Our Coast Our Future

Mornington Peninsula Coastal Strategy

MORNINGTON PENINSULA Shire

Fact sheet #5 Understanding vulnerability and risk

Understanding coastal hazard vulnerability and risk across the Mornington Peninsula allows us to assess how current and future coastal processes may impact what we value, and identify where and when adaptation may be required

We can use vulnerability and risk assessments to determine potential implications of coastal hazards. Aligning with Stage 4 of *Victoria's Resilient Coast – Adapting to 2100+ framework* (VRC), assessment brings together knowledge of coastal values and uses with our understanding of local coastal hazards.

In our assessments, we consider how values and uses may be affected across a range of coastal hazard types, event scenarios and timeframes (driven by sea level rise).

STAGE 4 **Vulnerability and risk**

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

The VRC framework has been guiding the development of the *Our Coast, Our Future* Coastal Strategy, our long-term strategy for adapting to climate-driven coastal hazard impacts across the Mornington Peninsula.



The **purpose** of **Stage 4** of the **VRC framework** is to provide a foundation for exploring place-based coastal hazard vulnerability and risk.

Stage 4 examines hazard risk and vulnerability. It brings together an appreciation of the region's values, vision and objectives (Stage 2) and the findings of coastal hazard exposure (Stage 3).

This stage asks the following key question:
How might coastal processes impact what we value?

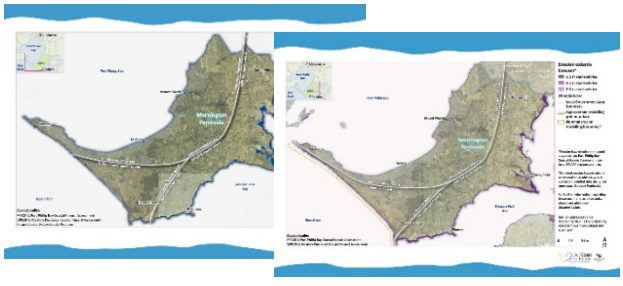
This is the sixth in a series of fact sheets available on the project website.
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Mapping coastal hazards

Identifying vulnerable areas along the Mornington Peninsula enables us to be proactive in reducing vulnerability and risk. We can identify vulnerable areas by assessing the coastal hazard exposure through modelling and mapping.

Modelling provides estimates of where coastal hazards impacts could occur. We call these 'hazard extents', which we can use to produce maps. This allows us to consider what values and assets might be impacted by hazards.

We assessed exposure across the Mornington Peninsula to the hazards of **coastal inundation**, **erosion**, **sea level rise** and **groundwater flooding**.



Understanding coastal values and uses

Once we know the areas likely to be exposed to coastal hazards, we can assess the vulnerabilities and risk for the values, uses and infrastructure in these areas over time.

We assessed coastal hazard impacts across:

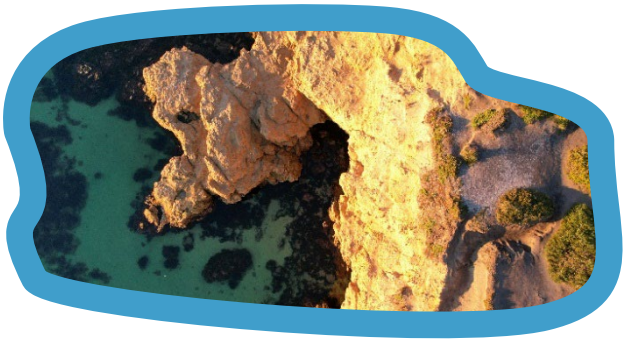
- **Beach and foreshore assets** - Access, stairways, bathing boxes, ramps, jetties, protection structures
- **Planning scheme** zones and overlays
- **Buildings and facilities** - Building footprints (public and private), Surf lifesaving clubs, amenities, shelters, park and street furniture
- **Transport infrastructure** - Roads, bridges, crossings, paths and trails
- **Other infrastructure and utilities** - Water, sewer, electricity, waste facilities and water sensitive urban design
- **Land use, environmental and cultural values** - Dune system, vegetation, habitat, ecosystems, sensitive sites, cultural values, places and sites

An exposure analysis is used to determine what values, uses and assets are located in the identified hazard areas. Using spatial data and analytical tools, we found which assets (or portions of assets) are exposed to the different coastal hazard scenarios.

These results inform the risk and vulnerability assessment and show where adaptation (hazard mitigation) might be necessary.

The unique Country of the Mornington Peninsula holds culturally important values and places for Bunurong peoples. Many are unacknowledged, unknown and / or undocumented. Many cannot be adequately reflected in databases or assessed in a quantitative assessment.

Our analyses attempt to reflect some potential cultural vulnerabilities in the region by examining some of understood history and values, and through considering the reciprocity between Bunurong people and the natural environment.



Assessing risk and vulnerability

Coastal hazard risk is the potential for coastal hazards to impact on things we value, where the outcome is uncertain.

Risk and vulnerability assessment involves assessing the risk of impact from coastal hazards on a range of values, uses and infrastructure. Risk is defined as the combination of likelihood of occurrence of an event and the consequence if the event occurs.

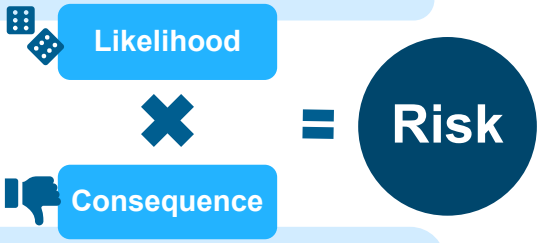
Coastal hazard risk is assessed based on the:

Likelihood (probability or chance) of exposure to coastal hazards. Likelihood is estimated for each hazard scenario that was considered, based on the probability of occurrence.

Consequence (impact) of exposure. Consequence is determined through a tailored rating of impact. This rating considers community and cultural values, existing risk management approaches, similar assessments nationwide, and Council input. It also considers the hazard type

Our consequence ratings have been tailored based on local stakeholder and community feedback we've gathered during the Our Coast Our Future engagement. Ratings have been assigned to all individual values, assets and infrastructure within our spatial values and asset database.

Informed by results of the **Coastal Hazard Exposure (Stage 3)** and exposure analysis of values, uses and infrastructure



Informed by **Values, vision and objectives (Stage 2)** – community values, cultural values and experiences, and existing Shire process towards risk, including Shire land / asset management processes

Risk matrix

Once consequence and likelihood ratings have been determined, a tailored risk matrix is used to assess the overall level of risk for each value or use, under different scenarios (Table 1). It is informed by existing Shire risk processes, Statewide risk assessments, guidance, the VRC framework and other leading practice approaches.

Quantifying risk provides a basis to strategically prioritise and manage risk. We may be able to 'cope' or 'live with' a certain level of risk before we reach a 'trigger' point where risk reaches unacceptable levels. Risk tolerance and required actions are provided for each risk category in Table 2.

We use the risk results to highlight when and where adaptation may be needed to manage (mitigate) coastal hazard risk.

Table 1. Risk matrix for the Our Coast, Our Future Coastal Strategy.

		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Likely	Low	Medium	High	Extreme	Extreme
	Possible	Low	Low	Medium	High	Extreme
	Unlikely	Very Low	Low	Medium	High	High
	Rare	Very Low	Very Low	Low	Medium	High

Table 2. Tailored risk tolerance categories for the Our Coast, Our Future Coastal Strategy.

Risk	Risk tolerance	Action required
Extreme	**Extreme risk:** a risk that is so high that it requires treatment (actions) to avoid or reduce the risk.	Immediate and/or ongoing action is needed to treat, eliminate or reduce risk to acceptable levels
High	**Medium to high:** a risk that is low enough to allow the exposure to continue, and at the same time high enough to require new treatment (actions) to reduce the risk. Society can live with this risk but believe as much as is reasonably practical should be done to reduce risks further.	Short term and/or ongoing action is needed to treat, eliminate or reduce risk to acceptable levels
Medium		Short to longer term and/or ongoing action is needed to treat, eliminate, or reduce risk to acceptable levels
Low	**Very low to low risk:** a risk that is sufficiently low to require no new treatment (actions) to reduce the risk further. Individuals and society can live with this risk without feeling the necessity to reduce the risks any further.	Manage and monitor the risk as part of current operations, provide for periodic maintenance/review. Some short to longer term and/or ongoing action may still be undertaken, but is not required based on this level of risk
Very Low		

What are the next steps for adaptation planning?

The next stages of the *Our Coast Our Future* Coastal Strategy will use the outcomes of the risk and vulnerability assessment to explore strategic adaptation responses. This will include development of adaptation actions to manage risk across the Mornington Peninsula.

We will start to consider how we manage and adapt to coastal hazard impacts at a regional and local scale, considering focus areas highlighted in the assessment.

See the '*Our Coast Our Future*: Stages 1 to 4 Summary' factsheet for an overview of the technical and strategic work and assessment findings, including risk.

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Working with stakeholders and community will continue to be important for informing decision making on long-term adaptation planning pathways.

How can I get involved?

To ensure you keep up to date with the *Our Coast Our Future* Coastal Strategy:

Visit the project website Our Coast Our Future | Shape Our Future (mornpen.vic.gov.au) **where you can:**

- Learn more about the project, coastal hazards and our coastal communities
- Sign up so that you receive progress updates and notifications
- Read our latest project updates

Ask us a question – email our team at: coastalplanning@mornpen.vic.gov.au