Cape to Cape Resilience Project

FACTSHEET #5 Vulnerability and risk

This fact sheet summarises how we have assessed coastal hazard vulnerability and risk and how we can use this understanding to inform adaptation planning.

Identifying vulnerable areas along the Cape to Cape coast enables us to be proactive in reducing vulnerability and risk. We can identify vulnerable areas by assessing the hazard exposure and the ability of systems (cultural, social, environmental) to cope with, respond to and adapt to coastal hazards.

Vulnerability and risk assessment brings together knowledge of coastal values and uses with understanding of local coastal hazards for a range of hazard types, event scenarios and timeframes.

Understanding coastal values and uses

Community and stakeholder engagement has been used to inform and collate data sets of key local coastal values, uses and infrastructure.

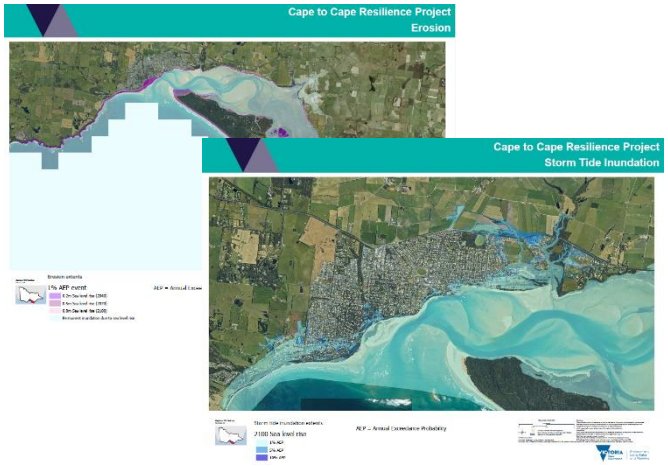
Data sets include:

- Planning scheme zones and overlays
- Places of environmental and cultural significance
- Infrastructure – buildings and facilities, transport, utilities.

Mapping the hazards

Parts of our coastline may be more vulnerable to coastal hazards. The Inverloch Region Coastal Hazard Assessment (CHA) has assessed the potential impact of coastal hazards, including erosion (sand loss) and inundation (flooding). Modelling has looked at both present day conditions and predicted future changes.

Estimated as “coastal hazard extents”, the results can be mapped to indicate areas along the Cape to Cape coastline that may be exposed to inundation, erosion or sea level rise. This spatial understanding can highlight how hazards and exposure varies for different hazard types, weather events, climate conditions and over different timeframes.



More information about coastal hazards and modelling is available in Factsheets #3 and #4, available on the website **engage.vic.gov.au/cape-cape-resilience-project**. We recommend reading these before this factsheet.

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We can explore vulnerability and risk by considering the values, uses and infrastructure that are located in the identified hazard areas. An exposure analysis is used to determine what values and uses are impacted by hazards. This informs the risk and vulnerability assessment and shows where adaptation (hazard mitigation) might be necessary.

Assessing vulnerability

Vulnerability assessment provides initial information on the susceptibility of areas and communities to coastal hazards and is commonly undertaken prior to a risk assessment.

Assessing coastal hazard vulnerability considers:

- potential impact of hazard exposure
- the sensitivity of our values and uses
- adaptive capacity of each value/use.

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.

Assessing risk

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

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.

It combines likelihood of the coastal hazard (i.e. a hazard event) and the potential consequence to the value/use exposed to that hazard.

Informed by results of the **Coastal Hazard Assessment** and **exposure analysis**

Likelihood × **Consequence** = **Risk**

Informed by **Community Values Study**, **Cultural Values Assessment** and land/asset management protocols

Likelihood of exposure to coastal hazards is determined by the probability (chance) of an event occurring. An 'event' is a storm or weather event that may cause inundation (flooding) or erosion along the coast. An event might include high winds, high tides and/or rainfall leading to high catchment (river) flow. For this assessment, we have various scenarios from more frequent to rarer events, and multiple sea level rise scenarios.

The **consequence** (impact/outcome) of a value or use being exposed to coastal hazard/s are tailored based on local stakeholder and community feedback and informed by the Cultural and Community Values studies. Consequence ratings can also vary for hazard types (erosion and inundation) and consider short and long term impacts.

Consequence themes include:

Community and lifestyle	Place and planning	Environment
- Lifestyle - Access - Public safety	- Cultural landscapes - Property and infrastructure - Economy and growth	- Environmental values

A consequence matrix can be used to assign individual ratings to each value and use. This may range from *negligible* where little to no impact is felt, to *extreme* where there are severe, widespread impacts, damage or loss of life.

Evaluating risk

Risk can be assessed at various scales – from a regional level to individual sites and assets. Once

consequence and likelihood ratings have been determined, the risk matrix can be used to assess the overall level of risk for each value or use, under different scenarios.

Quantifying risk provides a basis to strategically prioritise and manage (mitigate) risk, through an adaptation response. We may be able to 'cope' or 'live with' a certain level of risk before we reach a 'trigger' point where risk reaches unacceptable levels.

Risk matrix for the Cape to Cape Resilience Project

		Consequence				
Likelihood		Negligible	Minor	Moderate	Major	Extreme
	Likely	Medium	Medium	Significant	High	High
	Possible	Low	Medium	Significant	Significant	High
	Unlikely	Low	Medium	Medium	Significant	Significant
	Rare	Low	Low	Medium	Medium	Significant

Tailored risk tolerance categories for the Cape to Cape Resilience Project

Risk	Risk tolerance	Action required
High	**High risk:** a risk that, following an understanding of likelihood and consequence, is so high that it requires actions to avoid or reduce the risk.	Immediate and/or ongoing action is needed to treat, eliminate, or reduce risk to acceptable levels
Significant	**Medium to significant risk:** a risk that, following an understanding of likelihood and consequence, is low enough to allow the exposure to continue, and at the same time high enough to require new treatments or actions to reduce the risk. Society can live with this risk but believe that as much as is reasonably practical should be done to reduce the risks further.	Short term action is needed to treat, eliminate, or reduce risk to acceptable levels
Medium		Short to longer term action is needed to treat, eliminate or reduce risk to acceptable levels
Low	**Low risk:** a risk that, following an understanding of likelihood and consequence, is sufficiently low to require no new treatments or 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.

What does this mean for adaptation planning?

Adaptation planning considers a range of options to effectively manage coastal hazard risk, from present day to longer-term (2100). Effective risk management may require a suite of measures.

Relative sequencing, timing and triggers for action are based on the changing risk profile over time and for different locations. Action feasibility may change as conditions change or new information prompts a review of the adaptation approach.

How can I get involved in the project?

To ensure you keep up to date with the Cape to Cape Resilience Project:

- Visit the project website at marineandcoasts.vic.gov.au/coastal-programs/cape-to-cape-resilience-project
- Sign-up to receive progress updates and notifications – email capetocape.project@delwp.vic.gov.au
- Read our latest project updates at the website
- Ask us a question – email capetocape.project@delwp.vic.gov.au
- Visit our Engage Victoria page at ***engage.vic.gov.au/cape-cape-resilience-project***

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