VICTORIA'S RESILIENT COAST
Adapting for 2100+

Framework and guidelines
A strategic approach to coastal hazard risk management and adaptation

VICTORIA
State Government

Energy, Environment and Climate Action

Acknowledgements

Victoria's Resilient Coast – Adapting for 2100+ project team would like to acknowledge the contributions of the Traditional Owner project partnership, Department Working Group, Collaborative Working Group and consultant contributions to this document.

Acknowledgement

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader assertions in the 21st century and beyond.

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ACKNOWLEDGEMENT OF ABORIGINAL VICTORIANS[1]

Traditional Owners have an unbroken custodianship of the land and seas that extends back tens of thousands of years. Their knowledge, understanding, and relationships to Country are fundamental to the health of the environment and the success of any strategy to manage that environment.

Traditional Owners' deep and living relationship with the land and sea, and its resources, is evident in their cultures and in their unique connection to Country. Country is the water, the land and everything that these encompass. It is woven into the fabric of Aboriginal lore, language, governance, and wellbeing. Country embodies culture. Ecosystem health is therefore critical to safeguarding and protecting Aboriginal cultures, and the practice of culture is critical to the health of Country.

Traditional Owners have never surrendered rights to Country. The Victorian Government acknowledges Aboriginal peoples as Australia's first people, and as the Traditional Owners and custodians of the land on which we work and live. We recognise the strength of Aboriginal peoples and the need for reconciliation and genuine partnerships to address the ongoing negative impacts of the past.

We recognise and value the ongoing contribution of Aboriginal peoples and communities to Victorian life and how this enriches us all. We recognise that Aboriginal cultures and communities are diverse, and the value we gain in celebrating these cultures and communities. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice. We have distinct legislative obligations to Traditional Owner groups that are paramount in our responsibilities in managing Victoria's resources.

The following Registered Aboriginal Parties contributed to the development of these guidelines:

- Bunurong Land Council Aboriginal Corporation
- Eastern Maar Aboriginal Corporation
- Gunaikurnai Land and Waters Aboriginal Corporation
- Gunditj Mirring Traditional Owners Aboriginal Corporation
- Wadawurrung Traditional Owners Aboriginal Corporation
- Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation.

1 After the Marine and Coastal Strategy 2022.

INTRODUCTION

This section introduces foundational elements for a strategic approach to coastal hazard risk management and adaptation, including:

- program purpose
- framework stages
- guidelines purpose
- where these guidelines apply
- who will use these guidelines
- Victorian policy context
- coastal hazards
- adaptation context
- how to use these guidelines.

Program purpose

Victoria has over 2,600 km of coastline, including extensive sandy beach systems, rocky coasts, bays, inlets and estuaries, coastal lakes and floodplains. These diverse cultural landscapes have been nurtured by Traditional Owners of Country for countless generations, and are dynamic environments shaped by coastal processes.

Coastlines are among the most dynamic regions on the planet, and Victoria's coastline is constantly undergoing change, often at rapid rates.

At times, natural coastal processes including erosion, inundation and other physical/chemical processes may have an adverse impact on coastal values and uses. When this occurs, we often refer to these processes as coastal hazards.

Coastal hazard exposure is projected to increase with changes in wave action, storm activity and sea level rise associated with climate change.

Victoria's Resilient Coast – Adapting for 2100+ provides a strategic approach to coastal hazard risk management and adaptation.

This includes a framework, guidelines and support for local government, land managers and communities to:

- enable place-based, best practice and long-term coastal hazard risk management and adaptation
- build on the directions in the *Marine and Coastal Act 2018* and Marine and Coastal Policy 2020.

Framework stages

The Framework provides a staged approach across the technical, strategic planning and engagement elements of coastal hazard risk management and adaptation (**Table 1**, **Figure 1**). The seven stages correspond to the guideline chapters (this document).

Table 1. *Victoria's Resilient Coast - Adapting for 2100+* framework stages

Stage			Embedded in all stages
Stage 1		Scoping and preparation	Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
Stage 2		Values, vision and objectives	
Stage 3		Coastal hazard exposure	
Stage 4		Vulnerability and risk	
Stage 5		Adaptation actions and pathways	
Stage 6		Plan and implement	
Stage 7		Ongoing monitoring and review	

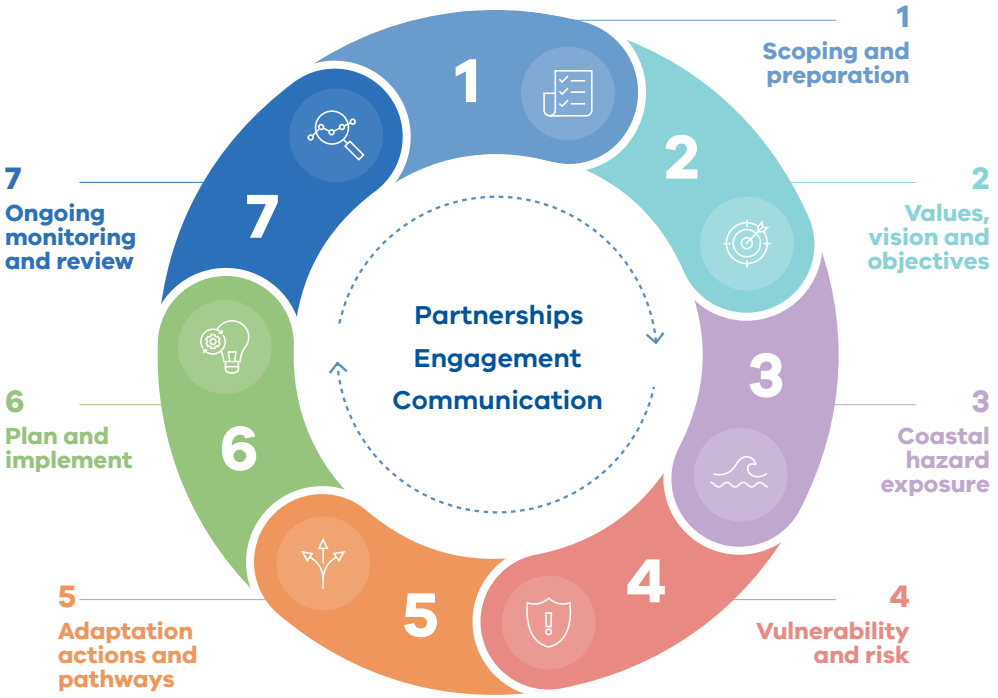


Figure 1. *Victoria's Resilient Coast - Adapting for 2100+* framework stages

***Victoria's Resilient Coast - Adapting for 2100+* is a strategic approach to coastal hazard risk management and adaptation.**

Each stage of the framework enables risk management and adaptation planning to be progressed consistent with national best practice approaches, and fit-for-purpose approaches for Victoria.

Progression between stages can be iterative, with feedback loops enabling review and refinement as the work progresses.

Guidelines purpose

The primary purpose of these guidelines is to:

- provide a best practice and consistent approach to the strategic management of coastal hazard risk
- support the progression of coastal adaption in Victoria.

Adaptation planning using these guidelines can be progressed from any stage of the framework to reflect work done to date.

Additional technical detail and guidance is provided in the following supporting documents:

- Coastal hazard extended guideline[2]
- Adaptation actions compendium[3]
- An economic approach to inform adaptation[4].

Program development

Our Victorian approach has been developed through a collaborative process to inform the program direction and design.

Many organisations provided time and expertise during this process from May 2021 to June 2022. This included a partnership approach with Traditional Owners, and a Collaborative Working Group with representatives from local government, Catchment Management Authorities, and a range of Victorian agencies, authorities, and peak bodies with an interest in coastal hazard adaptation.

This framework and guidelines have also been informed by:

- leading research on climate adaptation
- national/international approaches (refer **Attachment A**)
- Victoria's place-based coastal hazard risk management and adaptation needs.

A summary of the collaborative development process is provided in **Attachment B**.

2 Water Technology Ltd., 2022.
3 BMT Ltd., 2022.
4 Alluvium Consulting & NCEconomics, 2022.

Where these guidelines apply

All strategic coastal hazard risk management and adaptation

These guidelines are relevant for:

- public and private land
- all areas within the marine and coastal environment as defined by the *Marine and Coastal Act 2018*, which includes 5 km inland from the high tide mark, and 3 nautical miles offshore (refer **Figure 2**). Some exemptions within this may apply if declared under the *Marine and Coastal Act 2018*.

These guidelines can be applied to:

- coastal hazard risk mitigation in different spatial contexts (site/issue based, local, regional), through aligning to the framework stages and guidelines
- progress local/regional scale strategic adaptation planning through completion of one or more of the seven stages of the framework
- develop a regional Coastal Hazard Adaptation and Resilience Plan (CHARP) through completing the full seven-stages of the framework.

Who will use these guidelines

Victoria has a diversity of land and asset owners and managers across public and private land. These include Traditional Owners, Committees of Management, local and State government, local and State agencies and authorities.

The Victorian Marine and Coastal Strategy 2022 provides an overview of all parties with a role in caring for the marine and coastal environment. These same parties have a role managing coastal hazard risk and adaptation.

These guidelines are intended for use by officers and teams from:

- Local government land use planning, climate adaptation, foreshore and asset management, and other relevant areas
- coastal Crown land managers including Committees of Management
- State government departments and agencies who lead and support coastal hazard risk management and adaptation planning
- research organisations and industries who provide a range of relevant technical services.

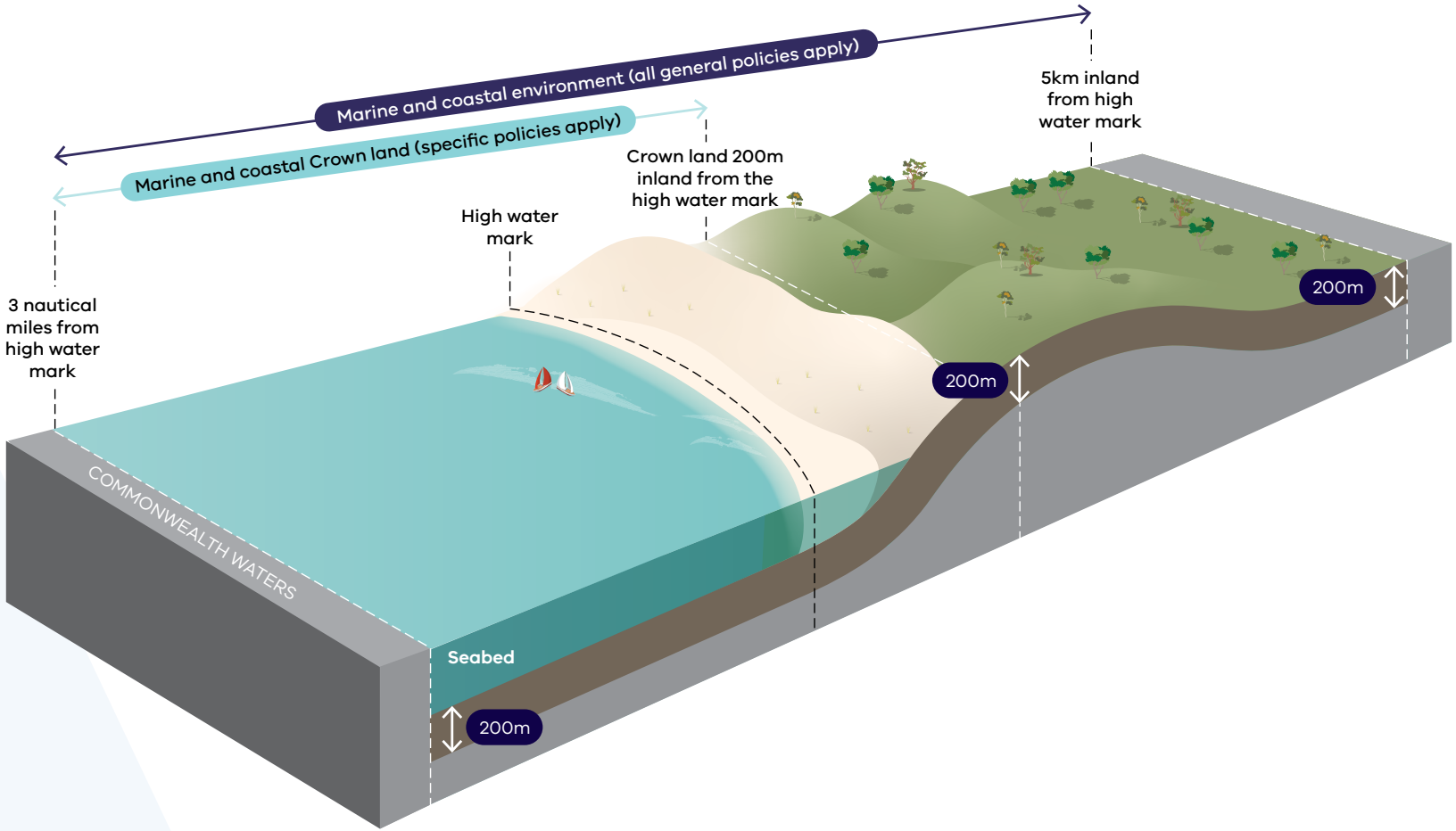


Figure 2. Areas where the Marine and Coastal Policy 2020 applies, including consideration of coastal processes and hazards[5]

5 The State of Victoria, DELWP 2020.

Developing a regional Coastal Hazard Adaptation and Resilience Plan (CHARP)

A Coastal Hazard Adaptation and Resilience Plan (CHARP) is a strategic document created by completing the seven stages of the *Victoria's Resilient Coast – Adapting for 2100+* framework.

It sets out the plan for adapting to coastal hazards in the study area, and identifies priority actions, funding, roles and responsibilities, change management, triggers for review, and a monitoring plan.

The spatial extent of a CHARP at a regional scale will be tailored to the place-based context, and encompass relevant sediment compartments and jurisdictional areas. Further guidance on scoping a suitable spatial scale is provided in **Stage 1**.

The spatial extent of a CHARP is also likely to include one or more Crown land foreshore areas with Coastal and Marine Management Plans (CMMPs) in place.

The work completed for CMMPs and other existing plans/strategies in a study area (e.g. Country Plans, National Park Plans, Municipal Planning Schemes, Marine Spatial Planning) should underpin the relevant stages of developing a CHARP (in particular **Stage 2 – Values, vision and objectives**).

Victorian policy context

Climate change adaptation

Climate change adaptation in Victoria is managed under the *Climate Change Act 2017* and Climate Change Strategy 2021[6].

Sector-based adaptation action plans and regional adaptation plans are in place to build the state's resilience and help Victoria plan for the impacts of climate change.

Climate change adaptation across the marine and coastal environment is integrated across the different sector and regional adaptation plans, with more specific adaptation needs addressed through the *Marine and Coastal Act 2018*, Marine and Coastal Policy 2020 and Marine and Coastal Strategy 2022[7].

Marine and coastal management

The *Marine and Coastal Act 2018* (the Act) is Victoria's overarching legislation to integrate and coordinate planning and management of the marine and coastal environment. The Act contains several planning and management tools that range in application from state to site-specific.

These tools support, and are supported by, relevant acts and policy in Victoria.

In particular, regional coastal hazard adaptation planning is informed by, and implemented through, policies and mechanisms under the *Planning and Environment Act 1987* and other relevant legalisation (**Figure 3**).

Cultural Landscapes

The Cultural Landscapes Strategy, launched on 27 August 2021, provides direction to the Victorian Government about how it can support Traditional Owner self-determination in land management.

Victorian Traditional Owners have developed the Cultural Landscapes Strategy (CLS) to set out a framework and pathways to lead the planning and management of Country in line with their cultural obligations to care for Country.

The CLS supports unique and iterative development towards this at the pace chosen by each Traditional Owner group.

6 The State of Victoria, DELWP, 2021.
7 The State of Victoria, DELWP, 2022.

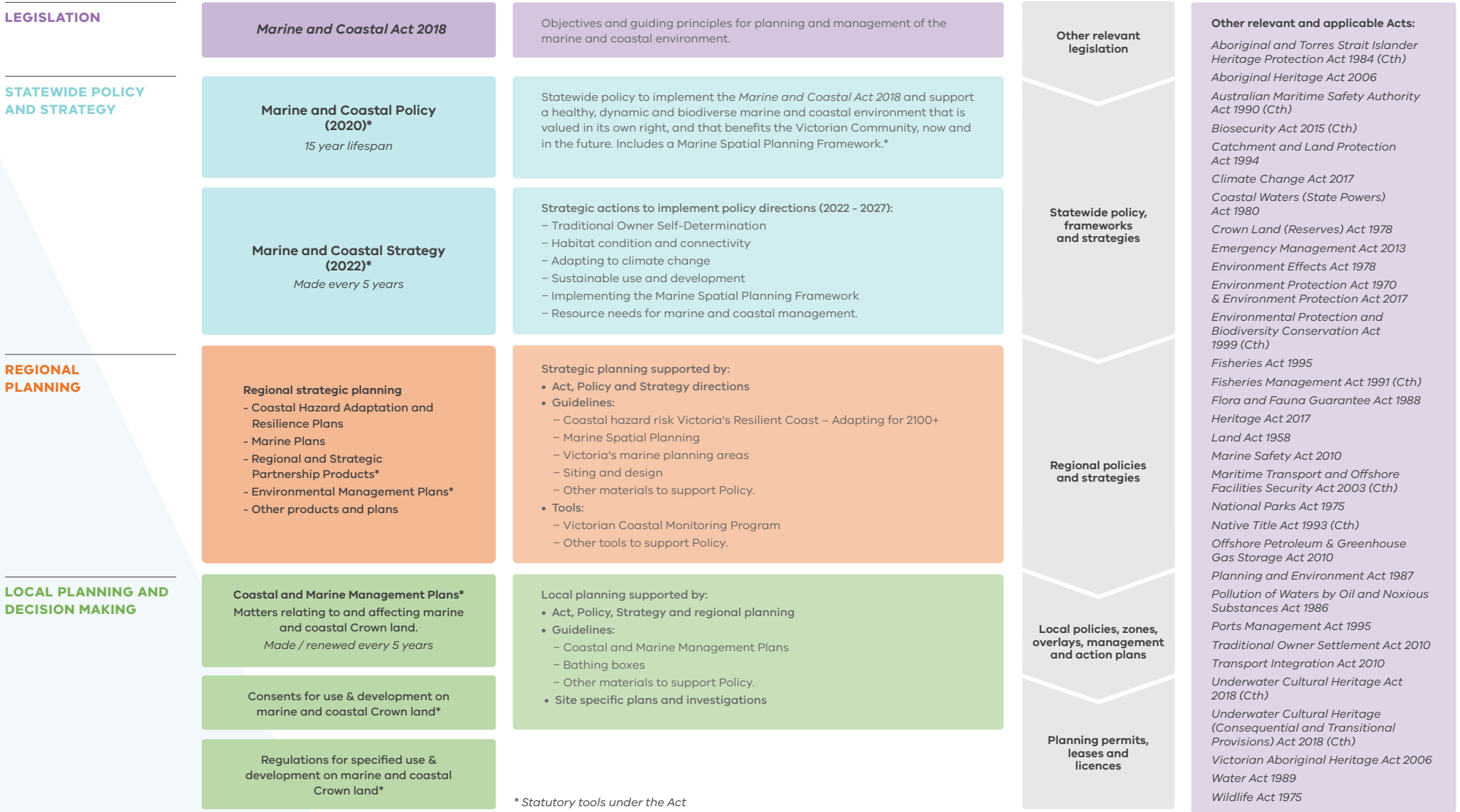


Figure 3. Key policy and legislative context for marine and coastal management

Policy foundations

The Marine and Coastal Policy 2020 sets out a 'Planning and Decision Pathway' (**Figure 4**) consistent with the objectives and guiding principles of the Act.

Figure 4. Marine and Coastal Policy 2020 Planning and Decision Pathway[8]

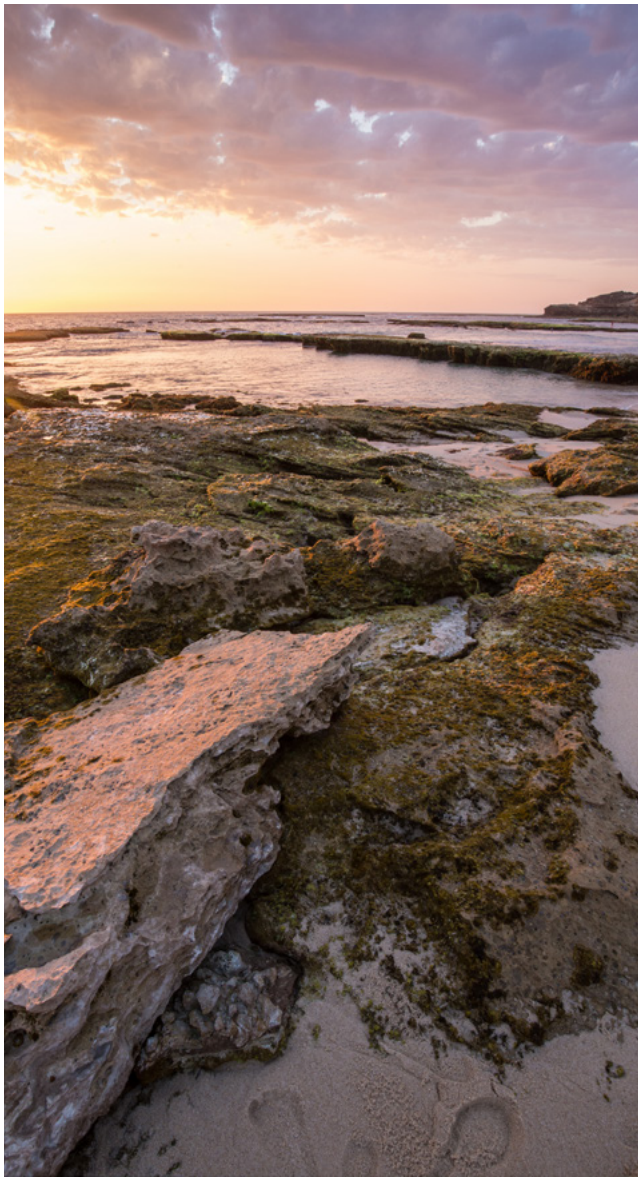
8 The State of Victoria, DELWP 2020.

The Planning and Decision Pathway applies to all planning and decisions in the marine and coastal environment (**Figure 2**), including consideration of coastal process, coastal hazard risk, and adaptation.

Acknowledge Traditional Owners' rights and assertions

In practice, for coastal hazard risk management and adaptation, Step 1 of the Policy Planning and Decision Pathway should include (at a minimum):

- ensuring a good understanding of the Cultural Landscapes Strategy, Country Plans and Traditional Owners' assertions for Country
- making early contact with Traditional Owner groups to support a partnership or alternative approach, as self-determined by groups
- providing necessary support for a partnership or alternative approach (including adequate time, budget, other).



Victoria's Resilient Coast and Marine Spatial Planning

The Marine and Coastal Policy 2020 includes a Marine Spatial Planning Framework that provides guidance and a process for achieving integrated and coordinated planning and management of the marine environment. The primary product of this process is a Marine Plan, which is a strategic document that helps to structure and guide management decisions in the area to which the plan applies.

Victoria's Resilient Coast - Adapting for 2100+ guidelines have been developed concurrently with the Marine Spatial Planning approach. Together, they provide direction for regional strategic planning across coastal and marine environments.

In place-based contexts, the planning process for a Coastal Hazard Adaptation and Resilience Plan will consider the integration with existing or developing Marine Plans, and vice versa.

Policies and directions regarding management of coastal hazard risk are outlined in Chapter 6 of the Marine and Coastal Policy 2020. This includes intended outcomes that:

- coastal hazard risks and climate change impacts are understood and planned for.
- communities, land managers and decision makers have the capability and capacity to respond to coastal hazards.
- the impacts of climate change on values of the marine and coastal environment are minimised.
- adaptation is embedded as a core component of planning in the marine and coastal environment and is used to manage uncertainty and build resilience.

Victoria's Resilient Coast – Adapting for 2100+ builds on the Marine and Coastal Policy 2020 towards these intended outcomes.

Coastal hazards

Natural hazards

Natural physical, chemical, and biological process continually drive changes in the Victorian landscape over short and long timeframes.

When these natural processes have a negative impact on landscape values and uses, we may refer to them as natural hazards.

Natural hazards can include a diversity of processes/events such as bushfires, extreme temperatures, invasive species, water quality changes, floods and drought.

The majority of natural hazards are not unique to the coast, and strategic management of natural hazards takes place through a range of specific and integrated approaches at local and regional scales.

Coastal hazards

'Coastal hazards' are a subset of natural hazards unique to the marine and coastal environment. Natural processes such as erosion and inundation continually shape our diverse and dynamic coastline.

When these processes may have an adverse impact on safety, environmental, cultural, social and economic values along the coast, we refer to them as coastal hazards.

In Australia, coastal hazard definitions vary across the different states and territories. Definitions for Victoria have been updated through the development of these guidelines and build on the previous definitions[9].

Definitions developed for Victoria (**Table 2**) provide a baseline for coastal hazard types that should be considered in relation to coastal hazard risk management and adaptation.

Further detail on hazard definitions and mechanisms is provided in **Stage 3** of these guidelines.

Additional natural hazards may be relevant in some areas and should be included if/as required to address place-based adaptation needs.

9 Tonkin & Taylor Pty Ltd 2012 for Department of Environment and Sustainability.

Table 2. Coastal hazard definitions for Victoria

Category	Process/ hazard	Setting classes include
Erosion	**Short-term erosion** Event-based erosion of sediment (storm-bite) and recovery **Long-term erosion** (recession) Progressive retreat of shoreline position over time	Sandy shorelines Low-earth scarp Soft rock Hard rock
Accretion	Short- or long-term build-up of sediment in a localised area	All shoreline types
Inundation	**Storm tide inundation** Temporary event-based inundation	All low-lying coastal land
	Permanent inundation Regular or persistent inundation by the regular tidal cycle	All low-lying coastal land
Estuary dynamics	Changes in form and processes associated with estuarine and tidal areas	Estuary/ tidal areas
Off-shore sediment dynamics	Changes in form and processes associated with offshore bathymetry and sediment transport	Up to 3 nautical miles offshore
Saline intrusion	Movement of saltwater into freshwater aquifers/groundwater	All low-lying coastal land

Adaptation context

Resilience, risk and adaptation

We can enhance our resilience to coastal hazards through risk management and adaptation.

Our approach to coastal risk management and adaptation in Victoria follows the directions of the Marine and Coastal Policy 2020. This includes to:

- follow the overall 'Planning and Decision Pathway' of the policy (refer **Figure 4**)
- respect natural coastal processes
- strengthen resilience to climate change
- take a values- and place-based approach.

Victoria's Resilient Coast - Adapting for 2100+ framework and guidelines provide an approach consistent with policy direction.

When considering adaptation options, including through **Stages 5** to **6** of this framework, the Marine and Coastal Policy 2020 also requires land managers to:

- consider strategic adaptation options in a certain order (**Table 3**)
- apply an adaptation pathways approach.

Resilience is: [10]
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 is:[11]
The effect of uncertainty on objectives. In an operational context, risk is the likelihood of an event occurring, combined with its potential consequence.

Adaptation is:[12]
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.

10 National Climate Change Adaptation Research Facility, 2017.
11 ISO 31000:2018 Risk Management – Guidelines.
12 National Climate Change Adaptation Research Facility, 2017.

Strategic order of consideration for options

There is a range of strategic options for coastal hazard risk management. In Australia, the definitions of these options are similar, but vary by state/territory.

For Victoria, these are defined in the Marine and Coastal Policy 2020 as (**Table 3**):

1. Non-intervention
2. Avoid
3. Nature-based methods
4. Accommodate
5. Retreat
6. Protect.

In practice, the hierarchy order must be considered and demonstrated when developing an approach for managing risk and developing an adaptation plan.

Further information on the range of actions that may be considered for each strategic adaptation option is provided in **Stage 5** of these guidelines.

Adaptation actions are not mutually exclusive, and often a suite of measures is required to effectively manage coastal hazard risk, enabled through an adaptation pathways approach.

Table 3. Strategic adaptation option order of consideration

Strategic options order	**Descriptions** (aligned to Marine and Coastal Policy 2020)	**Planning considerations/types of actions** (examples - see Stage 5 for all actions)
Non-intervention	Allow marine and coastal processes and the hazards they may pose to occur.	Triggers (event, timing, other) can be identified for when additional action may commence.
Avoid	Locate new uses, development and redevelopment away from areas that are or will be impacted by coastal hazards.	This option typically applies for all coastal hazard areas.
Nature-based methods	Nature-based methods use the creation or restoration of coastal habitats for hazard risk reduction.[13]	This may include beach and dune nourishment for the purposes of habitat restoration, wetland restoration, enabling landward migration of habitat, and potential hybrid nature-based approaches.
Accommodate	Structures can be designed to reduce the exposure to or decrease the impact of coastal hazard risk.	This may include movable infrastructure (e.g. life-saving towers, stairs/ramps) flood resilient building design and use of resilient materials.
Retreat	Existing structures, assets or uses may be decommissioned or relocated away from areas that are or will be negatively impacted by coastal hazards.	This may apply locally or more broadly as part of the adaptation planning process.
Protect (major engineering works)	Existing physical barriers are enhanced, or new ones constructed to mitigate the impact 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.	This may include major beach nourishment programs, seawalls or other physical barriers/structures or interventions that are likely to have significant influence on natural coastal processes.

13 Morris RL, *et al.* 2021.

Adaptation pathways

Definitions

A pathways approach to planning is embedded into national best practice for coastal hazard risk management and adaptation.

A pathways approach enables a range of actions to be identified to reduce current and emerging coastal hazard risk (**Figure 6**).

Pathways set out the relative sequence, timing, and triggers for implementation from present day to longer-term (2100+).

The feasibility of actions may change over time, as conditions change, and adaptation pathways are regularly reviewed.

Marine and Coastal Policy 2020

A pathways approach:

- is a decision-making process
- is made up of a sequence of steps or decision points over time
- uses thresholds and triggers for when new decisions need to be made
- addresses present day needs, and is forward-looking
- recognises the changing nature of climate change impacts
- aims to use the most effective tools at the most effective time.

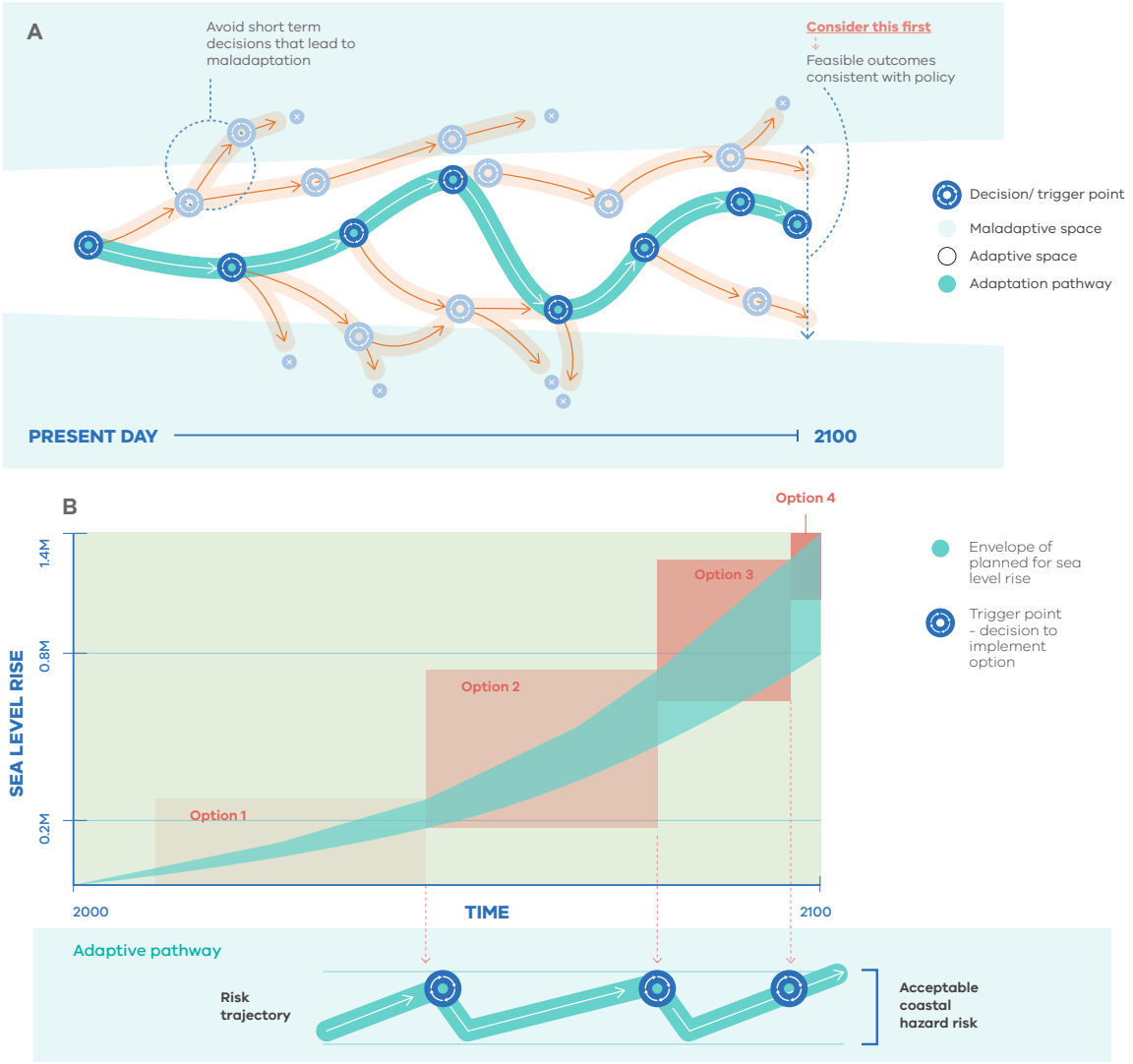


Figure 5. Example concepts for adaptation pathways approach: A - Consider pathway options and actions in the 'adaptive' space, B - Implement actions over time to reduce the risk profile.[14]

14 After National Climate Change Adaptation Research Facility 2017, Wise *et al* 2014 & Siebentritt *et al* 2014.

Pathways in practice

In practice, a pathways approach provides a 'road map' for adaptation from present day to a long-term planning horizon, usually 2100+ (**Figure 6**).

Using this approach enables:

- long-term strategic planning
- consideration of multiple potential futures and associated adaptation pathways, and preferred pathways consistent with Marine and Coastal Policy 2020 directions
- avoiding short-term actions that may lead to maladaptation
- confidence to take short-term action.

A pathways approach can be represented in a table or diagram that details:

- the range of adaptation actions to be taken over time
- a preferred adaptation pathway
- trigger/decision points for change
- alternative pathways
- required monitoring.

Adaptation actions can include planning and design, nature-based, engineering and other actions, as further outlined in **Stage 5** of these guidelines and the associated Adaptation actions compendium[15].

Further guidance on developing adaptation pathways is provided in **Stage 5** of these guidelines.

15 BMT Ltd, 2022.

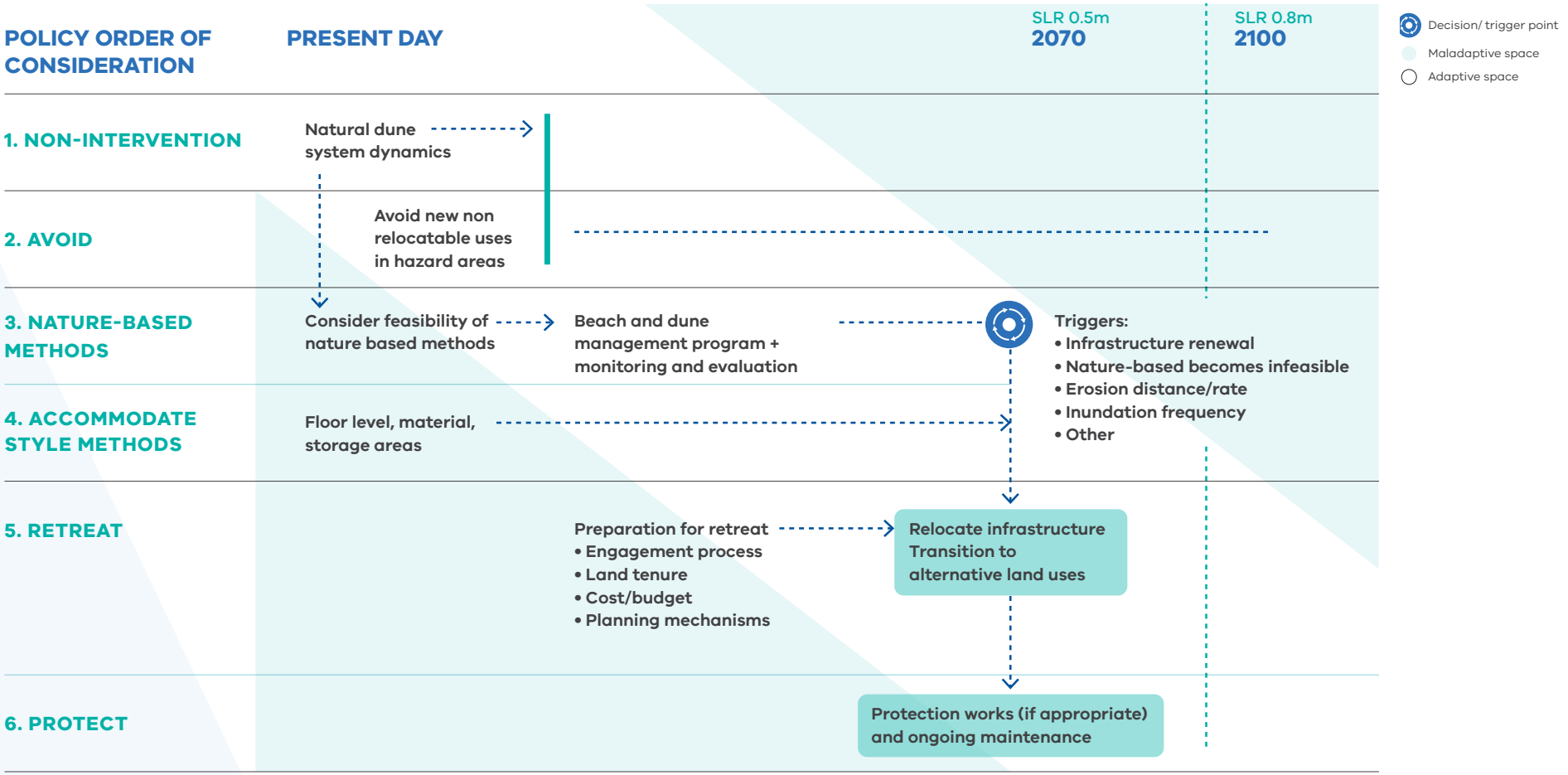


Figure 6. A simplified example of an adaptation pathway in practice

How we can adapt

There are a range of ways we adapt to change, including a spectrum of coping, incremental adaptation, through to transformational adaptation (**Table 4**).

Through the relevant Stages (1-6) of *Victoria's Resilient Coast – Adapting for 2100+* framework, the appreciation of values and vision, vulnerability and risk, and adaptation options, should inform consideration of where the opportunities may be for transformational adaptation.

In contrast to coping or incremental adaptation, transformational adaptation aims to reduce the root causes of vulnerability.

Transformational adaptation is desirable in systems where tipping points may be reached. Common examples of transformational adaptation include retreat pathways that involve relocating infrastructure and transitioning to alternative land use in coastal hazard zones.

Transformational adaptation typically requires long lead times and strong partnership approaches with communities.

Enabling best practice

Best practice coastal hazard adaptation planning includes the use of multiple scenarios for planning horizons and hazard event likelihoods.

Planning horizons

Inclusion of sea level rise scenarios of 0.2m, 0.5m, 0.8m and associated indicative time horizons (e.g. present day, 2040, 2070 and 2100) is recommended for consistency across the State. Inclusion of sensitivity scenarios of higher sea level rise scenarios for 2100 (e.g. 1.1m - 1.4m) is also best practice.

Additional (or alternative) interim scenarios may be included based on regional contexts and available information (e.g. timing for planning scheme updates, other strategic plan updates, available scientific data).

Multiple hazard likelihood scenarios

For each sea level rise/planning horizon scenario, it is recommended to include a minimum of 10%, 1% and 0.2% Annual Exceedance Probabilities (AEPs) for key hazards (e.g. erosion, inundation data).

Multiple AEPs are required to enable probabilistic approaches to risk and economic assessments. Additional AEPs may also be included as relevant to regional contexts.

Further detail on best practice, including planning horizons and AEPs is provided in **Stage 3** of these guidelines.

Table 4. Types of adaptation[16]

	Coping	Incremental adaptation	Transformational adaptation
Definition	Following impact, re-establish and restore systems and assets to a **similar state**.	Prior to or following impact, adjust, reduce vulnerability, or build resilience to **maintain the essence or integrity** of a system or process.	Prior to or following impact, change the fundamental attributes of a system to reduce the root **causes** of vulnerability and shift **systems** away from unsustainable or undesirable trajectories.
Examples	*Rebuild damaged built infrastructure after a major storm event.*	*Rebuild damaged built infrastructure to stricter standards following a major storm event.*	*Relocate built infrastructure to locations with lower risk of major storm events.*
	Re-plant crops affected by saltwater intrusion.	*Change to more salt tolerant crops in areas affected by saltwater intrusion.*	*Transition affected agricultural land to native coastal vegetation types (e.g. mangrove, saltmarsh) and associated ecosystem services.*
	Re-establish site conditions to maintain cultural and environmental values.	*Improve resilience through a suite of adaptation measures.*	*Support a transition of cultural landscapes and ecosystems.*

16 Adapted from Fedele *et al* 2019 and Noble *et al* 2014.

How to use these guidelines

General

These guidelines can be used to:

- **Review:** Provide guidance for reviewing coastal hazard risk management and adaptation planning work completed to date in a local/regional area. Existing work can be aligned to the framework stages, and gaps/needs identified.
- **Scope:** Assist with scoping a program of work to progress risk management and adaptation. A tailored scope of work can be developed for each stage.
- **Progress and endorse:** Assist with endorsing and tracking implementation of adaptation planning in line with best practice.

Additional supporting resources are provided in **Attachments A** to **C** and in supporting reports (Coastal hazards extended guideline[17], Adaptation actions compendium[18], An economic approach to adaptation[19]).

Summary reports

The output for each of the framework stages includes a summary report.

These reports are intended to provide a summary of the technical, engagement and strategic planning work completed for each stage, suitable for sharing with project partners for review, and to confirm next steps before the work progresses.

The length and detail may vary from a short memo for smaller local projects, to a more detailed technical report for regional scale projects.

The summary reports represent key 'hold points' in the risk management and adaptation planning process. This helps with:

- ensuring the scope of work in each stage has covered all necessary elements
- confirming with project partners the scope of the following stages
- ensuring a collaborative process is underpinning decision making.

Checklist

A checklist is provided at the end of **Stages 2**-**7** to:

- enable review of the core elements
- confirm support from project partners
- identify any gaps or elements that need to be revisited before progressing
- endorse that the work completed is fit for purpose and ready to progress.

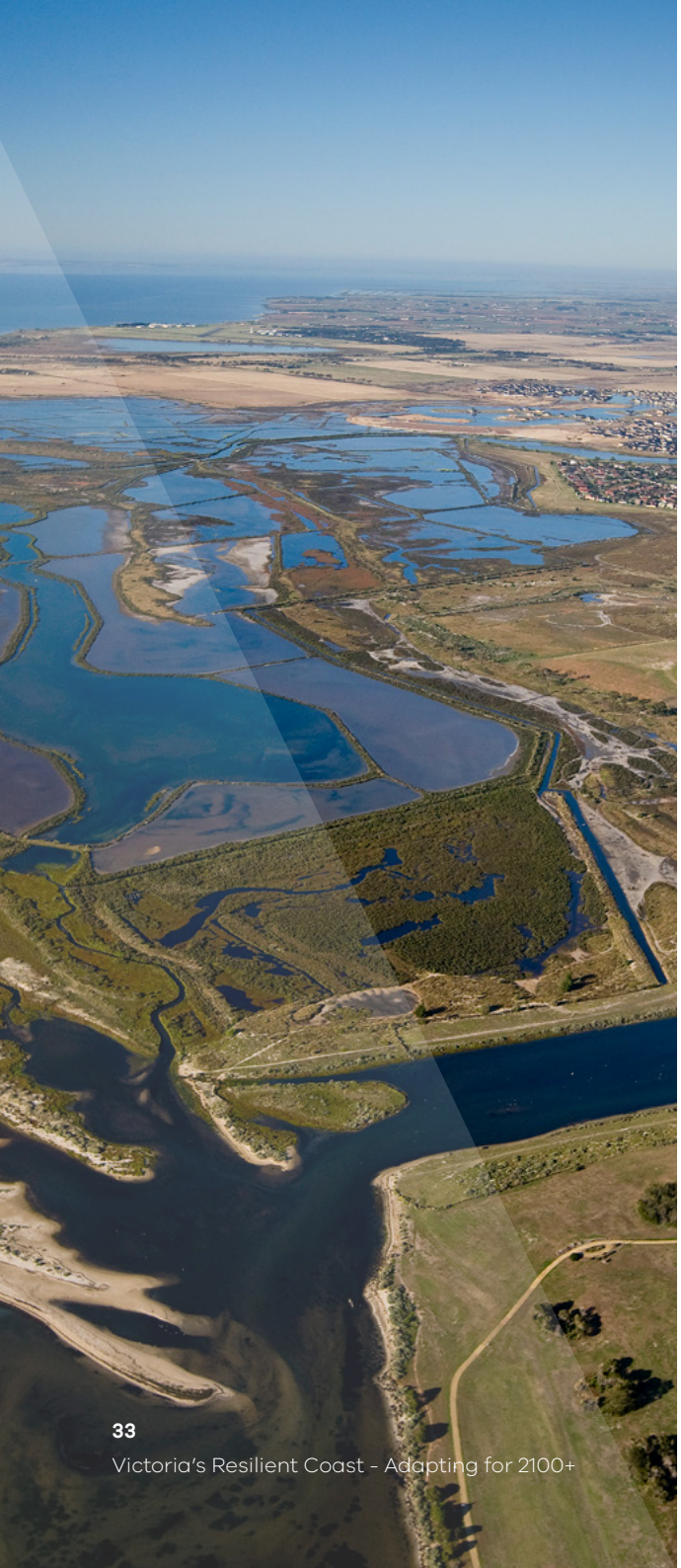
Project managers may wish to review and tailor checklists to the needs of each project and the project partners.

Need further support and advice?

The Department of Environment, Energy and Climate Action (the Department) can provide additional guidance and support for scoping coastal hazard risk management and adaptation planning projects.

Please contact the Department team in your region to discuss your initial ideas and opportunities in your area.

17 Water Technology Ltd., 2022.
18 BMT Ltd., 2022.
19 Alluvium Consulting & NCEconomics, 2022.



STAGE 1 –
Scoping and preparation

Stage			Across all
1		**Scoping and preparation**	Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
2		**Values, vision and objectives**	
3		**Coastal hazard exposure**	
4		**Vulnerability and risk**	
5		**Adaptation actions and pathways**	
6		**Plan and implement**	
7		**Ongoing monitoring and review**	

This section outlines the Stage 1 steps including to:

- define the need for action
- refine the study area
- select a governance model
- establish a collaborative process
- scope the work required
- complete a Project Plan
- complete a Stage 1 checklist

Stage purpose

The purpose of **Stage 1** is to provide a foundation for commencing or progressing coastal hazard risk management and adaptation planning, aligned to best practice guidance, in each place-based context.

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1.1. Define the need for action

Different parts of Victoria's marine and coastal environment will have different coastal hazard adaptation needs.

To progress risk management and adaptation planning, lead/partner organisations should first define the need for action across an area of interest. This helps with:

- generating internal and external support
- clarifying unique place-based needs and objectives for adaptation
- defining a suitable study area and governance model/collaborative process.

For example, the need for action may reference existing knowledge on:

- current hazard exposure, including the relevant types of hazards, past/recent events impacting on coastal values and use
- immediate hazard risks (where known)
- future hazard exposure (where known)
- known sensitive coastal values including cultural, social and environmental values that may be at risk
- expenditure on coastal hazard impacts to date
- organisational priorities to invest/act on climate change
- opportunities to align with priorities for multiple organisation/partners.

The need is often best framed as the positive outcomes expected from acting now. This may include:

- opportunities to avoid or mitigate adverse impacts on cultural, environmental, social and economic values
- proactive action on potential climate change impacts
- potential co-benefits of actions.

1.2. Refine the study area

The study area will vary based on each place-based context.

The definition of the study area should consider:

- the landscape setting, including sediment compartments and the availability/extent of hazard data
- jurisdictional areas and boundaries
- Traditional Owner rights and assertions for Country, including existing Country Plans
- existing plans and strategies, including Coastal and Marine Management Plans
- public and private land across the marine and coastal environment.

Lead/partner agencies can scope an appropriate study area that best meets the needs for each place-based context.

Further guiding questions to assist with defining a study are provided in **Table 5**.

Table 5. Guiding questions for defining a study area

Category	Example questions	Considerations
Traditional Owner rights and assertions for Country	What are Traditional Owner rights and assertions for Country, including existing Country Plans? What are Traditional Owner preferences for the study area?	Aligning study area to Traditional Owner rights and assertions, and to support Traditional Owner-led adaptation.
Landscape setting	What are the primary, secondary and tertiary coastal compartments in this region? (refer to **Stage 3** for further detail)	Aligning study area to landscape processes and existing / proposed hazard assessment extents.
	Where do we already have detailed coastal hazard information?	The cost/logistics of acquiring new coastal hazard information.
Jurisdictional areas	What jurisdictional areas should the study include?	Aligning study area to be: • inclusive of key partner areas including Local Government Areas (LGAs), Registered Aboriginal Parties, Catchment Management Authorities, National Park areas, other. • the best use of resources.
Existing knowledge, plans and strategies	Where are the known risks and vulnerabilities from coastal hazards currently, or projected to be?	Aligning study area with the greatest need for action.
	Where are there known management gaps?	
	What current plans and strategies exist (including CMMPs)?	Aligning study area to best incorporate and build on from (and not duplicate) existing work.
Public and private land	What extent of public and private land is likely to be within the 2100 hazard prone area?	Ensuring study area is inclusive of all relevant areas for long-term planning (2100+).

Refinement of the study area may also occur during iterative review of subsequent **Stages 2** to **5**, as more detailed assessments of values, physical process and hazards, vulnerability and risk are undertaken, and the collaborative engagement process progresses.

Where it is feasible to do so, adaptation planning is best framed across study areas at a regional scale e.g. whole or multiple LGAs, whole/multiple secondary sediment compartments.

Finer scale site/issue-based risk management should also consider and adopt relevant information from the broader regional context.

Resources: Digital Earth Australia

Digital Earth Australia provided by Geoscience Australia is a freely available analysis platform for satellite imagery and other Earth observations.

Digital Earth Australia contains several datasets, including the Coastline Dataset which shows the annual shorelines and rates of coastal change along the entire Australian coastline from 1988 to the present.

An appreciation of rates of shoreline change can inform study area delineation, project scoping, and technical assessments across **Stages 1 – 7** of *Victoria's Resilient Coast – Adapting for 2100+* framework.

dea.ga.gov.au

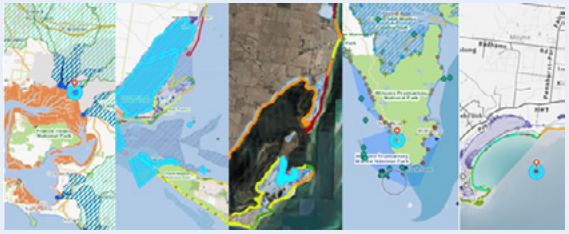
Resources: CoastKit

The CoastKit portal provides a range of up to date information on marine and coastal scientific data, images and resources including:

- existing coastal hazard information
- physical conditions/data for the coast
- jurisdictional and administrative areas
- statewide/first pass studies
- easy to navigate mapping products (aerial imagery, location details).

This resource supports refinement of study areas, and all **Stages 1 – 7** of *Victoria's Resilient Coast – Adapting for 2100+* framework.

CoastKit



marineandcoasts.vic.gov.au/coastal-programs/coastkit

1.3. Select a governance model

The progression of coastal hazard risk management and adaptation planning for Victoria is supported through a flexible range of governance models (**Table 6**). Different governance models will be fit for purpose in different contexts.

Lead/partner organisations can select a governance model that best meets the needs of the defined study area; founded on a collaborative approach in each case (as outlined in Section 1.4).

For progressing regional scale planning, lead/partner organisations may consider the relative benefits/ challenges of a statutory Regional and Strategic Partnership or non-statutory partnership model for their own place-based context.

Key considerations may include:

- model establishment time/preparation
- lead agency/partner agency needs, capacity, skills
- existing collaborative arrangements
- implementation needs – is statutory backing required for accountability/ enforceability, or is a non-statutory approach appropriate?
- complexity/scale of program.

Table 6. Governance models for progressing adaptation planning

Model	Context	Considerations
Regional and Strategic Partnership (RaSP)	Statutory strategic planning process under the *Marine and Coastal Act 2018* (refer **Figure 3**)	Land manager/ local government lead with State partnership State lead also feasible
Other partnership models for regional scale adaptation	Non-statutory strategic planning process	
Individual organisations – site/issue-based adaptation	Non-statutory strategic and operational planning	Land managers with State support

Roles

For regional partnership approaches, lead/partner organisations will need to confirm the proposed governance model and gather endorsement from all project partners.

Formalised governance arrangements can be provided through:

- the establishment of a Regional and Strategic Partnership (RASP) under the Act
- a non-statutory Memorandum of Understanding (MoU) between the project partners.

In all cases, Terms of Reference for the partnership are required, articulating project lead and partner roles, contributions and expectations.

Where a partnership will be seeking State funding support, the partnership must nominate a lead organisation to receive the funds and administer the project.

Department representatives from relevant regions and policy teams must form part of the governance arrangements for review/endorsement of each stage.

Skills/capacity

In considering project roles and establishing Terms of Reference, the range of skills/capacity required for regional scale adaptation planning should be considered. This includes skills in (and is not limited to):

- large/complex project management
- leading a collaborative process
- engagement and communication
- coastal hazard adaptation strategic planning
- policy and statutory planning
- coastal science and engineering
- cultural heritage
- environmental management
- infrastructure management
- economic assessments.

Project partners may contribute technical expertise, project funding or in-kind support, provide links to communities and implement actions.

Additional technical expertise/support may be procured to help with various technical, strategic and engagement elements of the framework.

Project partners

The range of project partners that may form regional partnership models (statutory or non-statutory) include:

- Registered Aboriginal Parties (see **Figure 7**)
- the Department
- Local government
- Committees of Management
- Catchment Management Authorities
- other Victorian Government agencies
- water authorities
- major infrastructure managers/providers
- port managers
- representative and peak body groups
- community groups.

Partnering with Traditional Owners

Australia is a signatory to the United Nations Declaration on the Rights of Indigenous Peoples (UN Declaration). The UN Declaration outlines the rights of Indigenous peoples around the world and describes self-determination as the right of Indigenous peoples to 'freely determine their political status and pursue their economic, social and cultural development'.

Agencies and departments must work in partnership with Traditional Owners and Aboriginal Victorians to support their right to self-determination. The *Aboriginal Heritage Act 2006* recognises Registered Aboriginal Parties (RAP) as the primary guardians, keepers and knowledge holders of Aboriginal Cultural Heritage. RAP groups must be engaged, using a self-determination model, in coastal hazard risk management and adaptation planning.

Traditional Owner groups may also be a Prescribed Body Corporate under the *Corporations (Aboriginal and Torres Strait Island) Act 2006* (Cth) with recognised rights for managing native title rights and interests under the *Native Title Act 1993* (Cth). Unique requirements for engaging with and seeking permissions from a Prescribed Body Corporate when conducting coastal hazard risk management and adaptation planning must be followed.

In the context of all governance models for coastal hazard risk management and adaptation, the following principles apply:

- seek a partnership approach with Traditional Owner groups in the region
- engage early (**Stage 1 – Scoping and preparation**) to support self-determination and inform funding needs for a partnership approach and project scope
- support self-determination of coastal hazard risk management and adaptation needs and interests
- support policies 1.1 to 1.9 of the Marine and Coastal Policy 2020 and actions in the Marine and Coastal Strategy 2022.

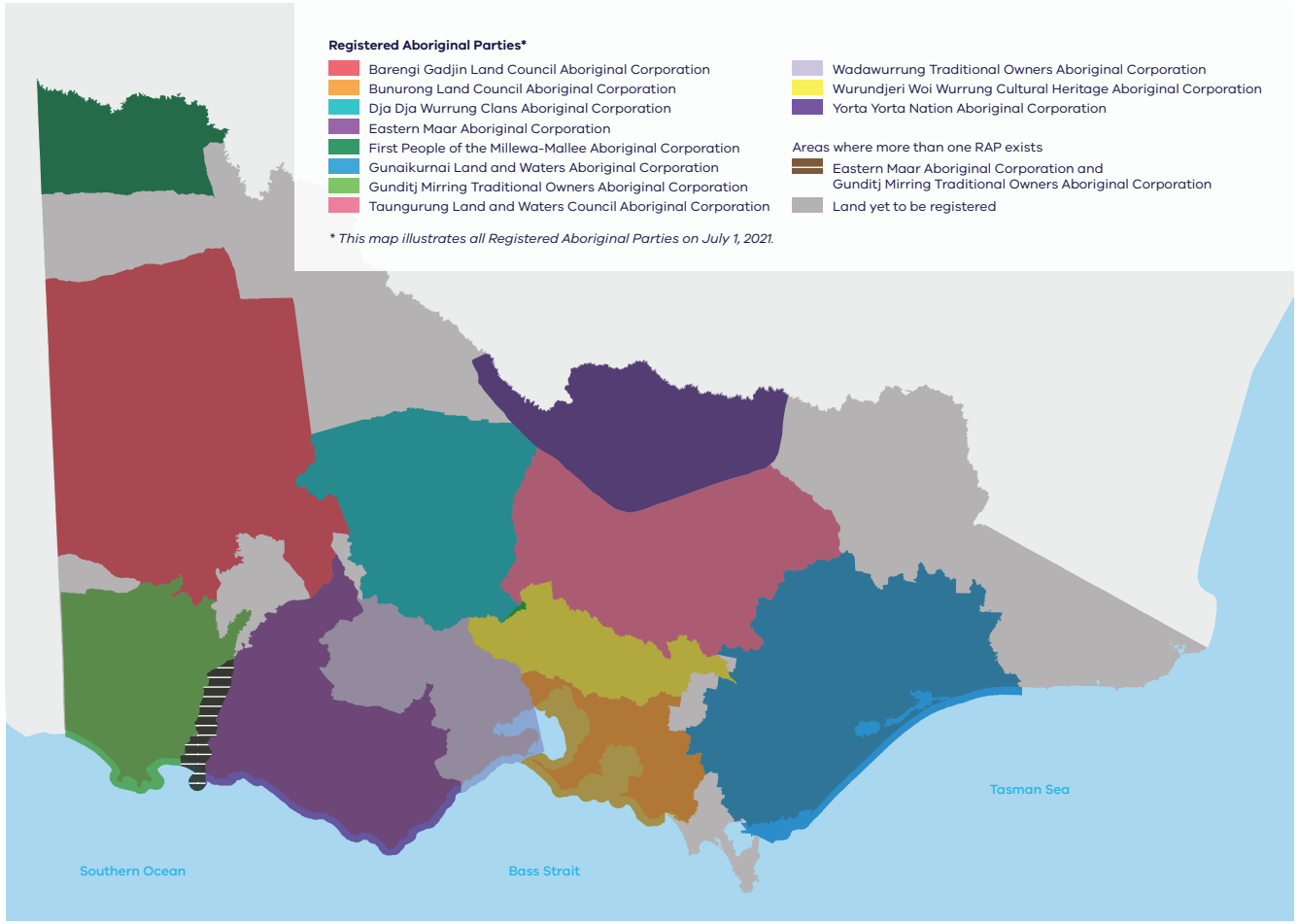


Figure 7. Registered Aboriginal Parties in 2021[20]

20 State of Victoria DELWP, 2022 (**https://www.aboriginalheritagecouncil.vic.gov.au/victorias-current-registered-aboriginal-parties**).

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1.4. Establish a collaborative process

A tailored approach

The planning and management of coastal hazards is ultimately the shared responsibility of a large number of rightsholders and stakeholders, including Traditional Owners, land managers, state agencies, local government, land and asset owners, and the broader community.

To achieve and sustain the desired long-term outcome of shared responsibility and accountability, a collaborative engagement process can be tailored to support adaptation planning (refer **Figure 8**).

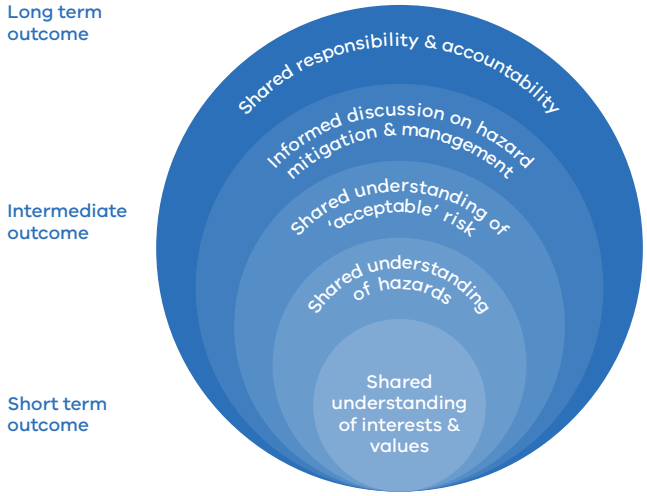

Figure 8. Desired engagement outcomes that support progression of adaptation

As part of **Stage 1 – Scoping and preparation**, a tailored engagement and communication approach for the entire project and for each Stage (as needed) is developed. This includes consideration of:

- the engagement process – activities and outcomes
- communication – key messaging and tools
- tailored needs for different audiences including executive, within lead organisations, project partners, community.

The approach to engagement and communication is fundamental to the successful progression of coastal hazard adaptation planning and action.

Development of the approach is best undertaken/supported by organisations with specialist engagement expertise in adaptation planning contexts.

Important components of establishing a collaborative process include:

- rightsholder/stakeholder mapping
- aligning activities to the desired outcomes of the relevant framework stages
- tailoring activities and approaches to audiences and with consideration of the IAP2 spectrum (**Figure 9**)
- a focus on two-way flow of information
- clarity on negotiables/non-negotiables
- key messaging for each stage
- developing an Engagement and Communication Plan with details for each stage of the framework
- keeping the Engagement and Communication Plan and approach live and regularly reviewing it as work progresses
- utilising the range of tools and resources available (e.g. **Table 7**).

Engagement and Communication Plan

Developing an Engagement and Communication Plan includes:

- **understanding** why you are engaging, who you should include in the process, the potential risks involved and the resources available to engage
- **implementing** the engagement process by choosing the right techniques, having a robust plan, a clear engagement message and by documenting and sharing the findings
- **evaluating** and reflecting on the engagement process and outcomes to learn, improve and share.

Further guidance on these elements is outlined in **Attachment C**.

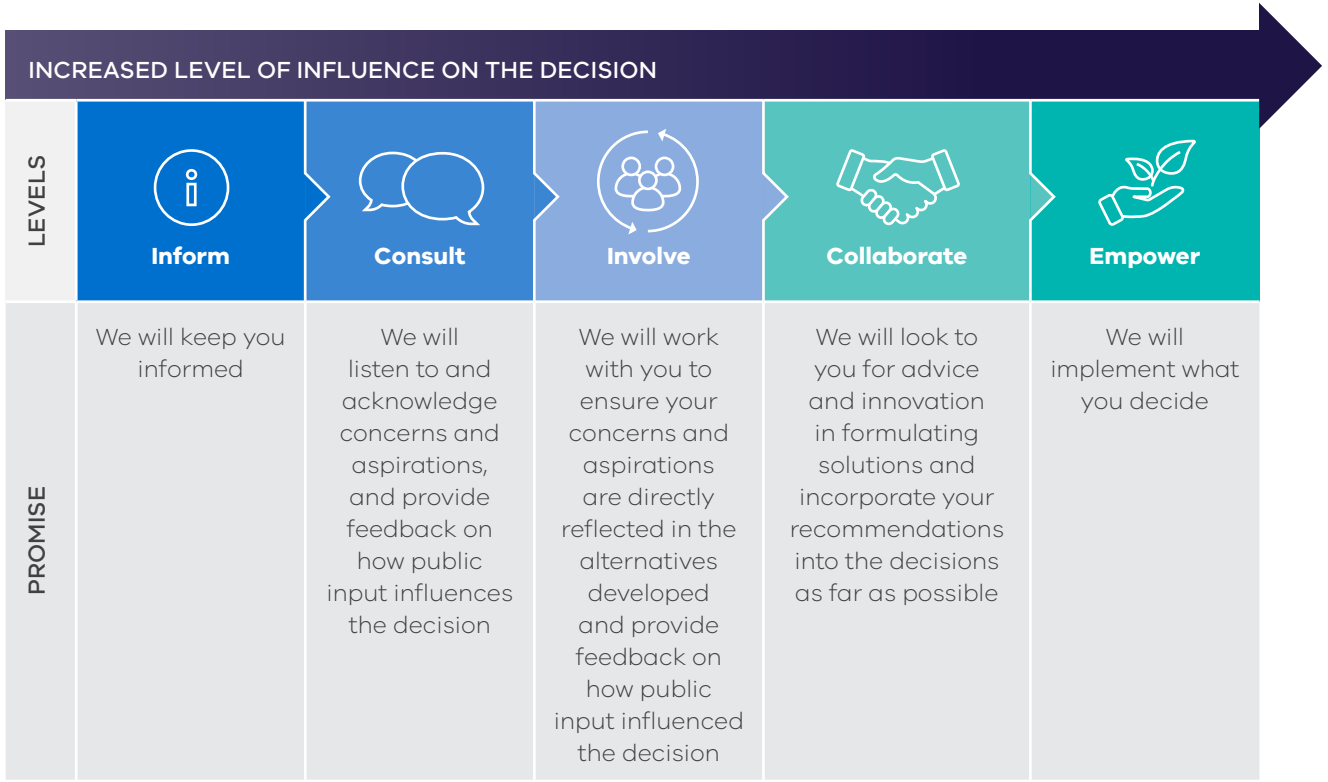

Figure 9. The IAP2 Spectrum of Public Participation[21]

21 DELWP 2018 (unpublished) adapted from International Association for Public Participation.

Table 7. Additional tools and resources

Additional tools

- online workshopping canvases and whiteboards including:
  - Mural™ - **mural.co**
  - Google Jamboard™ - **jamboard.google.com**
  - Miro™ - **miro.com**
- hemingway editor makes suggestions to improve clarity of written text. It also provides a readability grade (e.g. Grade 9 is readable by an average Grade 9 student) **hemingwayapp.com**
- test the readability of your messages using **readabilityformulas.com/free-readability-formula-tests.php**

Additional resources

- **engage.vic.gov.au/draft-public-engagement-framework**
- **vic.gov.au/stakeholder-engagement**
- **vic.gov.au/introduction-human-centred-design**
- **mdba.gov.au/sites/default/files/archived/mdbc-S-E-reports/1831_towards_whole_of_community_engagement_toolkit.pdf**
- **bi.team/publications/east-four-simple-ways-to-apply-behavioural-insights/**
- **bi.team/our-work/tools/**
- **psychologytoday.com/au/blog/some-assembly-required/201702/the-4-primary-principles-communication**
- **behaviouraleconomics.pmc.gov.au/learn-hub**
- **campaigns.sustainability.vic.gov.au/asset-library/community-climate-change-and-energy-action-program/communications-toolkit**
- **climatevisuals.org/evidence/**

Resource: Engagement and communication reference pack – example activities

A Communications and Engagement Reference Pack was developed as a resource to support and empower the Port Phillip Bay Coastal Hazard Assessment (PPBCHA) project delivery partners.

The Reference Pack included a series of factsheets about the following nine engagement and communication activities/tools:

- wave tanks
- coastal timelines
- community pop-ups
- community workshops
- interviews
- communications toolkit
- internal/intra-agency engagement
- stakeholder briefings
- interagency engagement.

Contact the Department for further information.

1.5. Scope the work required

Coastal hazard risk management and adaptation planning will be at different stages along the Victorian coastline.

This step defines the scope of the adaptation planning to be undertaken. By completing a scoping study, a solid foundation for future stages will be set.

A well-developed study will also help in gaining buy-in from the project partnership organisations, including internal senior officers and executive.

Victoria's Resilient Coast – Adapting for 2100+ seven-stage framework enables project leads / partners to progress adaptation planning from any stage of the process. In scoping adaptation needs, land managers should consider:

- has all the existing information been reviewed?
- how does work completed to date align with the seven-stage framework?
- are some stages fully complete?
- which stages have not yet commenced?
- are some stages partially complete – and what gaps need to be filled?
- does existing work from some stages need updating?
- what are the tailored needs of the project partners?
- what is needed to ensure a collaborative approach is continued/improved for future work?

Depending on the skills and capacity of lead organisations, seeking expert advice may be of benefit to define the work required to progress/ complete **Stages 2** to **7**.

Scoping of the work should include:

- consideration for all coastal hazard adaptation needs and opportunities for the study area, including environmental and cultural considerations
- the technical, strategic and engagement studies and activities required to align with best practice guidance and advance adaptation planning for the region
- options, hold points and flexibility to support delivery in an iterative way.

The scope should be confirmed and refined with project partners at each stage, as the work progresses and new information is delivered.

1.6. Complete a Project Plan

The output of **Stage 1 – Scoping and preparation** is a Project Plan that is supported by all project partners.

At a minimum this Project Plan must summarise:

- the need for action – refined through the collaborative work of the scoping stage
- the study area
- the governance model
- the proposed collaborative process for the project, detailed in a Communication and Engagement Plan
- the scope the work required for each Stage
- supporting documentation (e.g. RaSP or MoU arrangements, funding agreements, other).

1.7. Complete a Stage 1 checklist

Readiness to progress checklist	
Have you reviewed **Stages 2-7** of these guidelines to inform the scope of the work required?	✓
Have you received direction from Traditional Owner groups?	✓
Have you completed a Project Plan that includes a summary of the required **Stage 1** scoping elements (1.1. to 1.5)?	✓
Does the Project Plan have in principle support from all project partners?	✓
Has the Department provided in principle support for the Project Plan?	✓
Are all necessary agreements and resources in place for the scope of the work?	✓

STAGE 2 –
Values, vision and objectives

Stage			Across all
1		Scoping and preparation	Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
2		Values, vision and objectives	
3		Coastal hazard exposure	
4		Vulnerability and risk	
5		Adaptation actions and pathways	
6		Plan and implement	
7		Ongoing monitoring and review	

This section outlines the Stage 2 steps including to:

- progress engagement and communication
- identify aspirations and values
- develop a shared vision and objectives
- prepare a Stage 2 summary report
- complete a Stage 2 checklist.

Stage purpose

The purpose of this stage is to ensure coastal hazard risk management and adaptation planning is underpinned by place-based values and a shared vision and objectives.

This includes Traditional Owner assertions for Country, the Victorian Marine and Coastal Policy 2020 vision, and stakeholder, including community, aspirations.

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2.1. Progress engagement and communication

A tailored engagement and communication process should underpin **Stage 2** consistent with the approach to creating a collaborative process (**Stage 1.4**) and activities detailed in the Project Plan.

Activities should include participatory approaches to enable a two-way flow of information. For **Stage 2** this may include:

- site visits, workshops, meetings, and online sessions, surveys – to support identifying community aspirations, values and shared visioning
- ongoing partnership discussions (as mutually agreed) with Traditional Owners, including consideration of cultural values
- website/engagement platform and materials set up
- tailoring of key messaging for **Stage 2** and for different audiences – e.g. to introduce the project, key terminology, scope of work, opportunities to engage, values and vision context, seek input and communicate outcomes.

Further guidance on engagement, and example key messages, are provided in **Attachment C**.

2.2. Identify aspirations and values

Victorian context

The Victorian marine and coastal environment supports a diversity of values and uses.

Traditional Owners continue to nurture, heal and restore cultural landscapes across Country.

The Marine and Coastal Policy 2020 articulates the shared community aspirations for Victoria's marine and coastal environment. These aspirations are embedded in the policy vision.

Marine and Coastal Policy 2020

> ***Our vision is for a healthy, dynamic and biodiverse marine and coastal environment that is valued in its own right, and that benefits the Victorian community, now and in the future.***
>
> **(marineandcoasts.vic.gov.au)**

The policy provides the foundation for decision making to ensure planning and management actions align to the shared vision for the whole Victorian coast.

Country Plans

In addition to the directions in the Cultural Landscapes Strategy 2021, individual Traditional Owner groups may also have a Country Plan in place.

A Country Plan is an expression of individual groups, not dictated by government processes. It may identify and articulate the aspirations, assertions, and rights of Traditional Owner groups and how they will manage the values of their Country.

Where Country Plans are in place, they should inform the values, vision and objectives of the study area, as directed by the Traditional Owner groups.

Role of local aspirations and values

Local aspirations and values provide a strong foundation for strategic coastal hazard risk management and adaptation.

In practice, identifying local aspirations and values:

- supports a collaborative approach
- directly informs the scope of work in **Stages 3** to **6** (**Table 8**).

Table 8. Aspirations and values underpin scope

Aspirations and values inform	By:
Stage 3 – Coastal hazard exposure assessment scope	• ensuring that the scope of the assessments/data is suitable for assessing impacts for key values and uses.
Stage 4 – Vulnerability and risk assessment scope	• ensuring that the relevant data is sourced, and that the scope of assessments addresses place-based values • informing best practice risk (likelihood x consequence) assessments through embedding local values into the assessment of consequence of coastal hazard impacts.
Stage 5 and 6 – Adaptation actions, pathways, plan and implement	• informing the evaluation of adaptation options through tailored multi-criteria and cost-benefit analysis • providing an appreciation of local values in the context of regional values, to inform decision making, actions, implications and priorities.

Local values include consideration of broader regional areas (e.g. broader coastal compartments, cultural landscapes, LGAs) to ensure an appreciation of the tailored landscape setting within which local foreshore areas/ beaches/townships are situated.

Identifying aspirations and values

Identifying local community aspirations and values should include:

- a review of existing plans, strategies, including Country Plans, Coastal and Marine Management Plans (CMMPs), Municipal Planning Schemes, Regional Waterway Strategies and other relevant place-based strategies that articulate aspirations and values for marine and coastal environments. This includes:
  - all coastal areas
  - coastal waterways and estuaries
  - climate change planning contexts
- partnership discussions with Traditional Owner groups
- tailored engagement and communication activities to gather updated information on community aspirations and values
- documenting the diversity of environmental, cultural, social and economic values and uses.

Identifying local values should incorporate and build on values identified in existing CMMPs. Additional detailed guidance and sources for identifying values are provided in the CMMP guidelines[22].

Distinctive Area Landscapes

Several coastal areas are declared as Distinctive Area Landscapes (DAL).

Declaration as a DAL provides protection from inappropriate development in sensitive areas across Victoria and safeguards their unique features for future generations.

Once declared, a Statement of Planning Policy must be prepared for the area in partnership with Traditional Owners, local councils and the community.

A Statement of Planning Policy will include a long-term vision of at least 50 years, policy objectives and strategies to achieve the vision, and a strategic framework plan for guiding the future use and development of land in the declared areas.

This plan may identify long-term settlement boundaries to ensure that development does not inappropriately encroach into valued natural and rural landscapes.

planning.vic.gov.au/policy-and-strategy/distinctive-areas-and-landscapes

22 Croft for DELWP 2017.

Crown land/foreshore areas

A Coastal and Marine Management Plan (CMMP) is a tool under the *Marine and Coastal Act 2018* that establishes an agreement between the Victorian Government, land managers and the community about how an area of coastal Crown land in Victoria will be managed.

A CMMP helps Crown land managers and the community to care for special coastal and marine environments, and manage demand and conflicting uses now and in the future.

CMMPs provide a five-year plan for management that considers all values, threats and priority management needs for our marine and coastal Crown land.

marineandcoasts.vic.gov.au/coastal-management/coastal-management-plans

Climate adaptation contexts

Guided by the Climate Change Strategy, the Victorian Government is planning for climate impacts and delivering adaptation action at different scales across the state.

At a state level, Adaptation Action Plans build our climate resilience in areas either vulnerable to climate change impacts or essential to ensure Victoria is prepared. These seven areas or 'systems' are Primary Production; Built Environment; Education and Training; Health and Human Services; Transport; Natural Environment and the Water Cycle.

At a regional scale, Regional Adaptation Strategies are developed in partnership with regional stakeholders and communities to identify, prioritise and deliver place-based climate change adaptation action informed by local knowledge and needs.

Coastal adaptation and resilience planning cuts across all seven sectors, and all regional areas along the coast.

climatechange.vic.gov.au

Catchments, waterways, and estuaries

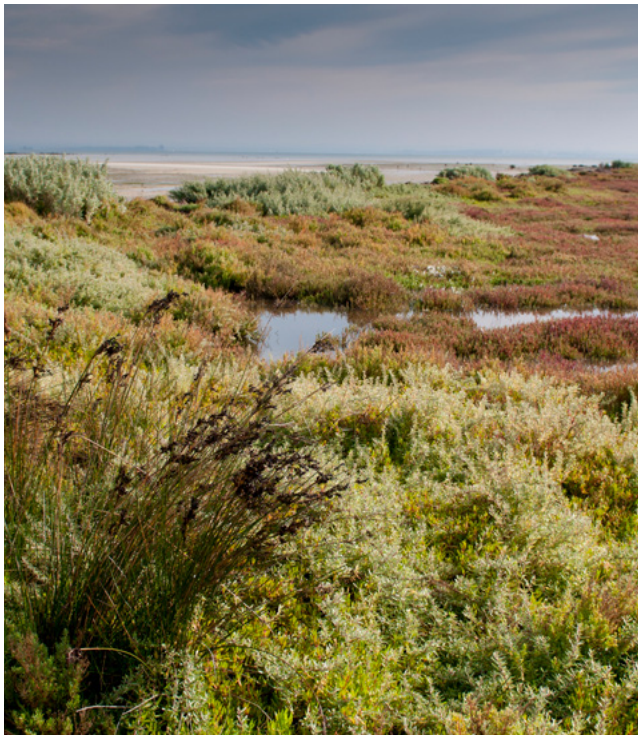
Regional Catchment Strategies (RCS) guide the collective effort to protect and improve the health of the land, water and biodiversity resources for each CMA region. Each RCS is reviewed every six years, and are intended to improve catchment stewardship under the *Our Catchments, Our Communities: Building on the Legacy for Catchment Stewardship* policy statement and investment program. The fourth iteration of the strategies can be viewed at **rcs.vic.gov.au**.

The *Victorian Waterway Management Strategy* provides a detailed policy for managing Victoria›s waterways over an eight-year period. The strategy aims to maintain or improve the condition of our waterways so they can support environmental, social, cultural and economic values that are important to communities.

Regional Waterway Strategies (RWS) are a single planning document for river, estuary and wetland management in each region and drive implementation of the management approach outlined in the *Victorian Waterway Management Strategy*. Each RWS outlines regional goals for waterway management. High value waterways are identified and from those a subset of priority waterways is determined for an eight-year planning period.

For coastal regions, the RWS includes the management of estuary health, highlighting the importance of estuaries as the link between catchments, coasts and the marine environment.

water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/strategies-and-planning



2.3. Develop a shared vision and objectives

The process for developing a shared vision and objectives is important to:

- generate interest and support from project partners and communities
- set the direction for adaptation
- align the work with project partner and community needs and preferences
- create a positive driver/goal for change.

The vision should be aspirational and long-term (2100+). Objectives may be more applied for specific issues and timeframes.

The approach to creating a shared vision should engage all project partners and coastal communities through tailored engagement and communication activities.

Case Study: Cape to Cape Resilience Project - community values study

Overseen by the Inverloch RaSP, the Cape to Cape Resilience Project is a coastal hazard adaptation project that combines the latest science, technical assessments and community aspirations.

A community values study was conducted as part of this project to document a shared understanding of the values, experiences and relationships the Cape to Cape community have with their coastline.

A cultural values assessment was completed by Bunurong Land Council for their RAP area in consultation with Bunurong community and elders, and additional targeted workshops with Traditional Owners.

Through the engagement process, community values and aspirations were identified across the following themes:

- landscape
- healthy ecosystems
- recreation
- native flora and fauna
- safe access
- heritage and unique history

This information was then analysed and synthesised to inform strategic decision making and adaptation planning in the Cape to Cape area.

Further information is available at **marineandcoasts.vic.gov.au/coastal-programs/cape-to-cape-resilience-project.**

2.4. Prepare a Stage 2 summary report

The output of **Stage 2** includes a summary report for project partners articulating:

- the work/process undertaken for this stage, including the engagement and communication process and who contributed, and key outcomes
- a summary of local aspirations and values
- a shared vision and objectives for coastal hazard risk management and adaptation
- summary of key updates to the Project Plan during/at conclusion of **Stage 2**.

2.5. Complete a Stage 2 checklist

Readiness to progress checklist	
Does the **Stage 2** summary report have in principle support from the project partners (noting iterative refinements may continue as the next stages progress)?	✓
Have you received direction on this Stage from Traditional Owners?	✓
Has the scope for **Stages 3** to **6** been reviewed and updated in the Project Plan based on the work completed for **Stage 2**?	✓
Are all updates to the Project Plan supported by the project partners?	✓

STAGE 3 –
Coastal hazard exposure

Stage			Across all
1		Scoping and preparation	Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
2		Values, vision and objectives	
3		Coastal hazard exposure	
4		Vulnerability and risk	
5		Adaptation actions and pathways	
6		Plan and implement	
7		Ongoing monitoring and review	

This section outlines the Stage 3 steps including to:

- progress engagement and communication
- define the geomorphic setting
- understand the coastal processes and drivers of change
- define coastal compartments
- confirm the coastal hazards
- adopt best practice scenarios
- generate coastal hazard data/ information
- prepare a Stage 3 summary report
- complete a Stage 3 checklist.

Stage purpose

The purpose of this stage is to assess coastal hazard exposure for the study area, including hazard data / scenarios that enable best practice approaches to risk assessment and adaptation planning.

Additional content to this **Stage 3** guidance is provided in the Coastal hazards extended guideline[23]. The extended version also updates and replaces the previous content in the Victorian Coastal Hazard Guide[24].

23 Water Technology Ltd, 2022.
24 Tonkin & Taylor, 2012 for Department of Environment and Sustainability.

3.1. Progress engagement and communication

A tailored engagement and communication process should continue across **Stage 3**, consistent with the approach to creating a collaborative process (**Stage 1.4**) and activities detailed in the Project Plan.

Activities should include participatory approaches to enable a two-way flow of information.

For **Stage 3** this may include:

- site visits, workshops, meetings, and online sessions, surveys – to support the technical work, including the scope of coastal hazard assessments, data sources, observations, verification
- use of physical demonstrations – e.g. wave tanks, to build capacity and promote conversations on hazards and adaptation
- ongoing partnership discussions (where mutually agreed) with Traditional Owners, including consideration of coastal hazard assessment needs
- tailoring of key messaging for **Stage 3** and for different audiences – e.g. to introduce key concepts on coastal processes, hazards, climate change and adaptation, and seek input and communicate outcomes.

Further guidance on engagement, and example key messages, are provided in **Attachment C**.

3.2. Define the geomorphic setting

Victoria's diverse coastal landforms have evolved over time due to interactions between geology and coastal processes such as ocean swell, storm surge, currents, prevailing wind, changing sea levels and tidal movement.

Sea level has been around its current elevation (±1.5m) over the past 6,000 years[25]. Over this period coastal processes have formed and re-shaped the shorelines we are familiar with today.

Dominant landscape classes across the Victorian coastline include extensive sandy shorelines, rocky coasts and dynamic estuary systems (**Table 9**).

A first step to understanding coastal hazard exposure involves summarising/assessing the geomorphic setting including:

- **landscape geology** – broad landscape context within Victoria
- **shoreline classes** (**Table 9**) - used to provide an appreciation for the nature of the coastal setting, and to link the shoreline typology to coastal processes and hazards.

Further detail and guidance on understanding the geomorphic setting and coastal delineation is provided in the Coastal hazard extended guidelines[26].

25,26 Water Technology Ltd, 2022.

Geomorphic setting and Traditional Owner cultural values and knowledge

Each shoreline class supports a diversity of Traditional Owner cultural values. These may include middens, other physical features, and sites of significance that are intrinsically linked with the landscape setting and coastal processes.

In consultation with Traditional Owner project partners, cultural values and knowledge should inform geomorphic assessments and scoping of technical studies for coastal hazard adaptation.

This may involve partnership discussions, cultural surveys and on-Country workshops.

Table 9. Victorian coastal settings/classes*

Setting/shoreline class		Length and percentage of total coastline	
Sandy shorelines	Beaches are formed from a combination of terrestrial and marine-derived sediments. In Victoria, sandy shorelines cover extended sections of the open coast, as well as smaller pocket or compartmentalised beaches.	1002km	38%
Low earth scarp shorelines	Low earth scarp shorelines or 'muddy' coasts are typically restricted to the low-energy environments of large bays and consist of low cliffs and scarps, intertidal flats consisting of silty sand or peat materials, often colonised by mangroves, seagrasses or saltmarsh vegetation.	138km	5%
Hard rock cliffs with and without platform and/ or beach	Rocky coasts are the result of the weathering of ancient rocks over millennia by marine and atmospheric processes such as waves, currents and winds. They comprise a range of landform types, including hard rock coasts (e.g. granite, basalt, sedimentary) and soft rock coasts (e.g. limestone, clay), and occur on open coasts and estuarine areas.	528km	20%
Soft rock cliffs with and without platform and/ or beach		144km	5%
Estuarine and tidal channels	Over 100 streams enter the sea either via estuaries and tidal channels. Around 85% of Victoria's estuaries are Intermittently Closed and Open Lakes and Lagoons.	671km	25%
Engineered coastline	Some sections of the coast have been significantly modified over time with the use of infrastructure – seawalls, drains, groynes.	160km	7%

*Additional detail on shoreline classes provided in the coastal hazards extended guideline[27]

27 Water Technology Ltd, 2022.

3.3. Understand the coastal processes and drivers of change

Variables

Key physical processes that drive change in the coastal zone include climate and geomorphology.

For a given study area, tailored coastal processes assessments are required to inform an appreciation of, and any modelling and assessment of, coastal hazard exposure.

Coastal processes assessments include collating and synthesising regional and place-based information on key variables including:

- climate:
  - global climate processes
  - regional/local wind, air pressure, rainfall
- ocean systems:
  - bathymetry
  - waves and currents
  - water levels – tide, storm tides, sea-level rise
- catchment processes:
  - geology
  - rainfall, runoff
  - hydro-dynamics
- geomorphic processes:
  - history of erosion/accretion
  - topographic and bathymetric features and changes (e.g. dynamic dunes, beach, cliffs, estuary processes)
  - sediment dynamics
  - overland flow and drainage
- subsidence.

The Coastal hazards extended guideline[28] provides details on these variables for the Victorian coast, and further guidance for assessments.

Associated data sources for assessing coastal processes are noted in Section 3.7.

Climate change

Long-term observed records show that Victoria's climate is changing under the influence of both natural variability and climate change.

The Victorian Coastal Council Science Panel (2018) summarised the projected coastal impacts of climate change in Victoria as:

- **temperature**: increased average temperature (between 0.6 and 1.3°C by 2030, and between 1.1 and 3.2°C by 2070 relative to the climate of 1986 to 2005); increased heatwaves and fewer frosts
- **rainfall**: less (total) rainfall in winter and spring; more frequent and more intense downpours
- **fire danger**: harsher fire weather and longer fire seasons
- **sea level**: rising global sea levels and increased frequency and height of extreme sea-level events. The Intergovernmental Panel on Climate Change's 6th Assessment Report projects 0.63-1.01m global sea level rise by 2100 relative to 1995-2014 levels under a high emissions scenario[29]
- **oceans**: increased wave height in winter, increased frequency of easterly winds, warmer and more acidic oceans, with sea-surface temperatures rising by between 1.1 and 2.5°C by 2070.

28 Water Technology Ltd, 2022.
29 IPCC 2022.

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Example physical changes for coastal regions are summarised in **Figure 10**. These will have a range of implications for cultural, social, and environmental values.

The Coastal hazards extended guideline[30] provides additional detail on climate change and implications for the Victorian coast.

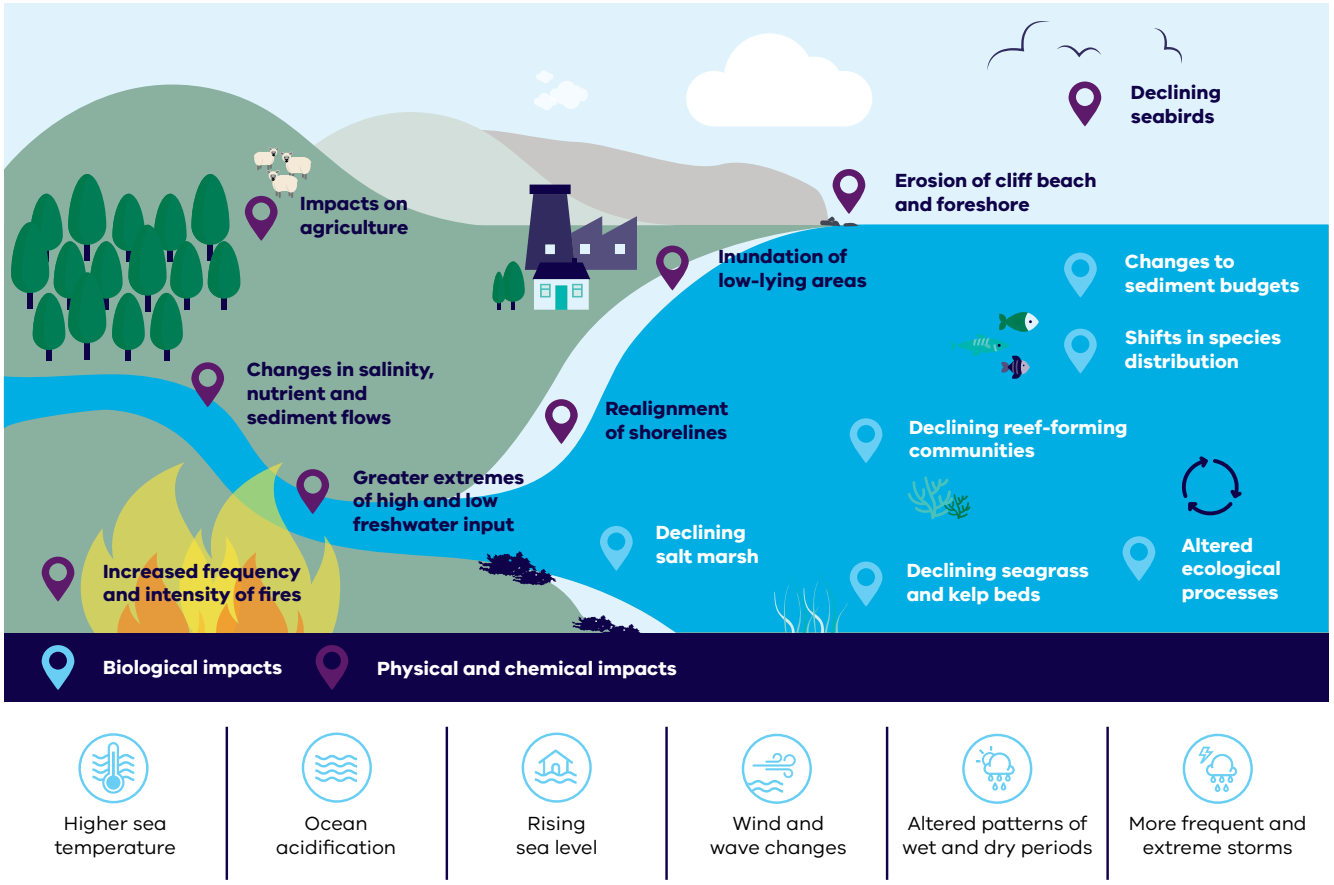


Figure 10. Likely changes to Victoria's coast caused by climate change[31]

*Realignment of shorelines also includes shoreline recession due to sea level rise.

30 Water Technology Ltd, 2022.
31 Holper *et al* 2018 for Victorian Coastal Council Science Panel.

Additional drivers of change that may influence coastal processes and hazard exposure include:

- population pressures
- bushfire
- extreme heat
- severe wind
- drought
- geologic instability.

Such additional drivers of change should be considered where relevant to coastal hazard adaptation in regional contexts.

3.4. Define coastal compartments

The Marine and Coastal Policy 2020 directs planners and decision makers to consider marine and coastal processes in the context of their coastal compartment.

Delineation of coastal compartments is based on landforms and sediment transport processes and provide a foundation for coastal process/hazard assessments (**Figure 11**).

Primary and secondary compartments are used to identify and refine study areas. Secondary and tertiary compartments are used to inform technical assessments within the study area.

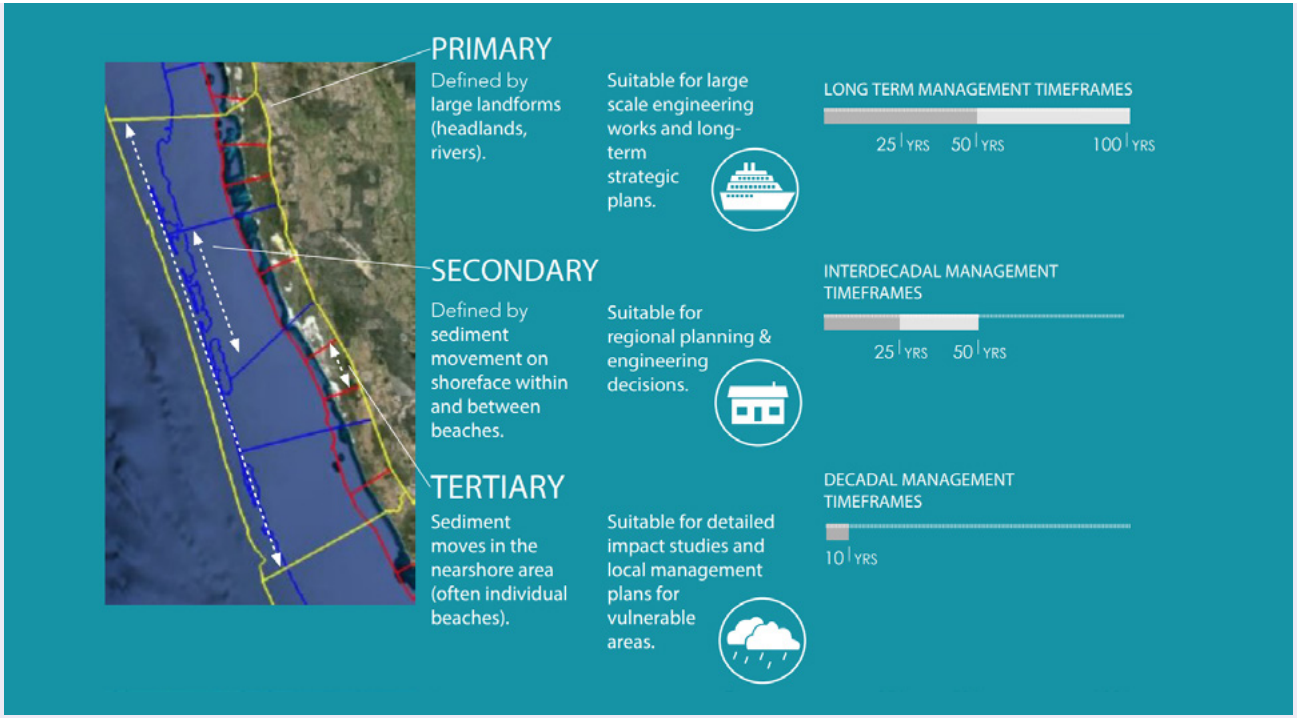


Figure 11. Coastal compartments[32]

Compartment definitions

Coastal compartments are spatial units, identified along the coast where there is a strong connectivity between submarine morphology, substrate, marine processes, sediment availability and transport and backshore landforms. A coastal sediment compartment is a section of coast which shares a common sediment resource with clearly defined physical boundaries.

The purpose of coastal sedimentary compartment analysis is to determine the nature and paths of sediment transport (onshore-offshore and alongshore) in coastal systems.

Coastal compartment scales, use and timeframes

The national coastal compartments approach to coastal classification[33] is hierarchical, descending from the 2 coastal 'provinces' (tropical and temperate) based on climate, 7 coastal 'divisions' based on coastal orientation, 23 'regions' based on geology and coastal configuration, 102 'primary compartments' determined by coastal structural features such as headlands and large bays, and around 350 'secondary compartments' on geomorphology.

The Smartline map (**coastadapt.com.au/coastadapt-interactive-map**) was developed to provide a single, consistent map of coastal landforms for the entire Australian coast. The Smartline map divides the coastline into distinct segments; within each, multiple GIS attributes describe the dominant coastal landforms.

The Victorian coast is comprised of six primary compartments and 23 secondary compartments (**Table 10**).

There is currently no comprehensive tertiary compartment mapping nationally and given the dynamic nature of shorelines at finer spatial and temporary scales, tertiary assessments can be defined/refined as needed for specific projects. Initial guidance on the approach for classifying tertiary compartments is provided in the Coastal hazards extended guideline[34].

32, 32 Thom, B. *et al* 2018 "National sediment compartment framework for Australian coastal management".
33 Water Technology Ltd, 2022

Table 10. Victorian primary and secondary coastal compartments

Primary compartment	Secondary compartment	Included area
Western Victorian Coast	Discovery Bay	From Cape Nelson to Danger Point (Brown Bay, SA)
	Portland Bay	From Port Fairy (Griffiths Island) to Cape Nelson
	Warrnambool	From Peterborough (Wild Dog Cove) to Port Fairy (Griffiths Island)
	Port Campbell	From Cape Otway to Peterborough (Wild Dog Cove)
Otway Coast	Great Ocean Road	From Split Point to Cape Otway
	Torquay	From Point Lonsdale to Split Point
Port Phillip	Port Phillip Bay (west)	From Williamstown to Point Lonsdale
	Port Phillip Bay (mouth)	From Point Lonsdale to Point Nepean
	Port Phillip Bay (east)	From Point Nepean to Williamstown
	Mornington Peninsula	From Cape Schanck to Point Nepean
	Cape Schanck-Flinders	From West Head to Cape Schanck
	Western Port	From Point Grant to West Head
	Kilcunda	From Cape Paterson to Cape Woolamai
	Venus Bay	From Cape Liptrap to Cape Paterson
	Waratah Bay	From Tongue Point to Cape Liptrap
	Wilsons Promontory (southwest)	From South Point to Tongue Point
Wilsons Promontory	Wilsons Promontory (east)	From Entrance Point to South Point
Ninety Mile Beach	Corner Inlet	From McLaughlins Beach Outlet to Entrance Point
	Gippsland Lakes	From Red Bluff to McLaughlins Beach outlet
	Snowy River	From Cape Conran to Red Bluff
Cape Howe	Croajingolong	From Rame Head to Cape Conran
	Mallacoota Inlet	From Cape Howe to Rame Head

Case study: Example study area informed by sediment compartments

Cape to Cape Resilience Project

Cape Paterson to Cape Liptrap - the study area

The study area for the Cape to Cape Resilience Project spans secondary sediment compartment of Cape Paterson and Cape Liptrap. The area of interest includes:

- The open coast from Cape Paterson along the coastal cliffs adjacent towards Inverloch
- The open foreshore and surf beach at Inverloch
- The dynamic estuaries and tidal mudflats of Anderson Inlet
- The open coast and dunes of Venus Bay south to Cape Liptrap
- Inland from the coastline, allowing for assessment of estuary and groundwater impacts.

For further information visit: **marineandcoasts.vic.gov.au/coastal-programs/cape-to-cape-resilience-project**.

3.5. Confirm the coastal hazards

Definitions developed for Victoria (**Table 11**) provide a baseline for coastal hazard types to be considered.

Additional natural hazards may be relevant in some areas and should be included if/as required to address place-based adaptation needs.

Strategic coastal hazard risk assessment and adaptation planning should include:

- identifying the range of relevant hazards in the study area based on the Victorian definitions
- ensuring the scope of assessments for each hazard is fit for purpose to meet the needs of the study area and project partners.

Table 11. Victorian coastal hazard definitions

Category	Process/coastal hazard	Setting/classes include:		Mechanisms
Erosion	**Short-term erosion:** Event-based erosion of sediment (storm-bite) and recovery	**Sandy shorelines**	Sandy coast/ embayment, beach ridge systems, barrier systems, and sandy spits	Erosion generally associated with storms or with elevated water levels. Can be driven by ocean or localised wind waves or tidal currents, as well as overland flow/ drainage. Susceptible to short and long-term erosion.
	Long-term erosion (recession): Progressive retreat of shoreline position over time	**Low-earth scarp**	Wide intertidal flats, silty sand or peats and muds. Narrow sandy beach may exist	Erosion primarily associated with a low active scarp cut into soft, poorly consolidated sediment. May also be influenced by overland flow and drainage. Erosion is typically long-term recession.
		Soft rock	Soft rock cliffs with and without a beach or shore platform	Erosion associated with combined terrestrial processes and wave action causing weathering, undercutting, slumping, slope failures (landslip) and cliff-falls.
		Hard rock	Hard rock cliffs with and without a beach or shore platform	Erosion associated with terrestrial processes and wave action causing weathering, undercutting, slope failures (landslip) and cliff-falls.

Category	Process/coastal hazard	Setting/classes include:		Mechanisms
Accretion	Build-up of sediment in a localised area	**All shoreline types**	Shoreline, dunes and intertidal zone	Localised build-up of sand, typically driven by long-shore sediment transport as well as influenced by erosion processes.
Inundation	**Permanent inundation:** Regular or persistent inundation by the regular tidal cycle	**All low-lying coastal land**	Low-lying shoreline areas, coastal floodplains, estuary margins	Occurs when low-lying areas are regularly flooded due to tidal processes. Understanding the scale of inundation and associated impacts is required over various sea level rise scenarios.
	Storm tide inundation: Temporary event-based inundation	**All low-lying coastal land**	Low-lying shoreline areas, coastal floodplains, estuary margins	Caused by a combination of predicted tides, storm-surges, and high wave action during severe storm events. Results in elevated water levels (storm surge), wave setup and wave runup causing overtopping and inundation.
Estuary dynamics	Changes in form and processes associated with estuarine and tidal areas	**Estuary/ tidal areas**	Estuaries, Intermittently Open and Closed Lakes or Lagoons (ICOLLs), river or creek mouths, coastal lakes; natural and constructed drains	Highly dynamic sediment environment in response to tides, sea level, storm events and catchment runoff. Resultant variations in channel alignments, sandy spits and entrance opening and closure.

Category	Process/coastal hazard	Setting/classes include:		Mechanisms
Off-shore sediment dynamics	Changes in form and processes associated with offshore bathymetry and sediment transport	**Up to 3 nautical miles offshore**	Off-shore seabed beyond the intertidal zone, including channels and sediment slugs	Dynamic submarine sediment transport environment offshore, influenced by tides, sea level, and storm events. Resulting variations in sea-bed bathymetry and sediment dynamics. Also including sediment transport between the lower subtidal shoreface and the active beach.
Saline intrusion	Movement of saltwater into freshwater areas/ groundwater	**Up to 5 km inland from high water mark**	Coastal wetlands, freshwater aquifers, springs, and systems in low-lying coastal areas	Rising sea levels may result in movement of seawater inland, including elevated groundwater and extension of salt water.

3.6. Adopt best practice scenarios

Best practice adaptation requires an approach that includes multiple scenarios. This includes associated planning horizons to 2100, and a range of hazard event likelihoods.

Sea level rise scenarios and planning horizons

Recommended scenarios

Planning horizons can be referred to as time horizons (e.g. 2050), as incremental sea level rise points (e.g. 0.8 m), as a period of time (e.g. medium-term) or number of years from plan creation (e.g. within 50 years) (**Figure 12**).

To enable consistency in adaptation planning across the state, the planning horizons in **Figure 12** are recommended as a minimum.

Figure 12. Recommended planning horizons

Period	Time step	Indicative horizon	Sea level rise*
Base line	Baseline of historic and current data	Present day ***	Mean Sea Level (MSL)
Short term	10 to 25 years	2040	MSL + 0.2m
Medium term	25 to 50 years	2070	MSL + 0.5m**
Long term	50 to 100 years	2100	No less than MSL + 0.8m by 2100
Sensitivity scenarios (examples)		2100	1.1m 1.2m 1.3m 1.4m

* Based on IPCC AR6 - subject to future updates in sea level rise benchmarking

** Where already available, 0.4m may be used

*** Baseline year set by technical analysis

Sea level rise benchmarks

Policy 6.1 of the Marine and Coastal Policy 2020 states: ***"Plan for sea level rise of not less than 0.8 metres by 2100, and allow for the combined effects of tides, storm surges, flooding, coastal processes and local conditions such as topography and geology, when assessing risks and coastal impacts associated with climate change."***

Alignment of sea level rise increments to time horizons should be based on the Marine and Coastal Policy 2020 and future updates to sea level rise benchmarks.

Sensitivity scenarios

Current best practice also includes sensitivity scenarios for 2100 sea level rise projections. Sensitivity scenarios that account for the upper-end projections under high-emissions scenarios are recommended. These upper-end scenarios may change as global projections improve and new data is obtained.

Additional planning horizons

Additional planning horizons may also be useful to include in each regional context.

To consider relevant additional planning horizons, the following principles of **alignment, consistency**, and **relevance** apply. This includes:

- **Alignment**
  - consider planning horizons of key strategies at the local scale
  - consider planning horizons of corporate planning cycles at the local and regional scale
  - consider the timeframe of the local land use planning scheme in place and amendment cycles
  - consider integration with other planning activities at the local and regional scale.

- **Consistency**
  - consider the increments that global or regional projected data is modelled in
  - consider national or state-wide climate change policy or planning instruments
  - consider advancement in best practice.
- **Relevance**
  - consider Intergovernmental Panel on Climate Change (IPCC) assessment reporting time periods (approximately every 6-7 years)
  - select a number of relevant trigger points/ thresholds (e.g. shoreline position, year or sea level increments) to enable appropriate adaptation to be implemented as necessary.

Example planning horizon considerations

Climate data is typically modelled to the years 2050 and 2100 (e.g. IPCC Sixth Assessment Report [AR6]).

CoastAdapt sea level rise data is modelled to the years 2030, 2050, 2070, and 2090. This can be scaled to inform other horizons.

Hazard event likelihoods

Recommended scenarios

Best practice in assessing coastal hazard risk (**Stage 4**) requires multiple event likelihoods for each planning horizon.

This also enables a probabilistic approach to economic analysis (**Stages 4** and **5**).

Annual Exceedance Probability (AEP) is the primary metric used to define event likelihood.

An AEP is the probability that an event of a given (or larger) magnitude will occur within a period of one year.

A 1% AEP means that in any given year there is a 1% chance of that magnitude of event occurring.

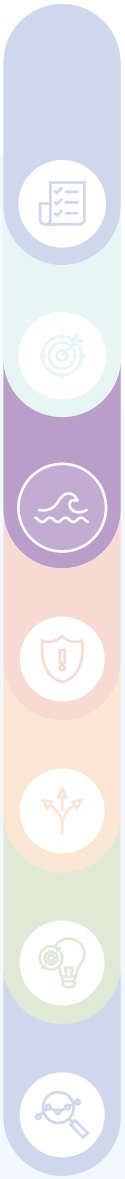
To enable consistency in adaptation planning across the State, the event likelihoods in **Table 12** are recommended as a minimum. This includes a spectrum of more frequent smaller (e.g. nuisance flooding) events and less frequent larger events.

AEP event likelihoods are often assigned a descriptor such as 'likely', 'possible' or 'rare' events. There is a range of different guidance on likelihood descriptors nationally and in different contexts (climate, general risk management, hazards). In practice, these descriptors can be assigned based on what is the most appropriate language for different place-based contexts.

Table 12. Recommended event likelihoods

Hazard AEP/event likelihood	Example descriptors
MHWS or HAT*	Almost certain
10%	Likely
1%	Possible
0.2%	Rare

* Mean High Water Springs or Highest Astronomical Tide – based on technical advice.



Additional event likelihoods

Additional hazard event likelihoods may also be useful to include in each regional context.

Prescribed scenarios may be required by the Victoria Planning Provisions in specific settings, when considering the location of emergency and community facilities (e.g. probable maximum flood.)

To consider additional relevant event likelihoods, the following principles of alignment, consistency, and relevance apply. This includes:

- **Alignment**
  - consider place-based contexts, such as drainage network design events (e.g. 20% AEP) and other strategic planning considerations
  - align with ISO31000 risk assessment (used in **Stage 4**) and a spectrum of event likelihoods that enables a robust risk assessment.
- **Consistency**
  - consider possible interactions between hazards (potential for multi-hazard assessment)
  - consider the range of hazards in the study area (e.g. riverine flooding) and select event likelihoods that can be consistently applied for multiple hazards (e.g. erosion and inundation)
  - consider what event likelihoods may have been previously assessed in the study area and what is required to add value or further understand risk.
- **Relevance**
  - consider values identified in the study area and what event likelihoods are most applicable for place-based coastal values.

Comparative event likelihoods

Another consideration in defining hazard scenarios and event likelihoods is the creation of comparable scenarios across planning horizons.

Technical consideration should be given to the inclusion of coastal and catchment influences applied to each scenario. The aim is to create a set of scenarios that will inform a comparable changing risk profile from present day to 2100.

This involves a base set of hazard scenarios that have similar coastal / catchment parameters (e.g. storm tide inundation + 20% AEP catchment) over the nominated planning horizons (present day to 2100).

Additional scenarios (e.g. storm tide inundation + 1% AEP catchment) can then be added to the base set as appropriate to inform adaptation planning needs.

3.7. Generate coastal hazard data/ information

To recap, by this point in **Stage 3**, coastal hazard risk management/adaptation projects will have:

- identified a study area and defined the geomorphic setting (3.2)
- documented an appreciation for relevant coastal processes, history of coastal change and drivers of change (3.3)
- confirmed relevant sediment compartments and study area (3.4)
- confirmed the relevant coastal hazards to be included in assessments and planning (3.5)

- confirmed the hazard scenarios to be assessed – including planning horizons and event likelihoods (3.6).

The next step is to generate coastal hazard data and information for each of the hazards and scenarios.

This requires developing and delivering a tailored scope of work to provide the required technical information on coastal processes and hazard extents. These are complex technical assessments requiring specialist skills and experience.

A guide on the range of data and information available (and from where, e.g. **Figure 13**) to inform coastal hazard exposure assessments is provided in the coastal hazards extended guideline[35].

A data assimilation and gap assessment should be undertaken to identify available data and opportunities for additional data collection. In practice, this gap assessment can run concurrently with the **Stage 1 – Scoping and preparation**.

In scoping a hazard assessment to inform adaptation planning, projects should consider:

- What hazard information is already available and fit for purpose?
- What new data/assessments may be required?
- Which hazards require detailed modelling approaches?
- Are conceptual models fit for purpose for some hazards?

Additional guidance towards scoping tailored coastal hazard assessments provided in the Coastal hazards extended guideline[36].

An agreed scope for the coastal hazard assessment, including types of hazards included, scenarios, events, spatial and temporal extents, data and modelling approaches and limitations, and agreed outputs (data, maps), is an important hold point before progressing to next stages.

All project partners should endorse that the scope of the coastal hazard assessment is fit for purpose to progress risk management and adaptation planning.

Iterative feedback from **Stages 2** to **4** may also require updates to the scope of the hazard assessment, including additional technical studies or hazard scenarios to address specific adaptation needs. A process to enable this should be allowed for in the scoping process.

All project partners should also endorse that the outputs of the hazard assessment are fit for purpose.

35 Water Technology Ltd, 2022.
36 Water Technology Ltd, 2022.

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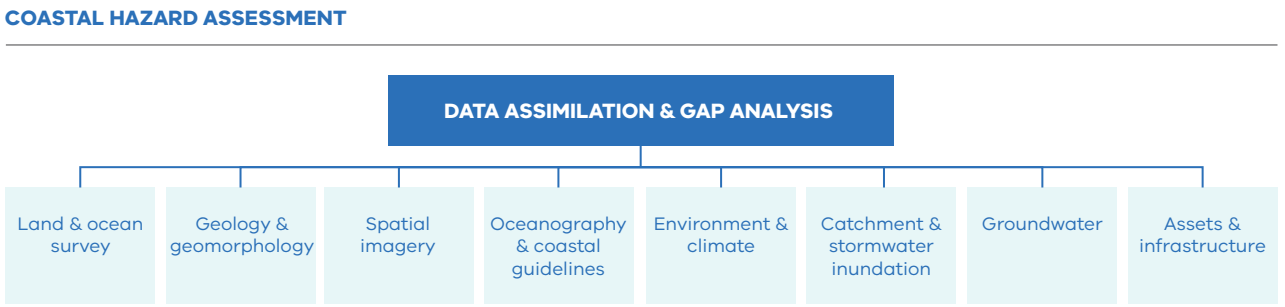

Figure 13. Range of data types and sample sources of hazard data information available to inform coastal hazard assessments

Victorian Coastal Monitoring Program

The Victorian Coastal Monitoring Program (VCMP) began in 2017 and is being led by the Department. It involves monitoring wave climate, shoreline changes, sediment movement and sediment budgets in priority coastal compartments of Victoria's open coastline, Western Port Bay and Port Phillip Bay.

Knowledge of sediment budgets help us to identify which areas of Victoria's coast are likely to lose or gain sediment under sea level rise and changes to wave directions. This assessment is crucial for understanding current processes and predicting future effects to undertake informed coastal adaptation planning and investment.

The creation of partnerships with community groups (citizen science) and institutions to co-invest in coastal monitoring projects at both regional and local scales has been central to the success of the VCMP.

For further information visit: **marineandcoasts.vic.gov.au/coastal-programs/victorian-coastal-monitoring-program**

Local Coastal Hazard Assessments

A range of third-pass Local Coastal Hazard Assessments have been completed in Victoria, and others are underway.

These assessments include a range of sea level rise scenarios and associated planning horizons (summarised below).

Hazard assessment	Planning horizon/sea level rise scenarios included
Port Fairy, 2013	Current, 2050 (0.4 m), 2080 (0.8 m), 2100 (1.2 m)
Bellarine Peninsula – Corio Bay, 2015	Current, 0.2 m, 0.5 m, 0.8 m, 1.1 m, 1.4 m
Western Port Bay, 2015	Current, 0.2 m, 0.5 m, 0.8 m
Gippsland Lakes/ 90 Mile Beach, 2014	Current, 2040 (0.2 m), 2070 (0.4 m), 2100 (0.8 m)
Cape to Cape Resilience project (Inverloch and surrounds)	0.2 m, 0.5 m, 0.8 m, 1.1 m, and 1.4 m

These assessments provide an improved understanding on current and future hazards for each local area. They also provide shared learnings on how to conduct third-pass coastal hazard assessments.

Information on these assessments and key lessons can be found at: **marineandcoasts.vic.gov.au**

3.8. Prepare a Stage 3 summary report

The output of **Stage 3** includes a summary report for project partners articulating:

- the work/process undertaken for this stage, including the engagement and communication process and who contributed
- a summary of the study area and geomorphic setting, coastal processes including history of coastal change and drivers of change, hazard scenarios included for adaptation planning, and the technical coastal hazard assessment report and hazard exposure data/maps
- summary of key updates to the Project Plan during/at conclusion of **Stage 3**.

3.9. Complete the Stage 3 checklist

Readiness to progress checklist	
Does the **Stage 3** summary report have in principle support of the project partners (noting iterative refinements may continue as the next stages progress)?	✓
Have you received direction on this stage from Traditional Owners?	✓
Has all coastal hazard data generated from **Stage 3** been stored securely with the lead agency or designated project partner?	✓
Has the scope for **Stages 3** to **6** been reviewed and updated in the Project Plan based on the work completed for **Stage 3**?	✓
Are all updates to the Project Plan supported by the project partners?	✓

STAGE 4 –
Vulnerability and risk

Stage			Across all
1		Scoping and preparation	Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
2		Values, vision and objectives	
3		Coastal hazard exposure	
4		Vulnerability and risk	
5		Adaptation actions and pathways	
6		Plan and implement	
7		Ongoing monitoring and review	

This section outlines the Stage 4 steps including to:

- progress engagement and communication
- assess hazard exposure for values/uses
- consider vulnerabilities
- undertake a tailored risk assessment
- consider economic implications
- identify priorities for action
- prepare a Stage 4 summary report
- complete a Stage 4 checklist.

Stage purpose

The purpose of **Stage 4** is to provide a foundation for exploring place-based coastal hazard vulnerability and risk[37]. This enables a strategic approach to considering coastal hazard risk and adaptation needs.

37 This section updates and expands on the guidance provided in the previous Victorian Coastal Hazard Guide (Tonkin and Taylor 2012).

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Coastal vulnerability – The susceptibility of people and places along the coast to adverse impacts from coastal hazards. Includes the degree of exposure, and ability to cope with, respond to and adapt to coastal hazards.

Risk assessment – A systematic process of evaluating the potential risks (likelihood and consequence) of coastal hazards, helping to inform a risk management response and adaptation actions.

4.1. Progress engagement and communication

A tailored engagement and communication process should continue across **Stage 4**, consistent with the approach to creating a collaborative process (**Stage 1.4**) and activities detailed in the Project Plan.

Activities should include participatory approaches to enable a two-way flow of information.

For **Stage 4** this may include:

- site visits, workshops, meetings, and online sessions, surveys to support the vulnerability and risk assessment work
- specific design and presentation of vulnerability and risk mapping and results that is fit for purpose for consultation and sensitive to the needs of project partners
- ongoing partnership discussions (as mutually agreed) with Traditional Owners, including on cultural vulnerability and risk
- tailoring of key messaging for **Stage 4** and for different audiences, e.g. to introduce key concepts on coastal hazard vulnerability and risk, seek input and communicate outcomes.

Further guidance on engagement, and example key messages, are provided in **Attachment C**.

4.2. Assess hazard exposure

Data collation

This first step involves collating all relevant data for the coastal values and uses, as defined and agreed on by project partners in **Stage 2**. This includes:

- all spatial data for quantitative and semi-quantitative analysis of coastal hazard risk
- any other qualitative data/information that may also inform assessments of vulnerability and risk.

Data can be sourced from a diversity of local, state and national data sets, and project partners as appropriate for the assessment. This includes planning overlays, asset management data, and a diversity of other sources.

Key elements to consider in developing a database include:

- collation of all available data
- clarification of data gaps / limitations
- confirming data format, meta data, nomenclature
- establishing a database / system that will:
  - support the required level of detail for the analysis
  - ensure transparency of approach
  - deliver the required outputs.

Data analysis

Once all data has been collated, a detailed hazard exposure analysis is completed for all values and uses, and all hazard scenarios across public and private land.

This involves geospatial analysis of each hazard scenario with available data. This may include:

- planning scheme zones and overlays
- statements of Planning Policy and Precinct Structure Plans
- places of environmental and cultural significance
- infrastructure – buildings and facilities, transport, utilities.

Data should be analysed in formats suitable for:

- informing collaborative vulnerability and risk assessments for strategic planning
- providing relevant exposure assessment data back to each land manager/data custodian to inform their existing programs.

Outputs will include a geospatial database of feature classes (e.g. point, linear and polygon) with associated exposure likelihoods for each hazard scenario.

Additional qualitative review for sensitive values and uses can also be included where spatial data are not available.

Resources: Coastal protection assets on Crown land

The Department oversees the performance of over 1,500 coastal protection assets on Crown land for both community and amenity value and their role in protecting other assets and infrastructure from coastal hazards.

The Department maintains a register of coastal protection assets on Crown land and their condition. The register is kept up-to-date by an asset inspection and management program guided by Victoria's Asset Management Accountability Framework.

The Department's Coastal Protection Program supports the maintenance, replacement or construction of new coastal protection assets across the Victorian coastline, in the context of the Marine and Coastal Policy 2020. Nature-based methods and beach renourishment works are also incorporated within this program. This program continues the Victorian Government's efforts to ensure the longevity of key coastal locations and their associated values well into the future.

Rolling investment into the maintenance, repair or new assets on Crown land is guided by a statewide risk assessment and prioritisation process. The approach to risk focuses on the likelihood of failure of the coastal protection asset due to coastal processes and other factors.

Statewide coastal protection asset data and information on current statewide priorities on Crown land is available to inform local and regional coastal hazard risk management and adaptation planning.

Resources: The South East Councils Climate Change Alliance (SECCCA) vulnerability assessment toolkit

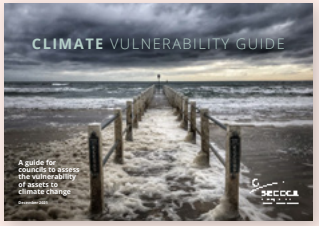
SECCCA is a network that supports member councils and their communities respond and adapt to the impacts of climate change in the south east of Melbourne.

SECCCA's Asset Vulnerability Assessment Project developed tools and approaches to support councils in considering how infrastructure assets may be impacted by different climate scenarios.

This included:

- developing a dataset of various asset types in the region
- attributing vulnerability ratings to those assets
- identifying adaptation options to increase asset resilience
- and an initial calculation of the financial and economic cost of different adaptation options for assets.

This information can also provide a key input for broader strategic adaptation planning.



For further information visit: **seccca.org.au**

Resources: Barwon South West Infrastructure Investment Framework

The Infrastructure Investment Framework, led by the Department's Land and Built Environment South West region, is an example of a data resource and existing strategic investment approach for assets.

All recreation assets in the Barwon South West Partnership area (Avalon-Marengo) have been GIS referenced and photographed to reflect the current condition of each asset, categorised into asset classes, and uploaded to a regional shared data platform. This data platform, once overlayed with up-to-date hazard mapping, will be used to better understand risk, asset service levels, maintenance scheduling and thresholds to determine investment priorities.

The project includes the development of an investment framework to provide a science-based decision-making process that prioritises strategic future investment for assets. The framework will be piloted within the region with a view to greater use along the Victorian coastline.

The data platform and recreation infrastructure priorities can also provide a key input for broader strategic adaptation planning.

4.3. Consider vulnerabilities

Vulnerability includes consideration of exposure, sensitivity, and adaptive capacity to coastal hazards.

Assessments are generally applied to coastal hazard studies at broad spatial scales, and can help with:

- informing a broad scale appreciation of vulnerable areas and communities for different hazard types
- providing information on social, cultural and ecosystem vulnerabilities
- informing a range of strategic actions to improve adaptive capacity
- prioritising focus areas for detailed risk assessments.

Vulnerability assessments are:

- commonly undertaken prior to / alongside a risk assessment
- useful for considering elements of coastal values and uses that do not have readily available spatial data for more quantitative assessments of risk
- useful for values / uses that require a bespoke investigation.

In each place-based context, a tailored scope of vulnerability assessments can:

- be scoped and informed by project partners and the engagement process
- focus on key place-based social, cultural and ecosystem vulnerabilities
- use case studies to explore specific vulnerabilities and adaptation needs.

Vulnerability includes consideration of[38]:

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.

Exposure: the degree to which a system is exposed to a given hazard.

Sensitivity: in the context of a vulnerability assessment, the term sensitivity refers to the degree to which a system is affected by, or responsive to a hazard.

38 National Climate Change Adaptation Research Facility, 2017.

4.4. Undertake a tailored risk assessment

Risk assessment purpose

The purpose of the risk assessment process in **Stage 4** is to:

- take a strategic approach to considering all coastal hazard risks
- identify and characterise the nature of coastal hazard risks
- identify qualitative or quantitative estimates of risk
- compare the sources of risk
- assess the impacts of uncertainty
- identify hot spots / priority areas
- provide a basis for strategic risk mitigation/ adaptation actions
- inform the timing of actions.

Risk definition

The *Australian Standard AS ISO 31000:2018 Risk Management – Guidelines (ISO 31000:2018)*[39] defines risk as the "effect of uncertainty on objectives". An effect may be an adverse or positive deviation from what is expected.

The ISO 31000: 2018 conceptual definition of risk is useful to frame risk in the context of goal-oriented terms, ensuring that risk is being assessed relative to the objectives for management/adaptation (e.g. as defined in **Stage 2**).

In practice, this is operationalised through the more traditional concept of risk, which considers the likelihood of an event occurring, and its potential consequence.

A widely used approach to illustrating risk analysis theory in relation to coastal hazards is based on the source–pathway–receptor concept.

The sources of risk are the coastal processes, the pathway is the associated hazards (e.g. inundation and erosion), and the receptors are the coastal values and uses (**Figure 14**).

Risk is the likelihood of the coastal hazard occurring (involving both the source and the pathway) and the consequence to the receptor.

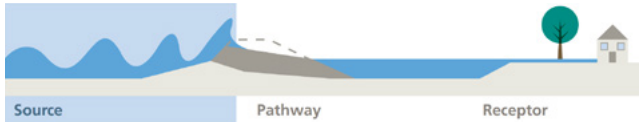


Figure 14. Source-pathway-receptor concept for coastal hazard risk assessment[40]

R = L × C

where R = risk

L = likelihood of the coastal hazard occurring

C = consequence of the coastal hazard (to receptor – e.g. to coastal values and uses including social, cultural, economic, environmental).

Figure 15. Risk equation

39 Standards Australia 2018
40 Tonkin & Taylor 2012 (after Wahl and Jensen 2011).

In Victoria, all risk assessments should follow ISO *31000:2018*, and align with the *Victorian Government Risk Management Framework*[41] and *DELWP Risk Management Guidelines*.[42]

The guidance provided in the following sections aligns with these guiding documents, and includes:

- identifying the risk
- analysing the risk
- evaluating the risk
- communication and consultation with internal/ external stakeholders during all stages of the process.

Risk treatment, monitoring and review is embedded in *Victoria's Resilient Coast – Adapting for 2100+* framework **Stages 5** and **6**.

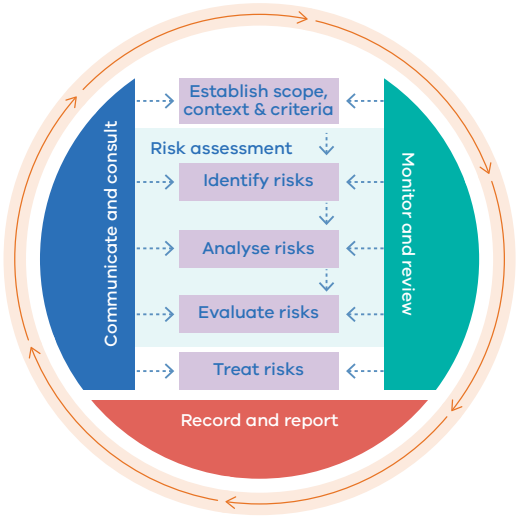


Figure 16. Risk management process (ISO 31000:2018)[43]

Identifying the risk

Key concepts to be considered in identifying risk include that:

- there is a degree of risk that is acceptable or tolerable
- risk varies over time
- risk varies spatially
- risks assessments need to match the scale of risk and the data or information available
- uncertainty needs to be considered.

The level of detail in a risk assessment will depend on the available coastal hazard data, as well as the scale of assessment and the receptors potentially affected by the hazards.

Best practice approaches are typically quantitative and semi-quantitative, combining all available criteria into the assessment.

Higher level or 'first pass' risk assessments may be completed first to inform where more detailed risk assessment is focused.

The focus for coastal hazard assessments is typically on adverse consequences, to inform the development of an approach to hazard mitigation/adaptation.

Beneficial consequences of coastal hazards could also be included in the risk assessment if considered significant to an individual project context.

41 State of Victoria, Department of Treasury and Finance 2020.
42 Zeeher and Khoo 2021.
43 Standards Australia 2018

Identifying coastal hazard risk for all values and uses involves defining:

- risk likelihood
- risk consequence
- risk level
- risk tolerance
- uncertainty.

These are further outlined below.

Risk likelihood

The likelihood of coastal hazard exposure is based on the probability of occurrence (the event likelihood - % AEP) (refer **Table 13**).

Risk consequence

The consequence of exposure should be a tailored place-based assessment considering the range of values and objectives identified in **Stage 2**, including:

- Traditional Owner values and connection to Country
- project partners, stakeholder and community feedback on the important aspirations, values and uses of the marine and coastal environment.

Detailed consequence criteria will vary for each project context, and can be refined through a participatory engagement process with project partners. Example categories/themes are provided in **Table 14**.

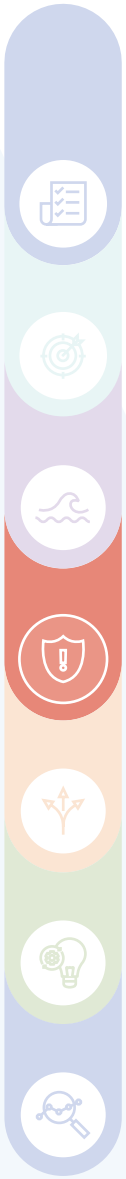
Consequence criteria can also be refined to align to project partner organisations' risk management approaches.

Risk level

The coastal hazard risk level (e.g. low, medium, significant, high - **Table 13**) should be determined for all coastal values and uses in the compiled data, for each hazard scenario (type and event likelihood), and for each planning horizon.

Risk tolerance

Risk tolerance can also guide risk analysis and evaluation to help build an understanding of where priority actions should be focused. Example risk tolerance levels are provided in **Table 15**.



Risk assessment context

In practice, risk assessments will vary based on the purpose and context of the assessment.

Risk assessments can inform different needs and programs, for example:

- business risk
- asset failure risk (e.g. infrastructure, coastal protection assets)
- hazard / issue risk.

The risk assessment undertaken in **Stage 4** of *Victoria's Resilient Coast – Adapting for 2100+* framework is intended to provide a strategic assessment of coastal hazard risk to a study area.

This includes consideration of all coastal hazard types, and risk for coastal values and uses, informed by the values and objectives identified in **Stage 2**.

This assessment then provides a strategic appreciation of current and emerging hazard risk (present day to 2100), to guide planning for where and when adaptation actions are focused, and the types of actions to be considered.

The strategic risk assessment can draw on, and in turn inform, other types of risk assessments that land managers use in the study area to inform their operations.

Uncertainty

The risk assessment process provides a systematic and best practice approach, however there will always be uncertainty. Uncertainty may relate to both the likelihood and the consequences of a hazard.

It is important to identify where uncertainty exists, which uncertainties have the greatest potential to affect decisions, and ways to reduce the uncertainty.

Uncertainty may be assessed by expert judgement or further investigations and specialist assessment.

Uncertainty associated with the risk assessment must be clearly understood and communicated. One practical way to do this is to assign a confidence rating (low, med, high) to each risk level assigned in the output data, and associated notes on the source of the uncertainty.

Table 13. Example risk level matrix

		Consequence				
		Negligible	**Minor**	**Moderate**	**Major**	**Extreme**
Likelihood	**Almost certain** MHWS*	Medium	Significant	High	High	High
	Likely 10% AEP	Medium	Medium	Significant	High	High
	Possible 1% AEP	Low	Medium	Medium	Significant	High
	Rare 0.2% AEP	Low	Low	Low	Medium	Significant

*Mean High Water Springs (regular tidal inundation).

Table 14. Example template of consequence categories

	Cultural landscapes	Environmental values	Social values		Infrastructure and services	
			Public safety	Access / lifestyle	Property and infrastructure	Economy and growth
Consider consequence of coastal hazard exposure for:*	Traditional Owner cultural values and connection to Country.	Regionally and nationally significant environmental values and ecosystem services	Human health and safety	Access to key sites, services and activities underpinning community lifestyle, wellbeing and culture	Property and infrastructure	Local business and economic growth opportunities
Extreme	Widespread, permanent impact	Widespread, permanent impact	Loss of life and/ or permanent disabilities	Widespread, permanent impact with no viable alternatives	Damage or loss of property and infrastructure with total value >$25million	Widespread permanent impact
Major	Widespread, temporary impact Full recovery expected to take several years	Widespread, temporary impact Full recovery expected to take several years	Widespread serious injuries / illness	Widespread, temporary disruption, with limited alternatives available Full recovery expected to take several years	Damage or loss of property or infrastructure with total value >$10million	Widespread, temporary impact Full recovery expected to take several years
Moderate	Localised, temporary impact Full recovery expected in < 1 year	Localised, temporary impact Full recovery may take <1 year	Isolated serious injuries / illnesses Or Widespread minor injuries / illnesses	Localised, temporary disruption, with limited alternatives available Full recovery expected in < 1 year.	Damage or loss of property or infrastructure with total value >$1million	Localised, temporary impact Full recovery expected in < 1 year
Minor	Isolated and temporary short-term impact Full recovery expected in < 1 month	Isolated and temporary short-term impact Full recovery expected in < 1 month	Isolated minor injuries and illnesses	Isolated and temporary short-term disruption, with some alternatives available Full recovery expected in < 1 month	Damage or loss of property or infrastructure with total value >$100,000	Isolated temporary and short-term impact Full recovery expected in < 1 month
Negligible	No expected impact	No expected impact	Negligible injuries or illnesses	Negligible disruption	Damage or loss of property or infrastructure with total value < $100,000	Negligible disruption

* Detail for these should be confirmed with project partners and incorporate **Stage 2 – Values, vision and objectives**.

Table 15. Example risk tolerance matrix

	Example risk tolerance
High	Falls outside project partners' risk appetite. A risk that requires actions to avoid or reduce the risk to as low as possible.
Significant	May fall outside project partners' risk appetite. A risk that requires action to be managed to a level that is as low as reasonably practicable.
Medium	Falls within project partners' risk appetite. A risk that may be managed or accepted without further treatment, with active monitoring and regular re-evaluation.
Low	Well within project partners' risk appetite. Business as usual is appropriate.

Analysing and evaluating the risk

Once risk has been attributed to all data, outputs can be mapped and analysed to identify:

- coastal values and uses with medium to high coastal hazard risk
- percentage of areas and number of values/uses/infrastructure with medium to high coastal hazard risk
- critical values, infrastructure and services at risk
- the changing risk profile for different coastal values and uses – for example, if there is step change in increasing risk level between certain planning horizons
- where there may be a step change in the predicted coastal hazard risk (e.g. 2040 to 2070), early identification may help to focus investment, and to sequence and time adaptation planning to mitigate risk before it occurs.

Residual risk

Current/initial risk ratings should consider any existing controls.

Residual risk is the revised risk rating after mitigation / adaptation actions have been successfully implemented.

A tailored review of the residual risk, if required, can be included as part of testing suitable adaptation options in **Stage 5**.

4.5. Consider economic implications

In the absence of intervention/adaptation (and the continuation of business as usual) there will be economic costs associated with coastal hazards.

Tailored economic analysis is an additional way to support assessments of coastal hazard vulnerability and risk and can inform adaptation decisions.

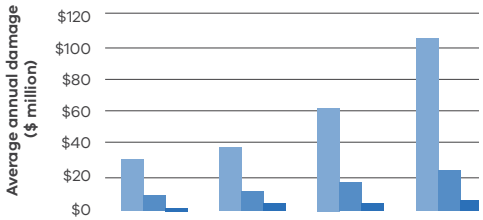
The first steps in an economic analysis involve valuing the **economic base case**.

The base case informs an understanding of current and emerging economic implications from coastal hazards. The base case:

- provides additional detail on economic risk
- gives an economic perspective on the need to proactively manage coastal hazard risk and adapt – this is useful for project scoping and business cases
- contributes to the evaluation of adaptation options in **Stage 5**.

Average Annual damage (AAD) represents the average damage/cost per year that's expected to occur from coastal hazard impacts.

AAD is calculated using probabilistic analysis of a range of coastal hazard likelihood scenarios, and the cost consequence of exposure.



	Present day	2041	2070	2100
Total Tidal Area	$31	$39	$61	$105
Storm-tide inundation	$9	$12	$17	$25
Open Coast Erosion	$1	$4	$5	$6

Figure 17. Hazard type examples - overall AAD for different hazards over multiple planning horizons

Developing a base case involves:

- **assigning monetary values** (where applicable) using market and non-market approaches for a range of coastal values, uses and infrastructure, including local industries and ecosystem services
- **assessing potential cost impacts** of coastal hazards for each planning horizon, based on probabilistic modelling using the multiple event likelihoods and planning horizons
- **presenting base case data** and tailored narratives on place-based economic impacts – including AAD ($) for different hazard types (**Figure 17**), as well as for different values/uses, industry and services (e.g. **Figure 18**).

An economic approach to inform adaptation[44] provides a five-step approach for using economics to inform coastal hazard risk and adaptation. It includes guidance on the range of tangible/intangible values, how to develop a base case, and subsequent adaptation options analysis.

Estimated total value ($ million/year)	Estimate	Potential higher end estimate
Estimated total value of wetland ecosystem services gained	$12M	$70M
Estimated total value of agriculture foregone	$2M	$3M

Figure 18. Ecosystem/industry example – estimated costs associated with 2100 inundation hazard exposure

44 Alluvium Consulting & NCEconomics, 2022.

4.6. Identify priorities for adaptation

The outputs of the coastal hazard vulnerability risk and economic assessments will include a diversity of data and mapped information.

A strategic interpretation of the information is required to identify focus areas/issues/opportunities for adaptation.

This may include:

- developing an overall narrative of coastal hazard vulnerabilities
- summarising the coastal hazard risk assessment results, highlighting high risk areas and issues, and the changing risk profile to 2100
- identifying where broader strategic actions may apply across multiple areas to address vulnerabilities and risk
- identifying focus areas/issues for finer scale risk management and adaptation planning, including localities for tailored adaptation pathways.

4.7. Prepare a Stage 4 summary report

The output of **Stage 4** includes a summary report for project partners articulating:

- the work/process undertaken for this stage, including the engagement and communication process and who contributed
- a summary of the approach to the vulnerability, risk and economic assessments, results and mapping from the analysis
- summary of key updates to the Project Plan during/at conclusion of **Stage 4**.

4.8. Complete a Stage 4 checklist

Readiness to progress checklist	
Does the **Stage 4** summary report have in principle support of the project partners (noting iterative refinements may continue as the next stages progress)?	✓
Have you received direction on this stage from Traditional Owners?	✓
Has all vulnerability and risk data generated from **Stage 4** been stored securely with the lead agency or designated project partner?	✓
Has the scope for **Stages 3** to **6** been reviewed and updated in the Project Plan based on the work completed for **Stage 4**?	✓
Are all updates to the Project Plan supported by the project partners?	✓

STAGE 5 –
Adaptation actions and pathways

Stage			Across all
1		Scoping and preparation	Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
2		Values, vision and objectives	
3		Coastal hazard exposure	
4		Vulnerability and risk	
5		Adaptation actions and pathways	
6		Plan and implement	
7		Ongoing monitoring and review	

This section outlines the Stage 5 steps including to:

- progress engagement and communication
- consider options and actions
- develop a pathways outline
- assess and select actions
- refine adaptation pathways
- prepare a Stage 5 summary report
- complete a Stage 5 checklist.

Stage purpose

The purpose of **Stage 5** is to 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 a diversity of integrated actions across land management, planning and design, nature-based and engineering themes.

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5.1. Progress engagement and communication

A tailored engagement and communication process should continue across **Stage 5** consistent with the approach to creating a collaborative process (**Stage 1.4**) and activities detailed in the Project Plan.

Activities should include participatory approaches to enable a two-way flow of information.

For **Stage 5** this may include:

- site visits, workshops, drop-in sessions, meetings, online sessions, including to inform options discussions and tailored multi-criteria analysis and economic analysis
- use of physical demonstrations – e.g. wave tanks to demonstrate and promote conversations of adaptation options and implications for coastal values and uses
- ongoing partnership discussions (as mutually agreed) with Traditional Owners, including on adaptation options and priorities
- tailoring of key messaging for **Stage 5** and for different audiences – e.g. to introduce key concepts on the range of adaptation options, options assessment, seek input and communicate outcomes.

Further guidance on engagement, and example key messages, are provided in **Attachment C**.

5.2. Consider options and actions

Strategic adaptation options

The Marine and Coastal Policy 2020 re-framed how coastal hazards are managed in Victoria, aiming to facilitate more balanced and positive management options for the long-term benefit of Victoria's coastline.

> Please review the **Introduction** section of *Victoria's Resilient Coast – Adapting for 2100+* framework and guidelines (this document) for key foundational context on policy directions, risk, resilience and adaptation, and adaptation pathways.

To recap on earlier text (refer **Table 3**, **Figure 5**, **Figure 6**), for coastal hazard risk management and adaptation planning, Chapter 6 of the Marine and Coastal Policy 2020 requires land managers to:

- Consider strategic adaptation options in a certain order:
  1. Non-intervention
  2. Avoid
  3. Nature-based
  4. Accommodate
  5. Retreat
  6. Protect.
- Apply an adaptation pathways approach.

In practice, the hierarchy order must be considered and demonstrated when developing an approach for managing coastal hazard risk.

This is also consistent with national best practice approaches, where there's a focus on first seeking to avoid risk, followed by the main-streaming of nature-based methods and working with natural coastal processes.

Types of adaptation actions

There are a wide range of adaptation actions that can be built into adaptation pathways.

These can be broadly classified under three key functional types (**Table 16**):

- land management, planning and design
- nature-based
- engineering.

Adaptation actions are not mutually exclusive, and often a suite of measures is required to effectively manage coastal hazard risk, enabled through an adaptation pathways approach.

The Adaptation actions compendium[45] provides information on the different actions across each functional type.

The compendium includes guidance on when and where different actions may be applicable, and example projects.

In these guidelines:

Adaptation options are different strategic approaches to managing coastal hazard risk. In Victoria, these are considered in the order of non-intervention, avoid, nature-based, accommodate, retreat and protect.

Adaptation actions are the range of tools, decisions and works that can be implemented to create adaptation pathways aligned to the strategic options.

45 BMT Ltd, 2022.

Table 16. Coastal hazard adaptation actions (detail provided in Adaptation actions compendium[46], examples in Figure 19 to Figure 22). Some actions may not yet be applicable in Victoria.

Functional type	Category	Adaptation action
Land management, planning and design	Land use	Land acquisition, swap or lease-back
		Controlled access
		Planning scheme zone change
		Planning overlays
		Rolling easements
		Relocation of infrastructure
	Resilient design / development	Development setbacks
		Use of resilient materials and design in new and retrofitted coastal infrastructure
	Cultural landscapes	Survey, document, salvage, other*
Nature-based (Nature-Based methods use the creation of restoration of coastal habitats for hazard risk reduction)	Coastal vegetation and blue carbon ecosystems	Mangrove forests
		Seagrass Meadow
		Salt marsh
		Kelp forests
	Beach and dune ecosystems	Beach and dune protection / vegetation / management
		Use of on-site natural materials
		Wet sand fencing
		Supported littoral vegetation **

* As led by Traditional Owners – guidance should be sought directly from local groups.
** May be considered a hybrid engineering and nature-based action, pending detail of the approach.

46 BMT Ltd, 2022.

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Functional type	Category	Adaptation action
Engineering	Nourishment**	Localised beach scraping / dune nourishment
		Beach nourishment
		Sand by-passing systems
	Reefs**	Shellfish reefs
	Dredging	Configuration dredging
	Seawalls	Vertical seawalls
		Eco engineering of hard structures
		Rock revetments
		Geobag revetment / wall
	Groynes	Groynes
	Breakwaters	Breakwaters
	Flood/tidal barriers	Levees / dykes
		Tidal / surge barriers
		Tidal valves on stormwater system
	Drainage	Saline groundwater intrusion barrier
		Upgrade of drainage network
	Road network	Upgrade of road network

** May be considered a hybrid engineering and nature-based action, pending detail of the approach.

Figure 19. Controlled access at Anglesea

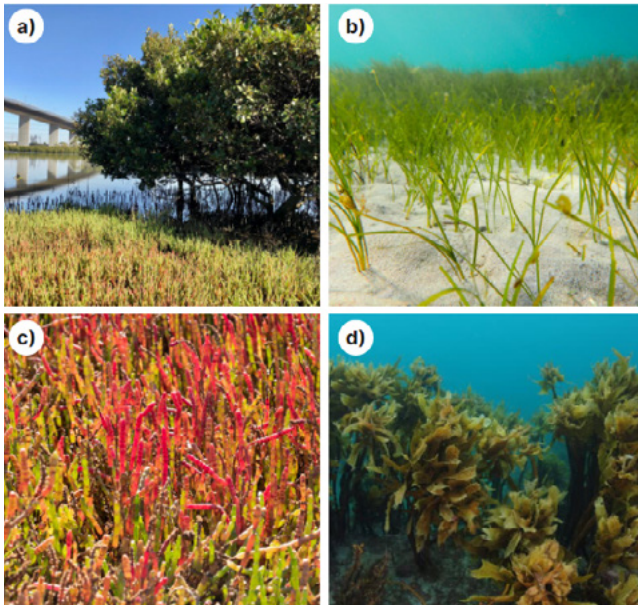

Figure 20. Restoration of blue carbon ecosystems: a) mangrove b) seagrass c) saltmarsh d) kelp

Figure 21. Rock revetment Skenes Creek

What are resilient homes?

Making changes to your home over time can reduce damage from future flooding and help you get back to normal quicker after a flood event.

Changes for a resilient home include:

- **Raise electrical power outlets** above waist height to reduce damage during a flood and allow power to be restored more quickly
- **Look at different floor and wall covering options**. Tiles and waterproof grout are much easier to clean after a flood than wallpaper or carpet
- **Raise TVs, speakers, Wi-Fi modems and other electrical** above waist height or mount on walls if possible, to reduce damage during a flood
- If fitting a new bathroom, think about a **free-standing bath or shower** that is easier to clean around after a flood rather than a fixed bath
- **Raise fridges, freezers, kitchen appliances and cupboards** on plinths or stands with removable kickboards to reduce damage and make cleaning up easier
- If replacing electrical appliances think about **appliances which can be lifted or placed in higher locations** such as a front-loading washing machine on a shelf or plinth instead of a top loader on the ground
- **Metal or raised bed frames** and other furniture will be easier to clean up than divan or upholstered furniture
- **Place work benches along the inside of garage walls** to help reinforce the walls and reduce damage from floodwaters and strong winds

Figure 22. Resilient homes (resilient infrastructure materials and design)[47]

Mainstreaming nature-based methods

Nature-based methods use the creation or restoration of coastal habitats for hazard risk reduction.[48]

This can be done through restoring the habitat alone ('soft' approach), or in combination with hard structures that support habitat establishment ('hybrid' approaches).

Nature-based adaptation in a coastal setting can include:

- rehabilitation of existing degraded habitats
- restoration of habitats that have been historically present
- the creation of new habitats in ecologically suitable areas.

Nature-based methods contribute to coastal hazard risk reduction through ecosystem processes such as increased bed friction, local shallowing of water, sediment deposition and building of vertical biomass.

Benefits of using nature-based methods include:

- their capacity to be adaptive to a changing climate
- self-repair after storm events
- co-benefits such as supporting biodiversity, fisheries productivity, water filtration and carbon storage.

47 After Sunshine Coast Council – Coastal Hazard Adaptation Strategy (2021).
48 Morris RL *et al* 2021.

They also often provide a way to best retain the natural features and values of the coast, e.g. natural beach and dune systems, sandy beaches and marine ecosystems, while also reducing coastal hazard risk.

Nature-based approaches can also be combined with other risk reduction actions. As noted in the IPCC *Special Report on the Ocean and Cryosphere in a Changing Climate*[49], coastal hazard mitigation is generally more effective if built-infrastructure adaptation is accompanied with nature-based approaches.

In recognition of the benefits of nature-based methods, there's an increasing focus globally on mainstreaming this approach to adaptation.

Nature-based methods – the creation or restoration of coastal habitats for hazard risk reduction.

Consistent with global and national best practice, the Victorian Marine and Coastal Policy 2020 recognises nature-based methods as the first strategic coastal hazard adaptation option after non-intervention and avoid.

In practice, this requires land managers to consider:

- How could I employ a nature-based approach?
- What nature-based actions could be included in my pathway?
- Could nature-based actions be undertaken for a period of time and/or trialled?
- Are hybrid nature-based methods feasible?
- Can I demonstrate that I've considered all nature-based possibilities in evaluating actions and building my adaptation pathway?

The National Centre for Coasts and Climate's *Australian Guide to Nature-based Methods for Reducing Risk From Coastal Hazards 2021* (**https://nespclimate.com.au**) provides a valuable resource to improve awareness of nature-based methods in Australia and outlines key considerations for their implementation.

The Adaptation actions compendium[50] provides additional information on a suite of nature-based methods across:

- coastal wetlands/blue carbon ecosystems
- beach and dune ecosystems
- hybrid actions.

49 Oppenheimer *et al* 2018.
50 BMT Ltd, 2022.

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Blue carbon

Blue carbon is carbon sequestration (the removal of carbon dioxide from the Earth's atmosphere) by the world's oceanic and coastal ecosystems. This occurs through plant growth and the accumulation and burial of organic matter in the soil.

Blue carbon ecosystems – including saltmarsh, mangrove forests, seagrasses – are natural and highly effective carbon sinks.

As a nature-based coastal hazard adaptation approach, the root structure of blue-carbon ecosystems can also reduce wave energy and hold shorelines in place. This reduces the likelihood of exposure to coastal hazards including coastal erosion and inundation (**Figure 23**).

Globally, mangroves alone provide flood mitigation benefits that exceed $US65 billion per year, while their loss is associated with 15 million more people being flooded annually (**Menéndez *et al.*, 2020**).

Blue carbon ecosystems also provide significant environmental, cultural, economic and social co-benefits.

A statewide assessment has been undertaken for Victoria[51] to provide spatial information on current and potential future blue carbon ecosystems along Victoria's coast. This assessment identifies feasible areas for the restoration or expansion of blue carbon ecosystems, and the co-benefits to fisheries, water quality, and coastal hazard management.

This information will be available through the **CoastKit** portal. It can be used by coastal land managers to identify potential areas where the creation or restoration of blue carbon ecosystems may be a feasible coastal hazard adaptation option.

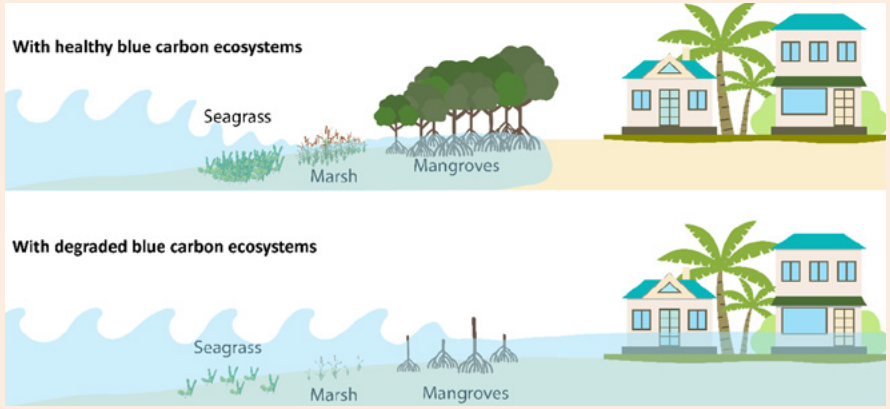


Figure 23. Example of the potential benefits of blue carbon ecosystems to prevent coastal hazards (e.g., storm tide inundation)[52]

51 Costa M *et al* 2022.
52 Costa M *et al* 2022 after Maryland Centre for Environmental Science.

Considering blue carbon opportunities in coastal hazard adaptation

For coastal hazard adaptation planning in Victoria, land managers may wish to consider their blue carbon opportunities.

An approach to considering blue carbon potential for coastal hazard adaptation at the local/site scale may include:

	Description	Example
1	Review blue carbon data available at national/state level to identify known opportunities through a first-pass assessment.	Statewide assessment of blue carbon potential[53]
2	Undertake a tailored site-based assessment according to the desired spatial scale to identify specific opportunities and priority actions.	**Blue carbon in Hobsons Bay City Council**
3	Undertake detailed investigation and modelling to inform on-ground works for blue carbon protection/ restoration through a detailed and third-pass assessment. This includes field data collection at target sites. This is particularly important at sites where restoration actions may be complex, such as hydrological restoration/bund wall removal where a local scale hydrological model needs to be developed. In addition, local soil carbon data can also be collected to provide accurate predictions of blue carbon gains with restoration.	**Avalon Coastal Reserve (Victorian Coastal Wetland Restoration Program)**

53 Costa *et al* 2022.

Enhancing adaptive capacity

Adaptive capacity is the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences[54].

Adaptation plans and pathways can embed a range of actions to enhance adaptive capacity of communities, ecosystems and social systems.

These may include:

- community stewardship programs
- knowledge sharing programs
- capacity building to increase individual / community resilience to hazards
- capacity building activities to support stakeholders
- funding programs to support enhanced adaptive capacity (e.g. resilient homes, alternative access / services)
- specific actions for further work required for vulnerable areas / issues.

Many of these actions may be incorporated as business as usual in broader coastal management programs. Where applicable, adaptation planning can further seek to:

- recognise and emphasise the importance of continuing existing programs
- identify any new programs / initiatives that may be required to enhance adaptive capacity in vulnerable areas
- identify opportunities for future research and actions to increase adaptive capacity.

54 National Climate Change Adaptation Research Facility, 2017.

5.3. Develop a pathways outline

A useful first step towards creating an adaptation pathway is to develop an outline/template.

Context

To reiterate some of the introductory context of these guidelines (refer **Table 3**, **Figure 5**, **Figure 6**), in practice, a pathways approach provides a roadmap for adaptation from present day to a long-term planning horizon (typically 2100). Using this approach enables:

- long-term strategic planning
- consideration of multiple potential futures and associated adaptation pathways, and preferred pathways consistent with the Marine and Coastal Policy 2020
- avoidance of short-term actions that may lead to maladaptation
- confidence to take short-term action to mitigate coastal hazard risk.

Adaptation pathways can be created at varying spatial scales including:

- multiple sites/localities (typically a beach or local area) with detailed pathways of risk reduction actions
- regional areas (e.g. sediment compartment or LGA) to demonstrate a higher level strategic approach.

A regional adaptation plan (e.g. CHARP) will typically include a set of site-scale adaptation pathways for priority areas, complemented by a higher-level strategic pathway view.

Approach

The approach to developing an adaptation pathway/s outline should enable project partners to:

- confirm sites/spatial scales and the number of pathways being created
- contribute to tailoring the focus of the pathways (areas, issues)
- shape the format of the outputs to the project needs (figures/tables).

Creating an adaptation pathway outline involves:

- setting up initial pathways template/s (tables/diagrams)
- confirming key information on current and emerging hazard risk (from **Stage 4**)
- considering initial feasibility of adaptation pathways in the context of known hazard risks and local values and adaptation objectives
- considering all possible futures to ensure pathways enable transformational adaptation where applicable.

The focus of creating a pathways outline is to consider all the possible pathways/futures that align with Victorian policy context, local and regional values, and project partner needs (**Table 17**, **Figure 24**), and to explore opportunities for transformational adaptation.

Potential concurrent pathways (e.g. avoid + nature-based + accommodate), and initial sequence and triggers for pathway changes can be noted. For example, triggers may include when the need to intervene may start, when nature-based and accommodate pathways may commence, or when planning for retreat may need to begin.

An initial screening of feasible adaptation actions for each pathway can also be identified in preparation for further evaluation in Section 5.4.

Table 17. Adaptation pathways foundational questions

Strategic options order	Foundation questions for building an adaptation pathway		Associated functional types of adaptation actions
1. **Non-intervention**	Is non-intervention appropriate?	For which hazards and risks? Where and for how long? What actions do we include? What would trigger a change?	• land management, planning and design
2. **Avoid**	Can we continue to avoid the hazards?		
3. **Nature-based methods**	Can we pursue a nature-based approach?		• land management, planning and design • nature-based
4. **Accommodate**	Can we better accommodate the hazards/risk?		
5. **Retreat**	Can we retreat from the hazards/risk?		• land management, planning and design
6. **Protect (major engineering works)**	Do we require a protect approach?		• land management, planning and design • engineering

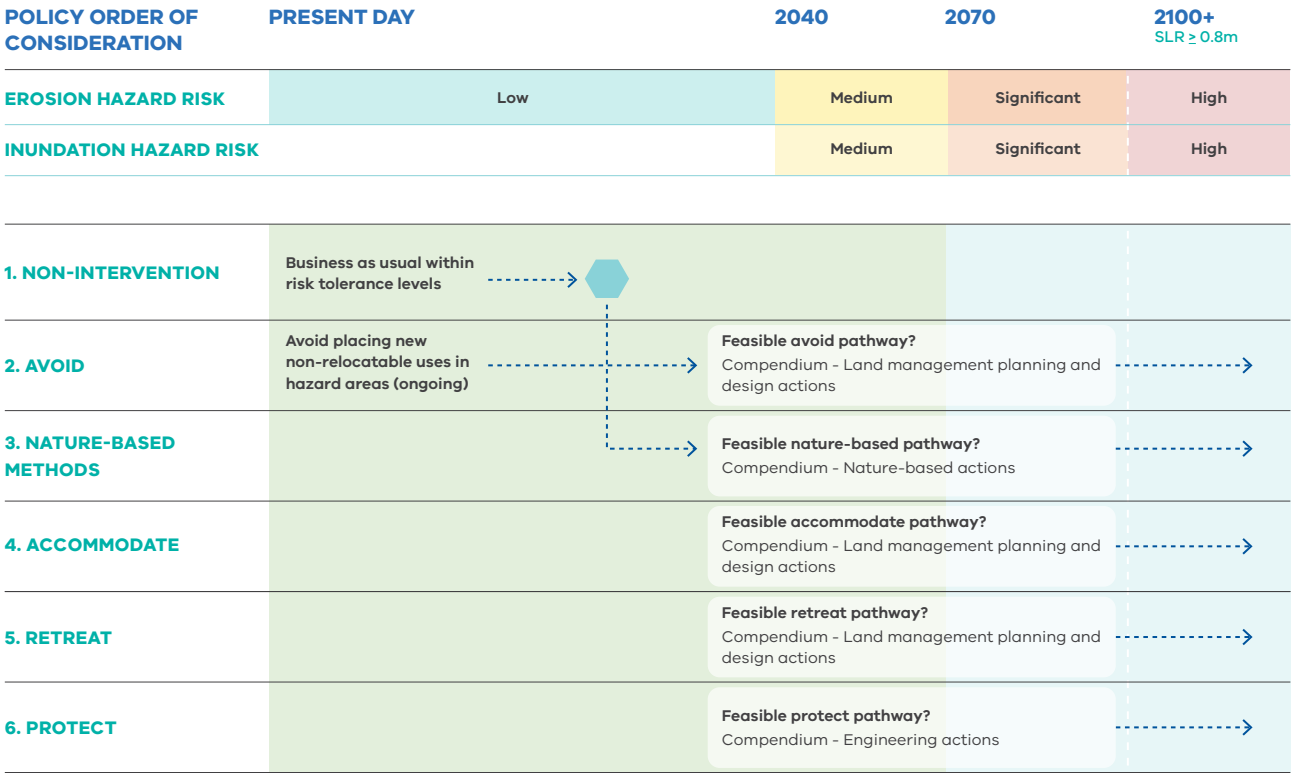


Figure 24. Building a pathways outline – consider all feasible pathways and futures aligned to Victorian policy and local values and objectives and emerging risk profile - supported by Adaptation actions compendium[55]

55 BMT Ltd, 2022

5.4. Assess and select actions

Approach

The purpose of this step is to further evaluate and select actions that will be included in implementing adaptation pathways.

The approach includes to:

- compile a shortlist of adaptation actions relevant to the feasible adaptation pathway (using the Adaptation actions compendium[56])
- use multi-criteria analysis to evaluate adaptation actions and guide consideration of the most appropriate actions for the adaptation pathways
- use economic analysis to support decision-making on appropriate actions and the sequence and timing of adaptation actions in the pathways.

Multi-criteria analysis

Multi-criteria analysis is a decision tool that enables actions to be evaluated based on multiple criteria.

This process can assist with shortlisting and selecting adaptation actions.

Multi-criteria analysis is performed by screening each adaptation action through a range of qualitative or semiquantitative criteria. Weightings may also be applied to different criteria.

Criteria must be developed collaboratively with project partners, and reflect the values and objectives identified in **Stage 2**, as well as any additional considerations related to implementation.

Criteria may include:

- confidence in hazard risk reduction
- alignment with cultural, environmental, social values
- Victorian policy alignment
- adaptive ability (enables future pathway changes)
- co-benefits/outcomes
- cost is feasible
- approvals are feasible.

The outcomes of the multi-criteria analysis may include:

- selection of a range of actions to be included in the adaptation pathways
- identification of any actions where economic analysis is required to help with decision-making on the selection, sequencing and timing of actions.

Economic analysis

Economics provides an additional tool to inform evaluation of adaptation options and strategic adaptation planning.

56 BMT Ltd, 2022.

A five-step best practice approach for economic evaluation has been developed to support coastal hazard adaptation in Victoria[57]. This includes:

Step 1 – Scope the assessment: Define the purpose, scope and scale of the work.

Step 2 – Value the base case: Perform a quantitative assessment of risks to calculate average annual damage values.

Step 3 – Support actions analysis: Scope adaptation actions and quantify costs and benefits of adaptation.

Step 4 – Compare cost and benefits: Use discounted cash flow analysis to compare costs and benefits with sensitivity testing.

Step 5 – Communicate the results and make decisions: Present the draft results of the cost-benefit analysis and use them to make informed decisions.

The economic analysis will increase confidence on the selection of actions for the adaptation pathways, and the sequencing and timing of actions.

The economic analysis also helps to give confidence in value for investment, and to highlight the economic benefits of adaptation and proactive planning.

Further detail on the role of economics in supporting coastal hazard risk management and adaptation, and the best practice approach for assessments, is provided in An economic approach to inform adaptation[58].

57 Alluvium Consulting & NCEconomics, 2022

57 Alluvium Consulting & NCEconomics, 2022

5.5. Refine adaptation pathways

Pathways and triggers

Following assessment of adaptation actions, the adaptation pathways can be further detailed and refined.

Formats for adaptation pathway content, figures and diagrams vary widely, and are generally tailored to be fit for purpose (See **Figure 6** for one example of an adaptation pathway format).

Pathways may incorporate all functional types of actions in the one diagram (e.g. the sequence and timing of planning, nature-based and engineering actions across pathways), or separate diagrams/ considerations for each functional type.

Triggers for change from one pathway/action to another should be identified. These may include:

- a change in the hazard risk level
- a hazard event (beyond predicted exposure)
- action effectiveness
- the timing of other notable events (e.g. design life end for infrastructure)
- updated values, vision and objectives.

Revising the initial pathway outline into a detailed adaptation pathway is best done in collaboration with project partners to ensure a fit-for-purpose output.

In addition to the detailed actions for individual pathways, broader ideas may also be identified to support implementation and enhanced adaptive capacity. These may include actions related to:

- environmental programs
- community collaborations
- engagement and education programs
- project partner organisations' capacity building
- other.

All individual pathways and broader actions can be incorporated into adaptation plans for implementation.

Transformational adaptation should be investigated if any of the following conditions are met[59]:

Significant changes have already occurred	If climate change has driven significant changes to social or ecological systems, it indicates transformational adaptation is necessary. This is not only to adjust the system to accommodate the changes but also to anticipate further impacts.
There are signs of high vulnerability	If climate change impacts are expected to test the existing systems' resilience (especially If tipping points might be reached), this is an indication that transformational adaptation is likely to be needed.
Current approaches are failing	If current approaches are no longer effective at achieving their goals, it might indicate that transformational adaptation is necessary.
Decisions have long-term consequences	If a decision has a long-term consequence and/or requires a long lead-time to implement, the need for transformational adaptation should be considered.

59 Adapted from State of Victoria DELWP, 2022, *Natural Environment Climate Change Adaptation Action Plan 2022-2026.*

Key principles

Key principles to consider in refining adaptation pathways for Victoria include:

- Have opportunities for transformational adaptation been considered?
- Can the policy order of strategic options consideration be clearly demonstrated?
- Have all opportunities to incorporate nature-based adaptation actions been considered?
- Have all accommodate and retreat actions been considered prior to protect?
- Have the adaptation pathways been underpinned by a robust engagement process with all project partners and the community?

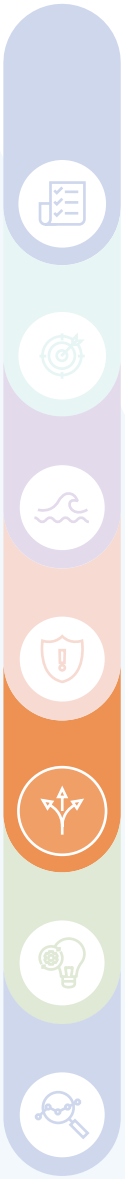
5.6. Prepare a Stage 5 summary report

The output of **Stage 5** includes a summary report for project partners articulating:

- the work/process undertaken for this stage, including the engagement and communication process and who contributed
- a summary of the approach to the adaptation options and actions assessment, including the adaptation pathways, and results from supporting analysis
- summary of key updates to the Project Plan during/at conclusion of **Stage 5**.

5.7. Complete the Stage 5 checklist

Readiness to progress checklist	
Does the **Stage 5** summary report have in principle support of the project partners (noting iterative refinements may continue as the next stages progress)?	✓
Have you received direction on this Stage from Traditional Owners?	✓
Have preliminary adaptation pathways and broader actions been identified for all priority areas?	✓
Has the scope for **Stages 3** to **6** been reviewed and updated in the Project Plan based on the work completed for **Stage 5**?	✓
Are all updates to the Project Plan supported by the project partners?	✓



Planning guidance

The Planning system offers a range of mechanisms and tools that can be used to support strategic land use adaptation actions. The Planning system helps to implement state marine and coastal policy in land use planning and development.

The Victoria Planning Provisions (VPP) provide a statewide reference document or template from which planning schemes or planning scheme provisions must be sourced or constructed.

The VPP can be accessed at: **planning-schemes.app.planning.vic.gov.au**.

The VPP includes zones, overlays and other provisions that can be applied to implement planning policy objectives for coastal hazards and reflect local circumstances.

Planning schemes are required to minimise the impact of flood, erosion or fire hazard on land use and development to minimise risk to life, health, property, the natural environment and community infrastructure from natural hazards.

Further guidance and information on applying the VPP can be accessed at **planning.vic.gov.au/guide-home/guide-to-victorias-planning-system**.

Additional guidance and examples of planning actions are provided in the Adaptation actions compendium.[60]

Practitioner's tip

Land subject to coastal hazards is required to be identified and appropriately managed through planning schemes to ensure that future use and development is not at risk and to avoid use and development in areas vulnerable to coastal inundation and erosion.

Review of local policies, zoning, overlays and other provisions in municipal planning schemes helps to ensure that future use and development of land continues to be appropriate in areas affected by coastal hazard risks and vulnerabilities. This helps to prevent exacerbation of identified risks to vulnerable people, property and the environment by ensuring that future use and development is compatible with identified coastal hazards.

Planning requirements for use and development (for example, as-of-right, exempt, permit-required prohibited etc.) should reflect the degree of risk and vulnerability identified in the local coastal hazard assessment. This helps to ensure that future use and development is appropriate for coastal hazard risk management and adaptation. Consideration should be given to instances where predicted and/or actual detrimental cumulative and/or synergistic impacts arise.

60 BMT Ltd, 2022

STAGE 6 –
Plan and implement

Stage			Across all
1		Scoping and preparation	Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
2		Values, vision and objectives	
3		Coastal hazard exposure	
4		Vulnerability and risk	
5		Adaptation actions and pathways	
6		Plan and implement	
7		Ongoing monitoring and review	

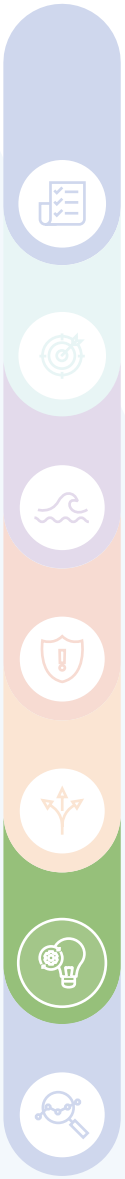
This section outlines the Stage 6 steps including to:

- progress engagement and communication
- refine the implementation plan
- gain support and endorsement
- review and finalise
- prepare final reporting
- complete a Stage 6 checklist.

Stage purpose

The purpose of **Stage 6** is to confirm the action plan for coastal hazard risk management and adaptation and to start implementation.

This includes clarifying priority actions, shared roles and responsibilities, triggers for review and resource requirements.



6.1. Progress engagement and communication

A tailored engagement and communication process should continue across **Stage 6** consistent with the approach to creating a collaborative process (**Stage 1.4**) and activities detailed in the Project Plan.

Activities should include participatory approaches to enable a two-way flow of information.

For **Stage 6** this may include:

- site visits, workshops, drop-in sessions, meetings, online sessions, including to support final input from project partners and the community on the draft plan, implementation priorities and opportunities
- ongoing partnership discussions (as mutually agreed) with Traditional Owners, including implementation needs/support
- tailoring of key messaging for **Stage 6** and for different audiences – e.g. to summarise outcomes of the adaptation planning process, including priority actions, seek final feedback and communicate outcomes.

Further guidance on engagement, and example key messages, are provided in **Attachment C**.

6.2. Refine implementation plan

In this final stage, an adaptation plan (CHARP or similar) is developed that includes refinement of adaptation pathways and triggers for change, and implementation details.

This includes (but not limited to):

- prioritising actions
- funding actions
- roles and responsibilities
- triggers for review
- change management
- Monitoring, Evaluation, Reporting, and Improvement (MERI).

These elements are outlined across the following sections.

Prioritising actions

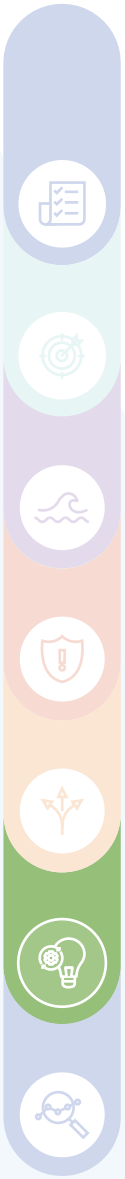
Prioritisation of actions within and across multiple pathways may include consideration of:

- immediacy/timing of coastal hazard impact
- magnitude of coastal hazard impact/ magnitude of threat to values
- irreversibility of damage to values (e.g. loss of Traditional Owner sites of significance)
- flow-on impacts of damage to values (e.g. loss of single access to township, increasing vulnerability to other hazards such as bushfire)
- lead-in time required for actions.

Funding actions

Providing confidence on funding resources to deliver the plan may include outlining:

- the cost of initial action
- ongoing maintenance cost of an action for its lifecycle – including any decommissioning
- costs of offsetting impacts to values
- short-, medium-, and long-term sources of funding
- cost-sharing arrangements
- avenues for alternate funding sources
- cost triggers for changing approach.



Roles and responsibilities

Clarity on roles and responsibilities may include identifying who will:

- implement adaptation actions
- monitor ongoing effectiveness and impacts
- maintain / replace / upgrade items
- deliver/support ongoing community engagement and education
- initiate review.

Triggers for review

Triggers for review of the plan may include changes in:

- sea level rise benchmarks
- scientific advances
- policy contexts
- project partners
- other strategic plans
- hazard risk updates
- changes in vulnerability profiles.

Case Study: Tide Gauge Trigger Levels for Sea Level Rise Adaptation Pathways

In 2002, Glenelg Hopkins Catchment Management Authority commissioned the study "*Tide Gauge Trigger Levels for Sea Level Rise Adaptation Pathways*"[61] to support adaptation planning for floodplains.

This study provided:

- analysis that identifies how current and future mean sea level corresponds to local tide gauge measurements
- thresholds, triggers and signals for when adaptation action needs to be taken in response to increasing sea level
- a proposed adaptation pathway logic.

The study provides an example of tangible local triggers that support the implementation of adaptation pathways and actions.

ghcma.vic.gov.au/tide-gauge-trigger-levels

61 Streamology Pty Ltd. 2022).

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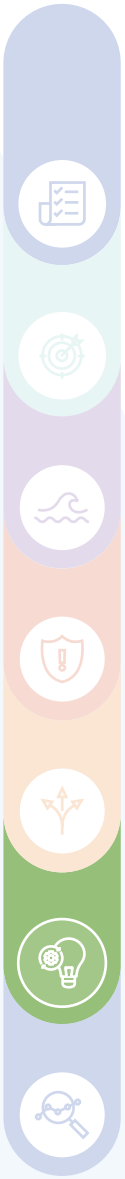


Change management

Change management refers to the methods taken to prepare and support organisations to alter their internal and external processes.

A change management plan can support organisational change required to implement adaptation. Characteristics of effective change management plans include:

- identifying and articulating the rationale and justification for change
- ensuring buy-in and support from senior management
- establishing change champions throughout the organisation
- participative management of the process – involve staff from across the organisation to contribute and characterise necessary changes
- identifying and initial 'quick wins' to build momentum.

Monitoring, Evaluation, Reporting and Improvement Plan

A Monitoring, Evaluation, Reporting and Improvement (MERI) plan is best practice to support implementation.

Key components of an effective MERI plan include:

- a program logic that details the links between the adaptation actions and the objectives identified in **Stage 2**, and the assumptions underpinning the actions being taken
- key measures of success that outline key performance indicators, and the baseline data from which performance is being measured
- roles and responsibilities for who will monitor and evaluate performance indicators, and how any necessary changes will be actioned.

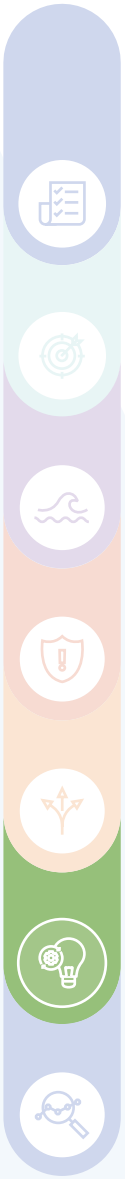
MERI plans can be tailored to the scope of the program, and may range of a bespoke set of key measures for smaller adaptation plans, to a more comprehensive set of measures for more extensive plans.

Asset Management Accountability Framework

The Department of Treasury and Finance's Asset Management Accountability Framework details mandatory asset management requirements as well as general guidance for agencies responsible for managing assets.

Mandatory requirements include developing asset management strategies, governance frameworks, performance standards and processes to regularly monitor and improve asset management. The requirements also include establishing systems for maintaining assets and processes for identifying and addressing performance failures.

Adaptation plans will be informed by, and in turn support, the existing asset management arrangements across agencies.



6.3. Gain support and endorsement

Endorsement and approvals of the draft and final adaptation plans should be sought consistent with the engagement and communication plan (**Stage 1**).

This includes all partner agencies, organisations with implementation roles, and public consultation.

The collaborative engagement process established in **Stage 1**, and running through all stages of the framework, will ensure that engagement has underpinned the development of the draft plan, to provide a strong platform for final consultation and support.

Council-led public consultation

All public engagement led by councils follows the community engagement principles set out in the *Local Government Act 2020*, including:

- engagement processes have a clearly defined objective and scope
- participants in engagement must have access to objective, relevant and timely information to inform their participation
- participants in engagement must be representative of the persons and groups affected by the matter that is the subject of engagement
- participants of engagement are informed of the ways in which the process will influence decision making.

6.4. Review and finalise

Following completion of final consultation and feedback, the adaptation plan and associated documentation can be finalised. This may include:

- an engagement summary report
- a summary of updates made to the final plan
- completion of the final plan and associated documents/data outputs
- endorsement of the final outputs by project partners.

6.5 Prepare final reporting

The output of **Stage 6** includes a final coastal hazard adaptation plan (CHARP or similar) including:

- documentation of the work/process undertaken for coastal hazard risk management and adaptation planning, including the engagement and communication process and who contributed
- adaptation pathways and priority actions across the study area, and associated implementation plan
- handover and storage of all data.

6.5. Complete the Stage 6 checklist

Readiness to progress checklist	
Does the final adaptation plan have in principle support of the project partners?	✓
Have you received direction on this Stage from Traditional Owners?	✓
Have all actions been assigned lead and partner agencies?	✓
Has all data been handed over to an agreed lead agency?	✓

STAGE 7 –
Ongoing monitoring and review

Stage			Across all
1		Scoping and preparation	Traditional Owner knowledge, rights and assertions Partnerships and a collaborative process Engagement and communication
2		Values, vision and objectives	
3		Coastal hazard exposure	
4		Vulnerability and risk	
5		Adaptation actions and pathways	
6		Plan and implement	
7		**Ongoing monitoring and review**	

This section outlines the Stage 7 steps including to:

- progress engagement and communication
- continue monitoring and review
- complete a Stage 7 checklist.

Stage purpose

The purpose of **Stage 7** is to ensure coastal hazard risk management and adaptation is accompanied by an ongoing monitoring and review process. This will enable effective implementation, shared knowledge, and improvement.

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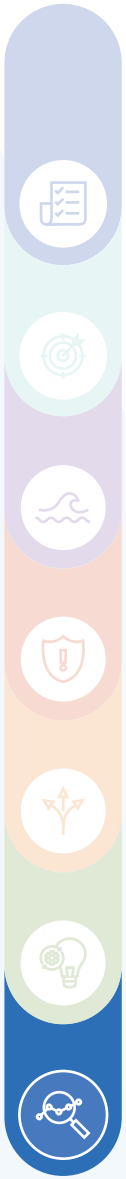


7.1. Progress engagement and communication

A tailored engagement and communication process should continue across **Stage 7** to maintain a collaborative process, and support community stewardship as adaptation is implemented.

Activities should include participatory approaches to enable a two-way flow of information.

For **Stage 7** this may include:

- site visits, workshops, drop-in sessions, meetings, online sessions related to action implementation and monitoring
- ongoing partnership discussions (as mutually agreed) with Traditional Owners
- ongoing training and support for citizen science programs.

7.2. Continue monitoring and review

A tailored monitoring program will support adaptation. This includes data and information to enable:

- tracking of key measures of success identified in MERI plans (**Stage 6**)
- improved data resources to inform adaptation plan updates
- improved data and information on triggers for change.

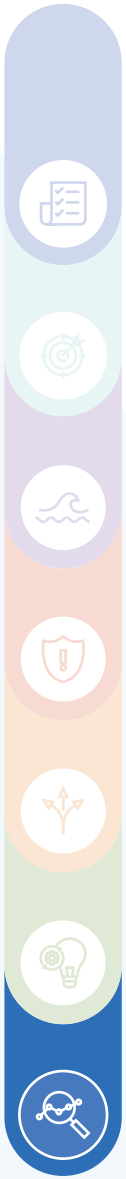
There are a range of elements that may be included in monitoring programs to support MERI plans and adaptation implementation.

These include (and are not limited to) data on:

- physical coastal changes
- changes in condition of values
- changes in vulnerability and risk exposure
- level of partner agency and stakeholder engagement and buy-in
- funds expended
- actions implemented
- co-benefits delivered.

Principles for developing a tailored monitoring program to support adaptation include:

- identify the key monitoring needs – including meri plan key measures of success and additional data resources required
- identify what data / information can be sourced from existing national, state and local data sources and existing monitoring programs
- identify gaps and clarify what additional local/ regional monitoring may be required
- identify opportunities for citizen science to further support monitoring, and community involvement in monitoring and review
- clarify roles and responsibilities across project partners for agreed monitoring activities and alignment to the MERI plan.



Resources: Existing monitoring / data sources

Sources of information that may be useful in monitoring programs include:

- Coastkit – provides a wide range of marine and coastal data: **mapshare.vic.gov.au/coastkit**
- VicWaves – Live wave buoy data: **vicwaves.com.au/**
- PropellerAero – 3D drone survey data: **vcmp.prpellr.com**
- DigitalEarthAustralia – combined satellite data and tidal modelling to show coastline position over time: **dea.ga.gov.au/products/sea-ocean-coast**
- Estuary watch - a citizen science project to monitor estuary health: **estuarywatch.org.au**
- State of the Environment - five-yearly reporting on the condition and trend of environmental values across Victoria: **ces.vic.gov.au**

Resources: Victorian wave and shoreline data

Victoria's Coastal Monitoring Program (VCMP) actively monitors wave conditions and shoreline changes across the coast.

This includes:

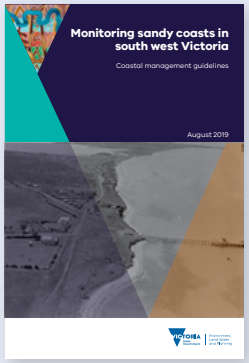
- a wave buoy program that provides live observations across 13 monitoring sites, covering the open coast and Port Phillip Bay
- a beach drone survey program that monitors over 30 sites statewide, plus on-ground survey
- assessments of short-term shoreline variability including storm erosion impacts, as well as seasonal changes
- assessment of long-term shoreline change based on historical aerial imagery and satellite extracted shorelines.

The statewide data is available to inform local adaptation planning, implementation, and local monitoring needs. Contact the Department for further information.

www.marineandcoasts.vic.gov.au/marine-and-coastal-knowledge/victorian-coastal-monitoring-program

Resources: Guidelines for monitoring sandy coasts

"Monitoring sandy coasts in south west Victoria: Coastal management guidelines"[62] discuss the types of beach features in western Victoria and available techniques to record and measure those features. They also provide recommendations on monitoring frequency and methods for data analysis and storage.



These guidelines are available at: **marineandcoasts.vic.gov.au/coastal-management/information-for-coastal-managers**

7.3. Complete a Stage 7 checklist

Readiness to progress checklist	
Have project partners agreed on the monitoring actions required to support the MERI program?	✓
Have you received direction on this Stage from Traditional Owners?	✓
Are arrangements in place to maintain the collaborative process across implementation?	✓
Are data storage and sharing arrangements in place for all new / local monitoring data being collected?	✓

62 DELWP 2019.

ACRONYMS

AAD – Average Annual Damage

AEP – Annual Exceedance Probability

AHD – Australian Height Datum

CHARP – Coastal Hazard Adaptation and Resilience Plan

CMA – Catchment Management Authority

CMMP – Coastal and Marine Management Plan

DAL – Distinctive Area Landscapes

HAT – Highest Astronomical Tide

IPCC – Intergovernmental Panel on Climate Change

LGA – Local Government Area

RAP – Registered Aboriginal Party

RASP – Regional and Strategic Partnership

MERI – Monitoring Evaluation Reporting and Improvement

MHWS – Mean High Water Springs

MSL – Mean Sea Level

RCS – Regional Catchment Strategy

RWS – Regional Waterway Strategy

VCMP – Victorian Coastal Monitoring Program

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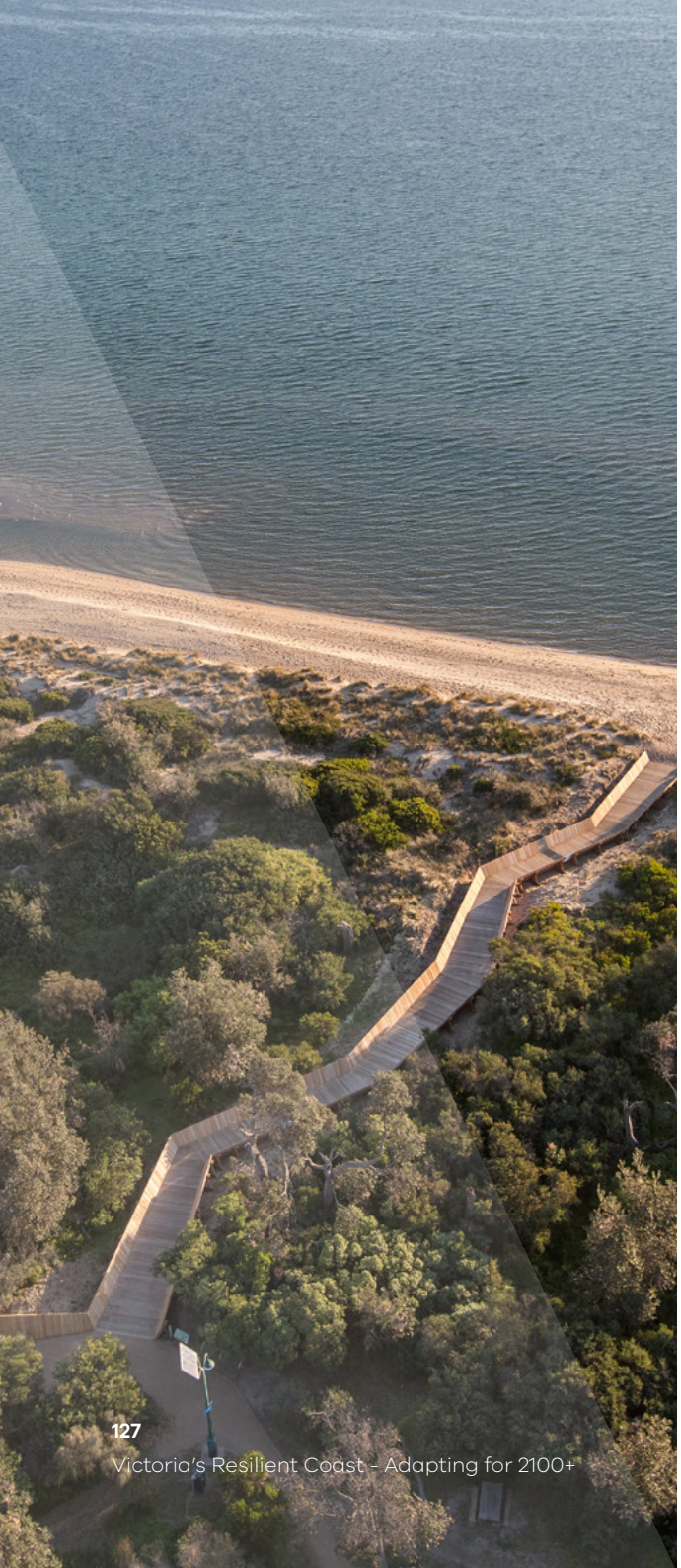
ADDITIONAL RESOURCES

Resource	Website
Behavioural Economics Team of the Australian Government	www.behaviouraleconomics.pmc.gov.au
Climate Visuals	www.climatevisuals.org/evidence
Cultural Landscapes Strategy	www.fvtoc.com.au/cultural-landscapes
CoastAdapt	www.coastadapt.com.au
Coastkit	www.mapshare.vic.gov.au/coastkit
Climate Change resources and guidance	www.climatechange.vic.gov.au
Coastal management resources and guidance	www.marineandcoasts.vic.gov.au/coastal-management/information-for-coastal-managers
Planning resources and guidance	www.planning.vic.gov.au/resource-library
Planning Distinctive Area Landscapes	www.planning.vic.gov.au/policy-and-strategy/distinctive-areas-and-landscapes
Waterways resources and guidance	www.water.vic.gov.au
DigitalEarthAustralia	www.dea.ga.gov.au/products/sea-ocean-coast
Estuary watch	www.estuarywatch.org.au
GeoScience Australia	www.ga.gov.au

Resource	Website
Local Coastal Hazard Assessments Bellarine Peninsula/Corio Bay, Gippsland Lakes/90 Mile Beach, Port Fairy, Port Phillip Bay, and Westernport	www.marineandcoasts.vic.gov.au/coastal-programs/port-phillip-bay-coastal-hazard-assessment
Marine and Coastal Strategy 2022	www.marineandcoasts.vic.gov.au
Marine and Coastal Policy 2020	
PropellerAero	www.vcmp.prpellr.com
Smartline	www.coastadapt.com.au/coastadapt-interactive-map
The South East Councils Climate Change Alliance vulnerability assessment toolkit	www.seccca.org.au
Victorian Government Public Engagement Framework 2021-2025	www.vic.gov.au/public-engagement-framework-2021-2025
Victorian State of the Environment Report	www.ces.vic.gov.au
VicWaves	www.vicwaves.com.au



ATTACHMENT A:
National context

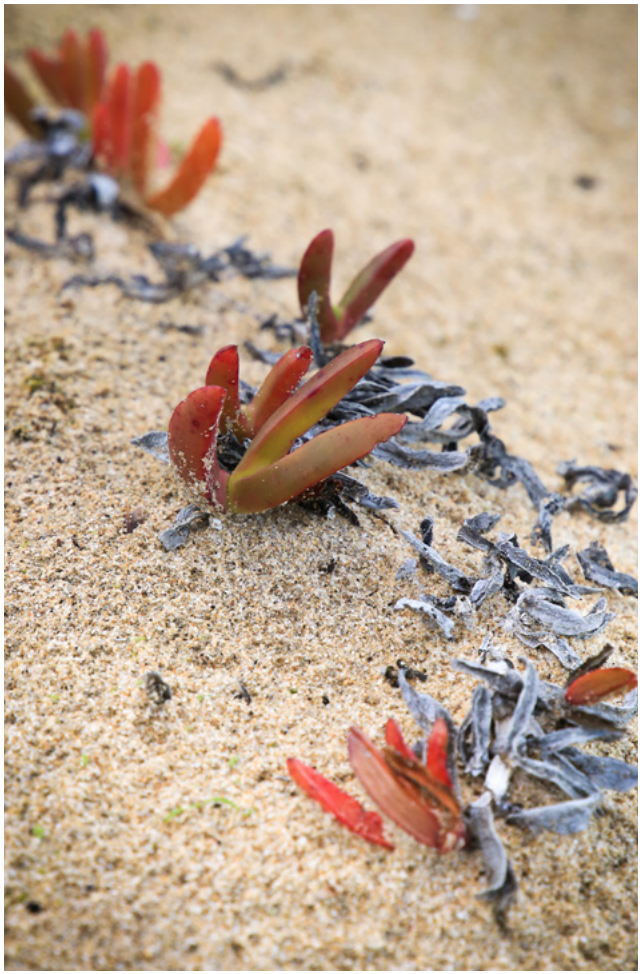
Victoria's Resilient Coast – Adapting for 2100+ framework and guidelines have been developed with reference to relevant research and national best practice approaches. The seven stages of *Victoria's Resilient Coast – Adapting for 2100+* framework are aligned to the national Coastal Climate Adaptation Decision Support model as outlined below.

CoastAdapt: Coastal Climate Adaptation Decision Support[63]	Victoria's Resilient Coast - Adapting for 2100+
Identify challenges Scoping and engagement planning	**STAGE 1:** Scoping and preparation
Assess risks and vulnerabilities Coastal hazard vulnerability and risk	**STAGE 2:** Values, vision and objectives
	STAGE 3: Coastal hazard exposure
	STAGE 4: Vulnerability and risk
Identify options Scope range of options	**STAGE 5:** Adaptation actions and pathways
Evaluate options, prepare plan Evaluate options, prepare strategy/plan	**STAGE 6:** Plan and implement
Take action, monitor and evaluate Implement and ongoing review	**STAGE 7:** Ongoing monitoring and review

63 National Climate Change Adaptation Research Facility, 2017, *The adaptation process: Coastal Climate Adaptation Decision Support.*

Other national and international frameworks have also informed the appreciation of best practice for coastal hazard risk management and adaptation planning, including the following:

- **Queensland:**
  Developing a Coastal Hazard Adaptation Strategy: Minimum Standards and Guidelines for Queensland Local Governments[64]
  www.QCoast2100.com.au
- **Western Australia:**
  Coastal hazard risk management and adaptation planning guidelines[65]
  www.wa.gov.au/government
- **New South Wales:**
  NSW Coastal Management Manual [66]
  www.environment.nsw.gov.au
- **New Zealand:**
  Coastal hazards and climate change: Guidance for local government[67]
  www.environment.govt.nz



64 State of Queensland, 2016, *Developing a Coastal Hazard Adaptation Strategy: Minimum Standards and Guidelines for Queensland Local Governments.*
65 Department of Planning, Lands and Heritage & Western Australian Planning Commission, 2019, *Coastal hazard risk management and adaptation planning guidelines.*
66 Office of Environment and Heritage 2018, *NSW Coastal Management Manual.*
67 Ministry for the Environment, 2017, *Coastal Hazards and Climate Change: Guidance for Local Government.*

ATTACHMENT B:
Collaborative development process

The collaborative process to develop our Victorian approach to coastal hazard risk management and adaptation included the following elements:

- **Development launch:** An online project introduction session in May 2021 with more than 100 attendees from organisations across Victoria who manage and care for the coast.
- **Department Working Group:** A Department Working Group, with more than 30 representatives from different areas within the Department. The group met monthly from June 2021 to June 2022.
- **Traditional Owner partnership:** A project partnership approach with Traditional Owners, including representatives from the six Registered Aboriginal Parties with Country across the marine and coastal environment. On average the project partnership met fortnightly from July 2021 to June 2022, plus individual discussions with each group.
- **Collaborative Working Group:** A Collaborative Working Group with more than 40 representatives from coastal local councils, Committees of Management, Catchment Management Authorities, government agencies, water authorities, Registered Aboriginal Parties and peak body groups. The group met for a series of seven workshops from July 2021 to July 2022, plus individual discussions.

A diversity of organisations that took part in the collaborative development process, as summarised below. Additional organisations elected to stay informed as the project progressed.

Sector	Organisation	
Local government	• Bass Coast Shire Council • Borough of Queenscliff • Casey City Council • City of Port Phillip • Colac Otway Shire Council • East Gippsland Shire Council • Glenelg Shire Council • City of Greater Geelong	• Hobsons Bay Council • Kingston City Council • Mornington Peninsula Shire Council • Moyne Shire Council • South Gippsland Shire Council • Warrnambool City Council • Wellington Shire Council • Wyndham City Council

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Sector	Organisation	
Catchment Management Authorities and Melbourne Water	• East Gippsland Catchment Management Authority • Glenelg Hopkins Catchment Management Authority • West Gippsland Catchment Management Authority	• Corangamite Catchment Management Authority • Melbourne Water
Registered Aboriginal Parties	• Bunurong Land Council Aboriginal Corporation • Eastern Maar Aboriginal Corporation • Gunaikurnai Land and Waters Aboriginal Corporation	• Gunditj Mirring Traditional Owners Aboriginal Corporation • Wadawurrung Traditional Owners Aboriginal Corporation • Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation
Committees of Management	• Barwon Coast Committee of Management • Bellarine Bayside Committee of Management	• Phillip Island Nature Parks
Victorian agencies and authorities	• Barwon Water • Great Ocean Road Coast and Parks Authority • Department of Environment, Land, Water and Planning	• Department of Transport • Parks Victoria
Representative bodies	• Association of Bayside Municipalities • Australian Coastal Society • Coastal, Ocean and Port Engineering Panel • Life Saving Victoria	• Municipal Association of Victoria • Port Phillip Bay Bathing Box Association • Planning Institute of Australia • Victorian Planning and Environmental Law Association
Ports	• Gippsland Ports • Geelong Port	• Port of Portland • Port of Melbourne

Sector	Organisation	
Contributing authors	• Alluvium and Natural Capital Economics (Stage 1 and 5) • Blue Carbon Lab (Stage 5)	• BMT (Stage 5) • Water Technology (Stage 3)
Department sectors/ teams	• Biodiversity Futures • Climate Change Policy • Community and Partnerships (Barwon South West, Gippsland and Port Phillip) • Floodplain Management • Integrated Catchment Management • Inverloch Regional and Strategic Partnership • Land and Built Environment (Barwon South West, Gippsland, and Port Phillip) • Land Management Policy	• Marine Biodiversity Policy and Programs • Marine Spatial Planning • Planning Systems Reform • Port Phillip Bay Coastal Hazard Assessment • Risk and Audit Unit • Statewide Coastal Programs • Waterway Health • Water Sector Climate Change Mitigation and Adaptation

ATTACHMENT C:
Guidance for Engagement and Communication

This Attachment provides guidance on:

- Developing an Engagement and Communication Plan
- Example engagement questions
- Example key messages.

Developing an Engagement and Communication Plan

This guidance applies for a whole project and / or individual stages of *Victoria's Resilient Coast – Adapting for 2100+* framework.

UNDERSTAND

1. **Define why you are engaging**	
Understand the background and context	• Why is this project happening and why now? • What previous engagement has occurred in this location or on this issue? • What else is happening that might impact on the project outcomes (e.g. a related issue in the media)? • Who else is working in this area that will have information to assist you?
Write a purpose statement	• What do you want the engagement to achieve? • What are the questions you want your engagement to answer? • What opportunities are you exploring? • What decision will engagement outcomes inform? • Does the purpose statement reflect the needs of decision makers, stakeholders and community?

UNDERSTAND

Create a list of engagement objectives	• Guide the development of your engagement process. • Objectives will also help measure the success of the project. • Objective examples include: – to inform development of the structure planning guidelines – to gain insight into relationships between key stakeholders – to improve community understanding of natural hazard planning.

2. Describe what people can and cannot influence in your project

List the project 'negotiables'	• What can people change through their input into the engagement process?
List the project 'non-negotiables'	• What elements do people not have any opportunity to influence? • Are there any safety, technical or legislative requirements that cannot change? • Critically assess why it is that these elements can't be influenced and how you will communicate this.

3. Understand who to involve

Brainstorm with your team members and partners	• What key organisations, partners, advocacy groups and community members should take part? • Have you included the involvement of a wide range of voices? • Who has taken part in the past?
Classify which stakeholders will need the most attention	• Who will be most affected by your project? • Who might find it harder to take part?
Understand the motivations of key stakeholders	• Who is most passionate about the project? • How much influence do people have? (inform, consult, involve, collaborate, empower). • How have people reacted to past projects?

UNDERSTAND

4. Identify resources, risks and sensitivities

Think about how much time, money and support you have for engagement	• How much time can members of your project team give to the engagement process? • How much project budget do you have to spend on engagement resources (people and materials)? • Are there people outside your team that can support your engagement? • What existing partnerships and networks can you leverage? • Will you require independent or specialist expertise (e.g. facilitation, data analysis, etc)?
Conduct a simple risk assessment	• What are the potential risks to the project? • Are project timelines long enough to allow you to engage meaningfully? • What is the history of engagement on this project or in this place? • What are the known risks about the people and organisations you wish to engage? • What is the risk if you do not engage? e.g. lack of trust in the project • engagement conversations dominated by 'squeaky wheels' • online engagement methods don't suit the audience • issues that are not part of the scope of the project dominate the conversation • communications invoke fear among the community • engagement fatigue • long-term planning process results in loss of key infrastructure.

IMPLEMENT

5. Design your engagement approach

Choose appropriate tools and techniques	• When examining different tools ask: • Are you hoping to engage many within the community, or go in-depth with a small group? • Which engagement techniques have been successful in the past? • Which tools and techniques will help in achieving the objectives of engagement? • How will you ensure the engagement is inclusive and accessible to everyone? • What engagement skills do your team members have?

IMPLEMENT

Write a delivery plan	• Tips for planning: – Include key project milestones, engagement dates, resources needed and responsibilities. – Involve all team members in engagement planning. – Define your end date and work backwards from there when planning engagement timelines. – Have you considered how you will provide feedback to participants?
Develop your evaluation approach	• Using the principles and your project engagement objectives, consider how you will track and assess the engagement. • Include evaluation planning into your delivery plan. • How will you collect information that will tell you if your engagement was successful or improvements could be made?
6. **Create an engagement narrative**	
Write key messages	• What do you want people to know about your project? • Why should people take part in your engagement process? • Would your key messages make sense to a person on the street? • Remember, each key message needs to be a stand-alone statement that communicates an important aspect of the project.
7. **Deliver engagement activities**	
Follow a delivery checklist	• Promote your engagement, use existing networks. • Give participants plenty of notice, confirm dates, times and locations, write agendas and runsheets, prepare to facilitate, ensure you have the right people in the room to answer questions, know your venue and location.
Capture all the engagement data	• Ensure you capture the ideas, feedback and input of participants of all engagement activities. • The data should be stored in a central location and be labelled to reflect the event and date it was captured.

IMPLEMENT

Track the engagement process	• Is the engagement rolling out as planned? • Are all key stakeholders and community members represented? • What can you improve? • Is it looking like the engagement objectives will be achieved? • Tip: It's ok to change or adjust an activity or question if it's not working.

8. Report engagement findings

Write an engagement report	• Your report should include an overview of the engagement process, information about engagement participants, an outline of engagement findings or outcomes and recommendations for next steps.

9. Close the loop – We asked, You said, We did and Why

Communicate engagement findings and outcomes to participants	• How will you report engagement findings, share how feedback and input was and communicate further opportunities for people to get involved? • Is there an engaging and visual way to present the information? • Consider diverse needs, e.g. some participants will want a lot of written information, some will want visual.

EVALUATE

10. Understand the success of your engagement

Complete your evaluation and reflect on lessons learnt	• What elements of engagement did you measure and collect data for? • Was engagement delivered in line with the Department's engagement principles? • Was engagement planned and delivered with efficient use of resources? • Did engagement influence the decision or outcomes?

Example questions to support engagement at each stage

This guidance supports tailored engagement for each stage of *Victoria's Resilient Coast – Adapting for 2100+* framework. This example list of questions can be drawn on / added to as applicable.

Stage	Key questions
Stage 1 – Scoping and preparation	• What is the direction from Traditional Owners on this Stage? • What is happening at the personal, organisational, community and political level that impacts on the engagement process? • What communities and stakeholders do we need to engage? • What are the purposes for engaging? • What is the level of influence that the community and stakeholders will have over the engagement program? • What is the decision makers commitment to the level of engagement and the engagement approach? • What is the last thing decided about this matter? • What is the next thing that will happen after this? • What are the things this project cannot change? • What are the things that the community and stakeholders can influence and shape? • How do the community and stakeholders describe this proposition? • What are things that define the scope of possible solutions? • What are the trade-offs that project partners may be comfortable with? • Are there limits in time and money/resources about solutions to the proposition?

Stage	Key questions
Stage 2 – Values, vision and objectives	• What is the direction from Traditional Owners on this Stage? • Who is the 'community of interest'? What values do they share? • What does the community care about? • What underlying values form the basis of these concerns? • Who is most passionate about the issue or project? – How much influence do they have? – How much power (informal or formal) do they have? – What are the things that are important to them? – From where they stand - how does this situation look? • What is the relationship between decision makers and the community? – Who are perceived leaders in the community? – What is their track record of participations? – Have they already told us that they think? – What is their willingness to change? – Do they perceive a benefit for them and the wider community? • How do stakeholders and community use the coast? How would they like to be using coast now and in the future?
Stage 3 – Coastal hazard exposure **&** **Stage 4 – Vulnerability and risk**	• What is the direction from Traditional Owners on this Stage? • How would the community rate their awareness of coastal hazards? • How would the community rate their understanding of the potential for coastal hazards in the area? • What have the community seen / experienced? • What local knowledge can inform technical assessments? • How likely does the community think that the area will be impacted by each coastal hazard type? • Does the community recognise / support the need to adapt? • To what degree are the community and physical environment prepared to adapt to future coastal hazards? • In the next eg. 10-20 years, how likely does the community think that the area will be significantly affected by coastal hazards, including erosion, storm tide inundation, and the impacts of sea level rise?

Stage	Key questions
Stage 5 – Adaptation actions and pathways	• What is the direction from Traditional Owners on this Stage? • What is the level of awareness of different adaptation options? • What adaptation initiatives are already underway? • What actions do the community perceive as best aligning with coastal values? • To what degree is the community supportive of adaptation initiatives?
Stage 6 – Plan and implement	• What is the direction from Traditional Owners on this Stage? • How would stakeholders and the community like to be involved in implementation? • What can the community do?
Stage 7 – Ongoing monitoring and review	• What is the direction from Traditional Owners on this Stage? • How will stakeholders and the community continue to be involved? • How effective has engagement been, and how can it continue to be improved? – Who were the high interest and high impact stakeholders/community members identified? – How were stakeholders and communities engaged at each stage of the planning process? – How has existing engagement data and departmental knowledge informed objectives and management strategies? – How was stakeholder and community input considered in the planning process? – How was it incorporated? – Where was it decided that it could not be incorporated? Why? – How has the project team 'closed the loop' on each phase of engagement?

Example key messages for communications

This guidance supports tailored communications for each stage of *Victoria's Resilient Coast – Adapting for 2100+* framework. This example list of key messages can be drawn on / added to as applicable.

Introduce from	Example key messages
Stage 2 – Values, vision and objectives	• Our Victorian coastal areas are diverse and dynamic, characterised by sandy beaches, rocky cliffs, bays and estuaries, coastal lakes and floodplains. • Coastal cultural landscapes have been nurtured by Traditional Owners of Country for countless generations. • The coast is dynamic and always changing, shaped by natural coastal processes such as erosion and inundation. • At times, natural processes may have a negative impact on coastal values and uses. When this occurs, we refer to the processes as coastal hazards. • Coastal hazard exposure is expected to increase with changes in wave action, storm activity and sea level rise associated with climate change. • We are taking a partnership approach to managing coastal hazard risk and proactively adapt, both now and in the long-term (2100+). • Our approach is following the direction of the Marine and Coastal Policy 2020 and *Victoria's Resilient Coast – Adapting for 2100+* framework and guidelines. • As we progress this project, local knowledge will provide a foundation for confirming coastal values and objectives, coastal processes, and tailoring adaptation options. • We're committed to working with the community to ensure decisions on the coast consider local knowledge, input and the best information available. • Your feedback will help shape current and future decision making around coastal hazard management.

Introduce from	Example key messages
Stage 3 – Coastal hazard exposure	• Coastal hazard information is currently publicly available at the state and national scale to assist communities and land managers with proactive planning. • This includes inundation and sea level rise scenarios through **Coastal Risk Australia**, and Victorian assessments through **CoastKit (marineandcoasts.vic.gov.au).** • The technical assessments completed for this project will assist to refine our understanding of coastal hazard exposure for our local area. • Coastal hazard assessments will be refined through local knowledge and data, and the best available science. • Coastal hazards are one of many natural hazards that can occur in areas we enjoy living in and visiting (e.g. bushfire, river flooding, air quality). Improved assessment and mapping of hazards enables us to create a plan to reduce the risk and adapt. • Coastal land managers and property owners have a responsibility to consider their risk exposure, and act in accordance with the Marine and Coastal Policy 2020.
Stage 4 – Vulnerability and risk	• Parts of our coastline may be more vulnerable to coastal hazards than other areas. • We can identify vulnerable areas by assessing the hazard exposure, and ability of systems (cultural, social, environmental) to cope with, respond to and adapt to coastal hazards. • Identifying vulnerable areas enables us to be proactive in reducing vulnerability and risk. • Community values and objectives for different coastal areas provide the foundation for understanding vulnerability and risk.
Stage 5 – Adaptation actions and pathways	• There are many ways we can manage coastal hazard risk and proactively adapt. • Different themes of actions include land management, planning and design, nature-based methods, and engineering actions. • Our Victorian policy directions, alongside community values and objectives, provide the foundation for assessing options and developing adaptation pathways. • Adaptation options must be carefully considered as some can lead to negative impacts elsewhere in the local environment. • Victoria's policy setting does not require land managers to manage Crown land in a manner that protects private property from natural coastal processes (policy 6.18 of the Marine and Coastal Policy 2020).

Introduce from	Example key messages
Stage 6 – Plan and implement	• Adaptation planning has been progressed through a partnership approach and includes a suite of strategic adaptation actions. • This planning will help us to proactively manage coastal hazard risk, both now and long-term (2100+). • Proactive adaptation will enable us to retain key values and uses of our coastal areas, and transition where we need to.
Stage 7 – Ongoing monitoring and review	• An ongoing partnership approach with Traditional Owners and local communities will provide a foundation for implementation. • We will continue to actively monitor physical processes and the effectiveness of adaptation actions, and triggers for a change in actions.


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