the regional coastal pathway connecting Wollongong with northern suburbs including Thirroul. This shared pathway is widely used for walking, cycling and commuting and contributes strongly to the recreational character of the reporting area.

Snapshot

Table 3.15 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Sandon Point to Bulli reporting area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3.

Table 3.15 Risk Context Snapshot – Sandon Point to Bulli

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Sandon Point Beach Bulli Beach	Coastal dune systems at Sandon Point and Bulli beaches Intertidal rock reefs at Sandon Point	
Waterways	Slacky Creek Whartons Creek Collins Creek	ICOLL ecosystems R&H SEPP Coastal Wetlands at Collins Creek	
Social / Community Nodes			
Surf Clubs	Sandon Point SLSC, Bulli SLSC		
Ocean Pools	Bulli Ocean Pool		
Access Nodes	Coastal Cycleway		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Bulli	6,940	6,820	-1.7%



Figure 3.35 Sandon Point Beach (image source: WCC)



Figure 3.36 Bulli Beach (image source: WCC)

3.7.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Impact of invasive species – flora**: At Bulli Beach, several WoNS are present within the dune system, including bitou bush, lantana, bridal creeper, asparagus fern, fireweed, Madeira vine and prickly pear (Wollongong City Council, 2018). This requires ongoing management to support native vegetation recovery and dune health. The present-day risk is assessed as High, remaining elevated across future planning horizons without continued management.

- **Habitat loss and impacts on native flora:** At the southern end of Sandon Point Beach, sections of the back-beach area contain limited native dune vegetation compared with other parts of the reporting area, due to the presence of coastal protection works and the limited space between the beach and the local roadway (Trinity Row) - reducing the extent of natural dune habitat and biodiversity values. The present-day risk is assessed as High.
- **Vegetation vandalism:** Localised vegetation vandalism has been observed along Sandon Point Beach, particularly within the central and southern sections of the dune system where public access and visual amenity pressure is highest. The present-day risk is assessed as Moderate.
- **Informal pedestrian and vehicle access damage:** Multiple informal pedestrian access tracks occur through the dunes at Sandon Point Beach, including approximately 13 informal paths within a 150 m stretch between Park Road and Alroy Street (see Figure 3.37). These access routes fragment dune vegetation and reduce the effectiveness of the dune system as a natural buffer. The present-day risk is assessed as Moderate.
- **Harvesting and walking on rock platforms:** The Sandon Point rock platform is a popular location for recreational fishing, shellfish collection and pedestrian access. These activities result in regular disturbance of the intertidal environment and associated marine habitats. The present-day risk is assessed as Moderate, with potential escalation over longer planning horizons.
- **Inadequate buffers for TECs and areas of wetland migration:** Coastal creek systems within the reporting area, including Slacky Creek, Whartons Creek and Collins Creek, contain environmentally sensitive habitats, including mapped R&H SEPP Coastal Wetlands associated with Collins Creek. Opportunities for upslope wetland migration are constrained by surrounding urban development and infrastructure. The present-day risk is assessed as Moderate, increasing over longer planning horizons.



Figure 3.37 Informal access paths through the dunes at Sandon Point Beach



Water Quality and Pollution

- **Water quality for primary contact recreation:** Beachwatch water quality grades for the last 5 years for Bulli Beach is provided in Table 3.16 indicates that Bulli Beach consistently achieves a “Good” annual water quality grade. Microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination, including discharge from Whartons Creek (DCCEEW, 2024). The risk is assessed as Low under present-day conditions, reflecting episodic but predictable storm-driven impacts, and remains relatively Low to Moderate across future planning horizons in the absence of significant local population growth and catchment change.
- **Urban stormwater and sewer pollutants:** Several creeks and stormwater drainage outlets discharge runoff from surrounding urban catchments into the nearshore environment – including Slacky Creek, Whartons Creek, and Collins Creek. Given the highly urbanised nature of the contributing catchments, these discharges represent a potential pathway for pollutants entering coastal waters following rainfall events. While the small estuarine and creek systems in the area are likely to experience temporary water quality impacts following rainfall, no dedicated estuarine water quality dataset is currently available to confirm the extent or frequency of those impacts. However, historical Beachwatch water quality monitoring indicates that overall water quality across the adjacent open coast waters remains generally good. The present-day risk is assessed as Moderate, and is expected to remain Moderate across future planning horizons.

Table 3.16 Beachwatch Water Quality Grades - Bulli Beach

Annual WQ Grades	Bulli Beach
2025	Good
2024	Good
2023	Good
2022	Good
2021	Good

- **Buried anthropogenic waste:** Ocean Park, located within the Collins Creek catchment, was historically used as a landfill site, with the park area formed by filling former coastal wetlands with rubbish until the early 1980s. Buried waste remains beneath the park, and there is potential for leachate to migrate through soils or groundwater and enter nearby drainage lines or Collins Creek. Ocean Park is recognised in planning documentation as “potentially contaminated land due to previous uses” (Wollongong City Council, 2024). However, the extent and environmental significance of any such discharge are not well documented.

Public Recreation, Assets, and Safety

- **Loss of lifeguard sight lines:** At Bulli SLSC, patrol operations are undertaken from the northern end of the beach, with mobile patrols used to monitor the southern sections of the beach. The length of the beach and distance from the SLSC can reduce direct visibility of swimmers in southern areas during busy periods. The present-day risk is assessed as High, staying across future planning horizons given that population growth is expected to be minor.
- **Loss of safe beach/foreshore/waterway access:** Beach access can be affected near the entrances of Slacky Creek, Whartons Creek and Collins Creek, where meandering outlet channels periodically alter access routes across the beach. Access constraints can also occur near Sandon Point SLSC, where erosion and dune scarping following storm events can temporarily restrict movement along the foreshore (see Figure 3.38). The present-day risk is assessed as High.

- **Loss of safe beach width (and scarping):** Sections of Sandon Point Beach, particularly near the SLSC at the northern end and along the narrower southern sections of the beach, are susceptible to temporary loss of beach width following storm erosion and dune scarping. These areas already experience relatively constrained beach widths compared with other parts of the reporting area. The present-day risk is assessed as High.
- **User group conflicts:** The Coastline Cycleway and shared user pathway running behind Sandon Point Beach and Bulli Beach supports high levels of use from cyclists, pedestrians and recreational users. Competing uses along this shared pathway can occasionally result in user conflicts, particularly during peak visitation periods. The present-day risk is assessed as High.
- **Wave overtopping and public safety:** Areas around Sandon Point SLSC and the Bulli SLSC (see Figure 3.38) and rockpool area are periodically exposed to wave overtopping during energetic ocean conditions, particularly when elevated water levels coincide with strong southeast swell. These locations are heavily used for recreation and coastal access. The present-day risk is assessed as Moderate, remaining elevated across future planning horizons as coastal water levels increase
- **Loss or rationalisation of rock pools:** The Bulli Rockpool, located within the rock platform near Bulli SLSC, is subject to periodic sand accumulation from wave overtopping. This requires occasional sand clearance works to maintain pool functionality (see Figure 3.39). With sea level rise and increasing coastal water levels, the frequency of wave overtopping and associated sand deposition is expected to increase. The present-day risk is assessed as Low, increasing over longer planning horizons.
- **Loss or rationalisation of SLSCs:** Sandon Point SLSC is located within the present-day coastal cliff and slope instability coastal hazard area (Salients, 2026) and may be exposed to slope instability during major storm events. Significant erosion could affect access to the facility or damage associated infrastructure. The present-day risk is assessed as Moderate, increasing across future planning horizons as coastal hazards intensify.



Figure 3.38 Sandon Point SLSC - reduced beach access (left) and exposure/proximity to wave overtopping (right)



Figure 3.39 Bulli Ocean Pool sand clearance works in July 2005 (image source: MetroMap)



Table 3.17 Social and Environmental Risk Summary – Sandon Point to Bulli

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1B	Impact of invasive species – flora	Almost Certain	Minor	High	High	Extreme	Extreme
1D	Habitat loss and impacts on native flora	Almost Certain	Minor	High	High	High	High
1E	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
1F	Informal pedestrian and vehicle access damage	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
1H	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
1I	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Moderate	Moderate
2C	Urban stormwater and sewer pollutants	Likely	Minor	Moderate	Moderate	Moderate	Moderate
2D	Buried anthropogenic waste	Possible	Major	High	High	High	High
	Public Recreation, Assets, and Safety						
3B	Loss of lifeguard sight lines	Possible	Catastrophic	High	High	High	High
3C	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	High	High
3D	Loss of safe beach width (and scarping)	Almost Certain	Minor	High	High	High	High
3E	User group conflicts	Likely	Medium	High	High	High	High
3H	Wave overtopping and public safety	Possible	Medium	Moderate	Moderate	High	High
3I	Loss or rationalisation of rock pools	Rare	Major	Low	Low	Moderate	High
3J	Loss or rationalisation of SLSCs	Unlikely	Major	Moderate	High	Extreme	Extreme



Legend

Coastal Ecosystem Management

- Impact of invasive species - fauna
- Impact of invasive species - flora
- Habitat loss and impacts on native fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Informal access damage
- Wind blown sand impacting vegetation
- Harvesting and walking on rock platforms
- Inadequate vegetation buffers

Water quality and pollution

- Recreational swimming quality
- Secondary water quality
- Urban stormwater and sewer pollutants
- Buried anthropogenic waste

Public recreation and assets

- Unpatrolled beaches
- Loss of lifeguard sight lines
- Loss of beach width & scarping
- Loss of safe beach/foreshore/waterway access
- User conflicts
- Dogs on beach conflict
- Wind blown sand impacting amenity
- Wave overtopping and public safety
- Loss or rationalisation of rock pools
- Loss or rationalisation of SLSC facilities

Administrative Mapping

- Reporting Area
- RH SEPP Coastal Wetlands
- RH SEPP Littoral Rainforest
- NPWS Land Tenure



Contains SIXMAPs Information
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Figure 3-40
Sandon Point to Bulli - Risk Summary





3.8 Area G - Woonona to Bellambi

3.8.1 Area Overview

Environmental Assets

The Woonona–Bellambi reporting area comprises the central portion of the Woonona–Bellambi embayment, extending from Collins Point in the north to Sandspit Point south of Bellambi Lagoon. The coastline consists predominantly of sandy open-coast beaches backed by vegetated dune systems of varying width and condition.

Woonona Beach forms the northern section of the embayment and is backed by a continuous dune corridor, with higher and narrower dunes toward Collins Point and wider, flatter dunes toward the south. Bellambi Beach occupies the southern portion of the embayment and transitions into a more complex coastal setting influenced by Bellambi Gully and Bellambi Lagoon (see Figure 3.41). Both Bellambi Gully and Bellambi Lagoon function as ICOLLs, with entrance behaviour influencing adjacent beach morphology and water quality. Dunes narrow and increase in elevation toward the northern section of Bellambi Beach, while areas closer to the lagoon and harbour are lower lying.

Bellambi Point is a low, dune-capped shale headland extending offshore as a reef, creating sheltered reef-dominated beaches on either side. Bellambi Harbour Beach lies to the north of the point, backed by low-lying land and maritime infrastructure, while Bellambi Point Beach extends south toward Sandspit Point and is backed by vegetated dunes that have been historically modified by sand mining.

Bellambi Lagoon and Bellambi Gully include areas mapped as R&H SEPP Coastal Wetlands (containing the TECs of Swamp Sclerophyll Forest and, Bangalay Sand Forest), reflecting their ecological significance and associated planning considerations. The lagoon, associated wetlands and dune systems provide important environmental values and are influenced by both coastal and catchment processes.

Social and Recreational Values

The reporting area is directly adjacent to the established residential centres of Woonona and Bellambi, with additional nearby populations in Russell Vale. As a result, the coastline functions as a highly accessible and well-used community asset, supporting daily recreation, organised surf life saving activities, walking and cycling, fishing and boating. Population growth and future demand for coastal open space may also be greater than current projections, noting the Bellambi Estate Renewal proposal includes staged redevelopment with new housing, upgraded public open space, improved walking and cycling links, and additional community facilities in the locality (NSW Government, 2026).

Key community nodes include Woonona Surf Life Saving Club and Rock Pool at Collins Point, and Bellambi Surf Life Saving Club and Rock Pool adjacent to Bellambi Gully. The Coastal Cycleway runs landward of the dunes along the full length of the embayment, forming part of a broader north–south active transport corridor.

Bellambi Harbour includes a boat ramp, jetty, breakwater and car park, supporting recreational fishing and maritime access. These facilities are located in relatively low-lying areas and are closely integrated with adjacent beach and lagoon environments. Popular off-leash dog exercise areas are also located west of Bellambi Harbour and on the beach south of Bellambi Point, adding to the area's strong day-to-day recreational use.

Bellambi is a place of rich cultural heritage significance and Bellambi Point holds strong value in the cultural landscape. Bellambi is home to many First Nations peoples who are deeply connected to Country and community.



Snapshot

Table 3.18 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Woonona–Bellambi reporting area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3.

Table 3.18 Risk Context Snapshot - Woonona to Bellambi

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Woonona Beach Bellambi Beach	Coastal dune systems at Bellambi and Woonona beaches Intertidal rock reefs at Bellambi Point and Collins Point	
Waterways	Bellambi Gully Bellambi Lagoon	ICOLL ecosystems R&H SEPP Coastal Wetlands at Bellambi Gully and Bellambi Lagoon - including TECs of Swamp Sclerophyll Forest and, Bangalay Sand Forest	
Social / Community Nodes			
Surf Clubs	Woonona SLSC, Bellambi SLSC		
Ocean Pools	Woonona Ocean Pool, Bellambi Ocean Pool		
Access Nodes	Coastal Cycleway, Bellambi Boat Ramp / Jetty		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Bellambi, Woonona, Russell Vale	18,140	17,930	-1.2%



Figure 3.41 Bellambi Beach, including Bellambi Gully estuary and ocean pool (image source: VisitNSW)



Figure 3.42 Woonona Beach (image source: WCC)

3.8.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Impact of invasive species – fauna:** Pest fauna including foxes, rabbits, deer, cats, and myna birds are present at Bellambi Point and within vegetated foreshore reserves around Bellambi Lagoon (Midges Bushland Restoration, 2023). These areas contain sensitive dune and wetland systems, increasing the ecological consequence of ongoing disturbance. Given the near-constant presence of pest species and the sensitivity of mapped Coastal Wetlands, the risk is assessed as High under present-day conditions, with escalation over longer planning horizons reflecting cumulative habitat pressure.
- **Impact of invasive species – flora:** Invasive coastal weeds are distributed across the dune corridor at both Woonona and Bellambi beaches, with greater intensity observed in the northern section of Woonona Beach – which contains woody weeds such as Bitou Bush, Lantana, Norfolk Island Hibiscus, Tuckeroo (Midges Bushland Restoration, 2023), as well as vines such as Madeira Vine, Cape Ivy, Honeysuckle, Coastal Morning Glory, and Blackberry. Weed encroachment is most evident in areas subject to pedestrian access and disturbance, where native dune vegetation is already under pressure. The risk is rated High at present given the widespread occurrence of invasive species and their persistence without ongoing management. Escalation to Extreme in longer-term scenarios reflects the increasing ecological consequence of degraded dune condition and the higher cost and complexity of future restoration.
- **Habitat loss and impacts on native flora:** Loss of native dune vegetation is currently evident in constrained sections of the back-beach, particularly along Robert Cram Drive near the Bellambi Boat Harbour where erosion and narrow coastal buffers have reduced vegetated area. These sections provide limited space for dune recovery and are already subject to pressure from shoreline processes and adjacent infrastructure. The risk is assessed as Moderate under present-day conditions, reflecting localised but permanent vegetation loss. Over longer planning horizons, projected sea level rise and shoreline retreat are likely to progressively reduce vegetated dune systems in areas with minimal accommodation space, including Woonona Beach in front of Beach Street and sections of Bellambi Beach adjacent to the Sydney Water wastewater treatment facility, resulting in escalation to High and Extreme risk.

- **Vegetation Vandalism:** Historical vegetation vandalism has occurred at several locations within the reporting area, including central Woonona Beach near Lighthouse Park, along Beach Street, at the northern end of Kurraba Road (see Figure 3.43), and on Bellambi Beach and south of the rock pool. These incidents typically involve clearing or deliberate damage to dune vegetation in high-access areas or for views. While impacts are generally localised, repeated disturbance reduces dune resilience and increases maintenance requirements. The risk is assessed as Moderate under present-day conditions due to the frequency of incidents and the sensitivity of foredune systems in these areas, with risk remaining elevated across future planning horizons without sustained management intervention.
- **Informal pedestrian and vehicle access damage:** Informal access tracks are evident within the dune system, particularly south of the Bellambi Ocean Pool where pedestrian movement is cutting through vegetated areas. These informal paths prevent natural dune recovery and fragment vegetation cover, particularly in areas already subject to erosion pressure. Although the immediate ecological consequence is currently limited, the likelihood of continued disturbance is high given proximity to established recreational nodes. The risk is therefore assessed as Moderate under present-day conditions and remains stable over time, reflecting an ongoing management issue rather than a climate-driven escalation.
- **Harvesting and walking on rock platforms:** The Bellambi Point rock shelf is subject to recreational fishing, collection and pedestrian use, resulting in disturbance to intertidal habitats. The present-day risk is assessed as Moderate due to periodic disturbance of sensitive marine communities. Over longer planning horizons, projected sea level rise is expected to reduce available intertidal habitat, increasing ecological sensitivity and escalating risk.
- **Inadequate buffers for TECs and areas of wetland migration:** Coastal Wetlands mapped under the R&H SEPP occur around Bellambi Lagoon and Bellambi Gully, with limited landward accommodation space in some areas. While current impacts are unlikely, future sea level rise may restrict wetland migration where development and infrastructure constrain transition zones. As a result, risk increases over longer planning horizons, reflecting the potential for permanent habitat loss.



Figure 3.43 Woonona Beach - Vegetation vandalism resulting in loss of tree canopy along Kurraba Road



Water Quality and Pollution

- **Water quality for primary contact recreation:** Beachwatch water quality grades for the last 5 years for Bellambi Beach and Woonona Beach are provided in Table 3.19. indicates that Woonona Beach consistently achieves a “Very Good” annual water quality grade, while Bellambi Beach is graded as “Good”. Elevated contamination at Bellambi is primarily associated with rainfall events and influenced by inputs from Bellambi Creek, stormwater outlets, wastewater infrastructure and urban runoff sources. Water quality exceedances on these open coast beaches are typically short-term and dissipate within several days of rainfall. The risk is assessed as Low under present-day conditions, reflecting episodic but predictable storm-driven impacts, and remains relatively Low to Moderate across future planning given the potential for local population growth and catchment change.
- **Urban stormwater and sewer pollutants:** However, DCCEEW estuarine water quality monitoring indicates that Water Quality is poorer inside Bellambi Gully and Bellambi Lagoon (DCCEEW, 2026a). In the most recent monitoring round, both estuaries received an overall water quality grade of “D”. This is consistent with the highly urbanised nature of their catchments, where stormwater runoff can deliver sediments, nutrients, litter, bacteria, hydrocarbons and other contaminants to receiving waters. Water quality can also be compounded by the reduced flushing capacity typical of intermittently closed and open lagoons (ICOLLs), allowing pollutants to accumulate during closed or low-exchange periods. The present-day risk is assessed as Moderate and may increase over time with further urban intensification and climate-driven pressures unless catchment controls are improved.

Table 3.19 Open Coast and Estuarine Water Quality Grades

Year	Beachwatch WQ Grades		DCCEEW Estuary WQ Grades	
	Bellambi Beach	Woonona Beach	Bellambi Gully	Bellambi Lagoon
2025	Good	Very Good		
2024	Good	Very Good		
2023	Good	Very Good	D	D
2022	Good	Very Good		
2021	Good	Very Good		
2015	Good	Very Good	E	
2019	Good	Very Good		B

Public Recreation, Assets, and Safety

- **Loss of lifeguard sight lines:** At Bellambi Surf Life Saving Club, there is a patrol tower north of the Gully estuary entrance – however, dune elevation and vegetation growth can limit clear sight lines to the northern sections of the beach under certain conditions. This reduces the ability of patrol members to visually monitor swimmers across the full beach compartment. While occurrences are intermittent, the potential consequence is severe given the reliance on direct visual surveillance for swimmer safety, resulting in a Moderate present-day risk rating, increasing to High and Extreme over longer planning horizons due to projected population growth and increased recreational use of the beach. At Woonona Beach, historical dune reprofiling and the presence of a lifeguard patrol tower within the dune system have improved visibility (see Figure 3.44), and the issue is less pronounced.
- **Loss of safe beach/foreshore/waterway access:** Storm-related scarping periodically affects key beach access points at Woonona (particularly near the SLSC, patrol tower and at the southern end of Beach Drive) and at Bellambi Beach (where entrance instability of the Bellambi Gully can impact access to and use of the patrolled beach area). These events can temporarily reduce safe pedestrian access between the car park, dunes and active beach zone. Additionally, at Bellambi Boat Harbour, sedimentation at the



boat ramp following storm events can restrict launching and retrieval (see Figure 3.45), with additional safety challenges arising during elevated swell conditions. The risk is assessed as High under present-day conditions due to episodic access disruption, which is maintained over longer planning horizons reflecting ongoing shoreline instability and energetic swell events.

- **User group conflicts:** The Coastal Cycleway running behind the Woonona-Bellambi embayment supports pedestrians, cyclists, e-bikes and dog walkers within a relatively narrow shared corridor. Competing speeds and user expectations can lead to conflict, particularly during peak recreational periods. Given the high frequency of use and the potential for injury, the present-day risk is assessed as High. This risk remains elevated across future horizons as visitation continues and the shared pathway remains a key north–south recreational link.
- **Dogs on beaches conflicts:** Bellambi Point and Bellambi Harbour are both off leash dog areas, occasionally leading to minor conflicts between dog owners and other beach users. While generally well managed, increasing visitation may contribute to occasional conflicts between user groups. The present-day risk is assessed as Low, increasing slightly over time due increased recreational use of the beach.
- **Wave overtopping and public safety:** Wave overtopping of the Bellambi Boat Harbour breakwater occurs infrequently during energetic swell conditions, and public use is generally low at those times. The present-day risk is therefore assessed as Low. With projected sea level rise, overtopping is expected to occur more frequently and under less extreme conditions, resulting in gradual escalation over longer planning horizons.
- **Loss or rationalisation of rock pools:** Woonona and Bellambi ocean pools are well-used community assets that provide sheltered swimming opportunities. Under projected sea level rise, increased water levels and wave energy may reduce pool functionality or create unsafe overtopping conditions unless adaptive measures such as crest modification are implemented. The present-day risk is assessed as Low, reflecting limited current exposure. Over longer planning horizons, risk increases where structural adaptation or redesign is not undertaken.
- **Loss or rationalisation of SLSCs:** Coastal hazard analysis indicates that, without long-term protection or adaptation, some SLSC buildings within the reporting area may become increasingly exposed to erosion and shoreline retreat over extended planning horizons. While current exposure is low, the consequence of loss of surf life saving services would be significant for community safety and beach management. The present-day risk is therefore Low, escalating to High and Extreme in later horizons where building relocation, redesign or protection measures are not implemented.



Figure 3.44 Woonona Beach SLSC and patrol tower sightlines (image source: The Illawarra Flame)



Figure 3.45 Bellambi Boat Ramp sedimentation raised as an issue in local media (image source: The Illawarra Mercury)



Table 3.20 Social and Environmental Risk Summary - Woonona to Bellambi

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1A	Impact of invasive species – fauna	Almost Certain	Minor	High	High	Extreme	Extreme
1B	Impact of invasive species – flora	Almost Certain	Minor	High	High	Extreme	Extreme
1D	Habitat loss and impacts on native flora	Likely	Minor	Moderate	Moderate	High	Extreme
1E	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
1F	Informal pedestrian and vehicle access damage	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
1H	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
1I	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Moderate	Moderate
2C	Urban stormwater and sewer pollutants	Possible	Medium	High	High	Extreme	Extreme
	Public Recreation, Assets, and Safety						
3B	Loss of lifeguard sight lines	Rare	Catastrophic	Moderate	High	High	Extreme
3C	Loss of safe beach/foreshore/waterway access	Likely	Medium	High	High	High	High
3E	User group conflicts	Likely	Medium	High	High	High	High
3F	Dogs on beaches conflicts	Likely	Insignificant	Low	Low	Moderate	Moderate
3H	Wave overtopping and public safety	Rare	Major	Low	Low	Moderate	High
3I	Loss or rationalisation of rock pools	Rare	Major	Low	Low	Moderate	High
3J	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme



Legend

Coastal Ecosystem Management

Impact of invasive species - fauna

Impact of invasive species - flora

Habitat loss and impacts on native fauna

Habitat loss and impacts on native flora

Vegetation vandalism

Informal access damage

Wind blown sand impacting vegetation

Harvesting and walking on rock platforms

Inadequate vegetation buffers

Water quality and pollution

Recreational swimming quality

Secondary water quality

Urban stormwater and sewer pollutants

Buried anthropogenic waste

Public recreation and assets

Unpatrolled beaches

Loss of lifeguard sight lines

Loss of beach width & scarping

Loss of safe beach/foreshore/waterway access

User conflicts

Dogs on beach conflict

Wind blown sand impacting amenity

Wave overtopping and public safety

Loss or rationalisation of rock pools

Loss or rationalisation of SLSC facilities

Administrative Mapping

Reporting Area

RH SEPP Coastal Wetlands

RH SEPP Littoral Rainforest

NPWS Land Tenure



3.9 Area H - Corrimal to North Wollongong

3.9.1 Area Overview

Environmental Assets

The Corrimal to North Wollongong coastline comprises a continuous open-coast embayment extending from Sandspit Point in the north to Wollongong Harbour and Flagstaff Point in the south. The reporting area incorporates Corrimal Beach (see Figure 3.47), Towradgi Beach, Fairy Meadow Beach and North Wollongong Beach (see Figure 3.48), with rocky headlands at Towradgi Point and the entrance to Fairy Creek providing localised compartmentalisation of the shoreline. Beaches predominantly face southeast to east and are characterised by sandy shorelines backed by vegetated dune systems of varying width, elevation and condition.

Corrimal Beach is approximately 1.5 km long and is framed by Bellambi Lagoon to the north and Towradgi Creek to the south. While Bellambi Lagoon is addressed within the adjoining reporting area (see Section 3.8), Towradgi Creek forms an integral part of this reporting area. Towradgi Creek and Fairy Creek, together with their associated arms and floodplains, function as ICOLL systems and possess extensive areas mapped as Coastal Wetlands under the R&H SEPP (Salients, 2023) – including the TECs of Swamp Oak Floodplain Forest, Bangalay Sand Forest, and Illawarra Lowlands Grassy Woodland.

These waterways drain highly urbanised catchments, conveying stormwater and runoff from established residential, commercial and transport corridors before discharging to the coast. Despite this urban influence, the systems retain important ecological values, including estuarine habitat, wetland vegetation communities and hydrological connectivity between catchment and coast.

Dune systems are a defining feature across much of the reporting area. Corrimal Beach is backed by relatively wide, vegetated dunes, with substantial areas of revegetation undertaken from the mid-1980s onward. Towradgi and Fairy Meadow beaches are backed by continuous dune corridors that in turn front a historically drained back barrier swamp system. These dunes provide ecological habitat, a buffer to coastal processes and separation between the active beach and adjacent urban land uses. North Wollongong Beach transitions to a more modified coastal setting, where dunes are narrower and partially supported by buried or exposed protection works (Salients, 2026), including gabions and seawalls near Stuart Park and the Surf Life Saving Club. Intertidal rock platforms at Towradgi Point and near Wollongong Harbour further contribute to habitat diversity and local variation in coastal processes.

This area also includes Puckeys Estate Nature Reserve, an annex of Wollongong Botanic Garden located directly behind Fairy Meadow Beach. Puckeys Estate was designated as a BioBank site by the NSW Government and Council in 2011 to be managed to conserve biodiversity for perpetuity. Due to changes in legislation Puckeys Estate is currently managed through a Biodiversity Stewardship Agreement under the Biodiversity Conversation Trust. It is a rare and highly valued coastal habitat comprising 35 hectares of dunes and floodplain forest, supporting around 130 bird species and five threatened ecological communities (Midges Bushland Restoration Pty Ltd, 2025). Puckeys Estate is also an important heritage place and holds strong Aboriginal cultural heritage values.

Social and Recreational Values

The Corrimal to North Wollongong reporting area is one of the most intensively used sections of Wollongong's coastline. Established residential suburbs at Towradgi, Fairy Meadow and North Wollongong are located immediately landward of the dunes, with moderate projected population growth over coming decades. As a result, the beaches function as highly accessible daily recreation spaces for local residents as well as regional visitors.



Four Surf Life Saving Clubs at Corrimal, Towradgi, Fairy Meadow and North Wollongong form key community nodes, supporting patrolled swimming, training, events and volunteer engagement. Towradgi Ocean Pool, constructed at Towradgi Point, provides a sheltered swimming facility and is a well-recognised landmark within the reporting area. North Wollongong Beach, adjacent to Stuart Park and the North Beach Pavilion, supports a broad range of passive and active recreational uses and is a focal point for tourism and major events.

The Shared Pathway runs behind the dune system along much of the reporting area, forming a major north-south active recreation corridor. Part of this reporting area has the Blue Mile, which links beaches, parks, surf clubs and commercial areas, and plays an important role in connecting coastal open space with surrounding neighbourhoods (Wollongong City Council, 2026). Land use behind the dunes includes Corrimal Beach Tourist Park, sports fields, playgrounds, picnic areas and open parkland at Stuart Park, reflecting the strong recreational orientation of the foreshore.

Snapshot

Table 3.21 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3.

Table 3.21 Risk Context Snapshot - Corrimal to North Wollongong

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Corrimal Beach Towradgi Beach Fairy Meadow Beach Wollongong North Beach Puckeys Estate	Coastal dune systems at Corrimal Beach, Towradgi Beach, and Fairy Meadow Beach Intertidal rock reefs at Towradgi Point	
Waterways	Towradgi Creek Fairy Creek	ICOLL ecosystems (Towradgi Creek and Fairy Creek) R&H SEPP Coastal Wetlands at Towradgi Creek and Fairy Creek - including the TECs of Swamp Oak Floodplain Forest, Sydney Freshwater Wetlands, Coastal saltmarsh, Bangalay Sand Forest, and Illawarra Lowlands Grassy Woodland.	
Social / Community Nodes			
Surf Clubs	Corrimal SLSC, Towradgi SLSC, Fairy Meadow SLSC, North Wollongong SLSC		
Ocean Pools	Towradgi Ocean Pool		
Access Nodes	The Blue Mile, North Beach Pavillion, Coastal Cycleway		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Towradgi, Fairy Meadow, North Wollongong	13,600	14,460	+6.3%



Figure 3.47 Corrimall Beach (image source: VisitNSW)



Figure 3.48 North Wollongong Beach, including the Pavillion (left) and SLSC (right) (image source: VisitNSW)



3.9.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Impact of invasive species – fauna:** Pest fauna, including rabbits and rodents, are present within the dune systems at Stuart Park and along North Wollongong Beach. The Corrimal Beach dunes have also been reported to contain foxes, rabbits, deer, cats (Midges Bushland Restoration, 2023). Within Puckeys Estate, Stuart Park and Fairy Creek known vertebrate pest species include the foxes, feral cats, rabbits, deer and Myna birds (Midges 2025) Given the ongoing presence of burrowing and disturbance within these environments, the present-day risk is assessed as Moderate, with escalation over longer planning horizons as coastal buffers narrow.
- **Impact of invasive species – flora:** Invasive flora are widespread across the reporting area. At Corrimal Beach, woody weeds such as Bitou Bush, Golden Wreath Wattle, Lantana and Tuckeroo occur within the dune system, along with exotic grasses and groundcovers including Asparagus Fern, Panic Veldt Grass, Kikuyu and Turkey Rhubarb. Along the foreshores of Towradgi and Fairy Creeks, species such as Winter Cassia and other invasive groundcovers are present within riparian and wetland margins (Good Bush, 2022) – see Figure 3.49. A large number of invasive flora are found within Puckeys Estate, including Weeds of National Significance. Asparagus Fern and Panic Veldt Grass have been recorded as dominant weed species across most of the site, with Lantana, Bitou Bush, Cape Ivy and Coastal Morning Glory also prevalent on site (Midges 2025). Within parts of Fairy Creek there are highly disturbed areas adjacent to industrial complexes which are dominated by weeds and exotic species, with little to no obvious native species present. These areas are commonly dominated by weeds such as Castor Oil Plant, Lantana, Kikuyu and invasive vines such as Morning Glory, Black-eyed Susan and Madeira Vine (Midges 2025).
- **Vegetation vandalism:** Localised vegetation vandalism has been identified along Corrimal Beach in front of the Corrimal Beach car park, and along Towradgi Beach in front of Marine Parade (south of the ocean pool). These areas are characterised by high public access and visual exposure. The present-day risk is assessed as Moderate and remains elevated across future planning horizons without sustained management intervention.
- **Harvesting and walking on rock platforms:** The Towradgi Point rock shelf is subject to recreational fishing, collection and pedestrian use, resulting in disturbance to intertidal habitats. The present-day risk is assessed as Moderate due to periodic disturbance of sensitive marine communities. Over longer planning horizons, projected sea level rise is expected to reduce available intertidal habitat, increasing ecological sensitivity and escalating risk.
- **Inadequate buffers for TECs and areas of wetland migration:** At Fairy Creek, including the urbanised arms of Fairy and Cabbage Tree creeks, existing industrial and residential foreshore development constrains buffer widths adjacent to mapped Coastal Wetlands under the R&H SEPP and other TECs. While the present-day likelihood is low, limited accommodation space for landward migration under sea level rise contributes to increasing risk over longer planning horizons.



Figure 3.49 Exotics and invasive weed infestation along the Fairy Creek waterway (Good Bush, 2022)

Water Quality and Pollution

- **Water quality for primary contact recreation:** Table 3.22 presents Beachwatch water quality grades for Corrimal Beach and North Wollongong Beach. Beachwatch water quality grades for Corrimal Beach and North Wollongong Beach over the past 5 years are consistently rated “Good”. Both beaches demonstrate generally suitable conditions for swimming, with occasional rainfall-related exceedances. The present-day risk is assessed as Moderate, with elevated risk ratings in later planning horizons reflecting increasing pressure on coastal water quality systems.
- **Urban stormwater and sewer pollutants:** Fairy Creek and Towradgi Creek drain highly urbanised catchments, estimated at approximately 75 percent and 67 percent urbanised respectively (Roper, et al., 2011). Stormwater discharges influence nearshore water quality, particularly following rainfall events. While impacts at adjacent beaches are often short-lived, conditions within the creeks can be more persistent due to lower dilution and flushing. This is reflected in DCCEEW estuarine water quality monitoring (DCCEEW, 2026a), which shows Fairy Creek consistently graded “C” between 2021 and 2025, while Towradgi Creek has recorded grades between “C” and “D”. Additionally, both Towradgi and Fairy Creek were assessed as having “E” grades in the NSW Broadscale Microplastic Assessment (DCCEEW, 2026b) – further demonstrating the impact of urban stormwater runoff on these estuaries. The present-day risk is assessed as High, increasing over longer planning horizons in line with catchment pressure and projected environmental change.



Table 3.22 Open Coast and Estuarine Water Quality Grades - Corrimal and North Wollongong Beach

Year	Beachwatch WQ Grades		DCCEEW Estuary WQ Grades	
	Corrimal Beach	North Wollongong Beach	Fairy Creek	Towradgi Creek
2025	Good	Good	C	
2024	Good	Good	C	D
2023	Good	Good	C	
2022	Good	Good	C	
2021	Good	Good	C	
2012			C	C
2008			C	C

Public Recreation, Assets, and Safety

- **Lifeguard services and unpatrolled beaches:** The northern section of the reporting area, particularly north of the Fairy Creek entrance, has limited direct lifeguard visibility and coverage compared with areas immediately adjacent to established Surf Life Saving Clubs. This spatial distribution of patrol infrastructure contributes to elevated present-day risk in unpatrolled or less visible sections of beach.
- **Loss of lifeguard sight lines:** At Towradgi SLSC, Fairy Meadow SLSC and Corrimal SLSC, dune vegetation and the overall scale and width of the beach compartment can restrict clear sight lines under certain conditions. The present-day risk is assessed as Moderate, escalating over longer planning horizons where dune growth or shoreline adjustment further constrains visibility.
- **Loss of safe beach/foreshore/waterway access:** At North Wollongong Beach, storm events can temporarily affect safe access between the promenade, dunes and active beach zone. Entrance behaviour at Fairy Creek contributes to localised shoreline variability, and foreshore erosion within the creek entrance also affects internal access along the channel margins (see Figure 3.50). Towradgi Beach has also historically experienced scarping after storm events, which has impacted on safe beach access. The present-day risk is assessed as High, and is expected to remain relatively consistent across future scenarios.
- **Wind-blown sand drift impacting recreational amenity:** Wind-blown sand periodically accumulates on the shared cycleway and adjoining public areas at Towradgi, particularly during strong onshore winds. While impacts are generally minor and manageable through routine maintenance, sand build-up can reduce user amenity, create minor safety hazards for cyclists, and increase maintenance demands. Over time, the maturation of dune vegetation and continued stabilisation of foredune areas may help reduce the frequency and extent of sand movement. The present-day risk is assessed as Moderate, and is expected to remain at this level across future planning horizons with effective vegetation management.
- **Wave overtopping and public safety:** Wave overtopping occurs intermittently along the northern portion of the Blue Mile and across areas adjacent to the North Beach Pavilion during energetic wave conditions. While infrequent under present conditions, the risk increases over longer planning horizons with projected sea level rise and increased exposure.
- **Loss or rationalisation of rock pools:** Towradgi Ocean Pool remains an important community asset. The pool is subject to periodic sand accumulation from wave overtopping, which requires occasional sand clearance works to maintain pool functionality. Under projected sea level rise and increased overtopping

frequency, the functionality and safety of the pool may be progressively affected. The present-day risk is Low, escalating over time where structural adaptation is not undertaken.

- **Loss or rationalisation of SLSCs:** The Fairy Meadow and Corrimal SLSCs, which are not currently protected by dedicated coastal protection works, may become increasingly exposed to coastal hazards over longer planning horizons. Furthermore, the North Wollongong SLSC is protected by a recently upgraded seawall structure – comprising a stepped concrete structure with stairs linking the promenade to the beach. While present-day exposure of these assets is limited based on coastal hazard mapping (Salients, 2026), the consequence of loss or relocation of services is significant, resulting in escalating risk ratings in later horizons.



Figure 3.50 Bank erosion across the entrance of the Fairy Creek waterway

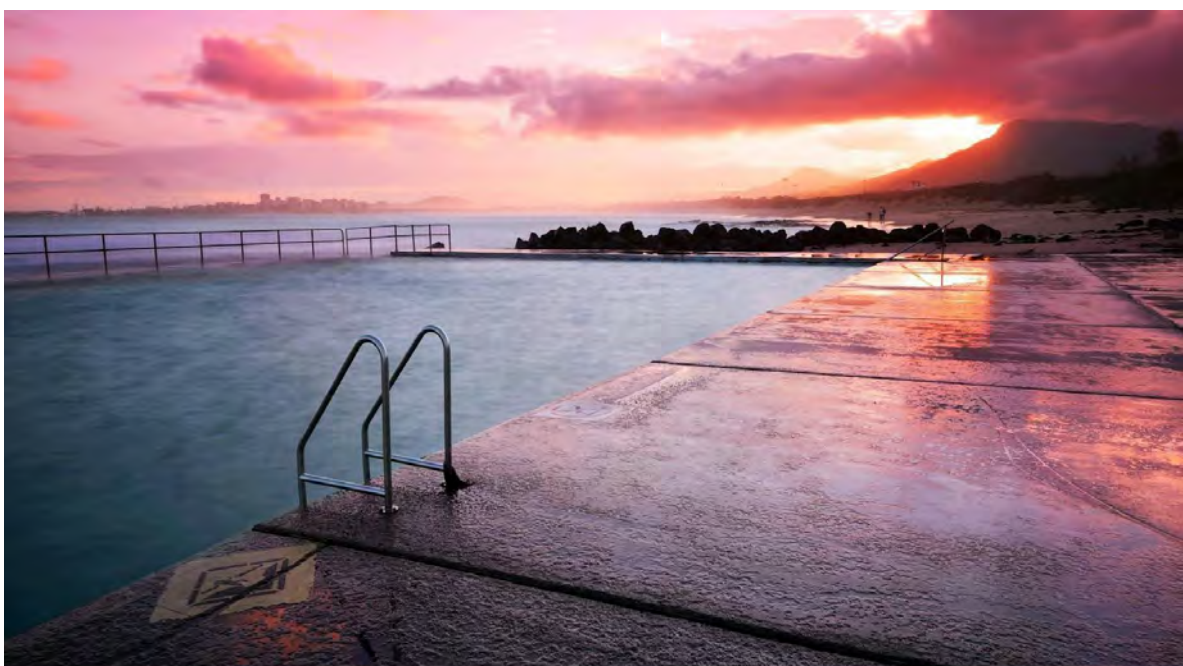


Figure 3.51 The Towradgi Ocean Pool (image source: VisitNSW)



Table 3.23 Social and Environmental Risk Summary - Corrimal to North Wollongong

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1A	Impact of invasive species – fauna	Likely	Minor	Moderate	High	High	Extreme
1B	Impact of invasive species – flora	Likely	Medium	High	High	High	High
1E	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
1H	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
1I	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Possible	Medium	Moderate	High	High	High
2C	Urban stormwater and sewer pollutants	Likely	Medium	High	High	Extreme	Extreme
	Public Recreation, Assets, and Safety						
3A	Lifeguard services and unpatrolled beaches	Possible	Catastrophic	High	High	Extreme	Extreme
3B	Loss of lifeguard sight lines	Rare	Catastrophic	Moderate	High	High	Extreme
3C	Loss of safe beach/foreshore/waterway access	Likely	Medium	High	High	High	High
3G	Wind-blown sand drift impacting recreational amenity	Likely	Minor	Moderate	Moderate	Moderate	Moderate
3H	Wave overtopping and public safety	Possible	Major	High	High	High	High
3I	Loss or rationalisation of rock pools	Rare	Major	Low	Low	Moderate	High
3J	Loss or rationalisation of SLSCs	Rare	Major	Low	Low	Moderate	Moderate



Legend

Coastal Ecosystem Management

- Impact of invasive species - fauna
- Impact of invasive species - flora
- Habitat loss and impacts on native fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Informal access damage
- Wind blown sand impacting vegetation
- Harvesting and walking on rock platforms
- Inadequate vegetation buffers

Water quality and pollution

- Recreational swimming quality
- Secondary water quality
- Urban stormwater and sewer pollutants
- Buried anthropogenic waste

Public recreation and assets

- Unpatrolled beaches
- Loss of lifeguard sight lines
- Loss of beach width & scarping
- Loss of safe beach/foreshore/waterway access
- User conflicts
- Dogs on beach conflict
- Wind blown sand impacting amenity
- Wave overtopping and public safety
- Loss or rationalisation of rock pools
- Loss or rationalisation of SLSC facilities

Administrative Mapping

- Reporting Area
- RH SEPP Coastal Wetlands
- RH SEPP Littoral Rainforest
- NPWS Land Tenure



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Figure 3-52
Corimal to North Wollongong - Risk
Summary





3.10 Area I - Wollongong City

3.10.1 Area Overview

Environmental Assets

The Wollongong City reporting area extends from North Wollongong Beach south along the Blue Mile to Belmore Basin (Wollongong Harbour), around Flagstaff Point, and continues along Wollongong City Beach to its southern extent at Port Kembla. This section of coastline represents one of the most urbanised and modified coastal environments within the LGA.

Between North Wollongong Beach and the harbour, the shoreline is predominantly rocky, comprising an intertidal rock platform backed by engineered seawalls and the elevated Blue Mile promenade. A coastal bluff rises landward of the pathway, carrying Cliff Road along its crest. Flagstaff Point forms a prominent rocky headland separating the harbour from Wollongong City Beach and provides significant geological and landscape character – see Figure 3.53.

Wollongong Harbour, also known as Belmore Basin, is enclosed by northern and northeastern breakwaters and contains a small, embayed beach, Belmore Beach (Cove Beach), along its southwestern margin. The beach is backed by a seawall and landscaped open space. A major stormwater outlet discharges to the centre of Belmore Beach, draining low-lying urban areas west of Cliff Road.

South of Flagstaff Point, Wollongong City Beach extends for approximately 2.8 km (see Figure 3.55). The beach is characterised by a sandy shoreline backed by vegetated dunes that are generally wider and higher at the northern end near Lang Park and the SLSC, and narrower and lower toward the south. Dune vegetation was established from the mid-1980s onward and has been subject to ongoing management. Unlike other divisions, there are no significant creek entrances along Wollongong City Beach, and ecological assets are limited relative to lagoon or wetland-dominated reporting areas. Much of the shoreline in the harbour and headland areas is rocky or supported by extensive coastal protection works.

Located in the hind-dune system of City Beach is the South Wollongong / Gurungaty waterway – a series of interconnected lagoons that drain into the broader Port Kembla / Tom Thumb Lagoon waterway. The waterways possess significant environmental values, including mangrove and saltmarsh communities.

Social and Recreational Values

The Wollongong City reporting area represents the civic and recreational focal point of the LGA coastline. The Blue Mile functions as a major north–south pedestrian and cycle corridor, linking beaches, parks, the harbour and the CBD – see Figure 3.54. Brighton Lawn Reserve, Lang Park and adjoining open spaces provide landscaped foreshore areas, playgrounds and event spaces directly adjacent to the shoreline.

Wollongong Harbour supports boating, commercial fishing, tourism and hospitality activities (Wollongong City Council, 2026). Wharves, slipways and breakwaters are managed primarily by Transport for NSW (Salients, 2026), while adjacent public domain areas are managed by Council. Restaurants, cafés and maritime premises contribute to the active waterfront character of Belmore Basin. The harbour area is also used for public recreation and community events such as the Wollongong Aquathon.

A number of historic ocean pools are located along the rock platforms in this reporting area. The Continental Ocean Pool sits immediately north of the harbour breakwater and is protected by a raised seawall. The Gentlemen's Pool, cut directly into the rock platform, is one of the earliest constructed pools in the region. Around Flagstaff Hill, the Nuns Baths and Wollongong Head Lighthouse Rockpool represent some of the oldest ocean bathing facilities in Australia, contributing to the heritage and identity of the area.

Wollongong City Beach is a high-use urban beach, supported by the Wollongong City Beach SLSC and lifeguard services. Key assets located immediately landward include Lang Park, WIN Stadium, Wollongong



Golf Course and the Wollongong wastewater treatment and recycling plant. The close proximity of major civic, sporting and commercial infrastructure to the shoreline reinforces the strong interface between coastal processes and critical community assets.

Overall, the Wollongong City reporting area combines engineered shoreline structures, historic maritime and bathing infrastructure, high-profile recreational spaces and major civic assets, making it one of the most socially significant and intensively managed sections of the Wollongong coastline.

Snapshot

Table 3.24 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Wollongong City reporting area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3.

Table 3.24 Risk Context Snapshot - Wollongong City

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	Belmore Beach City Beach Coniston Beach	Coastal dune systems at City Beach Intertidal rock reefs at Flagstaff Point	
Waterways	Wollongong Harbour Basin Gurungaty waterway	R&H SEPP Coastal Wetlands at Gurungaty waterway - including the TECs of Sydney Freshwater Wetlands.	
Social / Community Nodes			
Surf Clubs	Wollongong City SLSC		
Ocean Pools	Continental Ocean Pool, Gentlemen’s Pool, Nuns Baths		
Access Nodes	The Blue Mile Pathway, Wollongong Harbour Breakwaters, Boat Ramp and Public Jetty, Flagstaff Hill, WIN Stadium		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Wollongong City	18,470	28,321	+53.3%



Figure 3.53 City Beach (Left), Flagstaff Point (centre), and Wollongong Harbour (right) (image source: WCC)



Figure 3.54 The Blue Mile walkway looking south towards Wollongong Harbour (image source: WCC)



Figure 3.55 City Beach (image source: WCC)

3.10.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Impact of invasive species – fauna:** Foxes are present within the Wollongong City reporting area and are known to predate shorebirds and waders, particularly around rock platforms and headlands at Flagstaff Point and adjacent coastal areas. Given the ecological sensitivity of these habitats and ongoing predator pressure, the present-day risk is assessed as High and remains elevated across future planning horizons.
- **Impact of invasive species – flora:** Bitou Bush and other invasive species have been historically recorded along the southern portion of Wollongong City Beach, particularly in front of WIN Stadium and along the golf course frontage. This has been managed through periodic weed removal and re-planting of native species (see Figure 3.56). The present-day risk is assessed as Moderate, increasing over future planning horizons due to the constrained nature of the dune system in this area.
- **Vegetation Vandalism:** Localised vegetation vandalism has been observed south of the Surf Life Saving Club along Marine Drive. These areas are characterised by high access and visibility. The present-day risk is assessed as Moderate and remains at this level without ongoing management intervention.
- **Wind-blown sand drift and impacts on dune vegetation:** Localised dune blowouts are present at the northern end of the beach near the SLSC (see Figure 3.57), and along sections of the golf course frontage further south. These areas are subject to ongoing wind transport and vegetation disturbance. The present-day risk is assessed as Moderate, with escalation over longer planning horizons where dune buffers narrow.
- **Harvesting and walking on rock platforms:** The Flagstaff Point rock shelf is subject to recreational fishing, collection and pedestrian use, resulting in disturbance to intertidal habitats. The present-day risk is assessed as Moderate, increasing over longer planning horizons as ecological sensitivity increases.



Figure 3.56 Weed removal and replanting of native dune vegetation in front of WIN Stadium (image source: Salients, 2026)



Figure 3.57 Wind-blown sand drift impacting dune vegetation at the northern end of City Beach (image source: Salients, 2026)

Water Quality and Pollution

- **Water quality for primary contact recreation:** Wollongong City Beach and Coniston Beach have consistently achieved a “Very Good” Beachwatch rating over the past five years (Table 3.25). In contrast, Belmore Beach within the harbour, which is used for swimming events, is subject to periodic water quality issues, particularly following rainfall events (Wollongong City Council, 2026). Council has advised that the harbour is not suitable for swimming following rainfall events (Wollongong City Council, 2026). The present-day risk is assessed as High in recognition of the concentrated urban setting and harbour influences, remaining elevated across future planning horizons.
- **Water quality for secondary contact recreation:** Wollongong Harbour supports a range of secondary contact recreational uses, including dragon boating, paddling, rowing and general on-water recreation, and is an important community recreation hub. These activities typically involve a lower likelihood of full-body immersion than swimming, but users may still be exposed to reduced water quality, particularly following rainfall events when stormwater inflows can affect harbour conditions. Given the popularity and



regular use of the harbour, the present-day risk is assessed as High, remaining elevated across future planning horizons as visitation, urban intensity and catchment pressures increase.

- **Urban stormwater and sewer pollutants:** A major stormwater outlet discharges to Belmore Beach within Wollongong Harbour, draining low-lying urban areas west of Cliff Road. While the harbour area is known to experience temporary water quality impacts following rainfall, no dedicated water quality dataset is currently available to confirm the extent or frequency of those impacts. The present-day risk is assessed as High, escalating in later planning horizons in line with projected population growth and catchment pressure.
- **Buried anthropogenic waste:** Buried anthropogenic waste has been identified within the dunes in front of the Surf Life Saving Club at Wollongong City Beach. These materials can become exposed following significant storm erosion events. While current exposure is managed under the Wollongong City Beach Asbestos Management Plan, the likelihood of disturbance increases over longer planning horizons with projected sea level rise and shoreline recession. The present-day risk is assessed as Low, escalating over time. Furthermore, Greenhouse Park was used as a waste depot and builders' tip from the 1940s to the 1980s. Since the 1990s, Council and a team of dedicated volunteers have worked to turn this site into a community green space. Sections of the park though still have a high risk of contaminants and remediation measures need to be ongoing to capture contaminants and reduce the risk of entry into the waterway. The risk is considered High and remains so in future planning horizons.

Table 3.25 Beachwatch Water Quality Grades - City Beach

Annual WQ Grades	City Beach	Coniston Beach
2025	Very Good	Very Good
2024	Very Good	Very Good
2023	Very Good	Good
2022	Very Good	Very Good
2021	Very Good	Very Good

Public Recreation, Assets, and Safety

- **Lifeguard services and unpatrolled beaches:** Wollongong City Beach is patrolled from the northern end; however, the large spatial extent of the beach results in comparatively longer response times to the southern sections. The present-day risk is assessed as High, with escalation over longer planning horizons as visitation and population increase.
- **Loss of lifeguard sight lines:** Sight lines at Wollongong City Beach are generally adequate due to the presence of a tower within the dune system. However, increasing visitation and beach use contribute to escalating risk over time. The present-day risk is assessed as High, increasing across future planning horizons.
- **Loss of safe beach/foreshore/waterway access:** Following storm events, temporary access constraints can occur near the northern headland and along the southern section of the beach adjacent to the golf course. These impacts are typically short-term but recur periodically. Within Wollongong Harbour, there have also been historical issues with harbour surging and seiching, which can create unpredictable water level fluctuations and hazardous conditions for small craft, swimmers and users of wharves and boat ramps (Jayewardene & Williams, 2022). While these impacts are typically episodic, they pose safety risks during energetic conditions. The present-day risk is assessed as Moderate, with escalation over longer planning horizons as coastal water levels and storm intensity increase.



- **Dogs on beaches conflicts:** An off-leash dog area is located toward the southern end of Wollongong City Beach, managed under Council's Dogs on Beaches and Parks Policy. While generally functioning effectively, occasional user group conflicts occur. The present-day risk is assessed as Low, with gradual escalation under increasing population and beach use.
- **Wave overtopping and public safety:** Wave overtopping of the Wollongong Harbour breakwaters occurs during energetic swell conditions, particularly when elevated water levels coincide with long-period southeast swell. The northern and southern breakwaters are highly accessible and heavily used by the community for fishing, sightseeing and informal recreation (see Figure 3.58). Despite signage and periodic closures, members of the public frequently access these structures during hazardous conditions. Recent fatal incidents, including events in 2022 and 2025, demonstrate the severity of the consequence where individuals are swept from the structure by overtopping waves (Illawarra Flame, 2025). Overtopping, wave runoff and spray can also extend into areas beside the harbour, creating safety risks for vehicles and pedestrians within adjacent car parking areas. Overtopping also affects the historic rock platform pools at Flagstaff Point, where users may be exposed to sudden wave surges.
- **Loss or rationalisation of rock pools:** Several ocean pools in this reporting area, including the Gentlemen's Pool and other rock platform pools at Flagstaff Point, occupy low-elevation platforms – for instance the Gentlemen's Pool is hewn directly into the rock platform with typical elevations between 0.1-0.3 m AHD. With projected sea level rise, these assets may experience increased overtopping and reduced functionality. The present-day risk is assessed as Moderate, escalating in later planning horizons.



Figure 3.58 The Harbour breakwaters are popular recreational access spot, but are also subject to periodically dangerous wave overtopping (image sources: The Illawarra Flame)



Table 3.26 Social and Environmental Risk Summary - Wollongong City

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1A	Impact of invasive species – fauna	Likely	Medium	High	High	High	High
1B	Impact of invasive species – flora	Likely	Minor	Moderate	Moderate	High	High
1E	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
1G	Wind-blown sand drift and impacts on dune vegetation	Almost Certain	Insignificant	Moderate	Moderate	High	High
1H	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Possible	Major	High	High	High	High
2B	Water quality for secondary contact recreation	Possible	Major	High	High	High	High
2C	Urban stormwater and sewer pollutants	Likely	Medium	High	High	Extreme	Extreme
2D	Buried anthropogenic waste	Possible	Major	High	High	High	Extreme
	Public Recreation, Assets, and Safety						
3A	Lifeguard services and unpatrolled beaches	Possible	Catastrophic	High	Extreme	Extreme	Extreme
3B	Loss of lifeguard sight lines	Possible	Catastrophic	High	High	Extreme	Extreme
3C	Loss of safe beach/foreshore/waterway access	Possible	Medium	Moderate	Moderate	Moderate	High
3F	Dogs on beaches conflicts	Unlikely	Minor	Low	Low	Moderate	Moderate
3H	Wave overtopping and public safety	Likely	Major	Extreme	Extreme	Extreme	Extreme
3I	Loss or rationalisation of rock pools	Unlikely	Major	Moderate	Moderate	High	High



Legend

Coastal Ecosystem Management

- Impact of invasive species - fauna
- Impact of invasive species - flora
- Habitat loss and impacts on native fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Informal access damage
- Wind blown sand impacting vegetation
- Harvesting and walking on rock platforms
- Inadequate vegetation buffers

Water quality and pollution

- Recreational swimming quality
- Secondary water quality
- Urban stormwater and sewer pollutants
- Buried anthropogenic waste

Public recreation and assets

- Unpatrolled beaches
- Loss of lifeguard sight lines
- Loss of beach width & scarping
- Loss of safe beach/foreshore/waterway access
- User conflicts
- Dogs on beach conflict
- Wind blown sand impacting amenity
- Wave overtopping and public safety
- Loss or rationalisation of rock pools
- Loss or rationalisation of SLSC facilities

Administrative Mapping

- Reporting Area
- RH SEPP Coastal Wetlands
- RH SEPP Littoral Rainforest
- NPWS Land Tenure



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Figure 3-59
Wollongong City - Risk Summary





3.11 Area J – MM Beach to Windang

3.11.1 Area Overview

Environmental Assets

The Hill 60 to Windang reporting area extends from the southern boundary of Port Kembla to the northern breakwater at the entrance to Lake Illawarra (noting that land within Port Kembla and Lake Illawarra are not included within the CMP study area). This area encompasses several distinct coastal settings including MM Beach, Fishermans Beach, the Hill 60 headland, and the long Port Kembla – Windang embayment.

At the northern extent lies MM Beach (also known as North Beach), a 1 km pocket beach immediately south of Port Kembla. The beach is bounded by rocky outcrops and backed by narrow vegetated foredunes that vary in width between 10-25 m and provide a buffer for Gloucester Road and landward industrial land uses. Intertidal rock platforms occur at both the northern and southern ends of the beach, supporting marine habitat and providing natural coastal protection. Boilers Point forms the southern boundary of MM Beach and marks the transition to the next coastal compartment.

South of Boilers Point lies Fishermans Beach, a smaller embayed, north-east facing beach located at the base of the Hill 60 headland. Hill 60 forms a prominent elevated landform overlooking the coastline and represents one of the key natural landscape features within this reporting area. Rocky shoreline areas occur along the headland and adjacent points, providing intertidal habitat and contributing to the geomorphic stability of the embayment. Red Point, at the southern end of Fishermans Beach, supports major infrastructure including the Port Kembla Wastewater Treatment Plant, while residential properties along Dovers Drive occupy the elevated cliffs above the headland.

South of Red Point the coastline transitions into the extensive Port Kembla – Windang embayment, which extends approximately 6.5 km to the entrance of Lake Illawarra. The northern section of this embayment includes Port Kembla Beach and Perkins Beach, while Windang Beach occupies the southern section of the embayment. Much of the coastline within this embayment is backed by an extensive progressive barrier dune system, which provide an important significant habitat value and a 200-300 m wide natural buffer between the shoreline and adjacent land uses. Littoral rainforest communities are present in the dune system of Perkins Beach.

Dune systems within this area are highest toward the northern end near Port Kembla and become wider but lower further south. Dune vegetation was established during the mid-1980s and has progressively expanded seaward over time (Cardno Lawson Treloar, 2010; GHD, 2014). These dunes provide ecological habitat, as well as protection to foreshore infrastructure and open space areas located landward of the beach.

At the southern end of the reporting area, Windang Beach terminates at the northern breakwater of the Lake Illawarra entrance (see Figure 3.61), where twin breakwalls were constructed in the 2000s to stabilise the channel (BMT WBM, 2020). The shoreline in this area is backed by coastal reserve land and tourism accommodation, including the Windang Beach Tourist Park, while the suburb of Windang is located approximately 250 m landward. The extensive dune system here also contains the TEC of Bangalay Sand Forest.

This area also contains Coomaditchie Lagoon, a small coastal freshwater lagoon located landward of the northern section of Port Kembla Beach (see Figure 3.62). The lagoon and surrounding reserve support important ecological values and provide habitat for native fauna, including the endangered Green and Golden Bell Frog (Wollongong City Council, 2026). The lagoon is also the focus of several conservation and restoration initiatives aimed at improving ecological condition and protecting biodiversity. Wollongong City Council is undertaking the Coomaditchie Lagoon Improvement Program, which has included working with Illawarra Local Aboriginal Land Council (ILALC) rangers and the local community to strengthen native vegetation, installing



solar-powered aeration pumps to improve water movement and increase dissolved oxygen levels, and undertaking regular water quality monitoring to manage blue-green algae risks (Wollongong City Council, 2026).

The reporting area also has a strong offshore environmental component associated with the Five Islands, a cluster of small offshore islands and surrounding subtidal reef habitat located east of Port Kembla. The Islands are located within the bounds of the Five Islands Nature Reserve (FINR), which is managed by NPWS. The reserve includes Flinders Islet, Bass Islet, Martin Islet, Big Island and Rocky Islet, and is recognised for its geological and geomorphological significance as well as its important marine and coastal habitat values. The islands provide habitat and breeding areas for a range of seabirds, including the vulnerable sooty oystercatcher, wedge-tailed and short-tailed shearwaters, and also support species such as the White-bellied Sea-eagle, Australian fur seals, sea lions and little penguins, and remains important from a broader conservation and marine biodiversity perspective (NSW National Parks and Wildlife Service, 2005).

Social and Recreational Values

The Hill 60 to Windang reporting area supports a variety of coastal recreation activities including swimming, surfing, fishing and walking. While less urbanised than the Wollongong City reporting area to the north, this section of coastline remains an important recreational area for local communities and visitors, with several beaches, coastal reserves and surf lifesaving facilities located along the shoreline.

MM Beach and Fishermans Beach provide relatively sheltered beach environments compared with the more exposed beaches further south. These beaches are commonly used for walking, fishing and informal recreation, and are valued for their quieter setting adjacent to Hill 60. The surrounding rock platforms and headlands also support recreational fishing and coastal viewing.

The Hill 60 headland is a prominent landscape feature overlooking Fishermans Beach and the Port Kembla – Windang embayment. The area holds cultural and heritage significance and provides elevated viewpoints across the coastline. Surrounding reserves and pathways support walking and passive recreation.

Further south, Port Kembla Beach (see Figure 3.60) is a major recreational beach within the reporting area and supports surfing, swimming and surf lifesaving activities. The beach is serviced by the Port Kembla SLSC, while Port Kembla Ocean Pool, located on the rock platform at the northern end of the beach, provides a sheltered swimming facility popular with local residents.

Behind the northern section of the beach lies Coomaditchie Lagoon Reserve, which provides open space, walking opportunities and environmental values adjacent to the coastline. The lagoon holds deep significance for the local Aboriginal community and plays an important role in cultural preservation, environmental stewardship and community connection (Wollongong City Council, 2026; Salients, 2023).

At the southern end of the reporting area, Windang Beach supports surfing, swimming, fishing and beach recreation and is serviced by the Windang SLSC. Nearby foreshore reserves and the Windang Beach Tourist Park contribute to the recreational character of the area and support seasonal visitation.

Public access to FINR has been restricted to protect breeding seabirds and their habitats and is generally granted only for management and research activities (NSW National Parks and Wildlife Service, 2005). Nonetheless, the waters around the islands are used by kayakers, scuba divers, recreational fishers and spearfishers (NSW Marine Estate Management Authority, 2018).

Snapshot

Table 3.27 provides a concise summary of the key environmental systems, community nodes and population context that shape social and environmental risk within the Hill 60 to Windang area. It highlights the principal physical features, sensitive ecological areas and high-use community assets that inform the spatial distribution of risk and support the development of targeted management responses in Stage 3.



Table 3.27 Risk Context Snapshot – MM Beach to Windang

Environmental Features			
Category	Key Elements	Significant Environmental Features	
Foreshore Features	MM Beach, Fisherman Beach, Port Kembla Beach, Perkins Beach, Windang Beach, The Five Islands.	Five Island Nature Reserve TEC (Bangalay Sand Forest) at Windang Beach R&H SEPP Littoral Rainforest in Perkins Beach dune system Intertidal rock reefs at the Hill 60 rock platform	
Waterways	Coomaditchie Lagoon	R&H SEPP Coastal Wetlands at Coomaditchie Lagoon	
Social / Community Nodes			
Surf Clubs	Port Kembla SLSC, Windang SLSC		
Ocean Pools	Fishermans Beach Ocean Pool, Port Kembla Ocean Pool		
Access Nodes	Hill 60 Lookout, Coomaditchie Lagoon Reserve		
Population Centre(s)	2026 Population	2046 Population	Projected Change (%)
Port Kembla - Spring Hill, Windang - Primbee	9,380	9,600	+2.4%



Figure 3.60 Port Kembla Beach (image source: Healy, 2022)



Figure 3.61 Windang Beach (image source: Visit NSW)



Figure 3.62 Coomaditchie Lagoon (image source: WCC)



Figure 3.63 The Five Islands (image source: Healy, 2022)

3.11.2 Risk Assessment Summary

Coastal Ecosystem Management

- **Impact of invasive species – fauna:** Several invasive fauna species are present within the Hill 60 to Windang reporting area and pose risks to native wildlife and ecological communities. Foxes have been observed on the Hill 60 headland and surrounding coastal areas, where they are known to prey on native birds and other fauna. Within Coomaditchie Lagoon, introduced fish species including carp and mosquito fish are present and may threaten aquatic ecosystems, including habitat used by the endangered Green and Golden Bell Frog. Feral cats and fox are also present around the lagoon (ILALC 2025). Deer have also been observed within the Five Islands Nature Reserve, likely having swum across from the mainland, posing a risk to sensitive island vegetation and nesting habitats. In addition, avian influenza (H5N1) has been identified as an emerging threat to seabird populations across the region; in particular for the Five Islands Reserve which is recognised as important breeding grounds for seabirds. The present-day risk is assessed as Extreme, reflecting the ecological significance of the area and the high likelihood of continued pressure from invasive fauna.
- **Impact of invasive species – flora:** Invasive plant species are widespread across the coastal dunes between Port Kembla and Windang, with bitou bush representing a major management issue (BMT WBM, 2017). A number of weed species are present around Coomaditchie Lagoon, including a Weeds of National Significance, woody weeds, invasive vines and willow trees (ILALC, 2025). Within the Five Islands Nature Reserve, weeds continue to spread from the mainland via wind, birds, water and human visitation. One of the dominant introduced species is kikuyu grass, which has significantly altered habitat conditions on Big Island, reducing suitable nesting areas for burrow-nesting seabirds (NSW National Parks and Wildlife Service, 2005). Although access restrictions are signposted on the islands and at the Port Kembla boat ramp, unauthorised access to Big Island continues to occur and contributes to weed spread and disturbance. A Commonwealth-funded habitat restoration project is currently underway to control invasive vegetation and restore seabird habitat, however funding is short-term and long-term management remains uncertain. The present-day risk is assessed as Extreme, remaining elevated across future planning horizons without sustained management.
- **Habitat loss and impacts on native fauna:** The offshore islands and surrounding marine habitats support important breeding and roosting areas for seabirds and other marine fauna. Public access to the Five Islands Nature Reserve is restricted to protect these habitats; however, unauthorised access to Big Island continues to occur and poses a threat to conservation values. Recreational fishing activity and commercial fishing operations in surrounding waters, including ocean trap and line, haul and trawl fisheries, may also influence local marine ecosystems and fish populations. Coomaditchie Lagoon has



limited wetland vegetation on the northern side of the lagoon resulting in less habitat for the waterbirds that highly utilise this freshwater lagoon and for other native fauna including the endangered Green and Golden Bell Frog. Given the ecological and cultural importance of this lagoon the risk is assessed as High, remaining elevated across future planning horizons without management intervention.

- **Habitat loss and impacts on native flora:** Five Islands Nature Reserve contains sensitive coastal vegetation communities that are exposed to erosion, storm wave attack, salt burn and the longer-term effects of sea-level rise. These pressures may reduce vegetation extent, disturb natural regeneration processes and increase the risk of weed invasion following disturbance. Loss or degradation of native flora would diminish the ecological values of the reserve and may also affect habitat available for dependent fauna species. Degradation and loss of habitat pose significant challenges for Coomaditchie Lagoon's wildlife. Urbanisation, land use changes and alteration of water flow patterns have led to habitat loss, fragmentation and degradation impacting the habitat of the resident and migratory bird species and other fauna that utilise this lagoon (ILALC, 2025).
- **Vegetation Vandalism:** Localised vegetation vandalism has been observed within parts of the reporting area, particularly at MM Beach, near the Hill 60 hang-gliding launch area and Coomaditchie Lagoon. These impacts are generally isolated and occur where access tracks intersect with vegetated dunes or coastal reserves. At Coomaditchie Lagoon impacts also include arson and illegal dumping resulting in damage of the vegetation community. The present-day risk is assessed as Moderate, remaining relatively stable across future planning horizons with continued management and monitoring.
- **Informal pedestrian and vehicle access damage:** Informal access tracks and illegal vehicle use are causing damage to dune vegetation and coastal habitats in some areas, particularly at Perkins Beach, where unauthorised four-wheel-drive access has been observed (see Figure 3.64). These activities can destabilise dunes, damage vegetation and contribute to erosion pathways. Unauthorised access with 4WD vehicles and trail bikes is also causing damage at Coomaditchie Lagoon, impacting the important wetland environment (ILALC, 2025). The present-day risk is assessed as High, reflecting the high likelihood of ongoing disturbance where access controls are limited.
- **Wind-blown sand drift and impacts on dune vegetation:** Port Kembla Beach has always been subject to substantial sand drift, primarily because of windblown transport, particularly when winds approach from the south and are funnelled landwards of Hill 60 (Salients, 2026). This has resulted in smothering of dune vegetation, as well as impacts to recreational amenity – discussed later in this chapter.
- **Harvesting and walking on rock platforms:** Rock platforms at Hill 60 are used for recreational fishing, shellfish collection and pedestrian access. These activities can result in disturbance to intertidal habitats and associated marine communities, particularly where harvesting pressure is concentrated. The present-day risk is assessed as Moderate, with escalation over longer planning horizons where recreational use and visitor numbers increase.



Figure 3.64 Four wheel drive impacts observed at Perkins Beach between 2019 and 2025 (image source: MetroMap)

Water Quality and Pollution

- **Water quality for primary contact recreation:** Fishermans Beach consistently achieved a “Very Good” Beachwatch rating over from 2021-2025 (see Table 3.28), while Port Kembla Beach has consistent received score of “Good”. At Port Kembla Beach, water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater (water quality is impacted by flows from an stormwater discharge outlet located adjacent to the ocean pool) (DCCEEW, 2024).
- **Water quality for secondary contact recreation:** Coomaditchie Lagoon is a popular location for secondary contact recreation, including paddling, informal water access and passive use. A current water quality monitoring program by Council shows high nutrient levels, persistent high blue-green algal levels and periodically high enterococci levels making the water unsuitable for secondary contact recreation. The present-day risk is assessed as High.
- **Urban stormwater and sewer pollutants:** While routine water quality monitoring is not undertaken at MM Beach, several stormwater outlets discharge across the beach from surrounding industrial catchments associated with Port Kembla. These discharges may convey sediments, nutrients and other urban pollutants to the nearshore environment, particularly during rainfall events. Coomaditchie Lagoon is a



perched freshwater lagoon that is groundwater fed and hence not flushed. It has several stormwater pipes flushing into it. The lagoon has a number of water quality issues including high nutrient and chlorophyll a levels. Recently, the Lagoon has been subject to blue-green algal blooms making it unsuitable for primary and secondary recreational contact. Given the pressures on the system the risk is Extreme, and remaining so if management interventions are not implemented on an ongoing basis.

- **Buried anthropogenic waste:** A former landfill site is located at Hill 60, with potential for leachate to migrate through groundwater pathways to surrounding soils or coastal waters. While the extent and impact of any discharge is uncertain, landfill leachate can contain contaminants that may affect nearby ecosystems. Historical nightsoil deposits are also present at Perkins dunes and the risk is considered High across all timeframes. Leachate from contaminated soils and industry also occurs at a location westward of MM beach and the risk is considered High across all timeframes.

Table 3.28 Beachwatch Water Quality Grades - Fishermans and Port Kembla Beach

Annual WQ Grades	Fishermans Beach	Port Kembla Beach
2025	Very Good	Good
2024	Very Good	Good
2023	Very Good	Good
2022	Very Good	Good
2021	Very Good	Good

Public Recreation, Assets, and Safety

- **Lifeguard services and unpatrolled beaches:** MM Beach and Fishermans Beach are not patrolled, and Surf Life Saving Australia does not recommend swimming at these locations due to the absence of lifesaving services and potentially hazardous ocean conditions (SLS Australia, 2026). While these beaches attract recreational use, the lack of patrols increases the potential consequences of incidents. The present-day risk is assessed as High, increasing across future planning horizons as visitation grows.
- **Loss of lifeguard sight lines:** At Port Kembla and Windang, the SLSC patrol facilities are set back within the dune system, which can partially restrict visibility of the shoreline during busy periods or when beach morphology changes (noting that Lifeguard facilities at Port Kembla Beach are in the pool complex and have no sight line issues). Reduced sight lines can affect the ability of lifesavers to monitor swimmers and respond quickly to incidents. The present-day risk is assessed as High, remaining elevated across future planning horizons.
- **Loss of safe beach/foreshore/waterway access:** Following storm events, sections of MM Beach and Fishermans Beach can experience erosion and localised dune scarping, which may temporarily restrict pedestrian access along the beach and foreshore. These impacts are generally short-term, and access typically recovers as the beach system naturally rebuilds. The present-day risk is assessed as Moderate.
- **Loss of safe beach width (and scarping):** MM Beach and Fishermans Beach are relatively narrow pocket beaches and can experience temporary loss of beach width following storm events due to erosion and dune scarping. While these impacts can reduce recreational amenity and available beach space, natural recovery of sand typically occurs under calmer conditions. The present-day risk is assessed as Moderate. At MM Beach, projected sea level rise and shoreline recession may progressively reduce available beach width over time, as adjacent urban development limits the ability of the beach and dune system to migrate landward.
- **Dogs on beaches conflicts:** Dogs are permitted in designated areas at MM Beach, Fishermans Beach, and the off-leash beach area around the midpoint of the Windang - Perkins Beach foreshore. Occasional conflicts can occur between dog walkers and other beach users. However, these issues are generally

minor and sporadic in nature. The present-day risk is assessed as Low, with gradual escalation possible under increasing visitation.

- **Wind-blown sand drift impacting recreational amenity:** Wind-blown sand transport is a significant management issue at Port Kembla Beach, particularly near the SLSC storage shed and ocean pool reporting area (see Figure 3.65). Strong southerly winds can transport sand inland from the beach and dunes, resulting in accumulation on pathways, Cowper Street, the SLSC car park, and recreational infrastructure, and occasionally restricting access to ground-level buildings. Council has undertaken management measures including dune reprofiling to maintain accessways and operational areas. The present-day risk is assessed as Extreme due to the frequent occurrence and ongoing maintenance requirement.
- **Wave overtopping and public safety:** The Hill 60 rock platform is a popular location for recreational rock fishing but is highly exposed to energetic southeast swell conditions. Wave overtopping can occur suddenly, creating hazardous conditions for users of the platform. In February 2021, 2 rock fishers were swept from the rocks and drowned during such conditions (see Figure 3.66). The present-day risk is assessed as Extreme, reflecting the severe consequences associated with wave exposure at this location.
- **Loss or rationalisation of rock pools:** Port Kembla Pool relies on seawater intake infrastructure that can be affected by sand infilling and blockage, reducing water circulation and creating operational and maintenance challenges. If these issues become more frequent or difficult to manage, pool functionality, water quality and usability may be affected, potentially leading to increasing pressure for upgrades or changes to how the facility is operated. The present-day risk is assessed as Moderate, increasing over longer planning horizons.



Figure 3.65 Wind-blown sand blocking a SLSC storage building at Port Kembla Beach

Two men die after being swept off rocks at Port Kembla

Disasters, Accidents and Emergency Incidents

Fri 12 Feb 2021



Figure 3.66 ABC News article reporting on safety incidents for rock fishers at Port Kembla Beach



Table 3.29 Social and Environmental Risk Summary – MM Beach to Windang

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
	Coastal Ecosystem Management						
1A	Impact of invasive species – fauna	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
1B	Impact of invasive species – flora	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
1C	Habitat loss and impacts on native fauna	Likely	Medium	High	High	High	High
1D	Habitat loss and impacts on native flora	Possible	Major	High	High	High	High
1E	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
1F	Informal pedestrian and vehicle access damage	Almost Certain	Minor	High	High	High	High
1G	Wind-blown sand drift and impacts on dune vegetation	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
1H	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
	Water Quality and Pollution						
2A	Water quality for primary contact recreation	Possible	Major	High	High	High	High
2B	Water quality for secondary contact recreation	Possible	Major	High	High	High	High
2C	Urban stormwater and sewer pollutants	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
2D	Buried anthropogenic waste	Possible	Major	High	High	High	High
	Public Recreation, Assets, and Safety						
3A	Lifeguard services and unpatrolled beaches	Possible	Catastrophic	High	Extreme	Extreme	Extreme
3B	Loss of lifeguard sight lines	Possible	Catastrophic	High	High	High	High
3C	Loss of safe beach/foreshore/waterway access	Likely	Minor	Moderate	Moderate	Moderate	Moderate
3D	Loss of safe beach width (and scarping)	Likely	Minor	Moderate	Moderate	High	Extreme



ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
3F	Dogs on beaches conflicts	Unlikely	Minor	Low	Low	Moderate	Moderate
3G	Wind-blown sand drift impacting recreational amenity	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
3H	Wave overtopping and public safety	Likely	Major	Extreme	Extreme	Extreme	Extreme
3I	Loss or rationalisation of rock pools	Likely	Minor	Moderate	Moderate	High	High



Legend

Coastal Ecosystem Management

- Impact of invasive species - fauna
- Impact of invasive species - flora
- Habitat loss and impacts on native fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Informal access damage
- Wind blown sand impacting vegetation
- Harvesting and walking on rock platforms
- Inadequate vegetation buffers

Water quality and pollution

- Recreational swimming quality
- Secondary water quality
- Urban stormwater and sewer pollutants
- Buried anthropogenic waste

Public recreation and assets

- Unpatrolled beaches
- Loss of lifeguard sight lines
- Loss of beach width & scarping
- Loss of safe beach/foreshore/waterway access
- User conflicts
- Dogs on beach conflict
- Wind blown sand impacting amenity
- Wave overtopping and public safety
- Loss or rationalisation of rock pools
- Loss or rationalisation of SLSC facilities

Administrative Mapping

- Reporting Area
- RH SEPP Coastal Wetlands
- RH SEPP Littoral Rainforest
- NPWS Land Tenure



Contains SIXMAPS Information
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Figure 3-67
MM Beach to Windang - Risk
Summary





4 STRATEGIC PLANNING RISKS

4.1 Introduction

In addition to the location-specific coastal risks described in Section 3, several broader strategic and institutional stressors influence the effectiveness of coastal management across the Wollongong coastline. While the risks assessed in Section 3 focus on specific coastal reporting areas and on-ground issues, the stressors described in this section relate to governance, planning systems, policy direction and organisational processes that influence how coastal management actions are prioritised, funded and implemented across the entire study area.

Many of these issues were first identified during Stage 1 of the CMP, through a review of existing studies, policy frameworks and community and stakeholder engagement undertaken as part of the Stage 1 Scoping Study (Salients, 2023). That process highlighted several overarching challenges affecting coastal management, including governance complexity, knowledge gaps relating to cultural values and coastal processes, and limitations in existing planning frameworks (Salients, 2023).

Building on the outcomes of Stage 1, these strategic risks were further refined and explored during Stage 2 through targeted risk assessment workshops involving Council staff and key agency stakeholders (see Section 2.6). The workshop provided an opportunity to examine the drivers, consequences and potential future evolution of these risks in more detail, drawing on the operational experience and local knowledge of staff involved in managing the coastal zone.

While these strategic stressors do not represent physical coastal zone stressors themselves, they play a critical role in shaping how effectively those hazards can be managed. Factors such as governance arrangements, policy clarity, organisational capacity and planning frameworks can significantly influence the ability of Council and other stakeholders to respond to coastal stressors in a timely and coordinated manner.

The following sections describe the 9 key strategic stressors identified through the workshop process. For each stressor, the underlying drivers, and implications for coastal management are discussed. Risk ratings are provided using the framework described in Section 2, and are summarised in Section 4.3.

4.2 Strategic Stressors Affecting the Wollongong Coast

4.2.1 Complex Land Tenure and Governance Arrangements

The Wollongong coastal zone is characterised by a complex mix of land ownership, management responsibilities and governance arrangements. Land within the coastal zone is managed by a range of parties including WCC, DPHI-Crown Lands, NPWS, Venues NSW, Homes NSW, Sydney Water, private landowners and, in some cases, land subject to Aboriginal land claims or Native Title considerations. In addition, a number of coastal assets and infrastructure (such as the breakwaters of Wollongong Harbour) fall under State Government jurisdiction (TfNSW) (Dwyer & Dengate, 2021).

This complex tenure and governance landscape can create uncertainty regarding responsibility for managing coastal assets and implementing coastal management actions. In many locations, coastal infrastructure, environmental assets and public spaces occur across multiple land tenures within relatively small geographic areas. As a result, effective management often requires coordination between several land managers and regulatory authorities.

The Stage 1 Scoping Study similarly identified governance complexity as a key issue affecting coastal management, noting that responsibilities for managing the coastal zone are often shared across multiple agencies and levels of government (Salients, 2023). These arrangements can create challenges when



implementing management actions that require approvals, funding commitments or operational responsibilities from multiple stakeholders.

Several key drivers contribute to this stressor. A primary driver is jurisdictional ambiguity, where the roles and responsibilities of different land managers are not always clearly defined or understood. This can occur where land tenure boundaries intersect with coastal processes or infrastructure, or where the legal responsibility for managing a particular asset or environmental value is unclear.

A second driver relates to funding responsibilities. Even where management responsibilities are reasonably clear, uncertainty may remain regarding which organisation is responsible for funding investigation, maintenance or capital works. This can be particularly challenging where coastal assets are located on land managed by one authority but provide benefits to the broader community or require involvement from multiple agencies to manage effectively.

Changing land tenure arrangements over time also contribute to governance complexity. Aboriginal land claims, evolving Crown land management arrangements and changes in ownership of coastal properties can alter management responsibilities and create uncertainty regarding future governance arrangements. In some locations, cultural heritage values and Aboriginal places add an additional layer of governance considerations that require collaboration with Aboriginal organisations and heritage authorities.

In addition, the coastal zone contains several environments where ownership or management responsibilities are inherently complex, such as rock platforms, ocean waters and creek lines. These areas often fall under State Government jurisdiction while adjoining foreshore areas may be managed by Council or other land managers. Where coastal hazards or environmental management issues affect multiple adjoining tenures, coordinated management responses may be required.

If not effectively managed, these governance complexities may result in delays in implementing coastal management actions, difficulties securing funding for works on land outside Council ownership, or challenges obtaining the approvals required to undertake coastal protection, environmental restoration or adaptation measures. Strengthening coordination between agencies, clarifying asset ownership and management responsibilities, and developing place-based planning approaches that consider coastal assets across tenure boundaries may help reduce these governance challenges over time.

Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as High, and is expected to remain High across all future planning horizons if governance arrangements remain complex and unclear.

4.2.2 Gap Between Strategic Planning and On-Ground Implementation

While strategic planning documents such as CMPs and supporting strategies provide the overarching direction for coastal management, there can be a gap between strategic intent and the delivery of on-ground works.

This issue is commonly driven by constraints on funding, staffing resources and organisational capacity, as well as competing priorities within local government. In some cases, coastal management actions may also depend on additional investigations, detailed design or external approvals before works can proceed. As a result, even where risks are well understood and management actions have been identified, implementation can be delayed or deferred.

The Stage 1 Scoping Study identified similar challenges, noting that the successful implementation of coastal management actions depends on adequate resourcing and coordinated delivery across multiple agencies and stakeholders (Salients, 2023).

If this gap persists, coastal risks may remain unmanaged for extended periods, potentially resulting in environmental degradation, damage to coastal assets, and reputational risks for Council and other responsible authorities.



The CMP provides several mechanisms to help reduce this implementation gap. Importantly, CMP actions will be incorporated into Council's Integrated Planning and Reporting (IP&R) framework, providing a pathway for translating strategic priorities into operational programs, budgets and delivery plans. In addition, Stage 4 of the CMP requires formal commitment from relevant agencies responsible for implementing specific actions, including agreement on funding, resourcing or regulatory responsibilities.

Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as High, and is expected to remain High across all future planning horizons if constraints on funding, staffing resources and organisational capacity are not resolved.

4.2.3 Inconsistent Strategic Direction Across Council

Local government manages a wide range of strategies and policies relating to land use planning, infrastructure delivery, environmental management, recreation and economic development. While these strategies are typically well intentioned and developed to address specific policy objectives, when prepared independently they can occasionally lead to inconsistencies in strategic alignment or operational implementation across different areas of Council.

In the coastal context, these tensions may arise where objectives relating to housing supply, economic development or infrastructure provision intersect with the need to manage coastal hazards and environmental values. For example, planning strategies that seek to accommodate population growth or redevelopment in coastal areas need to be carefully balanced against the risks associated with coastal erosion, inundation and long-term climate change impacts. In some cases, these pressures can create competing priorities between facilitating development and avoiding or managing exposure to coastal hazards.

These challenges can be amplified by time pressures associated with strategy development, political or community expectations, and limited opportunities for cross-departmental coordination during the preparation of plans and policies. As a result, strategies developed in isolation may unintentionally create inconsistencies with coastal management objectives or complicate the implementation of coastal risk management measures. The Stage 1 Scoping Study highlights the importance of aligning coastal management objectives with broader strategic planning frameworks to support coordinated decision-making across Council functions (Salients, 2023)

Strengthening internal coordination, integrating CMP considerations into broader Council strategies, and establishing clear triggers for CMP alignment in future strategic planning processes may help reduce these risks and support more consistent decision-making across the organisation.

Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as High, and is expected to remain High across all future planning horizons if strategic alignment remains inconsistent.

4.2.4 Lack of Policy Direction for Coastal Hazard Management

Clear policy direction is required to guide how coastal hazards such as erosion, inundation and shoreline change should be managed across different parts of the coastline. In the absence of well-defined policy guidance, responses to coastal hazard events may become reactive or inconsistent, particularly where there is uncertainty regarding the most appropriate management approach.

The Wollongong CZMP (BMT WBM, 2017) provided an important framework for managing coastal hazards along the Wollongong coastline. However, changes in legislation, policy settings and the broader coastal management framework in New South Wales mean that updated policy guidance is required to support future decision-making. In particular, the transition from the former coastal protection framework to the current *Coastal Management Act 2016* and associated planning instruments has altered the way coastal hazards are assessed and managed (Salients, 2023).



Without clear and contemporary strategic direction, coastal hazard events may occur in areas where management responses are not well defined. This can lead to uncertainty regarding appropriate responses, delays in decision-making after hazard events, or inconsistent approaches between different locations along the coastline. In some cases, the absence of clear policy guidance may also create challenges when determining acceptable levels of intervention or balancing competing objectives such as hazard mitigation, environmental protection and public access.

Providing clear and consistent policy direction is therefore an important function of the CMP. Through the development of management actions in Stages 3 and 4, the CMP will establish:

- A strategic direction for the CMP – including precinct-based management approaches
- Clear guidance and assessment of hazard risk and appropriate responses such as protection, accommodation or retreat.

Establishing this strategic framework will help improve consistency in coastal hazard management and support more transparent and informed decision-making over time.

Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as High, and would otherwise increase to Extreme over longer planning horizons if clear policy direction for coastal hazard management is not established through the CMP process.

4.2.5 Insufficient Strategic Direction for Climate Change Adaptation

Climate change is expected to influence a range of coastal processes including sea level rise, coastal erosion and inundation risks (Australian Government, 2025). These changes have the potential to alter shoreline behaviour, increase the frequency and severity of coastal flooding events, and affect the long-term viability of coastal infrastructure and land uses. Effective coastal management therefore requires long-term strategic planning that integrates broader climate change considerations into decision-making processes.

The Stage 1 Scoping Study (Salients, 2023), together with the Stage 2 Hazard Study (Salients, 2025b) and Risk Assessments (Salients, 2026), identify climate change as a key emerging issue affecting the Wollongong coast. These studies highlight the importance of incorporating sea level rise projections and climate adaptation planning into future coastal management strategies to support more informed and proactive management of coastal risks.

While the adoption of Council's Climate Change Adaptation Plan (Wollongong City Council, 2022) has strengthened the strategic framework for addressing climate change, there remains an ongoing need to ensure that climate considerations are consistently integrated into coastal planning, infrastructure investment and land use decision-making. In practice, this requires alignment between climate adaptation strategies, CMP development, and broader land use planning frameworks (such as LEPs and DCPs).

Without clear and coordinated strategic direction, climate-related coastal risks may be addressed in an ad-hoc or reactive manner. This can lead to inconsistent decisions regarding coastal infrastructure design, development approvals, asset protection measures and long-term adaptation pathways. In particular, uncertainty regarding acceptable adaptation responses or planning horizons may create challenges for managing assets and development in areas that may become increasingly exposed to coastal hazards over time.

Strengthening the alignment between Council's climate adaptation planning processes (and future iterations of the Council's Climate Change Adaptation Plan) and the goals and objectives of the CMP will therefore be important for supporting a coordinated and forward-looking approach to coastal climate risks. Future updates to climate adaptation strategies should continue to integrate coastal hazard information and align with the long-term management framework established through the CMP.



Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as Moderate, and would otherwise increase to Extreme over longer planning horizons, reflecting the improving policy framework but ongoing uncertainty regarding the scale and timing of climate change impacts.

4.2.6 Lack of Understanding of Legislative Requirements Across All Levels of Council

Coastal management in NSW operates within a complex legislative and policy framework that includes the CM Act, the R&H SEPP, and a range of planning and environmental legislation. These instruments establish requirements for managing coastal hazards, protecting coastal ecosystems and ensuring that development and infrastructure planning consider coastal processes and long-term environmental change.

Where these legislative requirements are not well understood across all levels of Council, there is potential for planning, development or asset management decisions to occur without adequate consideration of coastal risks or statutory obligations. This may include situations where coastal planning controls are overlooked, where coastal hazards are not fully considered in infrastructure design, or where decision-making processes do not fully align with the intent of the coastal management framework.

The Stage 1 Scoping Study similarly highlights the importance of clearly understanding legislative responsibilities and governance roles in delivering effective coastal management outcomes (Salients, 2023). In practice, the coastal legislative framework intersects with a wide range of Council functions including land use planning, asset management, infrastructure delivery, environmental management and regulatory decision-making. Where awareness of these legislative requirements varies between teams or operational areas, inconsistencies can arise in how coastal issues are interpreted or addressed.

The consequences of these inconsistencies can include delays in decision-making, increased administrative burden where statutory requirements must be revisited, or the potential for reputational and legal risks if decisions are challenged or found to be inconsistent with legislative requirements. In some cases, a lack of awareness of statutory coastal obligations may also lead to missed opportunities to proactively manage coastal risks through planning controls, asset design standards or environmental protection measures.

Time pressures, competing operational demands and external development or community pressures may also contribute to situations where legislative requirements are not consistently applied. Strengthening organisational awareness of coastal legislation, improving internal guidance materials and building cross-departmental understanding of the coastal management framework may help reduce these risks and support more consistent decision-making across Council functions.

Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as Moderate, and is expected to remain Moderate across all future planning horizons.

4.2.7 Management of Historic Heritage in the Coastal Zone

The Wollongong coastline contains a number of historic heritage assets, including heritage buildings, ocean pools, seawalls, coastal infrastructure and other culturally significant landmarks. Many of these assets reflect the long history of coastal recreation, settlement and community activity along the Wollongong coast. However, a number of these heritage places are located in areas that are directly exposed to coastal hazards such as coastal erosion, coastal inundation, and coastal cliff and slope instability, creating challenges for their long-term protection and management.

In some cases, heritage values may not be formally recognised through statutory listings despite their strong cultural significance within the community. Informally valued places such as long-standing recreational facilities, coastal landmarks or community gathering spaces can still attract strong community attachment, even where formal heritage protection mechanisms are not in place. This can create challenges for decision-making where coastal hazard management actions may affect the character or function of these places.



The Stage 1 Scoping Study identifies cultural heritage values as an important component of the coastal environment, highlighting the need to consider heritage protection alongside coastal hazard management and environmental conservation objectives (Salients, 2023). In practice, heritage assets in coastal settings can be particularly difficult to manage where adaptation responses such as coastal protection works, relocation, structural modification or access changes may alter the heritage character of a site or require approvals from heritage authorities.

These complexities can result in difficult trade-offs between preserving heritage values, managing coastal hazards and maintaining public safety. In some cases, delays or uncertainty around heritage approvals may also affect the timing of coastal hazard responses or infrastructure upgrades.

Planning for heritage protection within the CMP, while acknowledging that some assets may need to adapt to changing coastal conditions over time, will therefore be important for maintaining the resilience of heritage places along the Wollongong coast. Integrating heritage considerations into long-term coastal management planning can help provide clearer pathways for balancing heritage conservation with the need to respond to evolving coastal hazards.

Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as High, and is expected to remain High across all future planning horizons.

4.2.8 Protection of Aboriginal Cultural Heritage

The Wollongong coastline contains a rich and diverse Aboriginal cultural heritage, including both tangible and intangible cultural values that reflect the deep and ongoing connection between Aboriginal people and the coastal landscape. Past studies, including archaeological investigations, historical records and ethnographic accounts, have identified numerous cultural heritage sites and places of cultural significance across the Wollongong coastline. More than one hundred Aboriginal sites, including artefact scatters, middens, scarred trees, rock art sites and formally declared Aboriginal Places, are currently recorded within heritage databases for the study area (ILALC, 2024). Beyond these recorded sites, Aboriginal knowledge holders recognise that many additional cultural values exist within the landscape that may not be formally documented. These values form part of a broader cultural landscape where landforms, waterways, vegetation and coastal processes are interconnected with cultural stories, traditional practices and long-standing connections to Country.

Subsequently, the Stage 1 Scoping Study emphasised the importance of using the CMP process as a key mechanism for recognising Aboriginal cultural values and strengthening the understanding of cultural heritage across the coastal zone (Salients, 2023).

Many of these cultural values are increasingly exposed to coastal hazards and environmental change. Coastal processes such as wave overtopping, coastal inundation, beach erosion, shoreline recession, tidal inundation, dune instability and coastal cliff or slope instability can directly affect culturally significant sites and landscapes. In some locations, surface runoff and erosion associated with intense rainfall events can also expose or disturb cultural deposits. These pressures are already affecting some coastal heritage sites and are expected to intensify over time as sea levels rise and storm events become more frequent and severe (ILALC, 2024).

Where cultural values are not widely known or formally recorded, there is also potential for inadvertent disturbance during coastal works or land management activities. At the same time, legislative approval processes associated with Aboriginal cultural heritage can sometimes make it challenging to respond quickly to emerging coastal hazard risks affecting cultural sites. These factors highlight the importance of improving knowledge, awareness and early integration of cultural heritage considerations within coastal planning processes.

To help address these challenges, Council commissioned the Stage 2 Cultural Values Study as part of the CMP process (ILALC, 2024). This work is being undertaken in partnership with Aboriginal knowledge holders



to improve understanding of cultural heritage values across the Wollongong coastline and to support their appropriate recognition within the coastal management framework.

Building on this work, Stage 3 of the CMP will focus on identifying practical management responses and pathways to better protect and manage Aboriginal cultural heritage within the coastal zone. This includes exploring approaches to reduce risks from coastal hazards, improve cultural heritage awareness in coastal planning and asset management, and support ongoing collaboration with Aboriginal communities in the stewardship of Country. Together, these initiatives will help strengthen the integration of Aboriginal cultural values within the long-term management of the Wollongong coast.

Table 4.1 depicts the risk profile for this stressor, noting more detail will be provided in the Stage 2 Cultural Values Study. This risk is currently rated as Extreme, and would be expected to remain Extreme across all future planning horizons in absence of the CMPs formal mechanism for this issue.

4.2.9 Land Use Planning Pressures in the Coastal Zone

Land use planning decisions play a critical role in shaping development patterns within the coastal zone. Historical zoning arrangements, redevelopment pressures and rising coastal property values can all influence how land is used, developed and redeveloped over time. In highly desirable coastal locations such as those along the Wollongong coastline, these pressures can be particularly strong, creating ongoing demand for new residential development, tourism infrastructure and coastal recreation facilities.

These dynamics can lead to increased development intensity in coastal areas, potentially placing additional assets, infrastructure and communities at risk from coastal hazards such as erosion, inundation and shoreline recession. In some cases, redevelopment of older coastal housing stock may also result in larger or more intensive developments, which can increase the long-term exposure of private assets and public infrastructure to coastal processes.

The Stage 1 Scoping Study notes that population growth, urban expansion and increasing demand for coastal recreation are key pressures affecting the Wollongong coastline (Salients, 2023), and additional population growth projections have been provided at a reporting area level in this report (see Section 3). As coastal areas continue to attract residents and visitors, there may be increasing pressure to accommodate additional development, upgrade public infrastructure and expand recreational facilities within the coastal zone. Without careful planning, these pressures could gradually increase the number and value of assets located in areas that may be exposed to coastal hazards over the long term.

Redevelopment and gentrification pressures may also influence the social and cultural character of coastal communities. In some locations, increasing development intensity can lead to the gradual loss of traditional village-scale development patterns and local character that contribute to the social identity of coastal neighbourhoods. Changes in land use patterns may also affect public access to the coast, recreational opportunities and the balance between built development and natural coastal environments.

Managing these pressures requires a coordinated planning approach that integrates coastal hazard considerations into strategic land use planning, development controls and infrastructure planning processes. This may include incorporating coastal hazard information into planning instruments, applying appropriate development standards in hazard-prone areas, and considering long-term land acquisition or retreat strategies where risks may become unacceptable over time.

Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as Moderate, and is expected to increase to High over longer planning horizons as development pressures continue to intensify and coastal hazards associated with climate change become more pronounced.



4.2.10 Lack of Community Awareness of the Importance of Coastal Ecosystems, Habitat Values and TECs

The Wollongong coastline supports a range of important coastal ecosystems and habitats that contribute to the environmental health and resilience of the coastal zone. These include dune systems, coastal wetlands, littoral rainforest communities and cliff-top grasslands, many of which are listed as Threatened Ecological Communities (TECs) under NSW environmental legislation. These ecosystems provide a range of ecological functions, including habitat for native flora and fauna, natural shoreline stabilisation, sediment trapping and buffering against coastal hazards.

Despite their ecological importance, community awareness of the role and value of these coastal ecosystems can vary. In highly accessible coastal areas with strong recreational use, environmental values may not always be readily visible to visitors or residents. As a result, activities such as informal track creation, trampling of vegetation, disturbance of dune systems, unauthorised vegetation removal and inappropriate recreational use can occur. While these impacts are often unintentional, they can gradually degrade habitat condition and reduce the resilience of coastal ecosystems. Many of these pressures have already manifested at a local scale along the Wollongong coastline and have been identified through the reporting area-level risk assessments presented in Section 3, including risks associated with vegetation vandalism, informal access tracks and damage to dune vegetation in heavily used foreshore areas.

A lack of awareness of ecological values can also influence community responses to coastal management initiatives. For example, revegetation programs, fencing to protect sensitive habitats or restrictions on access to environmentally sensitive areas may sometimes be perceived as limiting recreational use or coastal access. Without a clear understanding of the ecological reasons behind these measures, community support for such initiatives may be reduced.

The Stage 1 Scoping Study highlights the importance of recognising the ecological significance of coastal environments and promoting stewardship of coastal habitats as part of effective coastal management (Salients, 2023). Improving community awareness of coastal ecosystem values can help reduce unintentional impacts, support behavioural change and build broader community support for conservation initiatives.

Education programs, interpretive signage, community engagement initiatives and partnerships with local community groups may all play an important role in strengthening awareness of coastal environmental values. Increasing community understanding of the ecological importance of dune systems, coastal vegetation and threatened ecological communities can help support long-term conservation outcomes and improve the effectiveness of on-ground coastal management efforts.

Table 4.1 depicts the risk profile for this stressor. This risk is currently rated as High, and is expected to increase to Extreme across future planning horizons, as impacts of this stressor will escalate in concert with other climate related stressors.

4.2.11 Environmental Data Gaps

A lack of adequate environmental data across parts of the study area can constrain confident decision-making, increase uncertainty in risk assessments, and limit the ability to target management responses efficiently.

Reliable baseline data and ongoing monitoring are important for understanding current conditions, identifying trends, and evaluating whether management actions are effective over time. Where datasets are limited, outdated or spatially incomplete, councils may need to adopt more precautionary approaches or commit additional resources to investigations before progressing works.

A key example is the limited availability of estuarine water quality data. At present, water quality monitoring data is only available from the DCCEEW estuary monitoring program – which at present only covers four estuaries Bellambi Gully, Bellambi Lagoon, Fairy Creek, and Towradgi Creek; on a very limited spatial and



temporal scale. This lack of long-term data reduces confidence in assessing the extent, frequency and drivers of poor water quality outcomes.

Other examples include gaps in beach profile and shoreline survey data, ecological condition assessments, groundwater interactions, asset condition information (for coastal protection works), and visitation or recreational use data. These information gaps may affect planning for coastal hazards, water quality, biodiversity protection, public safety and infrastructure management.

The present-day risk is assessed as Extreme across the study area. Without targeted monitoring and improved data collection, this risk is likely to remain or increase over future planning horizons as climate change, population growth and competing land use pressures create more complex management challenges.

4.3 Summary of Strategic Planning Risks

Table 4-1 summarises the risk ratings assigned to each stressor across the present day and future planning horizons, providing a consolidated overview of the relative significance and expected evolution of these strategic planning risks.



Table 4.1 Risk Summary - Strategic Planning Risks

ID	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
4A	Complex land tenure and governance arrangements	Likely	Medium	High	High	High	High
4B	Gap between strategic planning and on-ground implementation	Likely	Medium	High	High	High	High
4C	Inconsistent strategic direction across Council	Possible	Major	High	High	High	High
4D	Lack of policy direction for coastal hazard management	Likely	Medium	High	High	Extreme	Extreme
4E	Insufficient strategic direction for climate change adaptation	Unlikely	Major	Moderate	High	Extreme	Extreme
4F	Lack of understanding of legislative requirements across all levels of Council	Likely	Minor	Moderate	Moderate	Moderate	Moderate
4H	Management of historic heritage in the coastal zone	Possible	Major	High	High	High	High
4H	Protection of Aboriginal cultural heritage	Likely	Major	Extreme	Extreme	Extreme	Extreme
4I	Land use planning pressures in the coastal zone	Unlikely	Major	Moderate	Moderate	Moderate	Moderate
4J	Lack of community awareness of the importance of coastal ecosystems, habitat values and TECs	Almost Certain	Minor	High	High	Extreme	Extreme
4K	Environmental Data Gaps	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme



5 SUMMARY AND NEXT STEPS

5.1 Summary of Key Risks

The reporting area-based and strategic risk assessment identified a wide range of coastal stressors across the Wollongong coastline. While these risks vary in their local expression, a number of clear and recurring management themes emerged across both present-day and future planning timeframes. The following sections summarise the key risks that most consistently present as High or Extreme across the study area and are therefore expected to be the main focus of Stage 3 options development.

In general, priority attention in Stage 3 should be given to risks assessed as High or Extreme, particularly where they occur across multiple reporting areas, affect high-value community or environmental assets, or are projected to escalate under future planning horizons. However, some Moderate risks may also warrant consideration where they show strong future escalation, occur in particularly sensitive locations, or where early intervention may reduce the likelihood of more significant impacts emerging over time.

5.1.1 Coastal Ecosystem Management

The risk assessment identified coastal ecosystem degradation as one of the most widespread and recurring themes across the Wollongong coastline. Risks under this theme are concentrated around dune systems, wetlands, estuarine entrances, headlands and intertidal rock platforms, and are often associated with a combination of historic modification, ongoing public access pressures, invasive species and limited opportunities for ecological migration under future sea level rise.

The stressors that most consistently emerged as the highest priority within this theme include:

- Impact of invasive species - flora and fauna
- Habitat loss and impacts on native flora
- Vegetation vandalism
- Inadequate buffers for TECs and areas of wetland migration
- Informal pedestrian and vehicle access damage
- Wind-blown sand drift and impacts on dune vegetation in selected areas.

These risks were repeatedly rated High, and in some locations Extreme, particularly where sensitive ecological systems coincide with heavy public use or constrained coastal buffers. Key hotspot locations include:

- Royal National Park and the Five Islands Nature Reserve, where invasive species, habitat disturbance and sensitive ecological values are all prominent
- Sandon Point to Bulli, including Collins Creek and dune areas subject to weed invasion, vandalism and informal access
- Woonona to Bellambi, where Bellambi Lagoon, Bellambi Gully and associated dune systems support significant wetlands and TECs
- Corrimal to North Wollongong, particularly around Fairy Creek and Towradgi Creek where wetland systems are constrained by adjacent development
- MM Beach to Windang, where invasive species, dune damage, Four Wheel Drive access and wind-blown sand impacts are especially pronounced



Taken together, these risks highlight that coastal ecosystems are not only important environmental assets in their own right, but also provide a critical natural buffer to coastal hazards. Their protection and restoration is therefore likely to be a central pillar of the Stage 3 management response.

5.1.2 Water Quality and Pollution

Compared with other themes, water quality and pollution risks were generally more localised and often assessed at lower present-day risk levels. However, a number of recurring issues were identified that remain important due to their public health, environmental and reputational consequences, particularly where they intersect with high-use recreational beaches or legacy contamination sources.

The stressors that most consistently emerged as priority concerns within this theme include:

- Urban stormwater and sewer pollutants
- Water quality for primary contact recreation
- Buried anthropogenic waste

While many beaches continue to achieve Good or Very Good Beachwatch ratings, pollution risks remain important where beaches are influenced by urbanised catchments, estuarine discharges or historic land contamination (also noting that Beachwatch only tests for enterococci). These risks may also intensify over time with increased catchment pressure, infrastructure ageing, or greater exposure of legacy contaminants due to coastal erosion.

Key hotspot locations include:

- Thirroul to McCauleys and Sandon Point to Bulli, where localised buried waste and landfill legacies were identified
- Woonona to Bellambi, where historical estuarine water quality has indicated that water quality inside Bellambi Gully and Bellambi Lagoon is poor – driven by urban stormwater impacts
- Corrimal to North Wollongong, where Fairy Creek and Towradgi Creek drain highly urbanised catchments and have historically received poor grades for their estuarine water quality
- Wollongong City, particularly Belmore Beach and the harbour reporting area, where urban stormwater discharges and primary contact water quality risks are elevated
- MM Beach to Windang, where industrial stormwater, former landfill areas and pollution pathways around Port Kembla and Hill 60 contribute to higher risk. Coomaditchie Lagoon has also been identified as a waterway with notable water quality issues.

Overall, water quality risks are generally less dominant than coastal ecosystem or public safety risks at a whole-of-study-area scale. However, they remain important in Stage 3 because of their implications for recreational use, environmental health and community confidence in coastal management.

5.1.3 Public Recreation, Assets, and Safety

This theme emerged as one of the strongest and most spatially widespread across the study area. Risks associated with beach access, beach width, public safety and the long-term exposure of recreation infrastructure were repeatedly identified as High or Extreme, particularly in relation to energetic wave environments, narrow beaches, storm erosion and the location of surf clubs and ocean pools close to the active shoreline.

The stressors that most consistently emerged as the highest priority include:

- Loss of safe beach/foreshore/waterway access



- Loss of safe beach width (and scarping)
- Wave overtopping and public safety
- Lifeguard services and unpatrolled beaches
- Loss or rationalisation of SLSCs
- Loss or rationalisation of rock pools

These risks occur across a wide range of coastal settings, from remote National Park beaches to highly urbanised recreational reporting areas. They are also among the most likely to escalate under future planning horizons as sea levels rise, wave overtopping becomes more frequent, and shoreline recession progressively reduces usable beach width and increases pressure on coastal infrastructure.

Key hotspot locations include:

- Figure 8 Pools and the Royal National Park coastline, where wave overtopping and public safety risks are already assessed as Extreme
- Coalcliff, Werrong, Bulgo, Little Austinmer, Wombarra and MM Beach, where narrow beaches are especially vulnerable to temporary or long-term loss of usable beach width
- Wollongong Harbour and the Blue Mile, where overtopping of breakwaters and foreshore structures presents serious public safety concerns
- Hill 60 / Fishermans Beach / Port Kembla, where rock fishing safety and wind-blown sand impacts are especially pronounced
- SLSCs and ocean pools throughout the study area, including Coalcliff, Austinmer, Thirrourl, Bulli, Fairy Meadow, Port Kembla and Windang, where long-term adaptation or protection may be required

This theme is likely to be a major focus of Stage 3, as it captures many of the risks most visible to the community and most directly linked to the future functionality of Wollongong's coastal recreation assets.

5.1.4 Strategic Planning

The strategic planning theme captures a number of non-spatial risks that influence Council's ability to effectively manage the coastal zone over time. While these stressors do not manifest as on-ground hazards in the same way as the reporting area risks, they strongly shape the feasibility, consistency and effectiveness of any future management response.

The stressors that most consistently emerged as the highest priority within this theme include:

- Complex land tenure and governance arrangements
- Gap between strategic planning and on-ground implementation
- Inconsistent strategic direction across council
- Lack of policy direction for coastal hazard management
- Protection of Aboriginal cultural heritage
- Management of historic heritage in the coastal zone
- Lack of community awareness of coastal ecosystems and habitat values

These issues are important because they influence how effectively Council and partner agencies can respond to the physical and environmental risks identified in Section 3. In particular, governance complexity, policy uncertainty and implementation gaps may delay or constrain responses to coastal hazards, while land use pressures and heritage considerations can add significant complexity to planning and adaptation decisions.



Although these risks apply across the entire study area, they are especially relevant in locations where hazards, environmental values and cultural heritage intersect. Key strategic hotspot contexts include:

- Royal National Park, where governance complexity, public safety, heritage shacks and Aboriginal values intersect
- Sandon Point / McCauleys / Bellambi / Coomaditchie Lagoon, where Aboriginal cultural heritage is particularly significant – and the Bellambi foreshore is also characterised by complex land tenure and multiple agency interests
- Wollongong City and the Blue Mile, where historic assets, civic infrastructure and hazard exposure overlap
- Port Kembla to Windang, where ecological, industrial, cultural and recreational values coexist within a highly complex management setting

This theme will be critical in Stage 3 because many of the highest on-ground risks cannot be effectively addressed without corresponding improvements to policy direction, governance coordination, planning alignment and implementation pathways.

5.2 Next Steps

The Stage 2 outputs provide the technical spine for Stage 3. The hazard mapping, risk ratings, and locality profiles define where risk is concentrated, which values are most exposed, and what timeframes matter. These findings will directly inform the selection and sequencing of adaptation options, the testing of design performance across scenarios, and the development of practical triggers for action. Stage 2 also establishes a transparent basis for conversations with community and stakeholders about acceptable levels of residual risk, trade-offs, and co-benefits.

Stage 3 will translate risk into an implementable pathway of actions that protect people, place, and assets while sustaining coastal values. The outcome of this stage will be a succinct set of management actions that can be enacted through an achievable and cost-effective implementation schedule. Therefore, Stage 3 of the CMP represents a critical component of the overall process. To achieve Council's objectives, Stage 3 will employ a robust, comprehensive, and transparent decision-making framework. The steps for Stage 3, as provided in the NSW Coastal Management Manual, are outlined in Figure 5.1. These next steps convert the Stage 2 evidence base into a practical, staged program that supports Wollongong City Council to reduce risk, protect cultural and environmental values, and sustain amenity over the next 50 to 100 years.

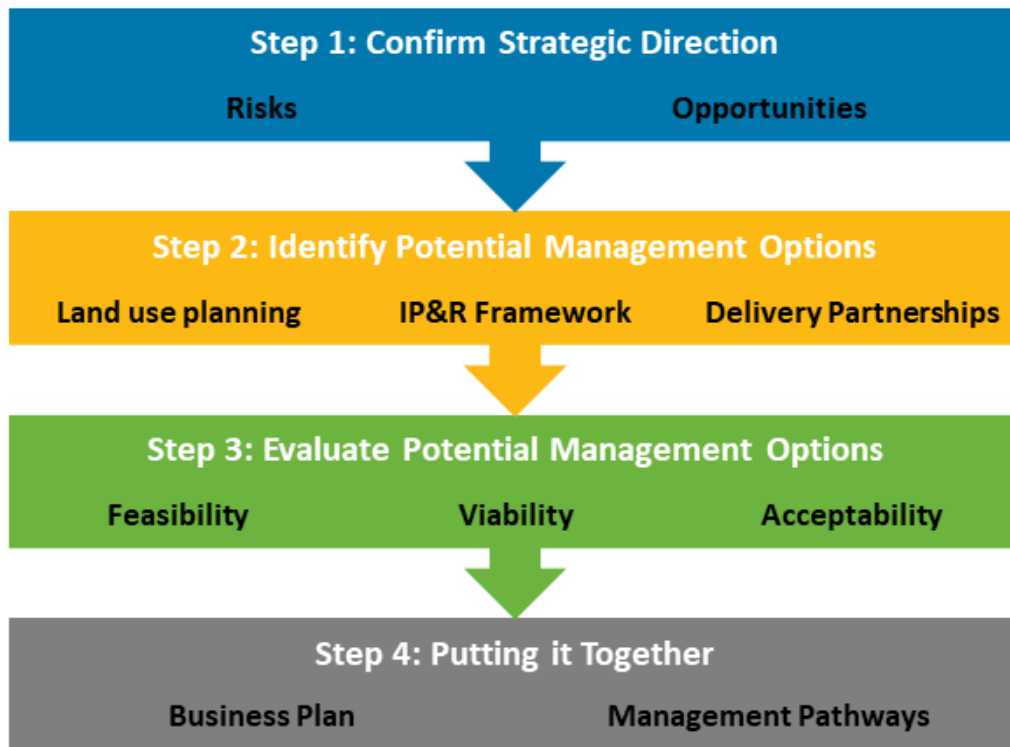


Figure 5.1 Stage 3 of the CMP (adapted from the CM Manual)



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APPENDIX A RISK ASSESSMENT SUMMARY





A-1 Risk Assessment Summary

This Appendix provides a consolidated summary of the risk assessment outcomes for all locations and management themes across the study area. The table presents the assigned risk ratings for each identified stressor, allowing comparison of priority issues across locations, timeframes and management themes. It is intended as a quick reference to support interpretation of the locality-based chapters and to help guide future planning, monitoring and Stage 3 Management Action derivation.



Table A-1 Overall Risk Assessment Summary

Area	ID	Management Theme	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
Area A - Royal National Park	1A	Coastal Ecosystem Management	Impact of invasive species – fauna	Almost Certain	Minor	High	High	High	High
Area A - Royal National Park	1C	Coastal Ecosystem Management	Habitat loss and impacts on native fauna (including shorebirds)	Unlikely	Major	Moderate	Moderate	High	High
Area A - Royal National Park	1D	Coastal Ecosystem Management	Habitat loss and impacts on native flora	Unlikely	Major	Moderate	Moderate	High	High
Area A - Royal National Park	1E	Coastal Ecosystem Management	Vegetation vandalism	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
Area A - Royal National Park	1F	Coastal Ecosystem Management	Informal pedestrian and vehicle access damage	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
Area A - Royal National Park	1G	Coastal Ecosystem Management	Wind-blown sand drift and impacts on dune vegetation	Likely	Insignificant	Low	Moderate	Moderate	High
Area A - Royal National Park	2A	Water Quality and Pollution	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Low	Low
Area A - Royal National Park	2C	Water Quality and Pollution	Buried anthropogenic waste	Unlikely	Major	Moderate	Moderate	High	High
Area A - Royal National Park	3A	Public Recreation, Assets, and Safety	Lifeguard services and unpatrolled beaches	Possible	Major	High	High	Extreme	Extreme
Area A - Royal National Park	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	Extreme	Extreme
Area A - Royal National Park	3D	Public Recreation, Assets, and Safety	Loss of safe beach width (and scarping)	Almost Certain	Minor	High	High	Extreme	Extreme
Area A - Royal National Park	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Likely	Major	Extreme	Extreme	Extreme	Extreme
Area A - Royal National Park	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Unlikely	Major	Moderate	High	Extreme	Extreme
Area A - Royal National Park	3J	Public Recreation, Assets, and Safety	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme
Area B - Stanwell Park to Clifton	1D	Coastal Ecosystem Management	Impact of invasive species – flora	Almost Certain	Minor	High	High	High	High
Area B - Stanwell Park to Clifton	1G	Coastal Ecosystem Management	Wind-blown sand drift and impacts on dune vegetation	Almost Certain	Insignificant	Low	Moderate	Moderate	High
Area B - Stanwell Park to Clifton	1I	Coastal Ecosystem Management	Inadequate buffers for TECs and areas of wetland migration	Rare	Major	Low	Moderate	High	Extreme
Area B - Stanwell Park to Clifton	2A	Water Quality and Pollution	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Low	Low
Area B - Stanwell Park to Clifton	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Unlikely	Minor	Low	Low	Low	Moderate
Area B - Stanwell Park to Clifton	3A	Public Recreation, Assets, and Safety	Lifeguard services and unpatrolled beaches	Possible	Major	High	High	High	High
Area B - Stanwell Park to Clifton	3B	Public Recreation, Assets, and Safety	Loss of lifeguard sight lines	Possible	Major	High	High	High	High
Area B - Stanwell Park to Clifton	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	Extreme	Extreme
Area B - Stanwell Park to Clifton	3D	Public Recreation, Assets, and Safety	Loss of safe beach width (and scarping)	Likely	Minor	Moderate	High	Extreme	Extreme
Area B - Stanwell Park to Clifton	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Rare	Major	Low	Low	Moderate	High
Area B - Stanwell Park to Clifton	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Unlikely	Major	Moderate	High	Extreme	Extreme
Area B - Stanwell Park to Clifton	3J	Public Recreation, Assets, and Safety	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme
Area C - Scarborough to Coledale	1D	Coastal Ecosystem Management	Habitat loss and impacts on native flora	Almost Certain	Minor	High	High	High	High
Area C - Scarborough to Coledale	1E	Coastal Ecosystem Management	Vegetation vandalism	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
Area C - Scarborough to Coledale	1I	Coastal Ecosystem Management	Inadequate buffers for TECs and areas of wetland migration	Likely	Minor	Moderate	High	Extreme	Extreme
Area C - Scarborough to Coledale	2A	Water Quality and Pollution	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Low	Low
Area C - Scarborough to Coledale	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area C - Scarborough to Coledale	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	High	High
Area C - Scarborough to Coledale	3D	Public Recreation, Assets, and Safety	Loss of safe beach width (and scarping)	Likely	Minor	Moderate	High	Extreme	Extreme



Area	ID	Management Theme	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
Area C - Scarborough to Coledale	3E	Public Recreation, Assets, and Safety	User group conflicts	Likely	Insignificant	Low	Low	Moderate	Moderate
Area C - Scarborough to Coledale	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Unlikely	Major	Moderate	Moderate	High	Extreme
Area C - Scarborough to Coledale	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Unlikely	Major	Moderate	High	Extreme	Extreme
Area C - Scarborough to Coledale	3J	Public Recreation, Assets, and Safety	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme
Area D - Sharky to Austinmer	1D	Coastal Ecosystem Management	Habitat loss and impacts on native flora	Almost Certain	Minor	High	High	High	High
Area D - Sharky to Austinmer	1E	Coastal Ecosystem Management	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area D - Sharky to Austinmer	2A	Water Quality and Pollution	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Low	Low
Area D - Sharky to Austinmer	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Unlikely	Minor	Low	Low	Low	Moderate
Area D - Sharky to Austinmer	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	High	High
Area D - Sharky to Austinmer	3D	Public Recreation, Assets, and Safety	Loss of safe beach width (and scarping)	Almost Certain	Minor	High	High	Extreme	Extreme
Area D - Sharky to Austinmer	3E	Public Recreation, Assets, and Safety	User group conflicts	Likely	Insignificant	Low	Low	Moderate	Moderate
Area D - Sharky to Austinmer	3F	Public Recreation, Assets, and Safety	Dogs on beaches conflicts	Likely	Insignificant	Low	Low	Moderate	Moderate
Area D - Sharky to Austinmer	3G	Public Recreation, Assets, and Safety	Wind-blown sand drift impacting recreational amenity	Likely	Minor	Moderate	Moderate	High	High
Area D - Sharky to Austinmer	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Possible	Major	High	Extreme	Extreme	Extreme
Area D - Sharky to Austinmer	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Rare	Major	Moderate	High	Extreme	Extreme
Area D - Sharky to Austinmer	3J	Public Recreation, Assets, and Safety	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme
Area E - Thirroul to McCauleys	1B	Coastal Ecosystem Management	Impact of invasive species – flora	Almost Certain	Minor	High	High	High	High
Area E - Thirroul to McCauleys	1D	Coastal Ecosystem Management	Habitat loss and impacts on native flora	Almost Certain	Minor	High	High	High	High
Area E - Thirroul to McCauleys	1E	Coastal Ecosystem Management	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area E - Thirroul to McCauleys	1I	Coastal Ecosystem Management	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
Area E - Thirroul to McCauleys	2A	Water Quality and Pollution	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Moderate	Moderate
Area E - Thirroul to McCauleys	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Possible	Minor	Moderate	Moderate	Moderate	Moderate
Area E - Thirroul to McCauleys	2D	Water Quality and Pollution	Buried anthropogenic waste	Possible	Major	High	High	High	High
Area E - Thirroul to McCauleys	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore access	Almost Certain	Minor	High	High	High	High
Area E - Thirroul to McCauleys	3D	Public Recreation, Assets, and Safety	Loss of safe beach width (and scarping)	Almost Certain	Minor	High	Extreme	Extreme	Extreme
Area E - Thirroul to McCauleys	3F	Public Recreation, Assets, and Safety	Dogs on beaches conflicts	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area E - Thirroul to McCauleys	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Possible	Medium	Moderate	High	High	Extreme
Area E - Thirroul to McCauleys	3J	Public Recreation, Assets, and Safety	Loss or rationalisation of SLSCs	Unlikely	Major	Moderate	High	Extreme	Extreme
Area F - Sandon Point to Bulli	1B	Coastal Ecosystem Management	Impact of invasive species – flora	Almost Certain	Minor	High	High	Extreme	Extreme
Area F - Sandon Point to Bulli	1D	Coastal Ecosystem Management	Habitat loss and impacts on native flora	Almost Certain	Minor	High	High	High	High
Area F - Sandon Point to Bulli	1E	Coastal Ecosystem Management	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area F - Sandon Point to Bulli	1F	Coastal Ecosystem Management	Informal pedestrian and vehicle access damage	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
Area F - Sandon Point to Bulli	1H	Coastal Ecosystem Management	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
Area F - Sandon Point to Bulli	1I	Coastal Ecosystem Management	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
Area F - Sandon Point to Bulli	2A	Water Quality and Pollution	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Moderate	Moderate



Area	ID	Management Theme	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
Area F - Sandon Point to Bulli	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area F - Sandon Point to Bulli	2D	Water Quality and Pollution	Buried anthropogenic waste	Possible	Major	High	High	High	High
Area F - Sandon Point to Bulli	3B	Public Recreation, Assets, and Safety	Loss of lifeguard sight lines	Possible	Catastrophic	High	High	High	High
Area F - Sandon Point to Bulli	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Almost Certain	Minor	High	High	High	High
Area F - Sandon Point to Bulli	3D	Public Recreation, Assets, and Safety	Loss of safe beach width (and scarping)	Almost Certain	Minor	High	High	High	High
Area F - Sandon Point to Bulli	3E	Public Recreation, Assets, and Safety	User group conflicts	Likely	Medium	High	High	High	High
Area F - Sandon Point to Bulli	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Possible	Medium	Moderate	Moderate	High	High
Area F - Sandon Point to Bulli	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Rare	Major	Low	Low	Moderate	High
Area F - Sandon Point to Bulli	3J	Public Recreation, Assets, and Safety	Loss or rationalisation of SLSCs	Unlikely	Major	Moderate	High	Extreme	Extreme
Area G - Woonona to Bellambi	1A	Coastal Ecosystem Management	Impact of invasive species – fauna	Almost Certain	Minor	High	High	Extreme	Extreme
Area G - Woonona to Bellambi	1B	Coastal Ecosystem Management	Impact of invasive species – flora	Almost Certain	Minor	High	High	Extreme	Extreme
Area G - Woonona to Bellambi	1D	Coastal Ecosystem Management	Habitat loss and impacts on native flora	Likely	Minor	Moderate	Moderate	High	Extreme
Area G - Woonona to Bellambi	1E	Coastal Ecosystem Management	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area G - Woonona to Bellambi	1F	Coastal Ecosystem Management	Informal pedestrian and vehicle access damage	Almost Certain	Insignificant	Moderate	Moderate	Moderate	Moderate
Area G - Woonona to Bellambi	1H	Coastal Ecosystem Management	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
Area G - Woonona to Bellambi	1I	Coastal Ecosystem Management	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
Area G - Woonona to Bellambi	2A	Water Quality and Pollution	Water quality for primary contact recreation	Unlikely	Minor	Low	Low	Moderate	Moderate
Area G - Woonona to Bellambi	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Likely	Medium	High	High	Extreme	Extreme
Area G - Woonona to Bellambi	3B	Public Recreation, Assets, and Safety	Loss of lifeguard sight lines	Rare	Catastrophic	Moderate	High	High	Extreme
Area G - Woonona to Bellambi	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Likely	Medium	High	High	High	High
Area G - Woonona to Bellambi	3E	Public Recreation, Assets, and Safety	User group conflicts	Likely	Medium	High	High	High	High
Area G - Woonona to Bellambi	3F	Public Recreation, Assets, and Safety	Dogs on beaches conflicts	Likely	Insignificant	Low	Low	Moderate	Moderate
Area G - Woonona to Bellambi	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Rare	Major	Low	Low	Moderate	High
Area G - Woonona to Bellambi	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Rare	Major	Low	Low	Moderate	High
Area G - Woonona to Bellambi	3J	Public Recreation, Assets, and Safety	Loss or rationalisation of SLSCs	Rare	Major	Low	Moderate	High	Extreme
Area H - Corrimal to North Wollongong	1A	Coastal Ecosystem Management	Impact of invasive species – fauna	Likely	Minor	Moderate	High	High	Extreme
Area H - Corrimal to North Wollongong	1B	Coastal Ecosystem Management	Impact of invasive species – flora	Likely	Medium	High	High	High	High
Area H - Corrimal to North Wollongong	1E	Coastal Ecosystem Management	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area H - Corrimal to North Wollongong	1H	Coastal Ecosystem Management	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
Area H - Corrimal to North Wollongong	1I	Coastal Ecosystem Management	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
Area H - Corrimal to North Wollongong	2A	Water Quality and Pollution	Water quality for primary contact recreation	Possible	Medium	Moderate	High	High	High
Area H - Corrimal to North Wollongong	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Likely	Medium	High	High	Extreme	Extreme
Area H - Corrimal to North Wollongong	3A	Public Recreation, Assets, and Safety	Lifeguard services and unpatrolled beaches	Possible	Catastrophic	High	High	Extreme	Extreme
Area H - Corrimal to North Wollongong	3B	Public Recreation, Assets, and Safety	Loss of lifeguard sight lines	Rare	Catastrophic	Moderate	High	High	Extreme



Area	ID	Management Theme	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
Area H - Corrimal to North Wollongong	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Likely	Medium	High	High	High	High
Area J – MM Beach to Windang	3G	Public Recreation, Assets, and Safety	Wind-blown sand drift impacting recreational amenity	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area H - Corrimal to North Wollongong	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Possible	Major	High	High	High	High
Area H - Corrimal to North Wollongong	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Rare	Major	Low	Low	Moderate	High
Area H - Corrimal to North Wollongong	3J	Public Recreation, Assets, and Safety	Loss or rationalisation of SLSCs	Rare	Major	Low	Low	Moderate	Moderate
Area I - Wollongong City	1A	Coastal Ecosystem Management	Impact of invasive species – fauna	Likely	Medium	High	High	High	High
Area I - Wollongong City	1B	Coastal Ecosystem Management	Impact of invasive species – flora	Likely	Minor	Moderate	Moderate	High	High
Area I - Wollongong City	1E	Coastal Ecosystem Management	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area I - Wollongong City	1G	Coastal Ecosystem Management	Wind-blown sand drift and impacts on dune vegetation	Almost Certain	Insignificant	Moderate	Moderate	High	High
Area I - Wollongong City	1H	Coastal Ecosystem Management	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
Area I - Wollongong City	2A	Water Quality and Pollution	Water quality for primary contact recreation	Possible	Major	High	High	High	High
Area I - Wollongong City	2B	Water Quality and Pollution	Water quality for secondary contact recreation	Possible	Major	High	High	High	High
Area I - Wollongong City	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Likely	Medium	High	High	Extreme	Extreme
Area I - Wollongong City	2D	Water Quality and Pollution	Buried anthropogenic waste	Possible	Major	High	High	High	Extreme
Area I - Wollongong City	3A	Public Recreation, Assets, and Safety	Lifeguard services and unpatrolled beaches	Possible	Catastrophic	High	Extreme	Extreme	Extreme
Area I - Wollongong City	3B	Public Recreation, Assets, and Safety	Loss of lifeguard sight lines	Possible	Catastrophic	High	High	Extreme	Extreme
Area I - Wollongong City	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Possible	Medium	Moderate	Moderate	Moderate	High
Area I - Wollongong City	3F	Public Recreation, Assets, and Safety	Dogs on beaches conflicts	Unlikely	Minor	Low	Low	Moderate	Moderate
Area I - Wollongong City	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Likely	Major	Extreme	Extreme	Extreme	Extreme
Area I - Wollongong City	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Unlikely	Major	Moderate	Moderate	High	High
Area J – MM Beach to Windang	1A	Coastal Ecosystem Management	Impact of invasive species – fauna	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
Area J – MM Beach to Windang	1B	Coastal Ecosystem Management	Impact of invasive species – flora	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
Area J – MM Beach to Windang	1C	Coastal Ecosystem Management	Habitat loss and impacts on native fauna	Likely	Medium	High	High	High	High
Area J – MM Beach to Windang	1D	Coastal Ecosystem Management	Habitat loss and impacts on native flora	Possible	Major	High	High	High	High
Area J – MM Beach to Windang	1E	Coastal Ecosystem Management	Vegetation vandalism	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area J – MM Beach to Windang	1F	Coastal Ecosystem Management	Informal pedestrian and vehicle access damage	Almost Certain	Minor	High	High	High	High
Area J – MM Beach to Windang	1G	Coastal Ecosystem Management	Wind-blown sand drift and impacts on dune vegetation	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
Area J – MM Beach to Windang	1H	Coastal Ecosystem Management	Harvesting and walking on rock platforms	Possible	Medium	Moderate	Moderate	High	Extreme
Area J – MM Beach to Windang	1I	Coastal Ecosystem Management	Inadequate buffers for TECs and areas of wetland migration	Unlikely	Major	Moderate	High	Extreme	Extreme
Area J – MM Beach to Windang	2A	Water Quality and Pollution	Water quality for primary contact recreation	Possible	Major	High	High	High	High
Area J – MM Beach to Windang	2B	Water Quality and Pollution	Water quality for secondary contact recreation	Possible	Major	High	High	High	High
Area J – MM Beach to Windang	2C	Water Quality and Pollution	Urban stormwater and sewer pollutants	Almost certain	Medium	Extreme	Extreme	Extreme	Extreme
Area J – MM Beach to Windang	2D	Water Quality and Pollution	Buried anthropogenic waste	Possible	Major	High	High	High	High
Area J – MM Beach to Windang	3A	Public Recreation, Assets, and Safety	Lifeguard services and unpatrolled beaches	Possible	Catastrophic	High	Extreme	Extreme	Extreme



Area	ID	Management Theme	Stressor	Present Day Likelihood	Present Day Consequence	Present Day Risk	2045 Risk	2075 Risk	2125 Risk
Area J – MM Beach to Windang	3B	Public Recreation, Assets, and Safety	Loss of lifeguard sight lines	Possible	Catastrophic	High	High	High	High
Area J – MM Beach to Windang	3C	Public Recreation, Assets, and Safety	Loss of safe beach/foreshore/waterway access	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Area J – MM Beach to Windang	3D	Public Recreation, Assets, and Safety	Loss of safe beach width (and scarping)	Likely	Minor	Moderate	Moderate	High	Extreme
Area J – MM Beach to Windang	3F	Public Recreation, Assets, and Safety	Dogs on beaches conflicts	Unlikely	Minor	Low	Low	Moderate	Moderate
Area J – MM Beach to Windang	3G	Public Recreation, Assets, and Safety	Wind-blown sand drift impacting recreational amenity	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme
Area J – MM Beach to Windang	3H	Public Recreation, Assets, and Safety	Wave overtopping and public safety	Likely	Major	Extreme	Extreme	Extreme	Extreme
Area J – MM Beach to Windang	3I	Public Recreation, Assets, and Safety	Loss or rationalisation of rock pools	Likely	Minor	Moderate	Moderate	High	High
Study Area Wide	4A	Strategic Planning Risks	Complex land tenure and governance arrangements	Likely	Medium	High	High	High	High
Study Area Wide	4B	Strategic Planning Risks	Gap between strategic planning and on-ground implementation	Likely	Medium	High	High	High	High
Study Area Wide	4C	Strategic Planning Risks	Inconsistent strategic direction across council	Possible	Major	High	High	High	High
Study Area Wide	4D	Strategic Planning Risks	Lack of policy direction for coastal hazard management	Likely	Medium	High	High	Extreme	Extreme
Study Area Wide	4E	Strategic Planning Risks	Insufficient strategic direction for climate change adaptation	Unlikely	Major	Moderate	High	Extreme	Extreme
Study Area Wide	4F	Strategic Planning Risks	Lack of understanding of legislative requirements across all levels of council	Likely	Minor	Moderate	Moderate	Moderate	Moderate
Study Area Wide	4H	Strategic Planning Risks	Management of historic heritage in the coastal zone	Possible	Major	High	High	High	High
Study Area Wide	4H	Strategic Planning Risks	Protection of First Nations cultural heritage	Likely	Major	Extreme	Extreme	Extreme	Extreme
Study Area Wide	4I	Strategic Planning Risks	Land use planning pressures in the coastal zone	Unlikely	Major	Moderate	Moderate	Moderate	Moderate
Study Area Wide	4J	Strategic Planning Risks	Lack of community awareness of the importance of coastal ecosystems, habitat values and EECs	Almost Certain	Minor	High	High	Extreme	Extreme
Study Area Wide	4K	Strategic Planning Risks	Environmental Data Gaps	Almost Certain	Medium	Extreme	Extreme	Extreme	Extreme

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