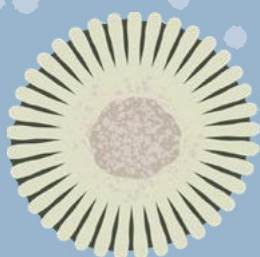




Bancoora Coastal Adaptation Plan

FINAL

July 2026



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Bancoora Coastal Adaptation Plan

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alluvium
consulting



**Barwon
Coast**

Acknowledgment

Barwon Coast acknowledges and respects Wadawurrung People as the original custodians of the marine and coastal environment of the southern Bellarine Peninsula and their unique ability to care for Country and deep spiritual connection to it. We honour Wadawurrung Elders, past and present, whose knowledge, and wisdom has ensured the continuation of culture and traditional practices.

We are committed to working with the Wadawurrung people to care for the coast.

About Us

Barwon Coast Committee of Management Inc. (Barwon Coast) is delegated to manage 22km of the southern coast along Victoria's Bellarine Peninsula. This includes the beaches and foreshores of Collendina, Ocean Grove, Barwon Heads, 13th Beach, Black Rock and Breamlea.

In partnership with Traditional Owners, Barwon Coast's charter is to protect and enhance the natural environment and provide opportunities for residents and visitors to enjoy these areas. We operate the Barwon Heads Caravan Park, Riverview Family Caravan Park (Ocean Grove), Riverside Campground (Ocean Grove), and Breamlea Caravan Park, as well as managing various commercial and community based leases and licences.

Barwon Coast is a State Government body, established under the *Crown Land (Reserves) Act 1978* on 1 July 1995. All revenue raised is reinvested to care for the natural environment and to provide facilities and infrastructure along the coast for use and enjoyment by all



Key Terms and Definitions

Term	Definition
Adaptation	The process of adjustment to actual or expected climate and its effects. This includes disturbance such as coastal hazards. In human systems, adaptation seeks to proactively manage/avoid harm, and make use of beneficial opportunities
Adaptive capacity	The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.
CAP	Coastal Adaptation Plan
Coastal erosion	The process of winds, waves and coastal currents shifting sediment away from a localised area of the shoreline. Coastal erosion can include short term (storm event) erosion and long-term erosion from both historic change and future changes due to sea level rise.
Coastal hazards	Natural coastal processes that may negatively impact on the marine and coastal environment, including impacts on human use, values, property or infrastructure. Hazards include coastal erosion and inundation (flooding) due to storm tide and sea level rise.
Event	Where weather conditions affecting a place are notably different from typical, day-to-day conditions experienced at that location (e.g. a storm event). An event might include high winds, high tides and/or rainfall leading to high catchment (river) flow and can cause inundation (flooding) and/or erosion. Events vary in magnitude (size) and duration (time). They may last from hours up to several days.
Exposure	The degree to which a system is exposed to a given hazard.
Permanent inundation	Regular inundation (flooding) from tides, increasing with sea level rise.
Planning horizon	An indicative timeframe by which a projected sea level rise scenario is anticipated to occur. While each sea level rise projection has been linked to a time period, the stated time is indicative and may need to be revised as more localised sea level projections are developed and/or updated.
Resilience	The capacity of social, economic, and environmental systems to cope with a hazardous event/trend, reorganising in ways that maintain their essential function, identity, and structure, while also maintaining capacity for adaptation, learning, and transformation.
Risk	The effect of uncertainty on objectives. In an operational context, risk is the likelihood of an event occurring, combined with its potential consequence.
Sand scraping	The mechanical movement or 'pushing' of sand from the lower part of the beach to the upper beach / dune or redistributing sand build-up from undesirable areas. This mimics natural beach recovery and helps accelerate dune rebuilding after storm-based erosion.
Sea level rise (SLR)	An increase in the mean level of the ocean. Relative sea level rise occurs where there is a local increase in the ocean level relative to the land, which might be due to ocean rise and/or land subsidence.
Storm tide inundation	Inundation (flooding) resulting from storm activity, combining storm surge and the predicted tide height.
VRC	Victoria's Resilient Coast - Adapting for 2100+. Victorian Government guidance for coastal adaptation planning.

1. Introduction

Bancoora Beach and Breamlea foreshore is treasured for its cultural values, natural beauty and as a place to unwind and get away from it all. The Traditional Owners of this area, the Wadawurrung, have a strong cultural connection to the land, waters, seas and skies across the region. The area is under pressure from more visitors and beach users as the population grows in outer Geelong and nearby Armstrong Creek growth corridor.

The dynamic coast is shaped by the natural processes of shifting sand, tides, waves and currents. The coast will continue to shift and change in response to rising seas and greater storms in the future. These changes may include parts of the coast being inundated and other areas being eroded and reshaped by sand movement.

Barwon Coast, in partnership with Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC), have developed this Coastal Adaptation Plan (CAP), for the Bancoora Beach and Breamlea foreshore. Alluvium Consulting were engaged to develop the plan. The project was fully funded under the Department of Energy, Environment and Climate Action's Victoria's Resilient Coast Grants Program 2023.

Role and purpose of the Plan

The purpose of Bancoora Coastal Adaptation Plan is to:

- Understand the cultural, environmental and community values of Bancoora Beach and Breamlea foreshore.
- Understand the projected changes to the coast and shoreline from rising seas and greater storms (through processes like erosion and inundation).
- Understand how these changes to the coast may impact important values.
- Understand what options are available to manage impacts on the values.
- Assess and choose adaptation options to manage current and future risks to these values.



The Wadawurrung People are the Traditional Owners of the dja, warri and ngubiyt (Country, Water and Sea) of the coastal reserves on the Bellawiyin (Bellarine Peninsula) that Barwon Coast manage. Representing the Wadawurrung People, the Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC) are key partners in this project.

How this Plan fits with broader coastal management across Barwon Coast

The Bancoora Coastal Adaptation Plan is part of Barwon Coast's whole-of-coast management approach that includes the **Coastal Hazard Exposure Report (CHER)** and **Foreshore Master Plan**.

The **CHER** maps current and future coastal erosion and inundation from Breamlea to Collendina. Results from this Plan have been incorporated into the CHER to create a consistent set of hazard maps across Barwon Coast's management area. Unlike this Plan, the CHER does not assess impacts on coastal values and assets or identify adaptation actions. However, its mapping has informed the draft Foreshore Master Plan and will support future risk-informed adaptation planning for other coastal areas.

The **Foreshore Master Plan** is a 15-year plan for protecting, accessing, and improving the coast from Breamlea to Collendina. Its scope extends beyond coastal adaptation, setting Barwon Coast's strategic direction, investment priorities and works program. It will help balance the protection and enhancement of the natural environment with pressures such as population growth and ageing infrastructure, as well as coastal hazards.

Limitations of the Plan

There are several limitations to consider when reading this plan. The Plan:

- Is focused on land and assets managed by Barwon Coast and does not include private land.
- Primarily assesses coastal hazards and does not consider the full impacts of other natural hazards such as catchment flooding or bushfire hazards.
- Does not include detailed assessment of the responses of the Thompson Creek estuary mouth to sea level rise.
- Uses best-available existing datasets and models and incorporates limitations of those studies.
- Has not included any new modelling.
- Describes adaptation pathways and high-level actions, but does not include detailed implementation planning.

Coastal modelling considerations and limitations

The best available coastal modelling datasets were used to develop this Plan. Coastal models are developed using extensive scientific knowledge and research and help fill knowledge gaps to provide important evidence for understanding coastal hazards. However, it's important to be mindful that models carry inherent limitations, and they can only provide a simplified representation of the complex coastal processes and hazards experienced in the real world.

Coastal models are also often costly and time-consuming to develop. This means the available models for a particular stretch of coast may be based on data or assumptions established some time ago. For example, most hazard assessments used in development of this Plan rely on a baseline sea level from around 1990. Since then, sea levels at Lorne have risen by almost 0.1 m. Present-day conditions may therefore be better represented by a 0.2 m sea level rise scenario than by the modelled baseline.

It should be noted that this Plan's approach to coastal adaptation involves revising planned actions as new information, observed changes or updated modelling becomes available.

Further information about the limitations of coastal hazard modelling is provided in Section 3.5 of the *Bancoora Coastal Adaptation Plan Technical Reporting* document.

Where the Plan covers

The Plan covers the coastal Crown land of Bancoora Beach and Breamlea foreshore managed by Barwon Coast (Figure 1). These foreshore reserves stretch from the Thompson Creek estuary in the southwest to Bancoora Beach to the east and include beaches, dune systems, wetlands, as well as the Breamlea Caravan Park and Bancoora Surf Lifesaving Club area.

The Plan is primarily focussed on the areas of coastal Crown land under Barwon Coast's jurisdiction. The Plan also considers the interconnected coastal system and adjoining land uses and access to these areas. Future adaptation actions and pathways relating to private land are not within scope of this project.

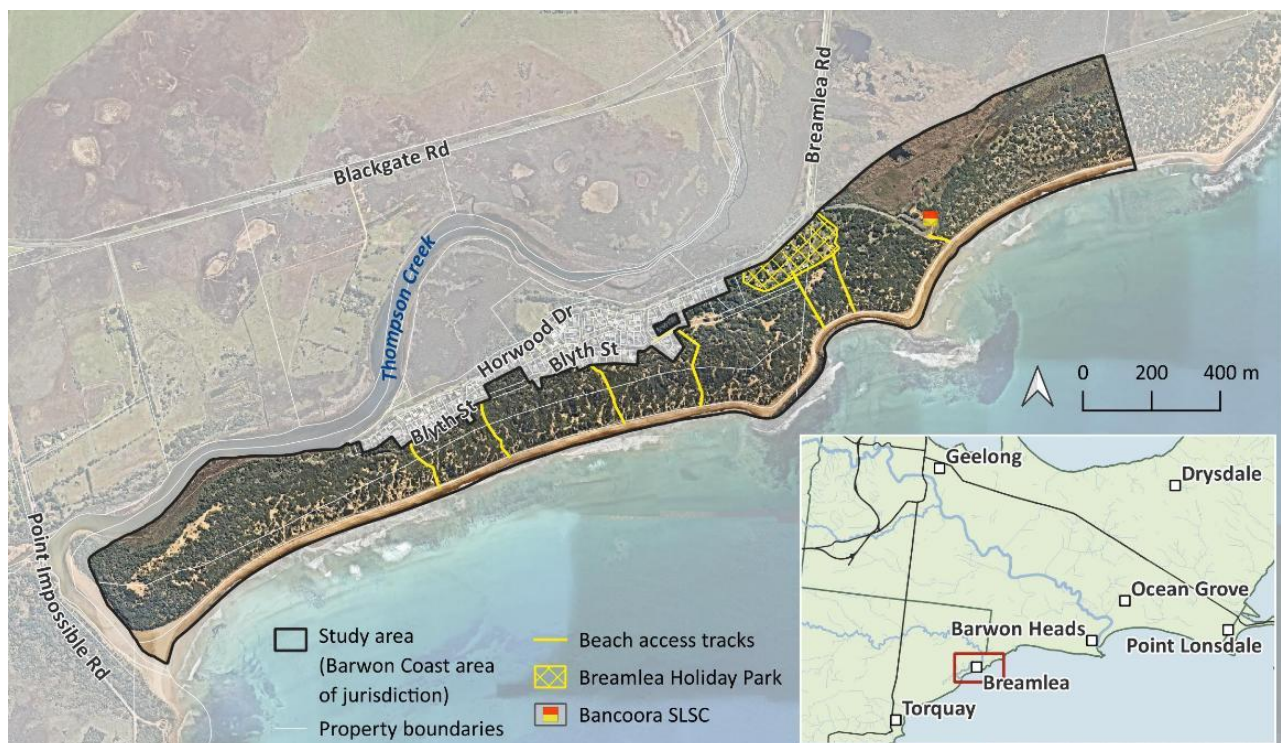


Figure 1. Bancoora Coastal Adaptation plan area

Ongoing community consultation

Community members, Traditional Owners, stakeholders and land managers will continue to be consulted as adaptation actions are further planned and implemented.

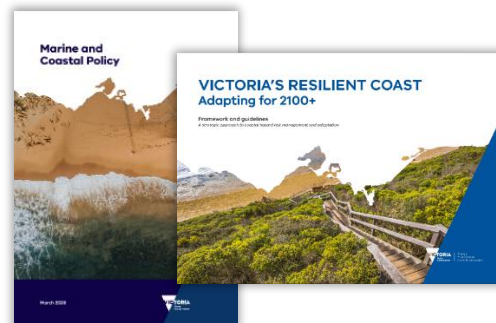
Additional information will be provided about how future adaptation decisions will be made, including opportunities for input on how actions will be delivered.

How the Plan was developed

The Plan has been developed in partnership with WTOAC, and in collaboration with government agencies, stakeholders and the community. There were five main stages underpinned by a cultural values assessment and community and stakeholder engagement.

The Plan aligns with the Victorian Government's [Marine and Coastal Policy 2020](#) and [Victoria's Resilient Coast – Adapting for 2100+ Framework and Guidelines \(VRC\)](#).

These policies and supporting documents guide decision makers (including land managers) in the planning, management and sustainable use of our coastal and marine environment, including direction for managing coastal hazard risk and adaptation.



For more information on the legislation, policies and frameworks that informed the Plan, please refer to **Section 1.2** of the Bancoora Coastal Adaptation Plan Technical Report.



The VRC framework sets out the process for adaptation planning in Victoria. It identifies seven stages that step through technical, strategic planning and engagement elements of adaptation planning (Figure 2). This project has been funded for stages one to five (Figure 3).

Barwon Coast will complete stages six and seven in a separate process. This will link to Barwon Coast's Corporate Plan, annual operational plans and other strategic plans, such as the Coastal and Marine Management Plan (CMMP).

Figure 2. Victoria's Resilient Coast – adapting for 2100+ framework stages

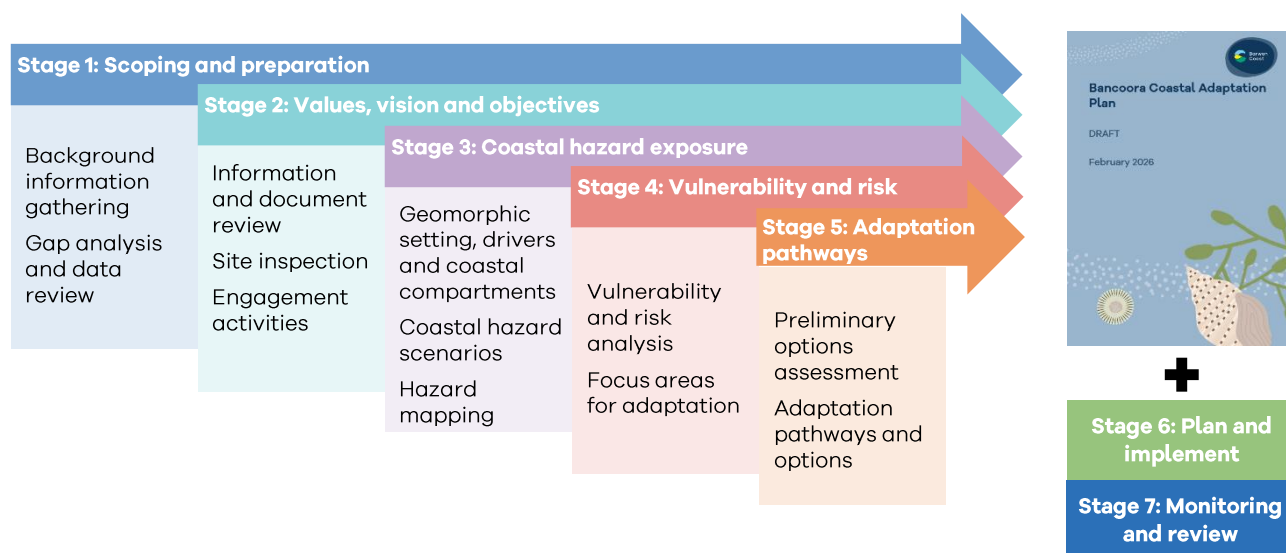


Figure 3. Victoria's Resilient Coast Stages that have shaped the Bancoora CAP.

This plan summarises the work in Stages 2 to 5 and is supplemented by a technical report with more detail on the work undertaken for each stage, technical assessments and outcomes.

Who was involved

Partnerships, engagement and communication are core aspects of adaptation planning. These help build rightsholder, community and stakeholder understanding and awareness of coastal hazards.

Rightsholders, government agencies/authorities, stakeholders, community, and adjoining land managers were involved in developing the Plan. We created a Project Steering Group (PSG) to engage with rightsholders and stakeholders. Local groups and the community were involved through online and in-person engagement activities including surveys and interviews. Table 1 provides a summary of the groups and their involvement in the project.

Table 1. Rightsholders, stakeholders and community groups involved in developing the plan.

Group		Involvement
 Barwon Coast	Barwon Coast Committee of Management Land manager and lead agency	✓ (lead)
 Wadawurrung Traditional Owners	Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC) Registered Aboriginal Party and Traditional Owners	Partner and PSG
 VICTORIA State Government	Department of Energy, Environment and Climate Action (DEECA) Project sponsor and statewide coastal policy and adaptation	PSG
 CORANGAMITE CMA	Corangamite Catchment Management Authority (CCMA) Catchment management authority and waterway manager for Thompson Creek	PSG
 Parks VICTORIA	Parks Victoria (PV) Adjoining land manager of Breamlea Flora and Fauna Reserve	PSG
 CITY OF GREATER GEELONG	City of Greater Geelong (CoGG) Local government authority and adjoining land and asset manager	PSG
	Bancoora Surf Lifesaving Club (Bancoora SLSC) Key asset user group and involved with Bancoora SLSC redevelopment	PSG
 Barwon Water	Barwon Water (BW) Adjoining land and asset manager east of Bancoora Beach	Informed and Plan feedback
 The Breamlea Association	Breamlea Community Association Local community group	Engagement activities
	Breamlea Coastcare Local community group	Engagement activities
	Breamlea and Bancoora community members People who live or are interested in the area	Engagement activities
	Broader coastal community People that visit and are interested in the area	Engagement activities
	Surf Coast Shire Council (SCSC) Adjoining local government authority and land manager	Informed and Plan feedback
	Great Ocean Road Coast and Parks Authority (GORCAPA) Adjoining land manager westward from Point Impossible	Informed and Plan feedback

Role of the PSG

The PSG was established as the primary tool for engaging with key rightsholders and stakeholders that have an interest or responsibilities across the study area. The PSG shared ideas, knowledge, information and feedback at key project stages. Four PSG meetings were held throughout the development of the plan.

Community engagement activities

Engagement to inform the plan focussed on understanding coastal values, uses and experiences of Bancoora Beach and the Breamlea foreshore. Activities aimed to capture the array of interests, values and aspirations held by the community as a foundation for adaptation planning. Our community engagement activities included an online survey and targeted interviews.



Online community survey

The online survey was available on the Barwon Coast website from August to October 2024. We had 56 respondents, including a range of permanent residents and visitors. They shared perspectives on:

- how they use and enjoy the Bancoora and Breamlea foreshore
- how often they visit and what activities they do
- what they value most and what important functions of the beach and coast are
- their understanding and experiences of coastal hazards and coastal processes
- ideas for building resilience of the coastal zone

Most respondents were residents of Breamlea or nearby towns (Figure 4). Nearly half of respondents visit Bancoora Beach / Breamlea foreshore at least weekly (Figure 5).

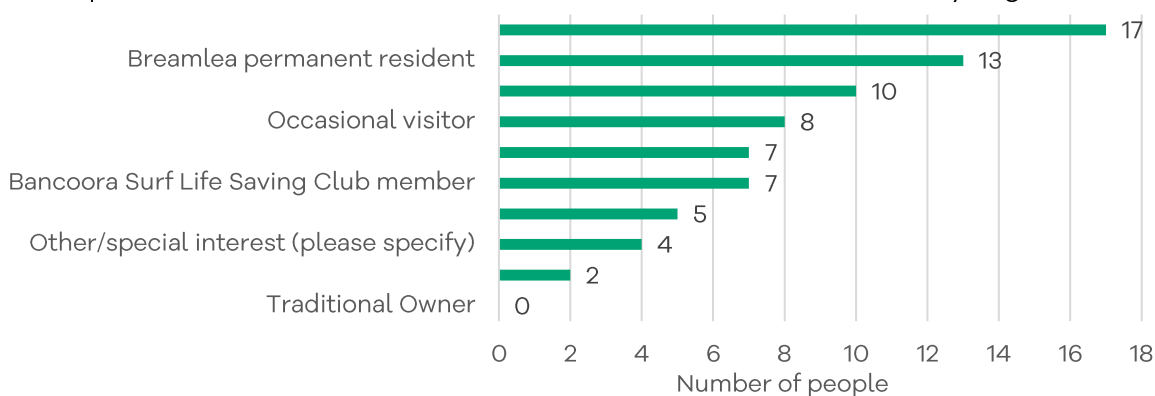


Figure 4. Survey results: "How would you describe your connection to the area".

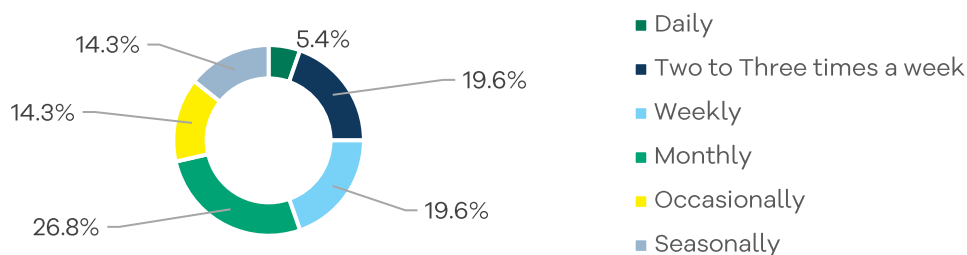


Figure 5. Survey results: "On average, how often do you visit Bancoora Beach and/or Breamlea foreshore?"



Five in-person interviews

Interview discussions were held with long-term residents and/or members of local community groups: Breamlea CoastCare, Breamlea Community Association, and the Bancoora Surf Life Saving Club. These interviews provided further insights into local values, history of the region and aspirations for the future.

2. Coastal values, vision and objectives

VRC Stage 2

Values, vision and objectives

Purpose: Ensure adaptation planning is underpinned by regional and place-based values.

Local marine and coastal values underpin strategic decision making and are essential to adaptation and resilience planning. Understanding the unique values of the Breamlea foreshore and Bancoora Beach is critical to developing a tailored adaptation plan. Understanding values ensures the unique character of the region is retained into the future. This stage describes these values which informs a vision and objectives for this adaptation plan.

Creating a future vision for the study area with supporting aspirations (objectives) is an important aspect of coastal adaptation planning. This section provides a summary of the values of Bancoora Beach, Breamlea foreshore and surrounding areas which were informed by a range of activities that have helped us better-understand the values of Bancoora and Breamlea (Figure 6).

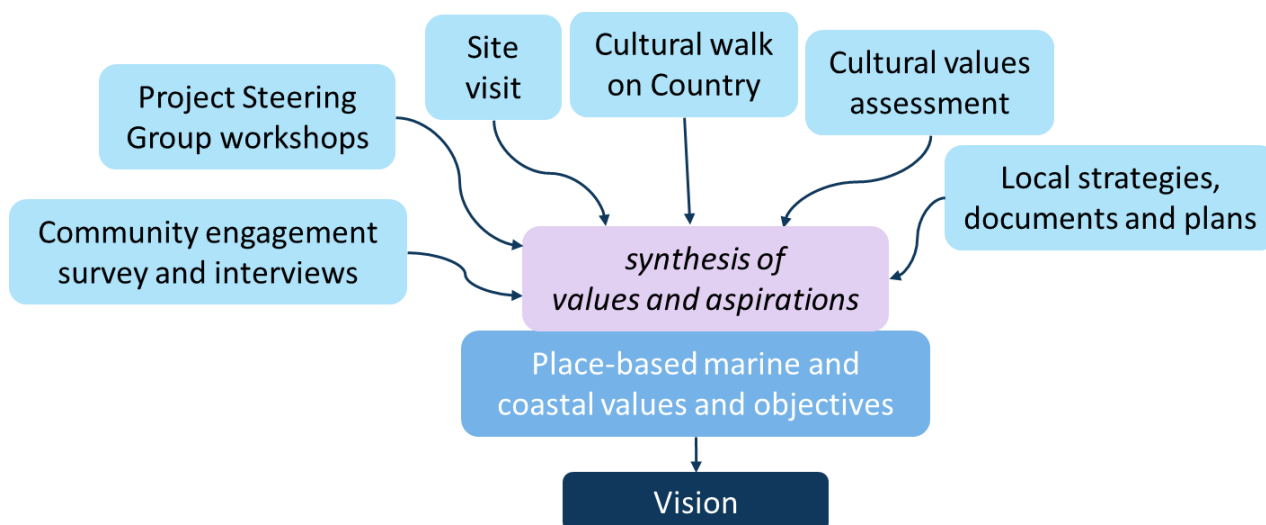


Figure 6. Inputs for understanding the values that will guide the vision and aspirations

The next sections describe these important values across four themes:

-  The study region through time and the influences that have shaped the area.
-  Wadawurrung connection to Country and aspirations.
-  Significant ecology and environmental values.
-  The social and recreation values of the area.



The study region through time

The study area is Wadawurrung land and sea Country which has been continually cared for by generations of Wadawurrung people over tens of thousands of years. Wadawurrung Traditional Owners have fought hard to survive the impacts of colonisation and dispossession and have maintained this connection with Dja (Country). This care and responsibility for Country continues today and is expressed in the *Paleert Tjaara Dja: Let's make Country good together 2020 – 2030 Wadawurrung Country Plan*. Country is interconnected, alive with dreaming and creation stories, imprinted with cultural values and social history. Wadawurrung Traditional Owners see no separation between cultural and natural resources and people. Caring for Country, land, sky, and waters, alongside continuation of cultural practices, is core to Wadawurrung identity as the Traditional Owners and custodians of Bancoora beach and the Breamlea foreshore.

Colonial history in the area began around the 1860s. In 1891 the SS Bancoora ran aground on what is now known as Bancoora surf beach, giving the beach its current name. By the turn of the century, the area had become known amongst settlers of Geelong as a location for summer camping. Figure 7 shows a topographic map of the area in 1915.



Figure 7. 1915 topographic map extract (State Library Victoria, 1915).

Official European surveying and public auction of land occurred in the 1940s. This included the creation of a recreational reserve and a municipal reserve, now known as Breamlea Recreation Reserve and Cahir Park, respectively.

Further development of the township included establishing the Bancoora Surf Life Saving Club and Breamlea Caravan Park. Today, the Breamlea township includes over 100 homes, with a population of 151 people in the most recent census (2021).

The timeline below summarises key events across the study region through time (Figure 8). This is not intended to be an exhaustive list but provides a summary of the different ways the area we see today has been shaped.

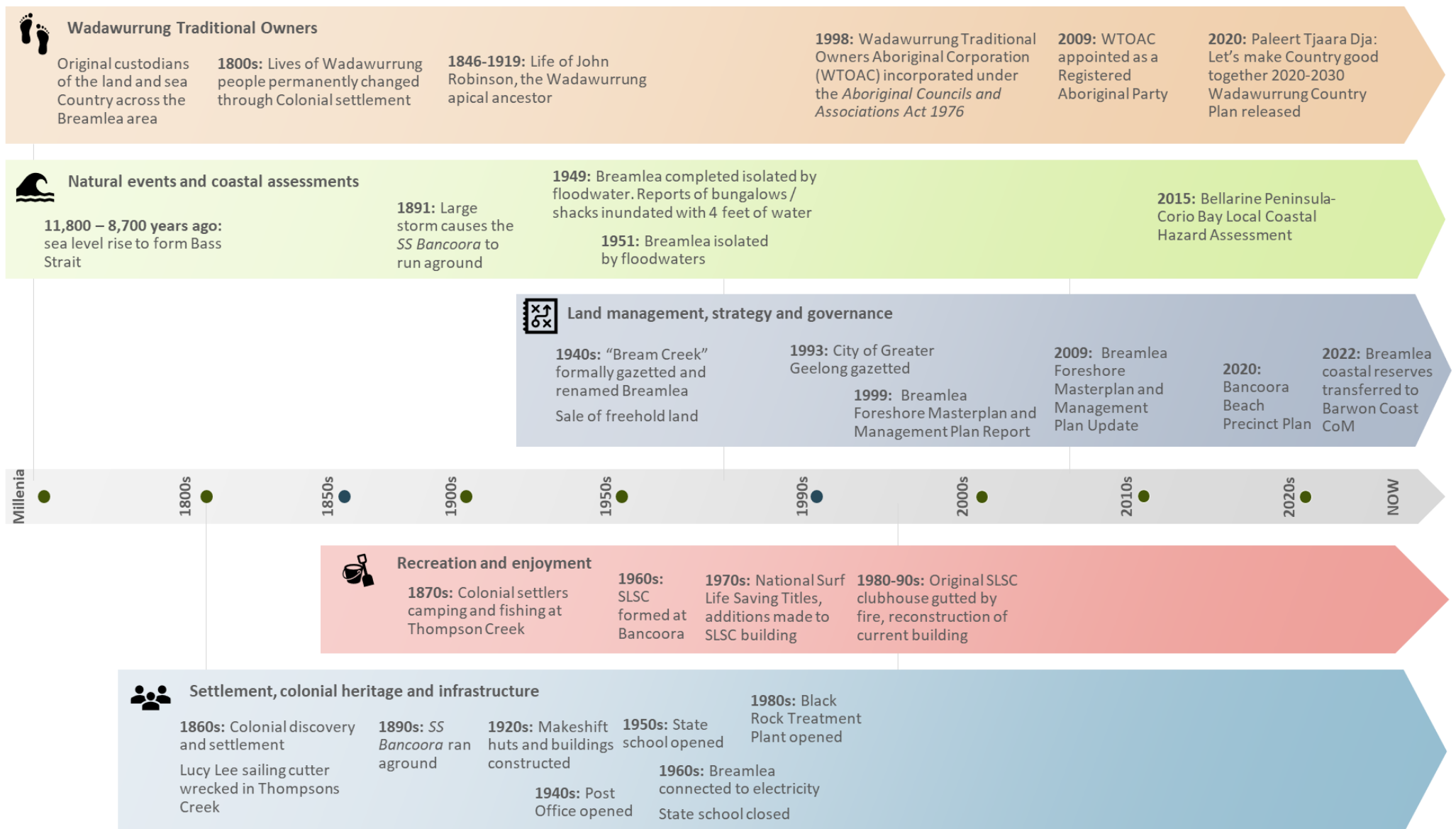


Figure 8. Timeline of key events within the study region, shaping the area through time (not exhaustive list).

Wadawurrung connection to Country

Wadawurrung people have long appreciated this coastal region as a special place. Their connection to the study area is tied to the holistic collection of all physical, cultural and spiritual aspects of this part of Country. Country is inseparable from Wadawurrung sense of self and identity.

This coastline is a traditional supermarket for Wadawurrung, producing a vast and diverse range of resources. The mosaic of ocean, reef, rock, dune, creek, wetland and salt marsh environments in close proximity of each other are cared for and celebrated by Wadawurrung people to safeguard their abundant cultural resources.

Wadawurrung people use these resources for many purposes, including:

- Crafting various tools, for both use and trade with close neighbouring and distant communities.
- Creating ceremony materials, such as ceremony paints from the many shades of ochre from coastal cliffs.
- Building large communal huts, which work with the natural shape and form of the Moonah trees of the area.
- Hunting, harvesting, and nurturing a vast array of food and medicinal sources.

The whole Bancoora / Breamlea area has high cultural significance. There are many places of cultural heritage, both tangible and intangible. Archaeological surveys show that Breamlea has one of the highest densities of middens along the central west coast of Victoria. The middens are a record of, and a present-day connection to, the many Wadawurrung people who gathered and shared meals and stories in these carefully selected places among the dunes and rocky platforms. More than 60 Aboriginal archaeological sites are registered with Aboriginal Affairs Victoria within a 2 km radius of Breamlea. Many places of significance are also likely to be undocumented, as Wadawurrung peoples' involvement in earlier archaeological surveys was not sought out.

Places of high spiritual importance associated with Wadawurrung Dreaming are present within the landscape. Wadawurrung people today continue to uphold cultural responsibility associated with caring for all parts of Country located within the Breamlea / Bancoora area. The Wadawurrung Country Plan details aspirations for a stable or increased extent of native vegetation, including moonah trees, and increased breeding of shorebirds.

Note: A separate Cultural Values Study has accompanied the Coastal Adaptation Plan and will provide additional insight into cultural values across the study area.

Ecology and environmental values

The ecology of the study area is highly diverse, with saltmarsh, wetlands, dunes, beaches and diverse flora and fauna.

Saltmarsh and wetlands

Thompson Creek flows through extensive wetlands and coastal saltmarsh that form the Breamlea Flora and Fauna Reserve (BFFR), managed by Parks Victoria, Corangamite CMA and DEECA. The mouth of Thompson Creek forms an intermittently open and closed estuary. The saline wetlands of the BFFR extend to the north-east, where they border the Bancoora Surf Life Saving Club, and to the west of the Breamlea township, where they are known as the Karaaf Wetlands.

The saltmarsh periodically floods with fresh and salt water, depending on catchment runoff and tidal water levels. The BFFR hosts succulent herbs, low succulent shrubs, rushes and sedges, including Beaded Glasswort, Marsh Saltbush, Coast Beard-heath and Seaberry Saltbush.

The diversity and conservation importance of the area's ecology is recognised in national legislation. Coastal saltmarsh and open-coast salt-wedge estuaries are recognised as threatened nationally under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).



Sandy beach and dunes

The wetlands and the ocean are divided by high dunes and sandy beaches. Basalt rock platforms are found, forming from historic lava flows from Mount Duneed. The dunes and grasslands include Coastal Dune Scrub and Coastal Dune Grassland. Species include Coast Tea tree and Coast Wattle (both not locally native), with some native species such as Coast Beard-heath, Coast Sword Sedge, Chaffy Saw-sedge, Coast Blown-grass and native orchids.

Moonah Woodland historically formed part of these ecosystems. Only 4% of mature remnant trees today are currently regenerating. Moonah are central to Wadawurrung marriage stories.

The Breamlea and Bancoora sand dunes are much steeper today than they were historically. This is due to the introduction of Marram grass in the 1950s. Marram grass has replaced the native Spinifex grass, transforming the dunes to be steeper and more likely to collapse following erosion events. However, the high dunes now create protection from wind and waves for the Breamlea township and Bancoora SLSC that sit behind them.



Marram grass is a European grass introduced to coastal areas of Australia as a dune stabiliser. Stimulated by sand coverage, the plant's dense growth and network of roots trap shifting sand and enhance dune formation.

Fauna

The diverse and rare ecosystems found in the area's surrounds are home to a large number of threatened animal species. This includes a number of migratory bird species and other threatened faunal species listed on the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) Threatened List and the national EPBC Act List of Threatened Fauna. Key species found in and around the study area are summarised below.

KEY: ^Mmigrates outside of Australia | ^{*}threatened species listed under the FFG Act (Vic) | [^]threatened species listed under the EPBC Act (Cth)
Where known, Wadawurrung language naming is included in brackets.

Birds

Small shorebirds / waders: Hooded Plover^{*,^}, Double-banded Plover^M, Red-capped Plover, Silver Gull, Crested Tern, Caspian Tern^{*}, Red-necked Stint^M, Common Greenshank^{M*,^}, Banded Stilt^M, Latham's Snipe^{M^}

Large waders: White-faced Heron, Eastern Grey Egret^{*}, Sacred Ibis, Glossy Ibis, Yellow Spoonbill, Royal Spoonbill, Brolga^{*} (porronggitj)

Waterbirds: Grey Teal, Black Swans (connewarre), Pied Cormorant, Pelican

Birds found within fringing wetlands: White-fronted Chat, Golden-headed Cisticola, Orange-bellied Parrot^{*,^}

Woodland birds: Superb Blue Fairy Wren, Red-browed Finch, Grey Fantail, Grey Shrike-thrush, Singing Honeyeater, Australian Magpie, Eastern Spinebill



Brolga
(porronggitj)



Double-
banded Plover



Common
Greenshank



Hooded Plover is listed as vulnerable in Victoria and nationally. They regularly breed and nest at Breamlea foreshore, Bancoora Beach, and along Thompson Creek. Their exposed nests are present on open sand from August to February, which places them at risk from disturbances, such as people, foxes and unrestrained dogs.



Orange-bellied Parrot is listed as critically endangered in Victoria and nationally. They migrate from Tasmania to the mainland over winter. They feed on the seeds of several saltmarsh species, in particular Beaded Glasswort. The coastal saltmarsh surrounding Breamlea is a known site for the birds and is considered critical 'core habitat' within the region.

Insects: Yellow sedge-skipper Butterfly^{*}, Bogong Moth, Spotted Wave Moth, Fiddler Beetle, moths from the *Chlorocoma* genus



Bogong
Moth

Reptiles and amphibians: Eastern Three-lined Skink, Blue-tongued Lizard, Tiger Snake, Marbled Gecko, Southern Brown Tree Frog, Growling Grass Frog^{*,^}, Eastern Pobblebonk, Spotted Marsh Frog



Yellow-
sedge
Skipper
Butterfly



Three-
banded
Skink



Growling
Grass Frog

Mammals: Echidnas, Brush-tailed Possum (walert), Bush Rat, Antechinus spp. ^{*}, Australian Fur Seal, Southern Elephant Seal^{*}, Leopard Seal, New Zealand Fur Seals, Eastern Grey Kangaroo (goim), Swamp Wallaby (go-yin)

Fish (kuwiyn): Yellowfin Bream, Black Bream, Big-headed or Flathead Gudgeon, Black Bream, Greenback Flounder, Long-snouted Flounder, Small-mouthed Hardyhead, Tommy Ruff, Yellow-eyed Mullet, Common Galaxias, Australian Salmon

Social and recreational values

There are a range of social and recreation values, ranging from community groups being involved in caring for the coast, to locals and visitors enjoying the beaches for surfing, walking and relaxing.

Community connection and stewardship

The local communities of Breamlea and Bancoora are passionate and heavily involved in the management of their coastal and marine spaces. Several active community groups support coastal management including the Breamlea Community Association, Breamlea Coastcare and Friends of Hooded Plover Bellarine. Barwon Coast maintains close working relationships with each of these groups, recognising the expertise and commitment present among their members.

Results of our community survey gave a clear indication that the local community and visitors to Bancoora Beach and Breamlea foreshore care deeply for the natural environment. Many comments expressed a desire to prioritise protection of the natural environment, including ensuring that there is little further development and that on-ground management of environmental values is strengthened. Survey respondents ranked *Natural landscapes, plants and animals and habitats* as the most important value to them.



Beach recreation

Bancoora Beach and the Breamlea foreshore are the social and recreational hub of the area, being visited regularly by locals and visitors. The beach and foreshore offer many different forms of recreation, attracting surfers, swimmers and people wanting to relax. The coast is readily accessible for locals and visitors, with six beach access paths from the village and caravan park to the coast and the patrolled Bancoora Beach. In our community survey, 45% of respondents visit the beach or foreshore at least weekly.

The beach and foreshore are also known for their tranquillity, lack of crowds, and family friendly nature, making it an ideal place for relaxation and walking. The dunes offer a scenic backdrop for walking, with formalised paths protecting the delicate dune ecosystem. Neighbouring the beach area, Breamlea's Thompson Creek draws fishers, kayakers, and small boat enthusiasts, while the wetlands and saltmarsh provide diverse birdwatching opportunities.

Growing populations across Armstrong Creek on the outskirts of Geelong are increasing pressures on the use of the beach and the limited visitor facilities of the Breamlea township. Parking availability is a key issue, particularly during busy summer period.

Supporting facilities

Many built facilities support recreational use of the coast. These include the Bancoora SLSC, adjoining car park and facilities, and the Breamlea Caravan Park. Other features that support the town and access to the coast include roads, water and sewer services, beach access paths, and stairs.

Bancoora Surf Life Saving Club

Founded in 1962, the Bancoora Surf Life Saving Club (SLSC) is a volunteer-led, non-profit organisation dedicated to beach safety. The club performs beach patrol services at Bancoora Beach, from late November through to late April. The club offers programs teaching children and teens water safety skills and lifesaving techniques, paving the way for future surf lifesavers.



In the 2023-24 season, the club saw a membership of over 500 members, with the popular Nippers (8-14 years) program growing to nearly 190 participants. Other programs offered include the Mozzies (5-7 years) and Young Guns (>14 years).

The SLSC clubhouse area offers facilities for visitors that include BBQ areas, public toilets, and parking. It also serves as an emergency access point for the township of Breamlea. The clubhouse is currently planning a significant redevelopment.

Breamlea Caravan Park

The Breamlea Caravan Park is also an important tourism asset within the area for Barwon Coast. The income generated from the park is directly invested in Barwon Coast's coastal management operations.

The Breamlea Caravan Park has a long history within the local community. Set within Breamlea's serene bush environment, the Caravan Park contains casual powered and unpowered sites, twelve-month permit sites as well as eco-villas and cabins. Many visitors to the park are longstanding, having returned to Breamlea for decades, forming a distinct and close-knit community. The park contains several recreational facilities, including a recreation room, playground, basketball area and sand volleyball area. There is direct access to the beach via two dune tracks. The park is known for its sense of calmness and amenity, close to nature.

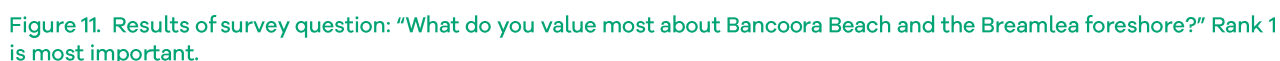
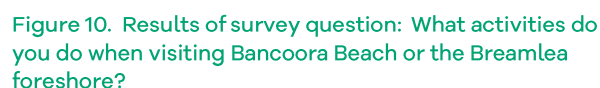
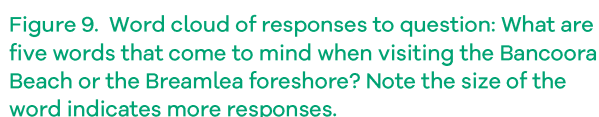


Other services and access

The main access to Breamlea and Bancoora beaches is through Breamlea Road, which also has sewer and water services running along it. While not managed by Barwon Coast, these roads and utilities service the surf lifesaving club and caravan park. Barwon Coast manage beach access paths through the dunes and stair access down to the beach.

Bancoora Beach and Breamlea foreshore are rich in Wadawurrung cultural values, host diverse ecosystems, are low key places to enjoy the beach, and are used and treasured by a passionate local community and visitors. We've built our understanding of these values through walks on Country, engagement with rightsholders, stakeholders and the community and reviewing many documents and plans.

We heard through community surveys and interviews that natural and peaceful landscapes, plants and animals, and enjoying access to the water for recreation were really important to the community. Figure 9, Figure 10 and Figure 11 show some of the results from our survey.



To summarise the values of Breamlea and Bancoora, we've identified six key themes, as follows:



Wadawurrung cultural heritage and significant places

Tangible sites and places of cultural significance and broader, more intangible stories, lore and connection to Country.



Coastal and marine ecosystems

Beach, dune, wetland, and waterway ecosystems including habitats for diverse flora and fauna.



A wild dynamic coast

Respect for and understanding of dynamic natural coastal processes that shape the coast. A coast that experiences the dynamic storms, winds and waves the Southern Ocean shaping and shifting it in response to these processes.



Simplicity and natural beauty

Quiet and peaceful community nested in the sand dunes, with social meeting places and recreational opportunities supported by low-key public facilities.



Recreational and tourism uses

Swimming, surfing and recreation opportunities supported by key facilities for residents and visitors, including the Surf Lifesaving Club and Breamlea Caravan Park.



Caring and connected community

Community supported by access and connection to, through and along coastal areas, with passionate community groups caring for coastal values and cross-organisation collaborative management to encompass the integrated coastal system.

These values inform the vision and objectives that set the direction for the Bancoora CAP, future adaptation and aspirations for what we want the coast to look like.

Some of these values rely on physical infrastructure, assets or important places and habitats. This means some of these values can be represented on a map. Mapping helps us to look at how coastal hazards might impact these values, uses and infrastructure. Figure 12 shows some of these mapped values. We also note that many of these values are intangible and cannot be mapped or described in one location. These are also important values to consider when deciding on future adaptation.

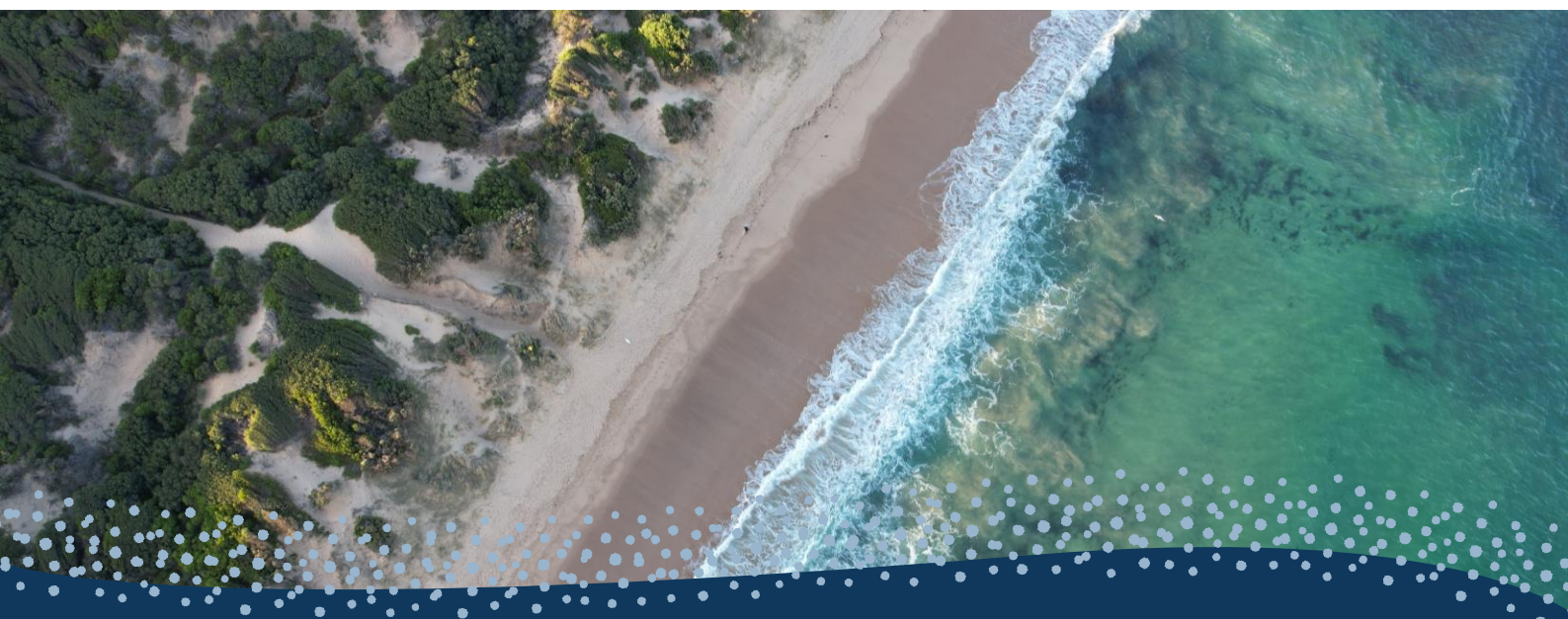




Figure 12. Mapped coastal values, uses and infrastructure across the Breamlea and Bancoora study area.

Vision

Based on these values, the vision for the Bancoora CAP is:

*Across the Breamlea / Bancoora coast **Wadawurrung cultural heritage and significant places, coastal and marine ecosystems, and recreational and tourism uses** are adaptive to coastal hazards. In addition, the **simplicity and natural beauty** of the area is valued by a **caring community**, that **respects dynamic coastal processes**.*

This vision sets the direction for this adaptation plan, helps align actions and creates a positive driver for change. The vision:

- supports key **values** which describe what is important to rightsholders, the community and stakeholders, and
- summarises **adaptation objectives** which detail how adaptation may support values and guide adaptation planning.

Objectives

To realise this vision, our aspirations for the coast, and to support our coastal values, we have developed more specific adaptation objectives. These objectives mean through adaptation, we will:

Look after Wadawurrung cultural heritage and significant places

Collaborate with Wadawurrung Traditional Owners in adaptation to manage both intangible and tangible Wadawurrung cultural heritage and significant places, minimise impacts on Wadawurrung values and support ongoing connection to Sea Country.

Care for coastal and marine ecosystems

Align adaptation outcomes to prioritise nearshore marine, beach, dune, estuarine and saltmarsh ecosystems and threatened species. Consider adaptation actions that have the dual function of increasing resilience while supporting restoration of natural spaces.

Respect strong and dynamic coastal processes

Work with and respect the strong natural coastal processes that shape the Breamlea / Bancoora coast, prioritising nature-based methods that leverage and support the coast's dynamic nature to continue.

Preserve simplicity

Ensure adaptation actions align with the simple and peaceful character of the area, prioritising nature-based methods that both protect and enhance the natural landscape while avoiding inappropriate development or structures.

Safeguard recreational and tourism uses of the coast

Ensure adaptation actions safeguard recreational uses, access and facilities of the coast, including use of and access to sandy beaches, maintaining sustainable tourism, visitation and the financial foundation these provide to local coastal management for as long as possible.

Collaborate with and empower community and stakeholders

Knowledge-share and collaborate with stakeholders and community members in adaptation, respecting stakeholder management responsibilities and community connection to place. Empower stakeholders and community through an educational and participatory approach to decision-making for adaptation.

3. Coastal processes and hazard exposure

VRC Stage 3

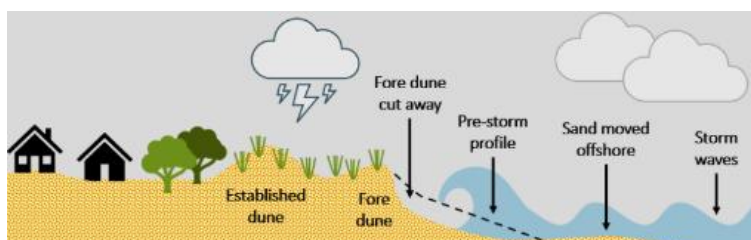
Coastal hazard exposure

Purpose: Assess coastal hazard exposure, including scenarios that enable best practice approaches to assessing current and emerging risk.

This stage looks at how natural coastal processes like tides, wind and storms affect the coast. This included assessing what changes might occur without any adaptation, reviewing available data, and looking at scenarios to show possible changes from erosion and flooding on coastal hazard maps. This helps us understand areas of the coast that are most exposed to coastal hazards to inform our risk assessment in Stage 4.

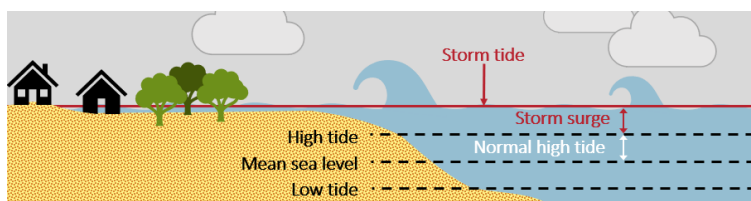
What are coastal hazards?

Natural coastal processes such as short- and long-term erosion and inundation shape the diverse features of the coastal zone. These processes are often referred to as coastal hazards when they impact on safety, environmental, cultural, social and economic values, uses and infrastructure. The coastal hazards assessed for the Bancoora CAP include erosion, permanent inundation and storm tide inundation.



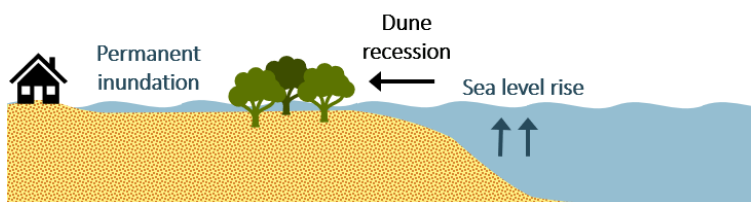
Erosion

Erosion can occur when winds, waves and coastal currents shift sediment away or along the shoreline. Erosion can be short-term, in response to storm events, and long-term in response to changing conditions.



Storm tide inundation

Storm tide inundation is the temporary inundation (flooding) of low-lying coastal land from a locally elevated sea level (storm tide). Storm tides flood low-lying land for hours to days.



Permanent inundation

Tidal inundation is the regular or permanent inundation of land due to rising sea levels. Areas of permanent inundation are where the highest tides are likely to reach on a permanent / semi-regular basis.

Changes to estuary entrances (e.g. Thompsons Creek mouth) and changes in groundwater levels, can also impact on coastal values. These changes are often hard to predict and require detailed investigations. For the Bancoora CAP, we have focussed on erosion, permanent inundation and storm-tide inundation, where data is available.

Hazards were considered over a range of “planning horizons” to 2100. This included considering permanent changes and hazards resulting from extreme storm events (e.g. 1% Annual Exceedance Probability*). Table 2 describes these planning horizons, indicative time periods and related sea level rise scenarios.

Under the Marine and Coastal Policy adaptation planning must plan for no less than 0.8 m sea level rise by 2100.

***Annual Exceedance Probability (AEP)** – on average, the probability of an event occurring in any given year. A higher AEP means it is more likely the event will occur in any one year. For example, a 1% AEP event represents an event that has a 1% chance of occurring in any given year.

Table 2. Planning horizons, indicative time periods and sea level rise scenarios.

Planning horizon	Time step	Indicative time period	Sea level rise (SLR)
Short term	0 to 25 yrs	Present day	Mean sea level (MSL)
		By 2040	MSL + 0.2m
Medium term	25 to 50 yrs	By 2070	MSL + 0.5m
Long term	50 to 75 yrs	By 2100	MSL + 0.8m
Sensitivity	75+ years	2100+	MSL + 1.1 to 1.4 m

Coastal hazard information and mapping

For the Bancoora CAP, we looked at coastal hazard modelling from available Statewide data and the Bellarine–Corio Bay Local Coastal Hazard Assessment (LCHA). This modelling has been undertaken by coastal modeling experts using extensive scientific knowledge and research. No new coastal hazard modelling was completed for the project.

‘Future Coasts’ Program (2007-2011) – DEECA (as DSE) modelled by CSIRO	This State-wide assessment of physical impacts of sea level rise and storms on Victoria’s coast, informed the development of guidelines, tools and recommendations for coastal planning and policy. This included estimates of projected sea levels (permanent inundation) and temporary flooding (storm-tide inundation) for Victoria’s coast.
Bellarine Peninsula – Corio Bay LCHA (2015) – Cardno for City of Greater Geelong and Stakeholders	This assessment, delivered as a pilot project as part of Victorian Government’s Future Coasts Program, provides information on the extent of coastal hazards for the Bellarine Peninsula and Corio Bay coastal environments, including the open coast to Breamlea and Port Phillip Bay shorelines. Its focus was primarily on inundation hazards, with erosion hazards also considered and mapped.

Modelling limitation: Combined catchment–coastal inundation

The assessment in this coastal adaptation plan focusses solely on coastal hazards. Available reporting and data from the Bellarine–Corio Bay LCHA indicate that coastal hazard mapping for Breamlea does not account for catchment-based flooding from riverine or rainfall sources. This means, combined catchment–coastal inundation has not been assessed. This lack of integrated flood information is acknowledged as a gap in the analysis and further actions (Section 5) seek to improve our understanding of catchment (riverine and rainfall) flooding and coastal hazards.

Coastal hazard mapping shows areas potentially affected by:

- short-term (temporary) inundation,
- regular inundation from tides,
- and/or areas potentially affected by short and/or longer-term coastal erosion processes.

The coastal hazard maps are in absence of any future adaptation actions. They also highlight impacted areas resulting from certain local weather (storm) conditions. Areas may not be impacted by all hazards all at the same time. The modelling and mapping is also based on ground and seabed elevations and shorelines at the time of the study. With some of these studies completed around 10 years ago, changes to the coast may have already occurred since.

Figure 13, Figure 14 and Figure 15 map coastal hazards for the short-, medium- and long-term planning horizons, for the following hazard types:

Hazard type		Data source	Scenarios
	Permanent inundation	Statewide 'Future Coasts' program	Sea level rise
	Storm tide inundation	Bellarine – Corio Bay LCHA	1% AEP storm event + sea level rise
	Erosion	Bellarine – Corio Bay LCHA	Two back-to-back 1% AEP storm events + sea level rise

This hazard assessment has considered the likelihood of these scenarios occurring over the three different planning horizons. Varying likelihood includes a range of likely, possible, unlikely or rare scenarios. Mapping below shows the “possible” scenario for each planning horizon. Further information on likelihood is in Section 4. While not mapped here, higher (1.1 m) sea level rise scenarios were included to consider latest sea level rise projections.

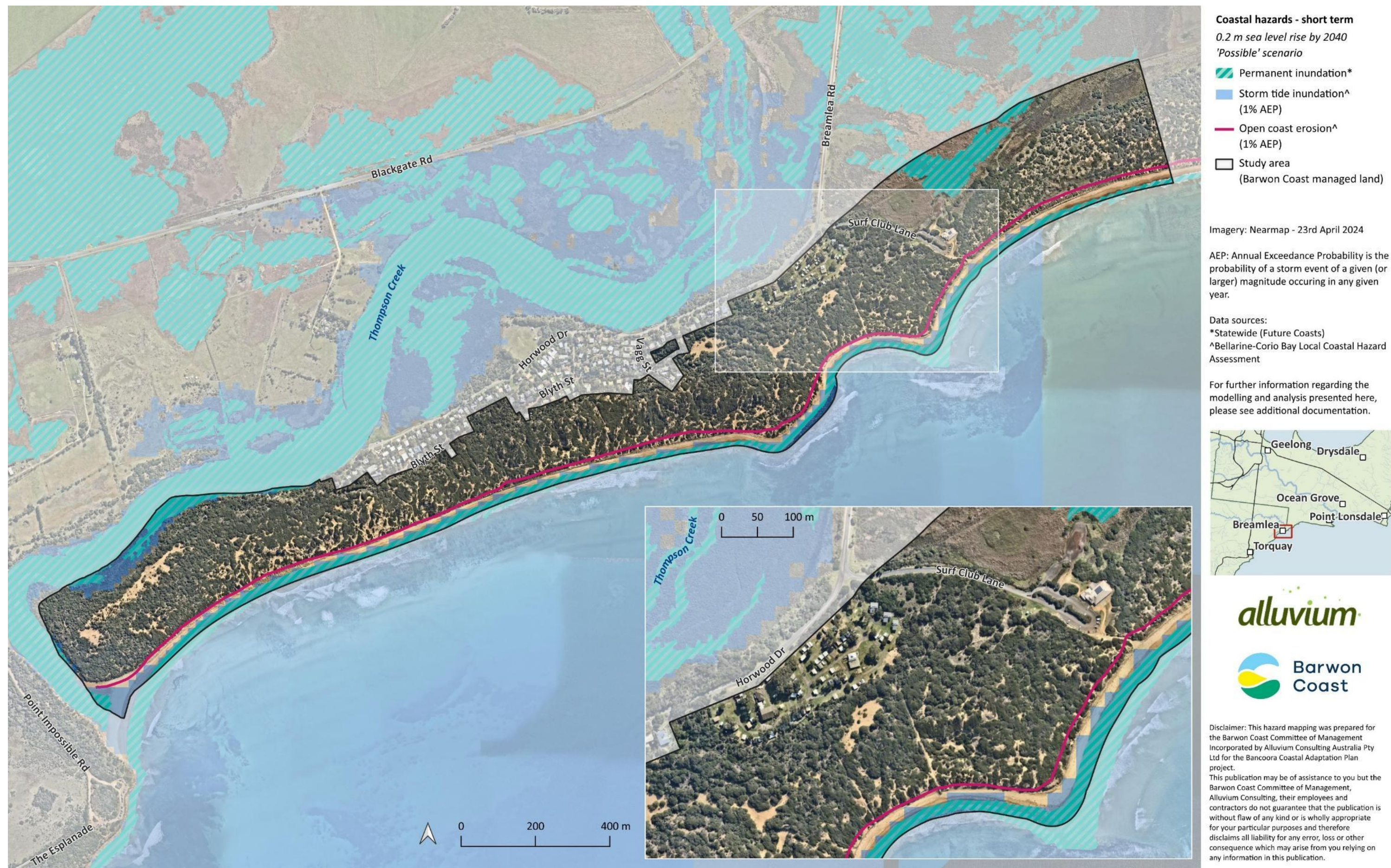
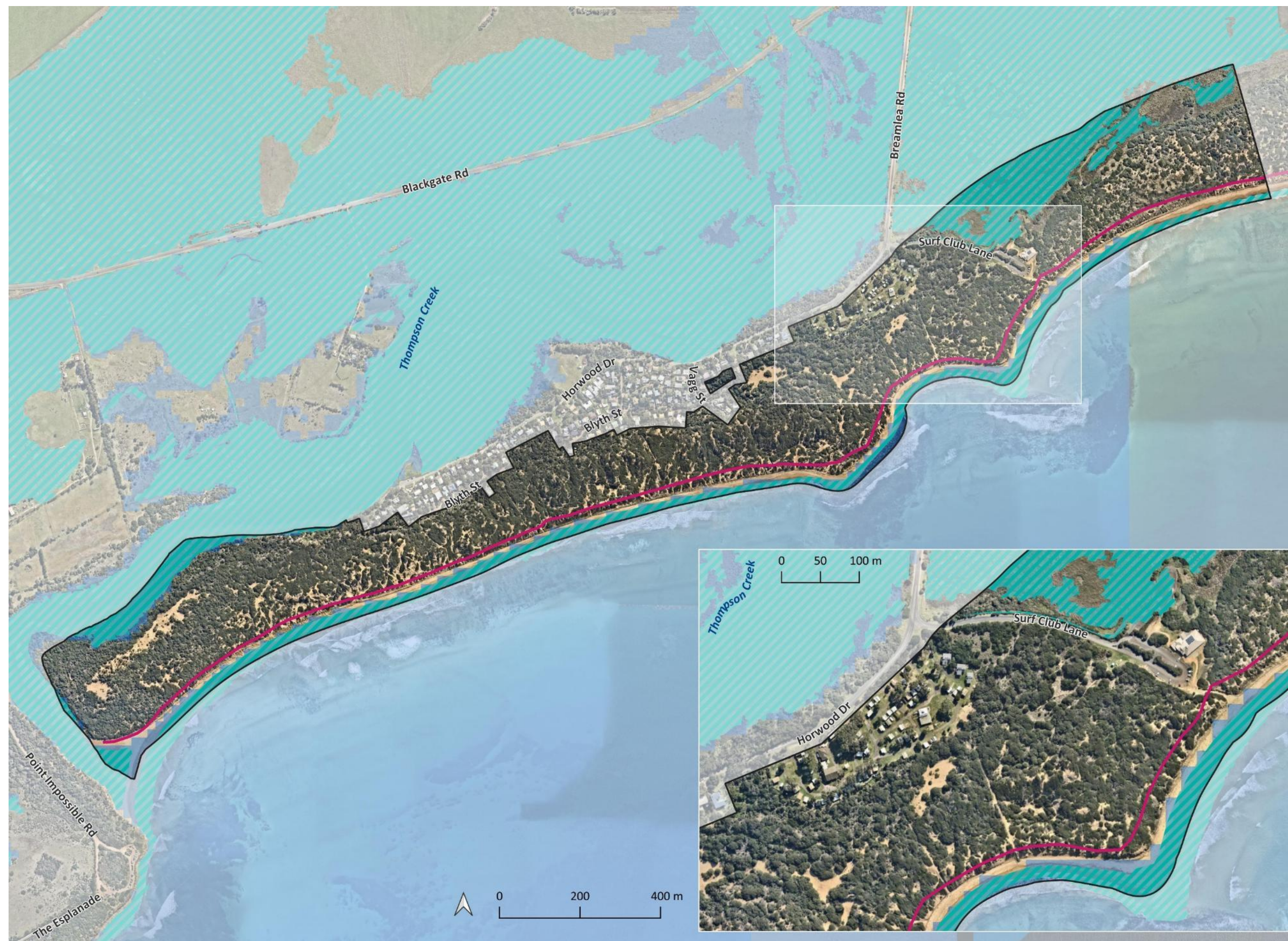


Figure 13. Coastal hazard mapping - short term (0.2 m sea level rise by 2040)



- Coastal hazards - medium term**
 0.5 m sea level rise by 2070
 'Possible' scenario
- ▨ Permanent inundation*
 - ▨ Storm tide inundation^
(1% AEP)
 - Open coast erosion^
(1% AEP)
 - Study area
(Barwon Coast managed land)

Imagery: Nearmap - 23rd April 2024

AEP: Annual Exceedance Probability is the probability of a storm event of a given (or larger) magnitude occurring in any given year.

Data sources:
 *Statewide (Future Coasts)
 ^Bellarine-Corio Bay Local Coastal Hazard Assessment

For further information regarding the modelling and analysis presented here, please see additional documentation.



alluvium



Disclaimer: This hazard mapping was prepared for the Barwon Coast Committee of Management Incorporated by Alluvium Consulting Australia Pty Ltd for the Bancoora Coastal Adaptation Plan project.
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Figure 14. Coastal hazard mapping - medium term (0.5 m sea level rise by 2070)

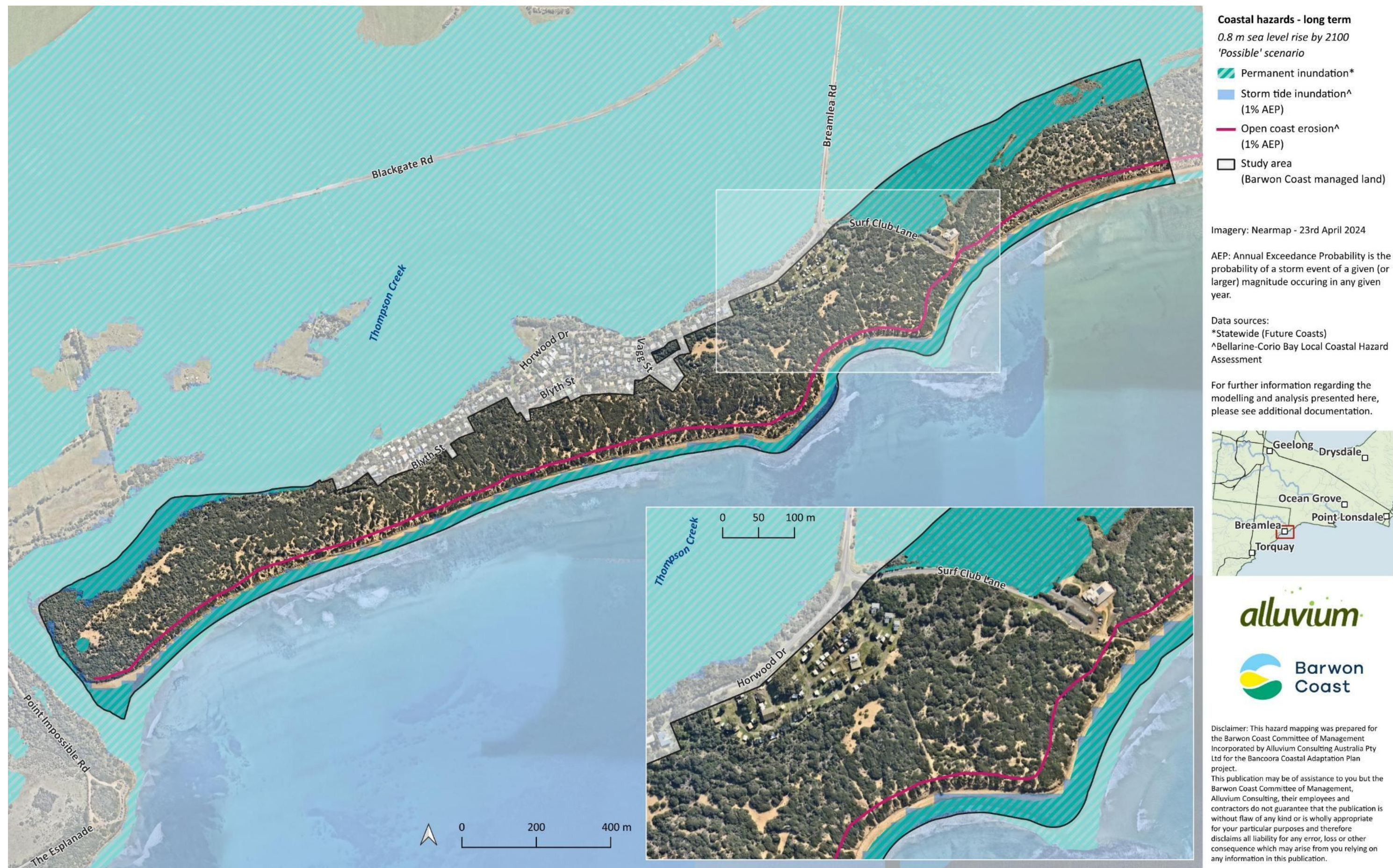


Figure 15. Coastal hazard mapping - long term (0.8 m sea level rise by 2100)

4. Vulnerability and risk

VRC Stage 4 Vulnerability and risk

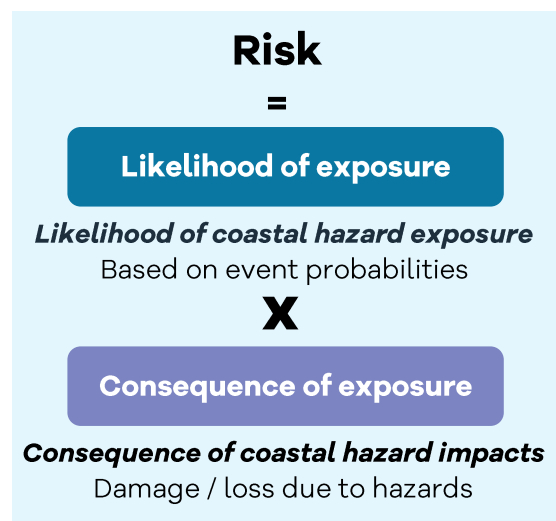
Purpose: Explore place-based coastal hazard vulnerability and risk, to enable strategic consideration of adaptation needs/priorities.

This part of the plan looks at how natural changes along the coast – like erosion and flooding – could affect the way in which we value and use the coast. Assessing risk is in the absence of adaptation (intervention) and helps understanding of possible changes over time. Understanding risk and vulnerability combines what's known about the area's values (from Stage 2) and coastal processes and hazards (from Stage 3). This stage asks *how might coastal processes impact what's valued?*

Risk and vulnerability approach

A **risk assessment** is a systematic process of evaluating the potential risks of coastal hazards, helping to inform a management response and adaptation actions. Risk is a function of coastal hazard *likelihood* (chance of hazards occurring) and *consequence* (impact of hazards). The following were brought together to assess risk:

- coastal values, uses and infrastructure (Stage 2),
- coastal hazard exposure likelihood (Stage 3),
- the impact / consequence of coastal hazard exposure.



Coastal vulnerability is the susceptibility of people and places to adverse impacts from coastal hazards. Vulnerability considers the degree of exposure, and ability to cope with, respond to and adapt to coastal hazards.



Values, uses and infrastructure

For the spatial risk assessment, we gathered and mapped information about values, uses and infrastructure (Figure 16). Some of these features are mapped in Figure 12 (Section 2).

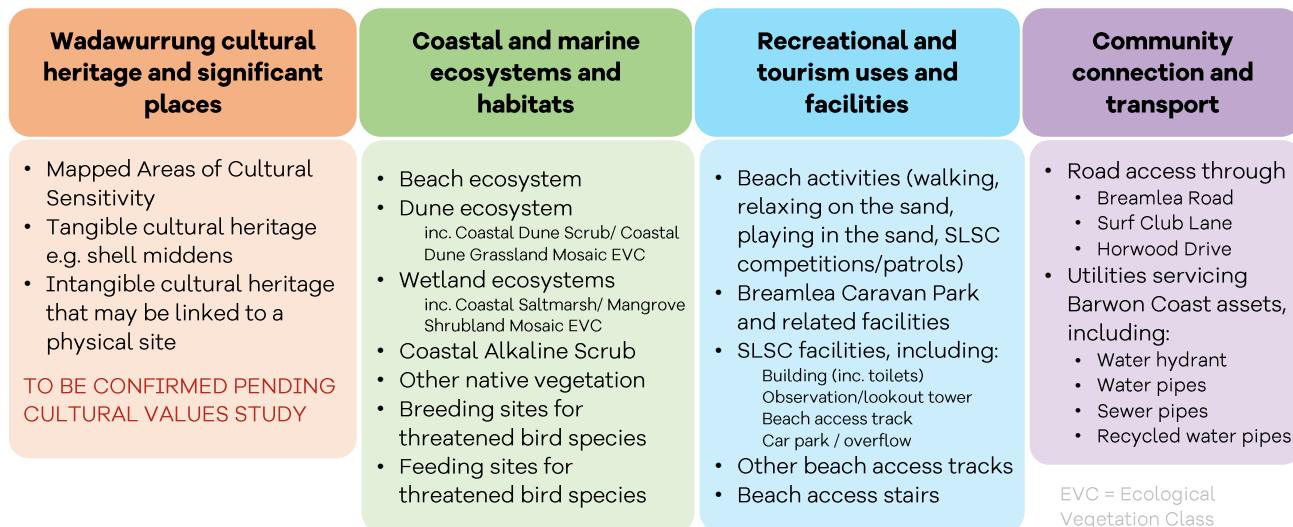


Figure 16. Mapped values, uses and infrastructure considered in spatial risk assessment.

We note there are a range of values that span bio-cultural landscapes of the study area, which cannot be mapped to a precise location. We have captured these elements in broader landscape-scale vulnerabilities in Section 5.

Coastal hazard likelihood and exposure

- Hazard exposure to these mapped values, uses and infrastructure was assessed. This examined the likelihood of exposure across a range of different planning horizons and scenarios, for each hazard type.

Figure 17 is an example of this assessment which considers:

- Which values, uses and infrastructure will be exposed?
- How likely is hazard exposure? – For which hazard types, scenarios and planning horizons?

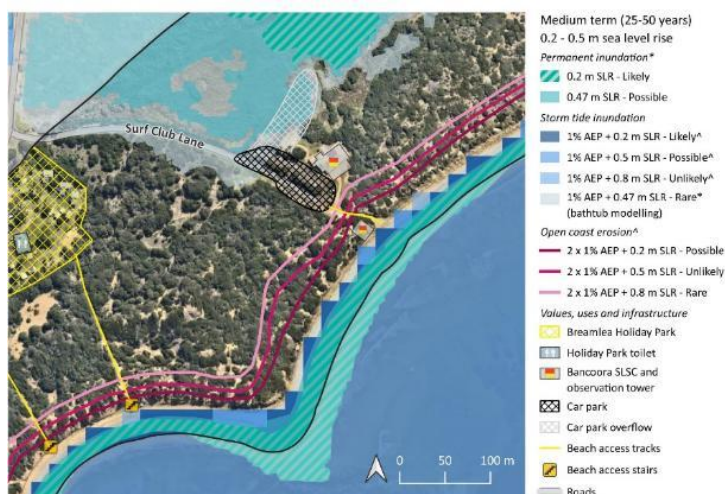


Figure 17. Example exposure assessment.

Consequence (impact) of hazard exposure

To understand how coastal hazards might affect values, uses and infrastructure, “consequence” categories to describe the level of impact (Table 3) was created. These categories are based on:

- Existing risk management practices in Victoria
- Similar studies in other coastal areas
- Local values and aspirations
- Feedback from Barwon Coast staff and the Project Steering Group

Each important place, use, or piece of infrastructure was given a rating for how serious the impact could be. Erosion usually causes more permanent damage than temporary flooding, so the consequence is higher. Permanent inundation (areas regularly underwater due to tides) is similar as it represents a long-term change.

Table 3. Bancoora CAP consequence ratings

	Health and safety	Cultural landscapes	The natural environment	Public access, use, provision of facilities and services	Property and assets	Financial and corporate
	Considers threats to human health and safety.	Specific consideration of traditional cultural values and the ability to maintain and pass on traditional knowledge and practices to future generations.	Considers elements such as regionally significant ecological values and ecosystem services.	Access to key sites, services and activities underpinning community lifestyle, wellbeing, and culture.	Damage to public property and infrastructure.	Considers threats to corporate/business operations and revenue generation.
Negligible	On-site first aid treatment required by staff, visitor, contractor, or member of the public.	Little to no impact on places of cultural significance expected	Little to no environmental impact(s) on the ecosystem services and natural features of local saline wetlands / estuary, coastal saltmarsh, or dunes.	Very small, short-term (<5 day) disruption to service delivery, access to key sites/facilities and activities. Numerous alternatives available.	Minimal damage to Barwon Coast infrastructure with total value <\$20,000	Minimal to no impact on business operations. Loss of revenue <\$20,000/yr
Minor	Minor injuries or illness (physical/mental) requiring medical attention by staff, visitor, contractor, or member of the public	Small, contained, and reversible short-term impact on places of cultural significance. Full recovery may take less than one year.	Isolated and temporary short-term impact across either saline wetlands / estuary, coastal saltmarsh, or dunes, affecting extent or quality of habitat for local species. E.g. Small-scale recovery of depleted or endangered EVCs up to one year.	Small to medium (1-3 week) disruption to service delivery, access to key sites/ facilities and activities. Some alternatives available. Some works/ repairs required to restore access/ services. Full recovery may take 6 months to one year.	Minor damage to Barwon Coast infrastructure with total value >\$20,000 but < \$150,000 Full recovery may take up to one year	Minor impact on business operations. Loss of revenue >\$20,000 but <\$100,000/yr E.g. Breamlea Caravan Park not operational for 1-2 days or ~10% sites not operational for a year
Moderate	Significant injury or illness (physical/mental) requiring in-patient hospitalisation of staff member, visitor, contractor, or member of the public	Substantial impact on one or more places of cultural significance. Full recovery may take more than one year.	Substantial yet localised impact across either saline wetlands/estuary, coastal saltmarsh, or severe and widespread impact across coastal dunes. E.g. Decline in invertebrate productivity leading to decline in species richness for estuarine waterbodies; shifts towards more salt-tolerant species. Medium scale recovery of endangered EVCs up to 5 years or depleted EVCs up to 10 years	Substantial (1-2 month) disruption to service delivery, access to key sites/facilities and activities. Works/repairs required to restore access/services. Full recovery may take more than one year.	Moderate to major damage to property or infrastructure with total value >\$150,000 but <\$1.5 million. Full recovery may take more than one year	Moderate impact to business operations. Loss of revenue >\$100,000 but <\$250,000/yr E.g. Breamlea Caravan Park not operational for 1-2 months or ~25% sites not operational for a year
Major	Extensive and/or permanent injury or illness (physical/mental) of staff member, visitor, contractor, or member of the public	Severe and widespread, semi-permanent impact on one or more places of cultural significance, including loss of land, connection to land and ability to continue traditional practices. Recovery may take many years.	Severe and widespread temporary impact across saline wetlands, estuary, coastal saltmarsh, or severe and widespread permanent impact across coastal dunes. E.g. Shifts in species composition, loss of habitat (foraging and roosting) for local and/or threatened species. Large scale recovery of endangered EVCs over 5-10 years or depleted EVCs over 10 years.	Severe (3–4-month peak season or full year) disruption to service delivery, access to key sites/facilities and activities. Major works required to restore access/services. Full recovery expected to take several years	Major damage or loss of property or infrastructure with total value >\$1.5 million but <\$10 million. Full recovery expected to take several years	Major impact to business operations. Loss of revenue >\$250,000 but <\$1,000,000/yr E.g. Entire Breamlea Caravan Park not operational for 1 year.
Severe	Single or multiple deaths or severe permanent disability or illness (physical/mental) of staff, visitor, contractor, or member of the public	Severe and widespread permanent impact on multiple places of cultural significance, including loss of land, connection to land and ability to continue. Recovery unlikely	Severe and widespread, permanent impact across saline wetlands / estuary, coastal saltmarsh, and/or dunes. E.g. Changed habitat from brackish to marine, loss of dune vegetation, loss of habitat for many species, including threatened species. Full recovery unlikely or expected to take >10 years.	Widespread and permanent disruption to service delivery, access to key sites/facilities and activities. Full recovery may be unlikely or take many years.	Widespread major damage or loss of property or infrastructure with total value >\$10 million. Full recovery may be unlikely or take many years.	Severe (long term and widespread) impact to business operations. Loss of revenue >\$1,000,000/yr E.g. Entire Breamlea Caravan Park not operational for multiple years.

Risk calculation

Once consequence and likelihood ratings are set, a matrix is used to assess the overall level of risk for each value, use or asset, under different scenarios. We created a tailored risk matrix for the Bancoora CAP (Table 4). It is informed by existing Barwon Coast risk processes, Statewide risk assessments, the VRC framework, the availability of data representing likelihood, and other leading practice approaches.

Table 4. Tailored risk matrix for the Bancoora CAP

		Consequence				
		Negligible	Minor	Moderate	Major	Severe
Likelihood	Likely	Medium	Medium	High	High	Very high
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	High

Quantifying risk provides a basis to strategically prioritise and manage (mitigate) risk, through an adaptation response. We may be able to 'cope' or 'live with' a certain level of risk before we reach a 'trigger' point where risk reaches unacceptable levels. Risk tolerance has been set, guided by Barwon Coast risk assessment processes, State guidance and the VRC framework (Table 5).

Table 5. Tailored risk tolerance categories for the Bancoora CAP

Risk	Risk tolerance	Action required
Very High	A risk that following an understanding of likelihood and consequence, is so high that it warrants that all possible mitigation measures be analysed in order to bring about a reduction in risk. Falls outside risk appetite.	Immediate and/or ongoing actions to avoid or reduce the risk to as low as possible should be undertaken as soon as practicable.
High	A risk that following an understanding of likelihood and consequence, is so high that it is likely to endanger service delivery and values. May fall outside risk appetite.	Risk should be reduced, treated, or eliminated through mitigation strategies, where possible, in the short term.
Medium	A risk that does not automatically require risk mitigation but rather a cost-benefit analysis is required to determine if treatment is necessary. Risk falls within risk appetite.	Risk should be reduced, treated, or eliminated through mitigation strategies, where possible, in the short to longer term.
Low	A risk sufficiently low that the risk should be able to be managed via existing controls and normal operating procedures. Well within risk tolerance.	Treatment of risk if/when resources are available. Manage and monitor as part of current operations and provide for periodic review.

Risk assessment outcomes

Risk has been assessed for each planning horizon, coastal hazard type and across different value and asset types

Risk across the study area

Overall, values, uses and infrastructure across the study area will be at increasing risk of more frequent / permanent inundation and erosion in the medium to long term. There is risk of open coast erosion impacts in the short-term with increasing risk for key values, uses and infrastructure into the long term. While coastal hazard risk is low for some hazards in the short term, proactive adaptation will help mitigate risk into the medium and long term. Table 6 presents a summary of risk ratings across the study area for each hazard type.

Table 6. Bancoora CAP risk profile summary.

	Short By 2040 (up to 25 yrs)	Medium By 2070 (25 to 50 yrs)	Long By 2100 (50 to 75 yrs)	Sensitivity 2100+ (beyond 75 yrs)
	Sea level rise (from ~1990 baseline)			
	0 to 0.2 m	0.2 to 0.5 m	0.5 to 0.8 m	0.8 to 1.1 m
STORM TIDE INUNDATION	Low	Low	Low*	Medium
PERMANENT INUNDATION	Low	Medium*	High	High
OPEN COAST EROSION	Medium*	Medium*	Medium*	High

* Select values, uses and infrastructure at higher risk.

Key values, uses and infrastructure at medium to high risk, for each hazard type include:

	Short By 2040 (up to 25 yrs)	Medium By 2070 (25 to 50 yrs)	Long By 2100 (50 to 75 yrs)
STORM TIDE INUNDATION			SLSC car park and road access through Horwood Drive, Surf Club Lane and Breamlea Road.
PERMANENT INUNDATION	Native vegetation, wetland ecosystems, and feeding sites for threatened bird species.	Dune ecosystems, breeding sites for threatened bird species, the SLSC overflow car park and road access through Horwood Drive.	Coastal grasslands, SLSC car park, Surf Club Lane access and sewer pipes.
OPEN COAST EROSION	Dune ecosystems, coastal grasslands, breeding sites for threatened bird species, beach activities, access stairs and tracks, emergency signage, the SLSC tower and viewing platform		SLSC car park and access surrounding the SLSC building

Risk across sub-areas

For the purposes of this adaptation plan, the study area was divided into three sub-areas (Figure 18) to reflect each area's unique values, uses and infrastructure. For each sub-area the key values, uses and assets are considered and an overall risk rating applied. Appreciation of risk at this more localised level helps to describe the core drivers of risk for each sub-area and adaptation priorities.

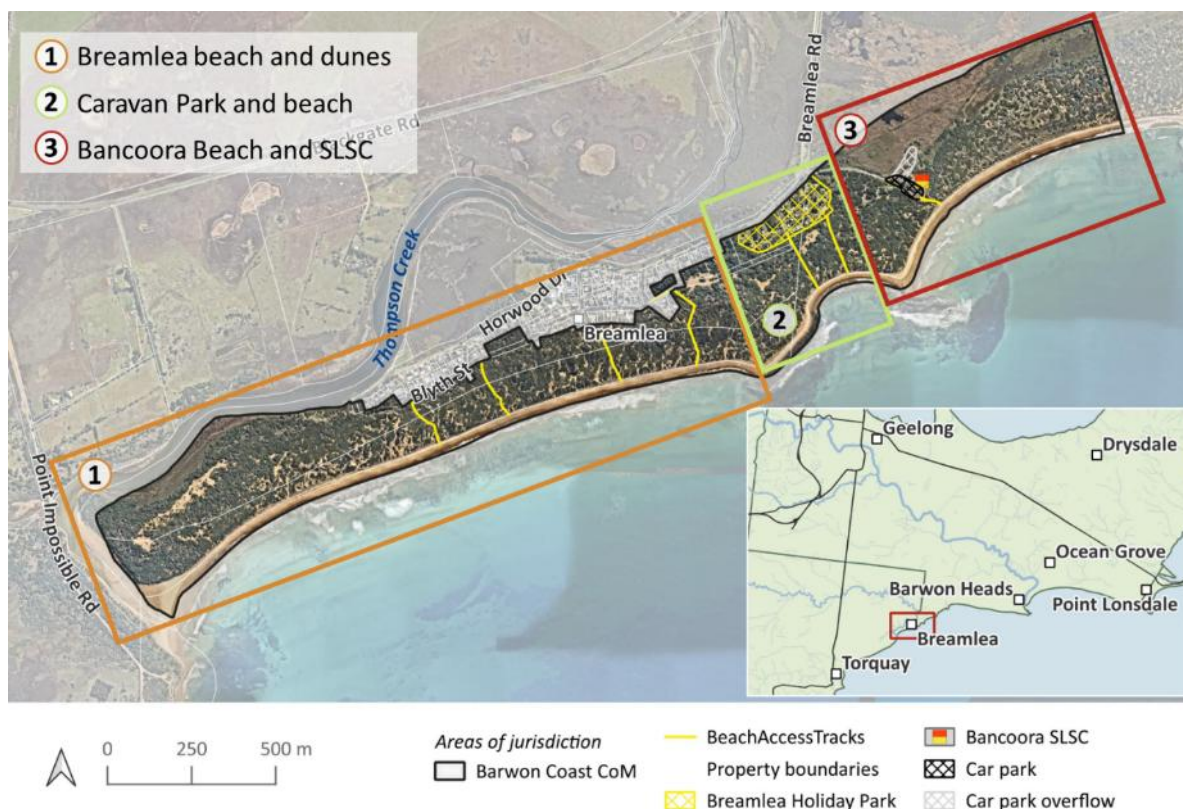


Figure 18. Bancora CAP sub-areas

The focus of the risk assessment and adaptation planning is on Barwon Coast land, assets and infrastructure. Risk ratings across these sub areas encompass the public values, uses and assets in these areas and the public assets servicing these areas (e.g. road access, water and sewer connection).

Risk assessment summaries for the sub-areas are presented below. Based on these risk profiles and tolerance of risk, we've highlighted adaptation priorities for each sub-area.

Broader landscape vulnerabilities and risks (outside Barwon Coast managed land)

We acknowledge that adaptation planning across the township is interconnected and adaptation planning at a broader landscape-scale has implications for Barwon Coast uses, facilities and operations.

Coastal hazards will affect areas and assets outside Barwon Coast's land, especially places relied on for access and services. This means we also need to plan at a broader landscape or township scale. That includes considering how cultural landscapes, the township itself (including private property access), the Thompson Estuary, local roads, and essential utilities might be affected as sea levels rise, and what actions will be needed.

These broader landscape-scale vulnerabilities are described further below.

Risk assessment summary: Breamlea beach and dunes

Description

Includes Barwon Coast managed land across Breamlea Beach and the dune systems. Key assets include coastal beach and dune vegetation, breeding and feeding sites for threatened birds, beach activities, access tracks, access stairs and emergency markers. Horwood Drive also provides road access to these public areas. Open coast erosion at the beach and inundation from the Thompson Creek estuary drive hazard exposure for this area.



Risk profile and outlook

	Short By 2040 (up to 25 yrs)	Medium By 2070 (25 to 50 yrs)	Long By 2100 (50 to 75 yrs)	Sensitivity 2100+ (beyond 75 yrs)
Sea level rise (from ~1990 baseline)				
	0 to 0.2 m	0.2 to 0.5 m	0.5 to 0.8 m	0.8 to 1.1 m
STORM TIDE INUNDATION	Low	Low	Low*	Low*
PERMANENT INUNDATION	Low	Medium*	High*	High*
OPEN COAST EROSION	Medium	Medium	Medium	Medium

*Higher risk for select assets – increasing inundation of Horwood Drive access

In the short term (next 25 years)

Medium risk of beach and dune erosion associated with large storms. May cause damage to access stairs and loss of dune vegetation, with increasingly steep dune scarps in response to storm events. Storm tide inundation from Thompson Creek is likely across wetland habitats.

Over the medium to long term (25 to 75+ years)

Increasing areas of open coast erosion with impact to beach access tracks and stairs likely into the long term, associated with storm erosion. Increasing inundation risk and potential permanent inundation of some areas, including access to foreshore via Horwood Drive and of beach/dune ecosystem.

Barwon Coast values, uses and assets at risk

Key assets at risk of coastal hazards include:

- Beach ecosystem and beach activities
- Dune ecosystems and vegetation
- Breeding sites for beach nesting birds
- Beach access stairs and tracks
- Access through Horwood Drive.



Adaptation priorities

- Avoid increasing coastal hazard risk through planning of any future assets / infrastructure outside of known coastal hazard extents.
- Support nature-based adaptation to allow and support dune, estuary and wetland ecosystems to respond to changing conditions.
- Explore opportunities for upgrade/redesign of beach access stairs to accommodate hazards, particularly when assets are damaged in storm events (i.e. to 'build back better').
- Ongoing monitoring and collaboration with other agencies, particularly in relation to Horwood Drive access and adaptation planning for the road and related utility assets.

Risk assessment summary: Caravan Park and beach

Description Includes the Breamlea Caravan Park, related facilities, beach access tracks / stairs and beach and dune environments. Breamlea Road provides access to the Caravan Park, with sewer and water utilities also servicing the park. Beach and dune erosion drive hazard exposure for this area. However, rocky headlands provide some protection. Inundation drives some exposure for roads along Thompson Creek.



Risk profile and outlook	Short	Medium	Long	Sensitivity
	By 2040 (up to 25 yrs)	By 2070 (25 to 50 yrs)	By 2100 (50 to 75 yrs)	2100+ (beyond 75 yrs)
	Sea level rise (from ~1990 baseline)			
	0 to 0.2 m	0.2 to 0.5 m	0.5 to 0.8 m	0.8 to 1.1 m
STORM TIDE INUNDATION	Low	Low	Low	Low*
PERMANENT INUNDATION	Low	Low	Low*	Low*
OPEN COAST EROSION	Low*	Low*	Low*	Low*

*Higher risk for select assets – Rare storm tide inundation of Breamlea Road access, possible erosion of beach access stairs, possible permanent inundation of sewer pipes servicing the Caravan Park.

In the short term (next 25 years)

Low risk from all hazard types. Some risk of beach and dune erosion associated with large storms. May cause damage to access stairs and loss of dune vegetation. Low inundation risk.

Over the medium to long term (25 to 75+ years)

Continued low risk with potential open coast erosion of beach access tracks/stairs and rare inundation of Breamlea Road, cutting off access to the Caravan Park. Potential risk to utilities servicing the caravan park.

Barwon Coast values, uses and assets at risk Key assets at risk of coastal hazards include:

- Beach ecosystem and beach activities
- Dune ecosystems and vegetation
- Beach access stairs and tracks
- Access through and utilities along Breamlea Road

Adaptation focus

- Avoid increasing coastal hazard risk through planning of any future assets / infrastructure outside of known coastal hazard extents.
- Explore opportunities for upgrade/redesign of beach access stairs to accommodate hazards, if assets are damaged in storm events ('build back better').
- Continued monitoring of conditions and nature-based methods to strengthen ecological values and improve natural hazard resilience and habitat migration.
- Collaborate with other agencies, particularly in adaptation planning for Breamlea Road and related utility services.

Risk assessment summary: Bancoora Beach and SLSC

Description Includes Bancoora Beach and the Surf Lifesaving Club building, toilet facilities, car parks, beach access track, SLSC tower, viewing platform, dune vegetation and some wetland saltmarsh vegetation. Breamlea Road and Surf Club Lane provide road access to the Beach and SLSC, along with water and sewerage infrastructure in the road corridor. Both open coast erosion and inundation drive hazard exposure for this area. A dune breakthrough could increase exposure further through time.



Risk profile and outlook

	Short By 2040 (up to 25 yrs)	Medium By 2070 (25 to 50 yrs)	Long By 2100 (50 to 75 yrs)	Sensitivity 2100+ (beyond 75 yrs)
Sea level rise (from ~1990 baseline)				
	0 to 0.2 m	0.2 to 0.5 m	0.5 to 0.8 m	0.8 to 1.1 m
STORM TIDE INUNDATION	Low	Low	Low	Medium
PERMANENT INUNDATION	Low	Medium	High	High*
OPEN COAST EROSION	Medium*	Medium*	Medium*	High

*Higher risk for select assets – very high risk of permanent inundation for Surf Club Lane access, high risk of open coast erosion for SLSC tower and viewing platform.

In the short term (next 25 years)

Some assets at immediate risk of open coast erosion, including the SLSC tower / viewing platform and beach access. Low risk from inundation hazards, with rare inundation events reaching saltmarsh areas, the overflow car park and Surf Club Lane access.

Over the medium to long term (25 to 75+ years)

Increasing risk into the medium and long term with high risk of permanent inundation of Surf Club Road access, associated utility connections and car parking areas. Increasing risk of erosion for the SLSC car park and building, with uncertainty in dune response and potential for dune breakthrough at the SLSC beach access track.

Barwon Coast values, uses and assets at risk

Key assets at increasing risk of coastal hazards include:

- SLSC tower and viewing platform
- SLSC car park and overflow car park
- Surf lifesaving club building (long term 75+ years)
- Beach ecosystem (inc. breeding sites for beach nesting birds)
- Dune ecosystems and vegetation
- Beach activities, access stairs and tracks
- Access through and utilities along Breamlea Road and Surf Club Lane.

Adaptation focus

- Immediate adaptation planning for at risk assets (SLSC viewing platform).
- Proactive planning to reduce risk for other assets (SLSC building, road access, utilities) at-risk into the medium and longer term. Capitalise on the unique opportunity to redesign the SLSC and ensure it accommodates hazard risk for its future design life.
- Support nature-based resilience across dune and wetland habitats, with monitoring of conditions, particularly potential dune breakthrough.

Broader landscape-scale vulnerabilities

There are a range of broader landscape-scale vulnerabilities across the Breamlea and Bancoora area. While these may fall outside of Barwon Coast's primary management responsibilities, they influence our adaptation responses. These vulnerabilities are described further below.

Bio-cultural landscapes

Bio-cultural landscapes across Breamlea are vulnerable to coastal hazards because they encompass interconnected natural features, cultural practices and places of deep significance to Wadawurrung Traditional Owners. Coastal hazards can impact tangible cultural sites such as middens, artefact scatters, coastal access, and other significant places.

At the same time, these hazards can threaten intangible cultural values. These include stories, songlines, language associations, practices, and ongoing connections to place. They might rely on the integrity and adaptive capacity of the landscape itself. Impacts on access for cultural use and ceremony, diminish the ability to pass knowledge to future generations, and weaken the continuity of relationships with Country. The WTOAC cultural values study will provide further insights into impacts of coastal hazards on cultural values.

Road access

Barwon Coast foreshore reserves, the Caravan Park and the SLSC are all accessed through Breamlea Road, Horwood Drive and Surf Club Lane. Road access is at risk from coastal hazards:

- *Breamlea Road* – at medium risk of storm tide inundation into the long term (by 2100). Breamlea Road may also act as a levee, limiting inundation east of the road. This levee function needs further investigation to understand risk to the road and adjoining land.
- *Horwood Drive* – at high risk of permanent inundation in the medium term (by 2070) and very high risk in the long term (by 2100)
- *Surf Club Lane* – at high risk of permanent inundation in the long term (by 2100).

Whilst these roads provide access to Barwon Coast assets, there are also broader considerations with these roads providing access to the township and private properties. Road access is the responsibility of CoGG and adaptation for these assets will need to occur in tandem with broader township adaptation planning. This planning could influence the longevity of the Bancoora SLSC as a key recreation node and access to the foreshore and Caravan Park.



Water and sewer services

Water and sewer connections service the Caravan Park and SLSC. Water pipes are at low risk of storm tide inundation; however, sewer pipes are at high risk of permanent inundation into the long term (by 2100). Barwon Water manage these assets. The ability of these assets to cope with coastal hazard exposure is uncertain. Collaboration with Barwon Water is needed to understand the resilience of these assets to coastal hazards and risks to servicing of Barwon Coast assets into the future.

Nature based resilience and habitat migration

While some natural values on Barwon Coast land are at risk of coastal hazards, there are also adjoining habitats at risk. These include the wetland/floodplain ecosystems around the Thompson Creek estuary. Adaptive capacity of these habitats can be low when adjoining land or infrastructure prevents natural migration due to changing conditions. Parks Victoria and Corangamite CMA manage these natural systems.

Thompson Creek estuary and catchment dynamics

The response of Thompson Creek estuary to sea level rise may also inform further risk understanding for Barwon Coast assets. The adaptive capacity of estuary systems responding to sea level rise is complex. The impact or magnitude of change depends on characteristics of individual estuaries. Management of the estuary is the responsibility of Corangamite CMA and Surf Coast Shire.



5. Adaptation actions and pathways

VRC Stage 5 Adaptation actions and pathways

Purpose: Identify, assess, consult on and decide which adaptation options and actions are the most appropriate for managing the current and future coastal hazard risks in the study area. This includes integrated actions across land management, planning and design, nature based and engineering themes.

This stage is about deciding on the best ways to manage risk from coastal hazards, now and into the future. Different adaptation options and actions were selected based on suitability for this area. Decisions were informed by adaptation objectives (Stage 2), our understanding of coastal hazards (Stage 3) and our risk assessment (Stage 4). This stage asks *how can we manage and adapt to coastal hazard impacts?*

Managing emerging coastal hazard risk, requires long-term strategic thinking and adaptive approaches. Understanding local values and risk profiles, including what is at risk (land, values and assets), and how the risk profile is changing over time, informs the adaptation response. The approach is guided by and built up of:

Adaptation objectives	Objectives set the direction for how to respond to future coastal changes. They're based on what's valued most about the area and ensure any future changes support what people care about. Section 2 describes these objectives and values. Objectives, practical function, cost, and approvals were considered to decide on adaptation options and actions.												
Adaptation options	Options are different strategic approaches to managing coastal hazard risk. The Marine and Coastal Policy has six strategic adaptations options, to consider in order of: <table> <tr> <td>1. Non intervention</td><td>Allow marine and coastal processes, and the hazards they may pose, to occur.</td></tr> <tr> <td>2. Avoid</td><td>Locate new uses, development and redevelopment away from areas that are or will be negatively impacted by coastal hazards.</td></tr> <tr> <td>3. Nature-based methods</td><td>Enhancing or restoring natural features to mitigate coastal hazard risk.</td></tr> <tr> <td>4. Accommodate</td><td>Structures can be designed to reduce the exposure to, or decrease the impact of, coastal hazard risk, thus 'accommodating' the risk.</td></tr> <tr> <td>5. Retreat</td><td>Existing structures, assets or uses may be decommissioned or relocated away from areas that are, or will be, negatively impacted by coastal hazards.</td></tr> <tr> <td>6. Protect (major engineering works)</td><td>Existing physical barriers are enhanced, or new ones constructed, to mitigate impacts of coastal hazards. Protect is an option of last resort; it is often expensive, its benefits tend to be very localised, and it frequently transfers the problem to nearby areas.</td></tr> </table>	1. Non intervention	Allow marine and coastal processes, and the hazards they may pose, to occur.	2. Avoid	Locate new uses, development and redevelopment away from areas that are or will be negatively impacted by coastal hazards.	3. Nature-based methods	Enhancing or restoring natural features to mitigate coastal hazard risk.	4. Accommodate	Structures can be designed to reduce the exposure to, or decrease the impact of, coastal hazard risk, thus 'accommodating' the risk.	5. Retreat	Existing structures, assets or uses may be decommissioned or relocated away from areas that are, or will be, negatively impacted by coastal hazards.	6. Protect (major engineering works)	Existing physical barriers are enhanced, or new ones constructed, to mitigate impacts of coastal hazards. Protect is an option of last resort; it is often expensive, its benefits tend to be very localised, and it frequently transfers the problem to nearby areas.
1. Non intervention	Allow marine and coastal processes, and the hazards they may pose, to occur.												
2. Avoid	Locate new uses, development and redevelopment away from areas that are or will be negatively impacted by coastal hazards.												
3. Nature-based methods	Enhancing or restoring natural features to mitigate coastal hazard risk.												
4. Accommodate	Structures can be designed to reduce the exposure to, or decrease the impact of, coastal hazard risk, thus 'accommodating' the risk.												
5. Retreat	Existing structures, assets or uses may be decommissioned or relocated away from areas that are, or will be, negatively impacted by coastal hazards.												
6. Protect (major engineering works)	Existing physical barriers are enhanced, or new ones constructed, to mitigate impacts of coastal hazards. Protect is an option of last resort; it is often expensive, its benefits tend to be very localised, and it frequently transfers the problem to nearby areas.												
Adaptation actions	Adaptation actions are the range of tools, decisions and works that can be implemented to create adaptation pathways aligned to the strategic adaptation options. There are three key types of actions: Land management, planning and design - Policy, planning instruments, guidance materials, communication, capacity building and strategic processes to enact change. Nature-based - Creation or restoration of blue carbon ecosystems and coastal habitats for hazard risk reduction. Engineering - Coastal structures, changes to landforms, and infrastructure modifications. Include "hard" and "soft" actions which can help support some nature-based methods. A suite of measures is often required to effectively manage coastal hazard risk.												
Adaptation pathways	Adaptation pathways help us plan ahead by showing what actions we can take now and what choices we may need to make in the future as the coast changes. They work like a roadmap made up of steps and decision points over time. This lets us prepare for today's conditions while staying flexible, so we can take new actions when the coast reaches certain 'trigger points' or risks increase.												

Foundational adaptation actions

Foundational actions enhance adaptive capacity of Barwon Coast, Traditional Owners and the community and inform the response to emerging hazard risk. They provide important knowledge, data, skills and tools to enable adaptation approaches to succeed. These actions are aligned with sub-area-specific actions and are under five key themes:

1. Coastal planning and asset management
2. Collaboration and community stewardship
3. Research and knowledge sharing
4. Monitoring evaluation and review
5. Funding and implementation

Table 7 details these foundational actions. These actions provide strong foundations for strengthening resilience across the Bancoora/Breamlea coast and the success of sub-area-specific initiatives. Place-based (sub-area) actions are also built into adaptation pathways, detailed below.

Table 7. Foundational actions to enhance adaptive capacity (priority actions over the next 5-10 years).

Theme	Action
F1. Coastal planning and asset management	
Proactive planning to avoid and manage coastal hazard risk	F1.1. Use the Bancoora CAP in Barwon Coast master planning and other asset management planning, to ensure no new sensitive uses, assets or infrastructure are developed in hazard-prone areas. • New or upgraded structures must consider avoiding hazard-prone areas and/or ensure structures can adapt to anticipated increase in coastal hazards. • Review existing planned infrastructure upgrades and renewals, and update design requirements, timing and prioritisation to incorporate hazard understanding. • Align with the Siting and Design Guidelines for Structures on the Victorian Coast.
	F1.2. Review and embed coastal hazard risk information (across all planning horizons) into asset planning and management. Consider assets at risk to inform appropriate asset management, including: • Asset design life, maintenance requirements and outlook with increasing hazard risk • Asset renewal timeframes and opportunities for enhanced resilient design in asset renewal/replacement • Potential relocation of existing assets • Future developments, facility upgrades and other design considerations

Theme	Action
F2. Collaboration and community stewardship	
Collaborate with rightsholders, land managers and community to promote holistic care for coastal areas and adaptation to changing conditions	F2.1. Continue to advance partnerships and collaboration with Wadawurrung Traditional Owners, to understand their needs, aspirations and involvement in coastal hazard adaptation. Includes identification of cultural values and management of significant sites. Support their ongoing role in caring for Country and informing future adaptation approaches to increase resilience and adaptive capacity for cultural values.
	F2.2. Promote cross-organisational and State information sharing. Advocate for and collaborate with land managers in landscape-scale adaptation planning for Breamlea/Bancoora including: • Township adaptation planning and road access (City of Greater Geelong) • Natural system adaptation and Thompson Creek estuary management (Corangamite CMA, Parks Victoria, Surf Coast Shire) • Other utilities and servicing of Barwon Coast land and assets (Barwon Water, other utility providers) • Incorporate outcomes into adaptation planning for Barwon Coast assets, uses and facilities.
	F2.3. Promote dune and vegetation enhancement knowledge building and educational programs. Includes: • Supporting volunteers to enhance dunes through on-ground initiatives (see action F3.2) • Communication and knowledge building of suitable species and vegetation management methods • Broad community education on importance of access control • Promotion of monitoring activities through citizen science programs (action F4.1)
	F2.4. Collaborate with other land managers, local government and emergency agencies to promote local emergency and disaster preparedness advice. Includes reviewing and incorporating coastal hazard risk considerations into Caravan Park and SLSC emergency procedures, Consider early planning for storm events and site-specific vulnerabilities, such as road access and evacuation constraints (i.e. one road access).

Theme	Action
F3. Research and knowledge sharing	
Undertake additional investigations and share existing knowledge to support adaptation	F3.1 Make the Bancoora CAP publicly available and continue to engage and communicate with the community, Traditional Owners, stakeholders and land managers on plan implementation.
	F3.2 Investigate dune system responses to species replacement (marram grass/tea tree vs. native spinifex) and potential implications for coastal erosion hazards. Based on investigations and research, trial replacement across Bancoora/Breamlea coastal zone and monitor changes to inform broader implementation. Align with Barwon Coast's Biodiversity Strategy and explore collaborations with research and university partners. Undertake dune and vegetation protection, enhancement and management for all existing dune areas, including access control and communication through action F2.3.
	F3.3 Investigate and develop an approach for small-scale sand scraping actions in response to increasing erosion and large storm events. Consider: • sand availability, methods of scraping, triggers for implementation • impacts on access and temporary access closure • planning requirements, contractors and logistics • potential impacts on shore-nesting birds and other sensitive ecosystems
	F3.4 Advocate for and collaborate with Corangamite CMA for local investigations into: • Estuary responses to sea level rise and changing climate and management implications. • Catchment and coincident flooding dynamics and impacts to coastal hazard risk. • Local ecosystem sensitivities / responses to changing coastal hazards and management implications, including exploring opportunities for making space for natural ecosystem migration. • Opportunities for blue carbon habitat restoration and expansion across the Thompson estuary.
	F3.5 Advocate for and collaborate with City of Greater Geelong for local investigation into the function of Breamlea Road as a levee-type structure, current specifications/maintenance regime and longevity of function in context of coastal hazards.
	F3.6 Guided by Wadawurrung Traditional Owners, investigate and continue to record Wadawurrung cultural heritage, history, values and culturally significant areas. Identify vulnerabilities to changing coastal hazards and management implications.

Theme	Action
F4. Monitoring evaluation and review	
Monitor changes in coastal hazard risk and effectiveness of adaptation	F4.1 Investigate opportunities for improved monitoring initiatives (drone, photo point programs e.g. CoastSnap). Regularly communicate key findings and opportunities for community involvement.
	F4.2 Undertake beach monitoring, particularly following large storm/erosion events and in key locations (Bancoora SLSC beach access) to understand response to storm events. Can include photo point monitoring or elevation, drone and/or beach survey monitoring. Should storm events damage access infrastructure (e.g. stairs), review configuration of access across entire study area, needs for multiple access points, and potential consolidation (removal of access).
	F4.3 During development, integrate evaluation metrics into implementation planning, including consideration of effectiveness of actions and reporting requirements.
	F4.4 Continue to review and update coastal hazard modelling and hazard extents in response to changes, including: • New/updated technical information as it becomes available (new hazard studies, updated records / major monitoring findings) • Changes to State policy (e.g. sea level projections, planning requirements, coastal hazard definitions) • Major landscape changes (e.g. following major hazard events, largescale development or other landscape change).
F5. Funding and implementation	
Refining implementation details and supporting implementation through adequate funding and resourcing	F5.1 Develop an implementation plan for the Bancoora CAP, including consideration of timing, responsibilities, funding sources and other implementation details. Align with other strategic and operational planning e.g. Masterplan, Coastal and Marine Management Plan (CMMP).
	F5.2 Capture potential funding avenues to support implementation of adaptation actions, such as Victoria's Resilient Coast Grants, Coastal Public Access And Risk Grants, Coastal and Marine Management Grants and Coastcare Victoria Community Grants.
	F5.3 Consider resources to facilitate implementation and opportunities for efficient and collaborative implementation with other land managers. Encourage community stewardship, agency co-funding and prioritised implementation to maximise resources.
	F5.4 Consult with the community, Traditional Owners, stakeholders and relevant land managers during the planning and implementation of adaptation actions.

Sub-area adaptation pathways and actions

Adaptation pathways include a collection and sequencing of adaptation actions for managing coastal hazard risk (from erosion, permanent inundation, storm tide inundation). These pathways are adaptive and may change over time as part of ongoing implementation, monitoring and budget considerations. Key elements of the pathways include (Figure 19):

- Sea level rise projections and emerging risk profiles over planning horizons
- Site-specific adaptation actions for each sub-area – capturing current and future actions
- Broader landscape-scale considerations and actions that influence the sub-area pathway
- Preparation time for planning and assessments required to enable action implementation
- Triggers to be used to determine a change in response or adaptation pathway
- Action performance / effectiveness in reducing risk for different hazard types and how that might diminish over time (with changing risk, and reducing performance due to elapsed time / aging measures)

Note that some pathways, triggers and timing is dependent on broader landscape-scale considerations. These are described further below.

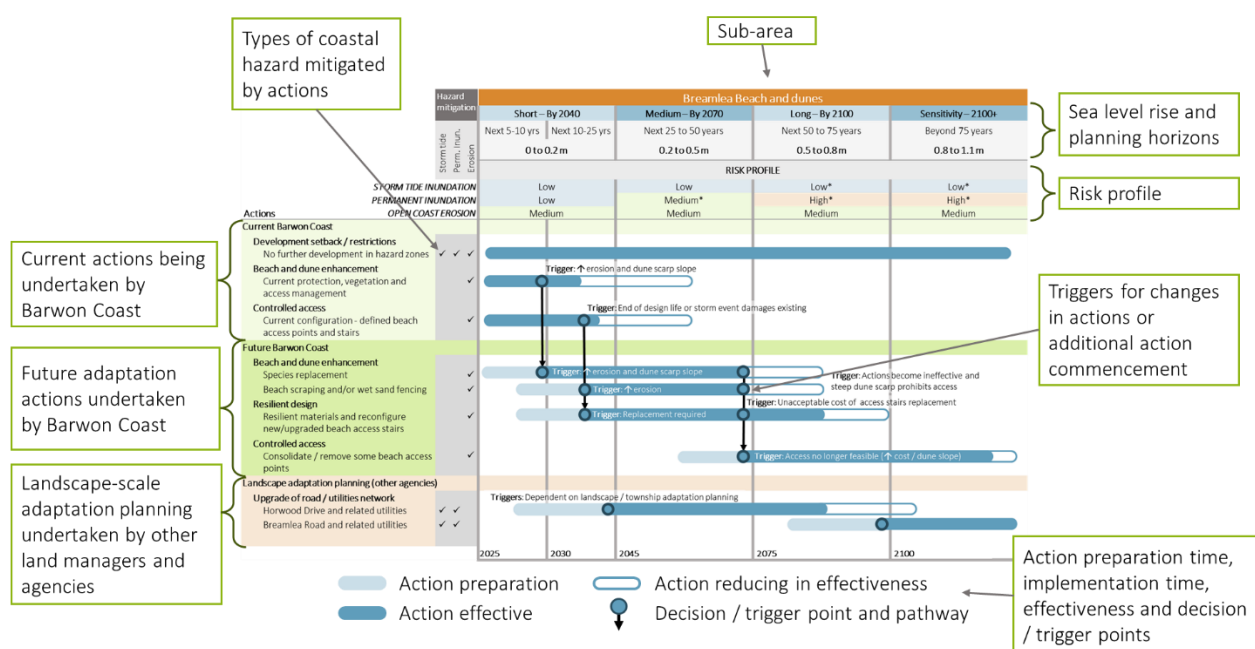


Figure 19. Example adaptation pathways, with core pathway elements labelled

Adaptation pathways for each sub-area are detailed below (Figure 20, Figure 21 and Figure 22). Table 8 summarises the actions for each sub area. Table 9, Table 10 and Table 11 provide detailed actions to implement the pathway for each sub-area, along with potential timing of actions.

Note on potential timing: The timing and implementation of these actions is indicative and underpinned by ongoing monitoring of conditions and frequency/severity of storm events (as per foundational actions). Actions may be brought forward or pushed back in time, depending on triggers such as observed conditions. Regular review of the Plan will be undertaken.

The actions and pathways below are focused on Barwon Coast-managed uses, values and assets. Some coastal hazard risks and adaptation opportunities are the responsibility of other rightsholders and authorities. Some of these interact with Barwon Coast values, uses and assets. These broader “landscape-scale” issues are flagged on the pathway diagrams and described further below.

Table 8. Summarised actions included in adaptation pathways

Sub area	In the short-term (next 5 to 10 years)	In the short-term by 2040 (10 to 25 years)	In the medium-term by 2070 (25 to 50 years)	In the long term by 2100 (50+ years)
Breamlea Beach and dunes (Figure 20)	- Continue planning controls, dune protection and access control. - Plan, implement and monitor dune species replacement. - Plan and investigate sand scraping and/or wet sand fencing, and beach access stair replacement. - Continue collaborating with CoGG on Horwood Drive inundation.	- Implement sand scraping and/or wet sand fencing (if feasible), in response to storm erosion. - Reconfigure and resilient design of beach access stairs, as they come to the end of their design life or are impacted by storm events.	- Implement landscape-scale planning with other agencies to address Horwood Drive inundation. - Investigate beach access and plan for consolidation / removal of some access points.	Implement landscape-scale planning with other agencies to address broader township access through Breamlea Road.
Caravan Park and beach (Figure 21)	Continue planning controls, dune protection and access control.		- Plan and implement (if suitable) species replacement and dune enhancement activities. - Landscape-scale planning with other agencies to address increasing risk to Barwon Water sewerage utilities servicing the Caravan Park.	- Plan for and implement beach scraping and access stair reconfiguration, in response to storm events. - If access / cost of management is no longer feasible, investigate removal of access
Bancoora Beach and SLSC (Figure 22)	Above actions and: - Investigate and implement wet sand fencing. - Redevelop SLSC to include resilient design and materials of building, strengthened access controls through the beach, access and overflow car park. - Consult with community as part of review of SLSC tower, including resilient re-design and siting of the viewing platform.	Above actions and: Implement car park drainage upgrades.	- Monitor, plan and implement beach scraping and dune reconstruction to minimise risk of dune breakthrough. - Reconfigure the SLSC car park to address inundation risks.	Above actions and: - As the SLSC reaches end of design life, plan for and implement either: - Redesign with resilient design and materials to suit conditions. - Removal of SLSC building and relocation of facilities elsewhere.

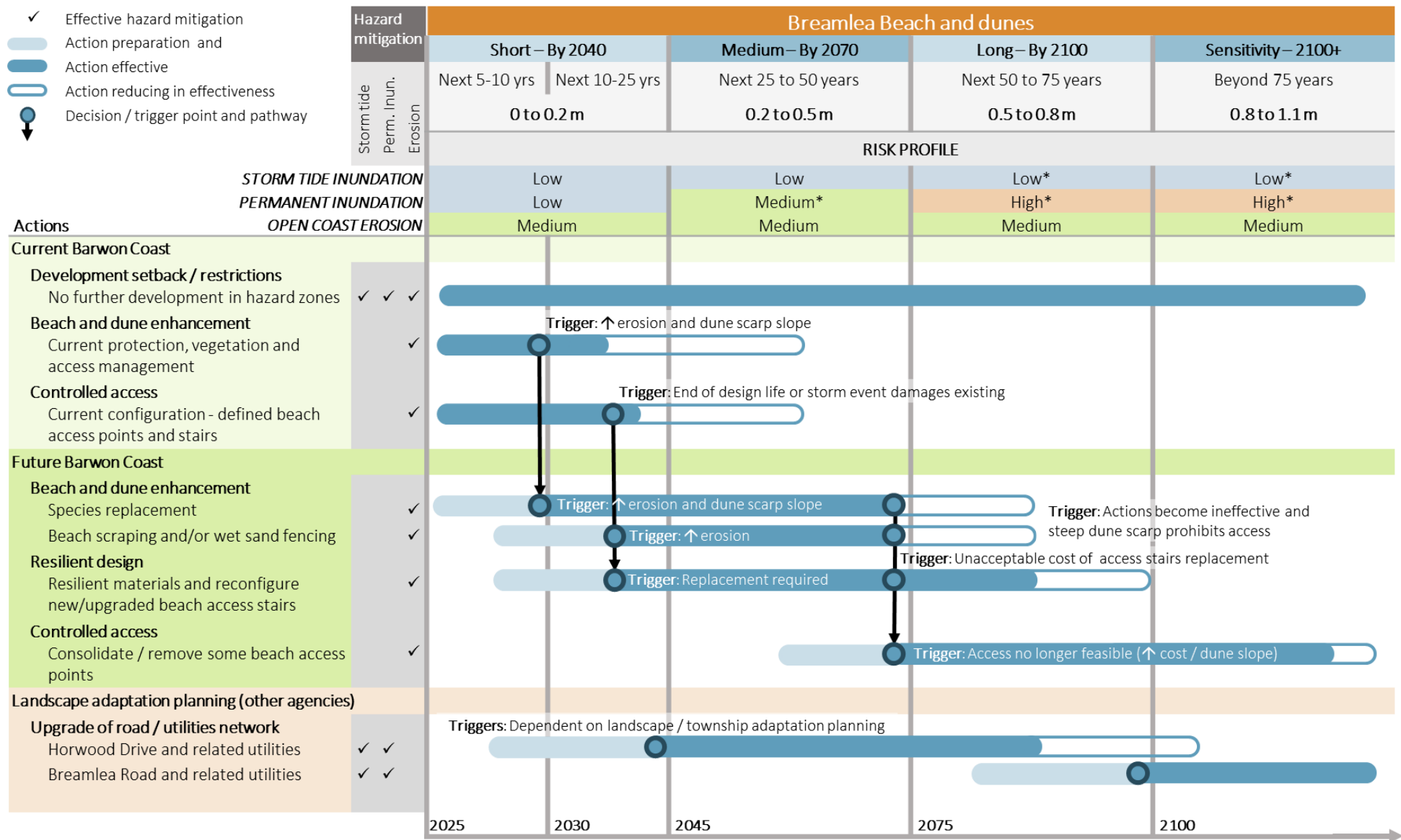


Figure 20. Adaptation pathway for Breamlea Beach and dunes sub-area

Table 9. Adaptation actions for the Breamlea Beach and dunes (BR) sub-area.

Breamlea Beach and dunes		
Action	Detail	Potential timing
Current Barwon Coast actions		
Development setback / restrictions No further development in hazard zones	BR 1.1 As Foundational action F1.1, ensure no new assets or infrastructure are developed in hazard-prone areas.	Now and ongoing
Beach and dune enhancement Current protection, vegetation and access management	BR 1.2 Continue current vegetation management, weed control and revegetation efforts.	Now and ongoing
Controlled access Current configuration - defined beach access points	BR 1.3 Continue current access management practices including defined access points and fencing to protect dune habitat areas.	Now and ongoing
Future Barwon Coast actions		
Beach and dune enhancement Species replacement	BR 2.1 As Foundational action F3.2, increase dune enhancement through further revegetation and control/investigate species replacement of marram grass to native species to encourage reduced dune slope. Monitor outcomes of species replacement over time.	Next 5-10 years and ongoing
Beach scraping and/or wet sand fencing	BR 2.2 As Foundational action F3.3, investigate and implement sand scraping following storm events to maintain safe access. Consider establishing wet sand fencing to support natural resilience, maintain access and a sandy beach. Investigate potential impacts to ecological values (e.g. Hooded Plover nesting).	10+ years
Resilient design Resilient materials and reconfigure new/upgraded beach access stairs	BR 2.3 As access stair infrastructure reaches end of design life, or if damaged in storms, replace with resilient designs. Can include: • resilient materials, • reconfigured access parallel to coast, rather than perpendicular, and/or • deeper piles and stairs to accommodate beach change.	20-50 years
Controlled access Consolidate / remove some beach access points	BR 2.4 Where changing conditions cause access to be prohibitive (due to cost of asset replacement or increasing dune slopes) remove some access points. Consider broader configuration of beach access and needs across entire landscape.	50+ years

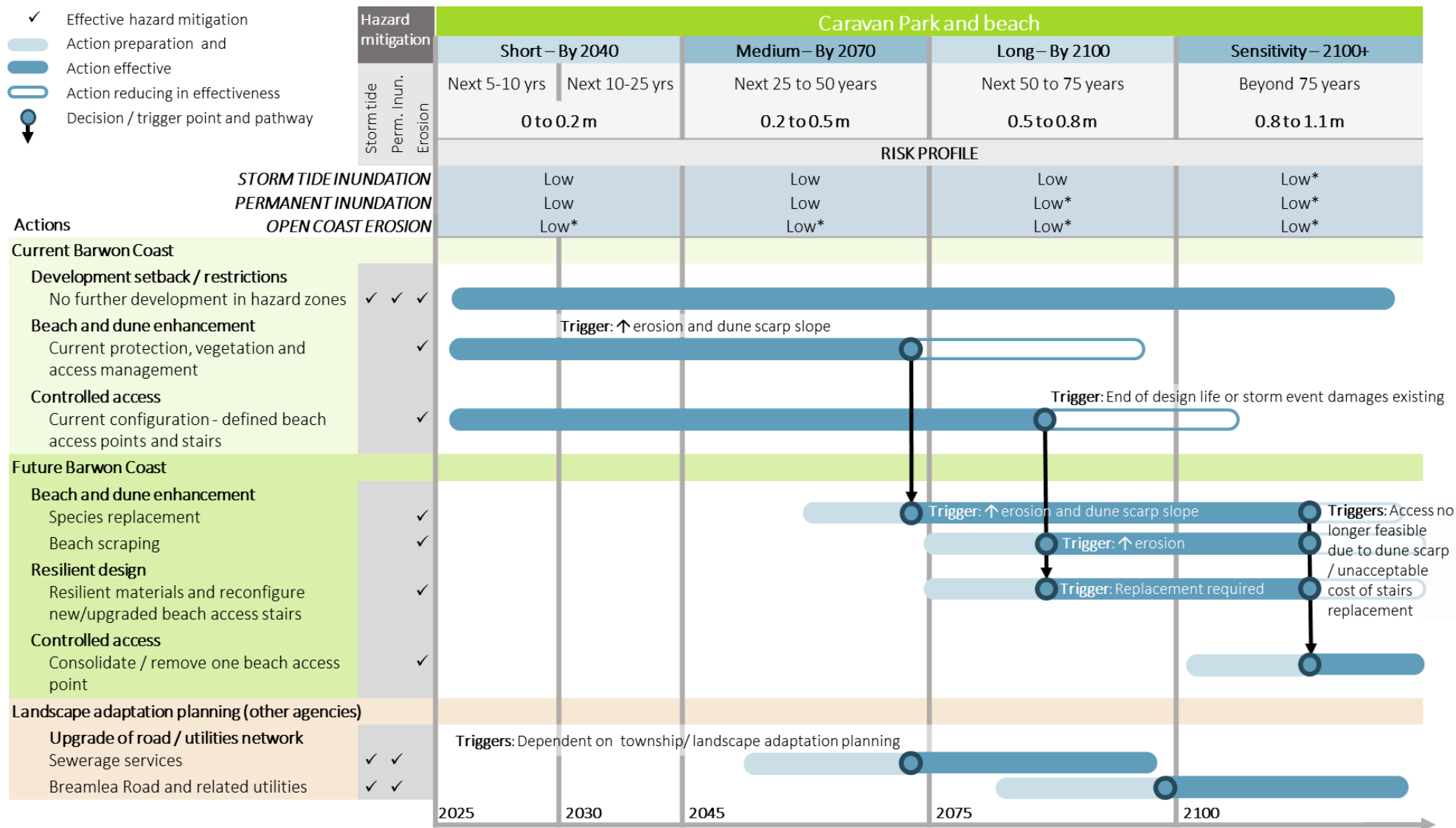


Figure 21. Adaptation pathway for Caravan Park and beach sub-area

Table 10. Adaptation actions for the Caravan Park and beach (CA) sub-area.

Caravan Park and beach		
Action	Detail	Potential timing
Current Barwon Coast actions		
Development setback / restrictions No further development in hazard zones	CA 1.1 As Foundational action F1.1, ensure no new assets or infrastructure are developed in hazard-prone areas.	Now and ongoing
Beach and dune enhancement Current protection, vegetation and access management	CA 1.2 Continue current vegetation management, weed control and revegetation efforts.	Now and ongoing
Controlled access Current configuration - defined beach access points	CA 1.3 Continue current access management practices including defined access points and fencing to protect dune habitat areas.	Now and ongoing
Future Barwon Coast actions		
Beach and dune enhancement Species replacement	CA 2.1 Increase dune enhancement through further revegetation and control/investigate species replacement of marram grass to native species to encourage reduced dune slope. Monitor outcomes of species replacement over time.	20+ years
Beach scraping	CA 2.2 As Foundational action F3.3, investigate and implement sand scraping following storm events to maintain safe access. Investigate potential impacts to ecological values (e.g. Hooded Plover nesting).	50+ years
Resilient design Resilient materials and reconfigure new/upgraded beach access stairs	CA 2.3 As access stair infrastructure reaches end of design life, or if damaged in storms, replace with resilient designs. Can include: • resilient materials, • reconfigured access parallel to coast, rather than perpendicular, and/or • deeper piles and stairs to accommodate beach change.	50+ years
Controlled access Consolidate / remove some beach access points	CA 2.4 Where changing conditions cause access to be prohibitive (due to cost of asset replacement or increasing dune slopes) remove one or both access points. Consider broader configuration of beach access to/from the Caravan Park.	75+ years

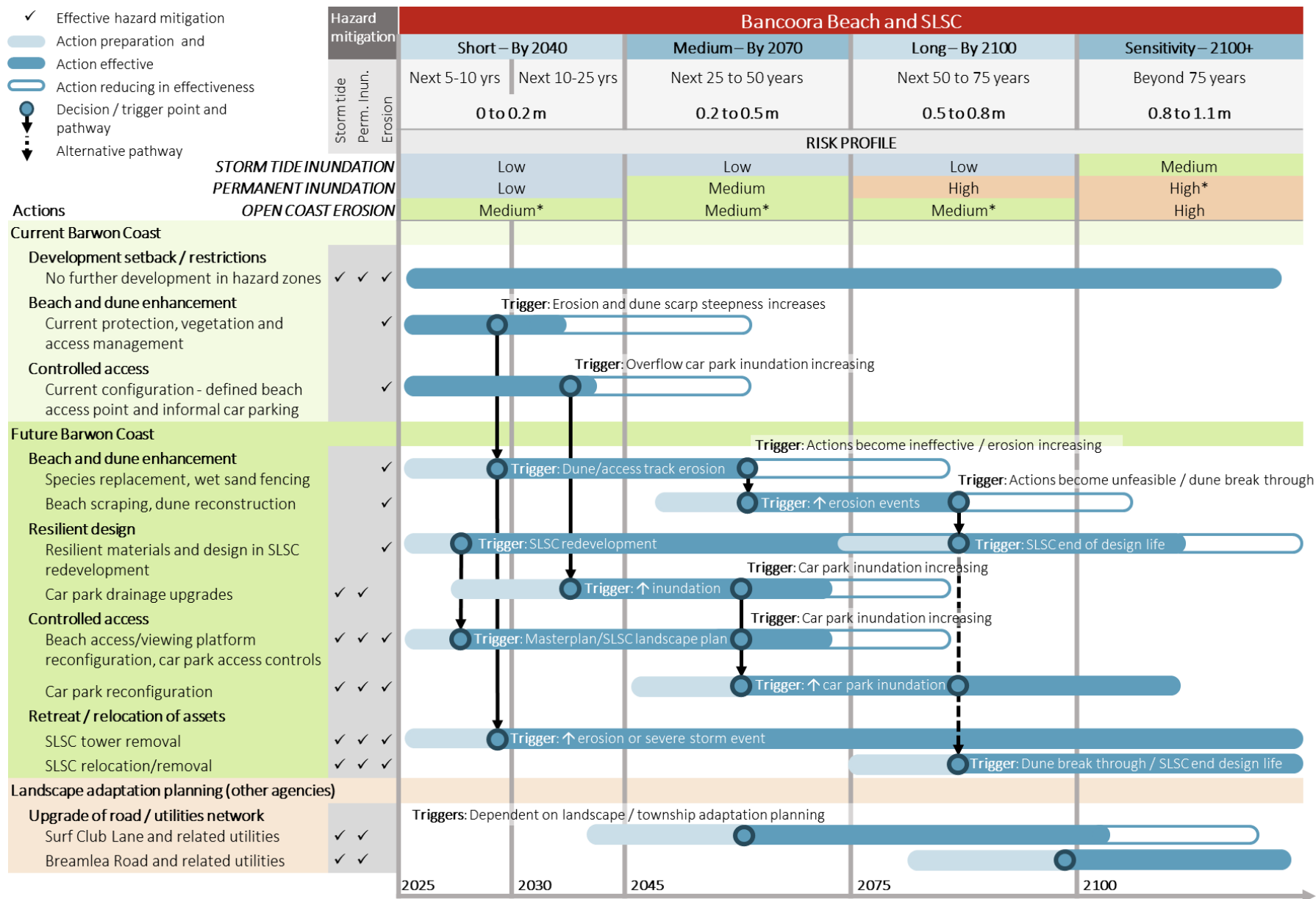


Figure 22. Adaptation pathway for Bancoora Beach and SLSC

Table 11. Adaptation actions for Bancoora Beach and SLSC (BA) sub-area.

Bancoora Beach and SLSC		
Action	Detail	Potential timing
Current Barwon Coast actions		
Development setback / restrictions No further development in hazard zones	BA1.1 As Foundational action F1.1 and in Barwon Coast masterplanning, CMMP and other asset management planning, ensure no new assets or infrastructure is developed in hazard-prone areas. Includes no increase in SLSC footprint.	Now and ongoing
Beach and dune enhancement Current protection, vegetation and access management	BA1.2 Continue current vegetation management, weed control and revegetation efforts.	Now and ongoing
Controlled access Current configuration - defined beach access point and car parking	BA1.3 Continue current access management practices including defined access point and fencing to protect dune habitat areas.	Now and ongoing
Future Barwon Coast actions		
Beach and dune enhancement Species replacement, and wet sand fencing	BA2.1 As Foundational action F3.2, increase dune enhancement through further revegetation and control/investigate species replacement of marram grass to native species to encourage reduced dune slope. Monitor outcomes of species replacement over time. Investigate wet sand fencing to support natural resilience, maintain access and a sandy beach. Investigate potential impacts to ecological values (e.g. Hooded Plover nesting).	5-10 years
Beach scraping, dune reconstruction	BA2.2 As Foundational action F3.3, investigate and implement sand scraping following storm events to maintain safe access. Implement localised sand scraping and dune reconstruction to reduce risk of dune breakthrough, enhance natural recovery following storms and maintain access.	20+ years, monitoring dependent
Resilient design Resilient materials and design in SLSC redevelopment	BA2.3 Redesign surf lifesaving club building with resilient materials and design to accommodate coastal hazard risk. Design for 30-year design life.	5-10 years
Car park drainage upgrades	BA2.4 Upgrade car park drainage (including Surf Club Lane, as required) to mitigate flooding risk. Consider permanent closure of overflow car park.	10-25 years

Bancoora Beach and SLSC		
Action	Detail	Potential timing
Controlled access Beach access reconfiguration and overflow car park access controls	BA2.5 In SLSC redevelopment, realign beach access to be more resilient to erosion processes, consider: • Alignment of beach access to be diagonal to coast, rather than perpendicular • Formalise beach access to reduce erosion impacts from foot traffic • Implement access controls (fencing, bollards and gates) for overflow car park to restrict access to wetland environments and during time of overflow car park inundation. Increase car park closure as conditions change.	5-10 years
Car park reconfiguration	BA2.6 Reconfigure SLSC car park to reduce coastal hazard impacts. May include reduction in car parking spots and transition of overflow car park to wetland habitat.	25-50 years
Retreat / relocation of assets SLSC tower	BA2.7 At the end of life, remove SLSC tower and revise siting and redesign viewing platform. Includes: • Removal of SLSC built infrastructure • Restoration of dune ecosystem through planting and protection • Consider alternative viewing platform structure with resilient design and revised siting to conditions; or • Consider SLSC observation needs and moveable towers / trailers	5-10 years
SLSC relocation / removal	BA2.8 Based on erosion and dune breakthrough monitoring, consider options to relocate SLSC, in alignment with broader township adaptation planning. Consider alternative locations, SLSC building removal, and requirements of SLSC service.	25-50 years

Landscape-scale adaptation

Some coastal impacts will affect areas outside Barwon Coast's land; especially places we rely on for access and services. This means we also need to plan at a broader landscape or township scale. That includes considering how the township itself (including private property access), the Thompson Estuary, rural lands, local roads, and essential utilities might be affected as sea levels rise, and what actions will be needed. Table 12 outlines landscape scale priorities that Barwon Coast will need to work with other agencies to address.

Table 12. Landscape-scale adaptation priorities with rightsholders and stakeholders that need to be involved.

Landscape-scale adaptation priority	Interactions / co-dependencies	Rightsholders and agencies
Cultural values and landscapes Adaptation planning for cultural values (tangible and intangible). Potential actions could include recording and documenting sites and stories and/or relocation/preservation of artefacts and physical values.	- Traditional Owner connection to Country - Cultural landscapes including land and sea country - Visitor experience and storytelling	Wadawurrung Traditional Owners Aboriginal Corporation
Township-scale adaptation planning Broader adaptation planning for all assets, values and uses across the Breamlea and Bancoora landscape, including public and private property and assets.	- Future of the Breamlea township and community needs for Barwon Coast services/assets - Broader planning scheme and development controls	City of Greater Geelong All other Rightsholders and stakeholders
Transport and utility networks Adaptation planning, related to above, for key access roads and utilities servicing the township. This includes Breamlea Road as the primary access to/from the township, Horwood Drive as access to foreshore areas and Surf Club Lane as access to the SLSC.	- Township access and longevity of township as a coastal destination - Utility servicing of Barwon Coast assets - Access to key Barwon Coast facilities including the Caravan Park and SLSC.	City of Greater Geelong Barwon Water Other Rightsholders, utility providers, and stakeholders
Nature-based resilience and habitat migration Further assessments and adaptation planning for natural systems including migration of wetland/floodplain habitats around the Thompson Creek estuary and dune system response to sea level rise.	- Opportunities for habitat expansion/retreat onto Barwon Coast managed land. - Complementary actions to support nature-based landscape-scale adaptation	Parks Victoria Corangamite CMA Other Rightsholders and stakeholders
Thompson Creek estuary response to sea level rise Further investigations into responses of Thompsons Creek estuary mouth to rising sea level including likely changes in estuary opening/closure regime and implications for flood extents / frequency.	- Interactions of catchment-driven and coastal flooding, implications for hazard extents / exposure - Subsequent management interventions (if any) and implications for hazard risk to Barwon Coast assets.	Corangamite CMA Surf Coast Shire Other Rightsholders and stakeholders

6. Next steps

Planning for coastal change is a shared responsibility. Barwon Coast, Traditional Owners, other agencies, stakeholders and the community all have important roles to play. Roles and responsibilities will need to be clearly defined, and strong collaboration between organisations will be essential. Barwon Coast and partner agencies will need to prioritise coastal hazard management and make sure it is included in their existing plans and day-to-day work. Many actions can be delivered through current programs, such as asset management, risk management, coastal planning, masterplans and annual works programs, while others may require new projects or processes.



The Bancoora CAP provides a range of technical and strategic outputs. The next stages of the VRC framework include confirming the plan for action, commencing implementation, ongoing monitoring, and review (Table 13). This means:

- Developing an implementation plan and/or embedding CAP actions into other strategic planning documents (e.g. Coastal and Marine Management Planning, Masterplanning). We will need to consider adequate funding sources, resourcing, and monitoring processes.
- Confirming foundational and sub-area actions and determining a process for collaborating with Traditional Owners, other managing authorities and the community to progress these actions.
- Refining landscape-scale adaptation and implications for Barwon Coast management responsibilities.

Putting adaptation into action will also involve ongoing monitoring, evaluation and improvement. An adaptive approach, informed by monitoring will help track progress, be accountable, and ensure the region continues to build resilience over time.

Table 13. VRC stages and stage purpose, highlighting next steps for the Bancoora CAP.

VRC stage	Purpose	Status		
 1. Scoping and preparation	Provide a foundation for adaptation planning aligned to best practice guidance.	✓	Complete	Embedded throughout: Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
 2. Value, vision and objectives	Ensure adaptation planning is underpinned by regional and place-based values.	✓	Complete	
 3. Coastal hazard exposure	Assess coastal hazard exposure, including scenarios that enable best practice approaches to assessing current and emerging risk.	✓	Complete	
 4. Vulnerability and risk	Explore place-based coastal hazard vulnerability and risk, to enable strategic consideration of adaptation needs/priorities	✓	Complete	
 5. Adaptation actions and pathways	Identify, assess, consult on and decide which adaptation options and actions are the most appropriate for managing the current and future coastal hazard risks in the study area.	✓	Complete	
 6. Plan and implement	Confirm the plan of action for coastal hazard risk management and adaptation and commence implementation.		Out of scope - To be commenced	
 7. Ongoing monitoring and review	Ensure coastal hazard risk management and adaptation is accompanied by ongoing monitoring and evaluation process that enables effective implementation, learnings and improvement.		Out of scope - To be commenced	