

# Port Willunga

# Coastal Adaptation Study

Assessing the coastal impacts of rising sea levels

## What did the study investigate and why?

Changes in our climate are causing sea levels to rise over the long term. The aim of the Coastal Adaptation Study was to understand how people, the natural environment and built assets might be impacted by rising sea levels. This information will help council and other stakeholders, such as state government and private landowners, to plan and take action for the future. The study was undertaken by consultancy Integrated Coasts with input from Flinders University coastal experts.

The study is just another step in an ongoing journey of adaptation that is likely to take place over the coming years, decades, and even centuries. Our next step is to engage with our communities and develop a Coastal Adaptation Plan that responds to the identified risks and lays the groundwork for effective coastal management now and into the future.

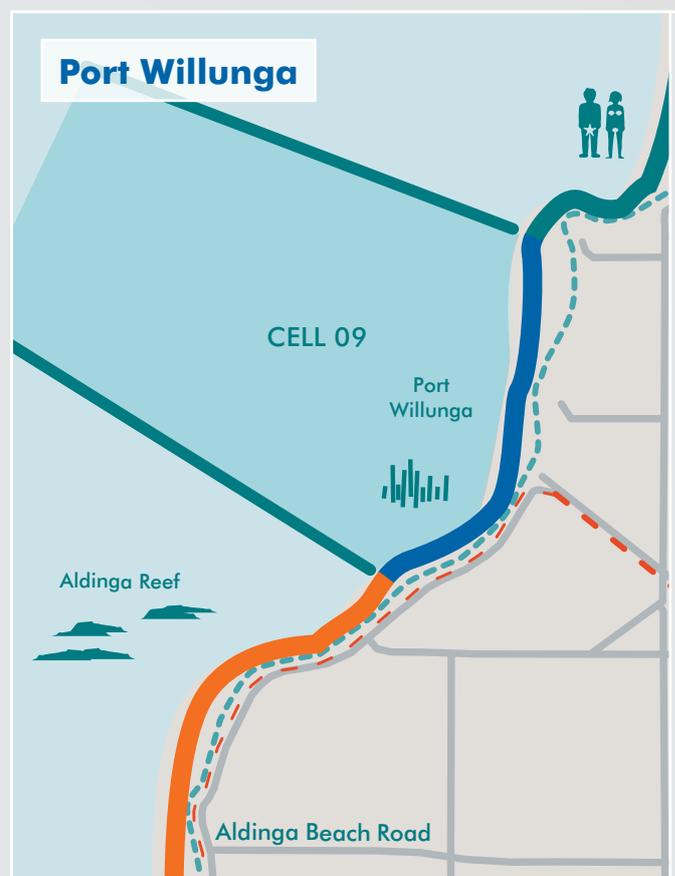
The City of Onkaparinga has already completed extensive coastal adaptation work over previous decades. Our long history of proactive coastal adaptation means that we have built a solid foundation upon which to respond to future coastal hazards and climate risks.

## What is coastal adaptation?

Coastal adaptation involves adjusting our practices in response to the impacts of our current and expected climate. This means identifying actions to manage our coastline that provide benefits across many sectors (e.g. safety, tourism, health, environment and recreation). It also means avoiding things that would make it more difficult to cope with coastal hazards and climate risk in the future.

There is a range of potential adaptation options available in the areas of planning, engineering, environmental management, and community awareness and education.

Onkaparinga's coastline is of significant cultural, social, environmental and economic value to the Kurna people, our wider communities and visitors.



Cell: 09 Port Willunga

## What were the focus areas of the study?

Onkaparinga's coastline was divided into 12 sections or coastal 'cells', with a separate report prepared for each cell. This fact sheet summarises the key findings for the Port Willunga cell.

There are fact sheets available for the other 11 coastal cells. There is also an 'About the project' fact sheet explaining the study and its overall findings in more detail.

## How has each cell been studied?

The study investigated the current and future risks (for now, 2050 and 2100) to built assets, people and ecosystems located along Onkaparinga's coastline in the context of projected global sea level rise. A range of data was gathered to inform the analysis.

The nature of the coastline was analysed, for example, whether the coast is sandy or rocky, or whether it is at low elevation or high elevation.

The history of each cell was evaluated to see how the coast in that area has changed over time and how people have interacted with it in different time periods.

The impacts of various storms and tides have been modelled using a 3D computer model to assess current risks and also the future risks associated with sea level rise. The study has adopted South Australian Coast Protection Board sea level rise policy projections for a 0.30m rise by 2050 and a 1.00m rise by 2100, which the board believes is based on the best available advice, including advice from the Intergovernmental Panel on Climate Change.

The impact of previous storms was studied, including the storm of 9 May 2016, which was the highest storm on record in Gulf St Vincent. This storm was significant because it almost reached the risk level set by the South Australian Coast Protection Board known as the -in-100-year extreme event.

Taking into account current risks from actions of the sea and the risks from projected sea level rise, the study has evaluated the risks to public assets, private assets, public safety and the potential for disruption to ecosystems. For example, a low-lying freshwater ecosystem would be disrupted if sea water flowed into the area.

## Historical comparison

We compared aerial photographs of Port Willunga from 1949–2018 to assess how the coastline has moved and changed. Where available, we also used land-based photography to assess coastal changes. For example, the dunes south of Willunga Creek eroded by up to 9m between 2006 and 2017. However, longer term analysis shows that this coastline undergoes cycles of erosion (recession) and accretion (building out) and has been largely stable for 110 years.



1909



Port Willunga 2006



2019

## Forecast impact

Example: modelling of a routine tidal event projected for 2100 demonstrates that the dunes on the left of the picture would likely recede and the limestone cliff on the right of the picture would be likely to be undermined at a faster rate.



2100  
Port Willunga routine tide

## What past storms tell us

Studying past storms provides a window into the future. Storms are embedded in Port Willunga's post-settlement history, following the infamous wrecking of the *Star of Greece* in 1888.



1888



2009



2016

## Key findings for Port Willunga

Port Willunga is a sandy beach backed by soft coastal cliffs in the north and limestone cliffs in the south. Willunga Creek dissects these two sections of the coast and sand dunes are situated adjacent. Offshore from the coast is dominated by sand and a low-profile reef of varying consistency.

Port Willunga was established primarily as a port from which to export farming produce from a jetty constructed in 1853. In its early years, Port Willunga was also a premier holiday destination and supported a viable fishing industry. From the 1950s and 1960s onwards Port Willunga was more permanently settled. Storms were frequent occurrences with the most famous being the one that wrecked the *Star of Greece* in 1888.

Historical analysis indicates that the coastline north of the lower carpark undergoes a cycle of accretion (when the shoreline builds out) and erosion (when the shoreline recedes landward), but over a 100-year period, it has been largely stable. South of Willunga Creek, there appears to be less sand adjacent to the cliffs than there was 100 years ago. Some recession of the cliff has occurred as a result of rock falls and the cliff has become undermined in places.

Most of the coastal region of Port Willunga is elevated well above sea level and therefore will not be vulnerable to seawater flooding due to sea level rise. Current storm action does have some impact, but the beach normally recovers. Modelling for 2050 indicates that the dunes would suffer some recession and it is likely sand levels adjacent to the cliffs may drop. Modelling for 2100 indicates that both storm surge action and routine high-water events would be likely to cause significant recession of the dunes and continually undermine the base of the cliffs, with increases of rock falls and slumps likely to occur. Seawater would be limited to an additional 200m inland flow up Willunga Creek.

## Key adaptation issues for Port Willunga

IF SEAS RISE AS PROJECTED:

- public assets, such as carparks and pedestrian accessways, are not expected to come under threat in the first half of this century. Any new assets, such as the Port Willunga North Coast Park Trail, should be designed for future conditions. If undermining of the cliffs accelerates post 2050 public assets may be impacted because they're set relatively close to the top of the limestone cliffs. The *Star of Greece* restaurant would become vulnerable if the cliffs were undermined
- private assets are not expected to come under threat over the course of this century because they're primarily set back behind the Esplanade
- the elevated nature of the backshore means that freshwater ecosystems will only be impacted in Willunga Creek when seawater flows a further 200m inland in the second half of this century
- increased undermining and erosion at the base of cliffs may increase the likelihood of rock falls and slides, and public safety is likely to become more of an issue.

Families picnicking at Port Willunga jetty, Port Willunga, South Australia. Date unknown.

## Next steps

Now that the study is complete, we'll be engaging with our communities and developing a Coastal Adaptation Plan that responds to the identified risks and lays the groundwork for effective coastal management now and into the future.

All existing and upcoming projects, such as the proposed Port Willunga North Coast Park Trail, will consider the study findings to ensure that they are designed for future conditions.

## COASTAL ADAPTATION PLANNING AND ENGAGEMENT PROCESS



## More information

To learn more about the Coastal Adaptation Study visit [yoursay.onkaparinga.sa.gov.au/coastal-adaptation-study](http://yoursay.onkaparinga.sa.gov.au/coastal-adaptation-study), email [mail@onkaparinga.sa.gov.au](mailto:mail@onkaparinga.sa.gov.au) or phone 8384 0666.



The Coastal Adaptation Study was delivered by Integrated Coasts with input from Flinders University coastal experts.

*Historical photos courtesy of Onkaparinga Libraries*

### Disclaimer

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