

Port Phillip Bay Coastal Hazard Assessment

Summary #7: Applying the coastal hazard assessment



Overview

The Port Phillip Bay Coastal Hazard Assessment (PPBCHA) looks at likely coastal hazards around the Bay. Hazards include flooding, erosion and changes in groundwater. We explore these hazards for current and future climate and sea level scenarios. Results will help land and asset managers and the community to consider climate change in future planning.

This summary outlines how the PPBCHA findings can be used to inform resilience planning and decision making. It also looks at where this work fits with State, regional and local approaches to coastal hazard risk management and adaptation.

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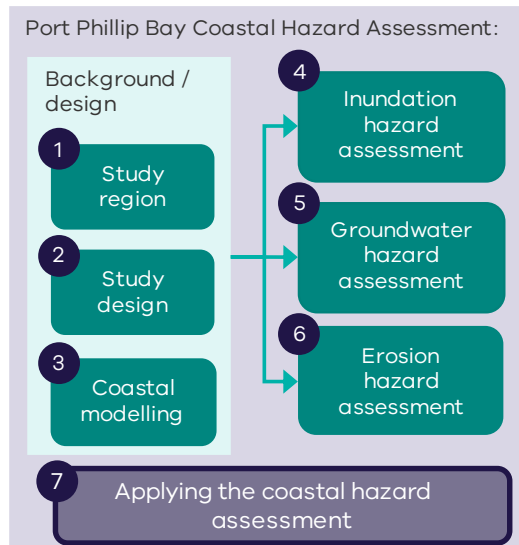
The PPBCHA provides us with coastal hazard information for various hazard types, storm events and sea level rise scenarios.

Understanding hazard prone areas provides a starting point for planning our hazard adaptation approach. This includes deciding what further analyses and assessments are needed to determine potential implications of coastal hazards. This can inform decision-making on how we manage hazard risks.

An evolving piece of work, this assessment has been scoped as a regional scale assessment, and has sought to understand:

- what the possible coastal hazards are for the Bay
- where they occur
- when they might occur
- how they change over time.

This knowledge provides the foundation for planning how we manage coastal hazard risks through adaptation.



How did we get here?

We know that some areas around Port Phillip Bay already experience coastal hazard impacts. To inform our coastal hazard adaptation planning, we need improved, fit-for-purpose information and data.

A regional bay-wide assessment, this core technical investigation will enable our land managers to better understand coastal hazards for their region. The PPBCHA provides consistent bay-wide model/s and hazard extents.

i More information on our approach to scoping the PPBCHA can be found in **Summary #2: Study design**

The development and delivery of the PPBCHA has taken time. A complex piece of work, the scope has evolved and expanded over the life of the project in response to stakeholder feedback, Victoria's state processes and industry standards.

The comprehensive suite of technical, strategic and communication assessments and products that have been developed for the PPBCHA are shown in the delivery timeline (Figure 1).

Various State policy, legislation and supporting guidance for coastal hazard assessment and planning has also evolved during this time.



Source: Alluvium

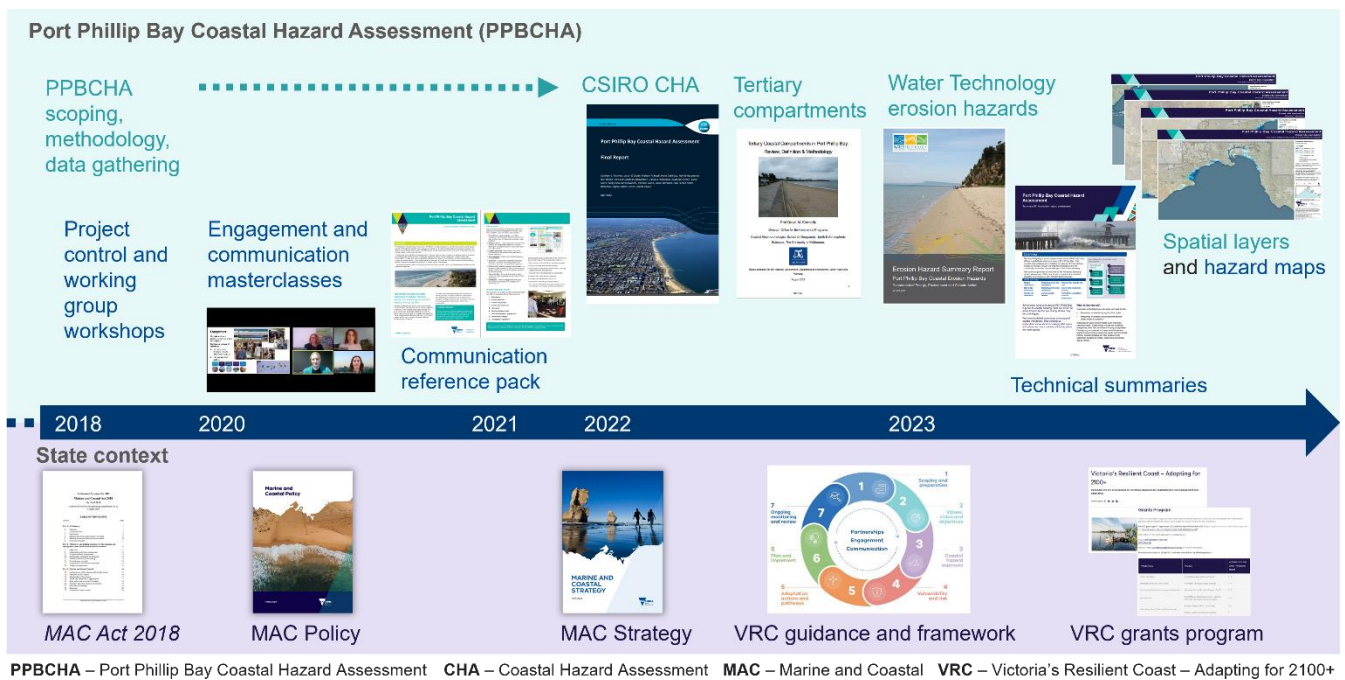


Figure 1. Delivery timeline for the PPBCHA, showing key outputs and the evolving Victorian context in coastal hazard planning

A statewide framework to guide adaptation

Coastal hazard adaptation and management needs to align with state policy, advice and guidance. Victoria has a strategic approach to coastal hazard risk management and adaptation. *Victoria's Resilient Coast – Adapting for 2100+* provides a framework, guidelines, and support for Local Government, land managers and their 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 Policy 2020.

Victoria's Resilient Coast (VRC) provides a staged approach to the technical, strategic and engagement elements of risk management and adaptation.



Figure 2. Victoria's Resilient Coast - Adapting for 2100+ framework stages.

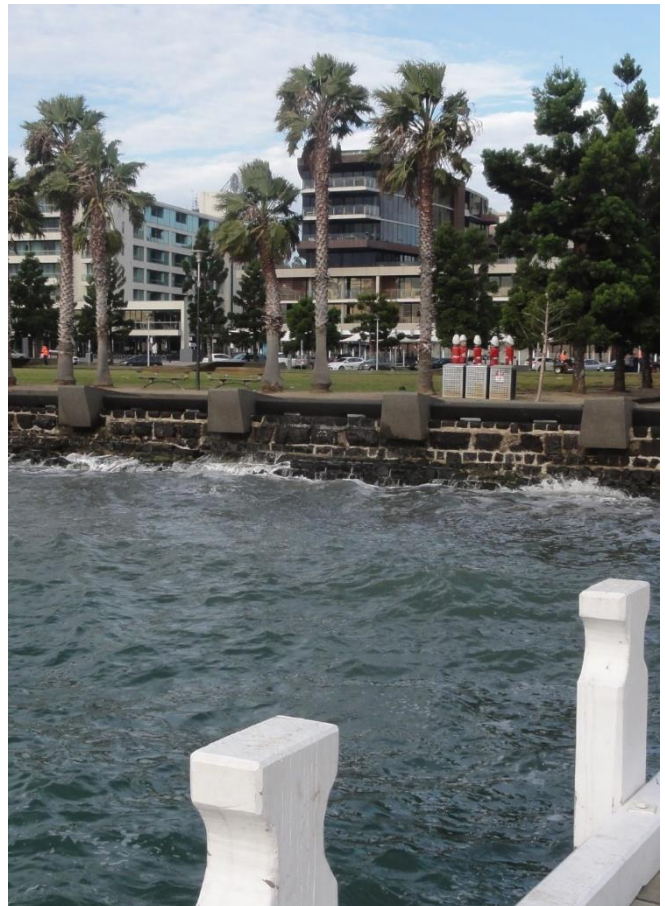
Adaptation and resilience planning under the VRC framework brings together science, technical and strategic assessments and community aspirations.

A core part of this framework is a coastal hazard assessment (CHA). CHAs provide hazard data, information and knowledge that we can use to help us understand, assess, plan for and manage coastal hazards.

Stepping through the VRC framework allows us to develop long-term plans, like Coastal Hazard Adaptation and Resilience Plans (CHARPs). This type of strategic planning is essential for managing important places, assets and other values into the future.

Port Phillip Bay Coastal Hazard Assessment (PPBCHA) provides a key data set to assess regional coastal hazard exposure at locations around the Bay.

(Aligns with stage 3 of the VRC framework)



Source: Alluvium

i Have a look at **Summary #2: Study Design** to find more information on how the PPBCHA was designed to fit with the Statewide approach to coastal hazard adaptation planning and building our resilience to climate change.

Using coastal hazard assessments (CHA) in adaptation planning

A CHA, like PPBCHA, helps us better understand some of the complex processes across our coastlines and surrounding areas. Its outputs, including hazard extents and maps, allow us to gain an appreciation of where and when we may experience the effects of coastal hazards. This gives us an initial understanding of coastal areas that might be potentially at risk.

We can also use the findings of a CHA to guide and inform where and what other detailed and targeted assessments are still needed. Combining the regional (bay-wide) data with localised knowledge and context allows us to increase our appreciation of the implications of coastal hazards at a local scale.

This includes identifying values and assets that may be vulnerable (exposed) to coastal hazards in our coastal communities. This knowledge helps us to understand potential risks and inform the development of possible management or adaptation responses.

Where does the PPBCHA fit with other existing hazard data?

The PPBCHA will form a key source of hazard data and information for many different adaptation planning projects. It was designed to increase our understanding of coastal hazards around the Bay. It uses the latest and best available data sets, more sophisticated modelling and analytical methods. This has improved our knowledge of hazards at a bay-wide and regional scale.

Various other hazard models, data and information also exist for Port Phillip Bay. We need to consider all the available hazard data and determine what is useful and/or fit-for-purpose for informing adaptation and resilience planning at locations around the bay.

Assessment scale

Coastal hazard assessments can be described in terms of their scale, complexity and resolution of assessment. A regional scale assessment, like the PPBCHA, provides a good preliminary understanding of where we might experience coastal hazards under certain conditions. We can use this to guide where to focus our time, effort and resources on more detailed, site-specific assessments.

More detailed, localised coastal hazard assessments may be needed to inform some site-based decision making and the development and design of suitable adaptation responses.

Deciding on your data

When deciding which data to use for examining hazard exposure, risk and planning adaptation, consider:

- what modelling scenarios are of interest: storms, sea level rise, hazard type
- what areas does the data cover
- what level of detail do you need (scale): is more localised (site specific) data required or regional scale appropriate?

You may need to combine a number of data sets to create a good understanding for your areas of interest.



The **VICTORIA'S RESILIENT COAST**

Adapting for 2100+ framework provides further information on how you might build upon available coastal hazard data and knowledge to allow you to undertake more detailed technical and strategic assessment for your local area.

<https://www.marineandcoasts.vic.gov.au/marine-coastal-management/victorias-resilient-coast-adapting-for-2100>

Comparing the different models

We can compare the PPBCHA inundation modelling with previously available hazard data. We can see notable differences in some locations.

Drivers of these differences include:

Previous model was a bathtub (static) model

- can lead to overestimating or underestimating flood extents.
- latest modelling more accurately accounts for tides and water flow dynamics.

Revised (improved) methods for estimating design storms (including wind forcing)

Exploring the PPBCHA results further we can see the effects of these model updates in:

- Less flooding in some urban, built-up areas. Modelling for some areas also incorporated flow dynamics of pipe drainage networks, and presence of coastal structures.
- Less flooding via some creeks and waterways in some areas. This is because the new modelling allows for time taken for water to flow over land and how long water levels remain high enough overtop creek banks.



Source: Alluvium

The key outputs of the PPBCHA

The PPBCHA has produced:



Detailed technical reports describing key data analyses and modelling for PPBCHA



Hazard maps highlighting areas potentially impacted by different coastal hazard types



Spatial hazard extents as GIS layers that we can use to further examine hazard implications



Supporting **communication and engagement materials** to assist in translating and conveying findings

These outputs provide a regional, bay-wide perspective of coastal processes and potential hazard areas around the bay.

They will be key data and information to use to progress hazard adaptation planning.

Detailed technical reports

In addition to the hazard data, models and results, various technical reports have also been developed as part of the PPBCHA. These have been produced by each team of coastal experts involved in the project: CSIRO, University of Melbourne team, and Water Technology.



These comprehensive documents provide valuable and extensive information on the technical work undertaken. This includes data and methods used, modelling setup and design, assumptions made and possible limitations, as well as key findings of the various assessments.

The technical documents will be an important reference source providing critical coastal processes and hazards information for Port Phillip Bay. Engineers and scientists are likely to use and refer to these assessments in future work linked to the coastal and marine areas of the Bay. This may include detailed site-based (local) assessments, theme-based studies (i.e. hazard planning, ecological condition, sea and landforms) through to informing engineering design and land and asset management.

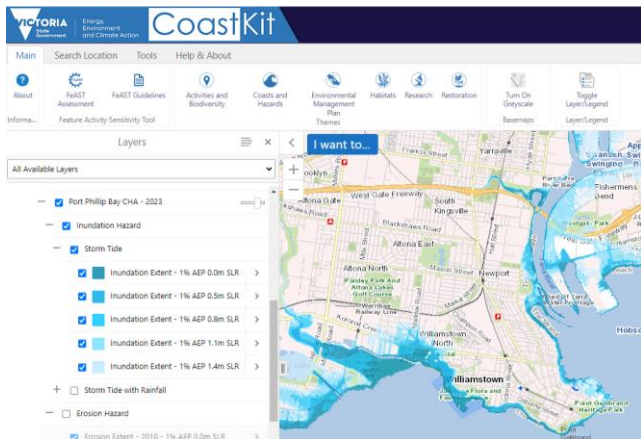
Hazard maps and spatial hazard extents

Spatial “**hazard extents**” allow us to visualise where coastal hazard impacts may be experienced. Mapping highlights areas exposed to coastal hazards for certain sea level rise scenarios and storm event conditions.

The PPBCHA has produced:

- Series of static maps at different spatial scales and scenarios
 - Bay-wide and sub areas
- Spatial layers in GIS – use for visualisation and further GIS analyses (exposure and risk). These can also be downloaded and put into your own geospatial (GIS) platforms.

DEECA’s online CoastKit platform provides an interactive means for looking at the hazard layers. They can also be viewed alongside other spatial layers. These layers might relate to planning and land use, values, uses and infrastructure and/or coastal landscape setting.



Supporting communication and engagement materials

Simplified technical summaries

To make the findings of the PPBCHA more accessible and usable for our stakeholders and communities, we developed a technical summary library.

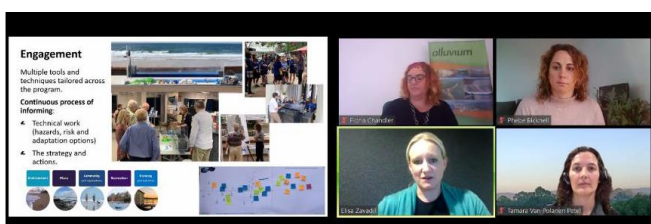
These summaries looked to translate and communicate key aspects of the science, modelling and analyses undertaken for the assessment. They also outline what can come next for using the data, information and knowledge in adaptation planning.



Upskilling in hazard communication and engagement

During the PPBCHA, it was identified there were opportunities to improve capacity and knowledge of hazard communication and engagement. In response to this need, several activities were undertaken to assist in building these skills with delivery partners.

This included a **coastal hazard engagement and communication masterclass series**. This aimed to provide and discuss knowledge and ideas and generate momentum in developing and delivering communication and engagement for PPBCHA and beyond.



We also developed a **communication and engagement reference pack** through a collaborative process with partners. These resources have been designed to support delivery partners in delivering successful hazard and adaptation engagement programs.

They include guidance on how to decide upon engagement and communication tools and methods to use and then plan and design for enabling successful and meaningful delivery. The pack also shares relevant principles, messages and content for coastal hazard and adaptation engagement, independent of the tools being used.



Upon completion of the PPBCHA, a tailored **stakeholder workshop series**, focussed on communicating PPBCHA and its findings, has also been held with representatives of delivery partners. These sessions also examined how the results can be used to progress adaptation planning in their coastal communities.



Source: Alluvium

Deciding on adaptation

Land and asset managers in our coastal communities have a responsibility to plan how we manage coastal hazards into the future.

Coastal hazards, their impacts and management have relevance that extends across an organisation. Adaptation in coastal communities brings together a range of skills and expertise that span many different disciplines. From land and asset managers, planners, executives, and decision-makers through to our communicators and educators, each has a key role to play in increasing resilience of our coastal communities.

PPBCHA has produced a mix of important outputs. From spatial data and technical reports, hazard maps, to clear communication materials. By presenting the PPBCHA findings in a range of ways, these outputs enable all our different stakeholders to play their part in progressing adaptation planning.

A strategic approach

The Marine and Coastal Policy 2020 re-framed how we manage coastal hazards in Victoria. The aim is to have more sustained and holistic management to benefit Victoria's coastline for the long-term. Land managers must be strategic in their management. This includes using strategic adaptation options and an adaptation pathways approach to determine actions.



Have a look at the **VICTORIA'S RESILIENT COAST Adapting for 2100+ framework** and its **Adaptation actions compendium** to find more information on the wide range of ways we can manage coastal hazard risk and build our resilience to climate change.

<https://www.marineandcoasts.vic.gov.au/marine-coastal-management/victorias-resilient-coast-adapting-for-2100>

Building upon the PPBCHA findings

The PPBCHA findings provide a basis for guiding where to focus our efforts next. This might be additional analyses and obtaining extra information to aid decision making. Some areas may need local scale studies, to better-determine risk or guide our adaptation planning.

Regional and local scale (site-based) knowledge and analysis will be an important part of informing decision-making and adaptation planning (including design).

We can build upon the knowledge of the PPBCHA with:

- **Community values and perspectives** – establishing an appreciation of what is important to coastal communities, to shape our adaptation
- **Exposure assessments** - what things (values, uses, infrastructure) are within inundation prone areas (exposed)

- **Vulnerability and risk assessments** - what is the impact (consequence) of inundation on these things
- **Economics assessments** – what are the costs/ economic implications of coastal hazard damages and/or losses
- **Adaptation planning** – what are the range of actions available to manage current and future inundation risks.

Quantifying exposure, vulnerability and risk informs management decisions of these areas. This can also help show why we need to respond with adaptation and provide evidence (justification) to inform and make decisions – such as business cases.

Additional localised studies, monitoring and modelling – from local coastal processes to community values, may also be needed to shape and determine the detail and feasibility of adaptation approaches.

What next?

The PPBCHA provides additional hazard information to inform further hazard assessment and local adaptation planning. There is an expectation that Port Phillip Bay land and asset managers will utilise more recent and fit-for-purpose data and guidance in continuing to progress their strategic longer-term hazard planning.

The Victorian Government continues to provide support, funding and guidance to coastal land and asset managers to assist them with managing coastal hazards and the risks they pose.

For PPBCHA, this has included the development of tailored outputs and materials, and the delivery of targeted engagement and communication, as well as funding opportunities via the Victoria Resilience Coast grant program.

We acknowledge Victorian Traditional Owners and their Elders past and present as the original custodians of Victoria's land and waters and commit to genuinely partnering with them and Victoria's Aboriginal community to progress their aspirations.



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