

The Coastal Hazard Risk Management and Adaptation Plan (CHRMAP)

Erosion and inundation are an increasing risk for the coastal portions of the Shire of Murray.

Looking after our waterways is crucial for our community.

What is the CHRMAP?

The Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) is a strategic document that identifies potential coastal hazards, the consequences and necessary actions. It aims to understand coastal hazard impacts on the community and their assets, and addresses these impacts.

The CHRMAP is required under State Planning Policy No. 2.6 – State Coastal Planning policy (SPP2.6).

Responding to likely challenges of a changing climate and probable sea-level rise is a priority. Our aim is to provide the community with the maximum benefits of our unique natural environment for generations to come.

There are two focus areas in this work:

01

Public land and infrastructure | we aim to provide outcomes where environmental, lifestyle, access and economic services will still thrive in an era when sea-level rises and their impacts are likely.

02

Private property | ensure coastal risks are considered in new planning decisions. This will ensure that growth areas and further developments to existing properties are designed to minimise vulnerability to coastal risks.

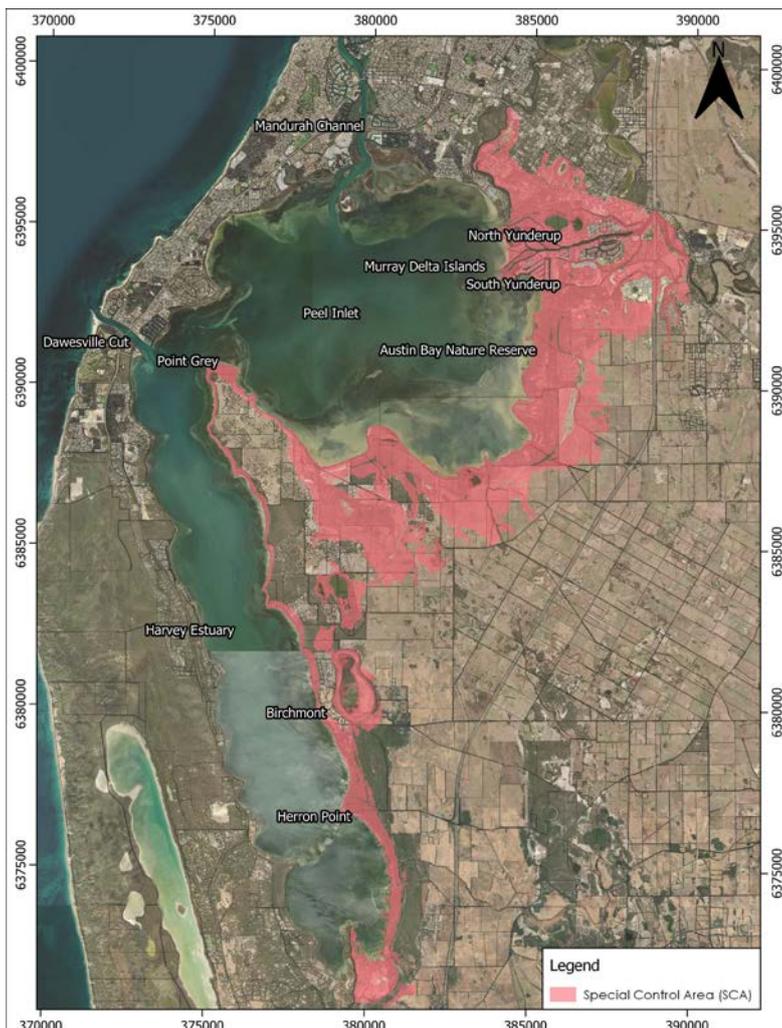
Key benefits of having a CHRMAP

- ✓ Provides an understanding of risks associated with coastal erosion and inundation.
- ✓ Greater certainty for those looking to purchase or develop private property within areas at risk from coastal erosion and inundation.
- ✓ Informs appropriate development, maintenance and renewal of public infrastructure assets such as foreshore areas; car parks, toilet blocks and jetties.
- ✓ It will avoid the need for site specific coastal risk assessments to be undertaken to support development applications.
- ✓ Prioritises a program of shoreline stabilisation works.
- ✓ Enables the Shire to advocate for State and national funding for coastal management works.
- ✓ Ensures new development is protected from coastal erosion and inundation.

CHRMAP FAQ's

What areas may be affected?

The areas at risk from inundation and / or erosion are below:



Map 1: Areas at risk of erosion and/or inundation.

Are other local governments preparing CHRMAP's?

The CHRMAP process has been active in Western Australia for approximately 10 years. To date 36 Local governments around Western Australia have prepared CHRMAP's or are in the process of preparing CHRMAPs.

For more click [here](#) or visit www.wa.gov.au

Is erosion and inundation already happening?

Yes. The CHRMAP has identified where erosion rates are highest. This includes along the western shorelines of the Murray Delta Islands. For inundation, the risk is highest in low lying areas around Yunderup, in the natural floodplain of the Murray River.

How are Climate Change and Sea Level Rise considered in CHRMAP?

The CHRMAP is guided by SPP2.6 policy to consider climate change and potential sea level rise for future planning purposes. In Western Australia the rate of sea level rise that is recommended for planning purposes has been developed using internationally accepted standards and equates to +0.4m for the 50-year planning period and +0.9m for the 100-yr planning period. This sea level rise allowance has been applied in coastal planning studies in Western Australia since about 2010.

For more click [here](#) or visit www.wa.gov.au

Is there already evidence of sea level rise?

Yes, sea level has been recorded at Fremantle continuously since 1897, the longest sea level data record in the southern hemisphere. This provides a robust time series to determine mean sea level (MSL) changes.

The following up to date advice on sea level rise is provided by Professor C Pattiaratchi, UWA Oceans Institute, The University of Western Australia:

Sea level variability along the West Australian coastline is the result of a number of different processes acting on different time scales ranging from days to decades with amplitudes of the order of 0.2 to 0.5 m. The Fremantle mean sea level (MSL) responds very strongly to El Niño/La Niña events with lower sea levels occurring during El Niño events and vice versa. Analysis of the 126 year record has shown many changes to the MSL with periods of increasing and decreasing trends. For example, over the period 1952 to 1991, there was a decreasing trend and an increasing trend between 1990 and 2022 (Figure 1).

The main contributors to the global MSL rise is due to thermal expansion due to increase in ocean temperatures and melting of mountain glaciers and ice sheets. Over the period 1970-1990, thermal expansion and ice melting contributed almost equally to the observed sea level rise. However, in the past 2 decades, melting of mountain glaciers and ice sheets have accelerated, resulting in the amount of sea level rise due to ice melting being nearly twice the amount of sea level rise due to thermal expansion. This has resulted in the acceleration in the global MSL rise in observations, including those measurements from satellite in recent decades. It is expected that the component of ice melting to MSL rise will increase into the future resulting in higher rates of mean sea level rise compared to that in the past.

These patterns are reflected in the Fremantle tide gage record (Table 1 and Figure 1). In the longer term, 1900 to 2022, the MSL at Fremantle increased at a rate of 1.9 mm/yr. However, the mean rate of increase between 1990 and 2022 was 3.8 mm/yr - a rate double that over the previous 100 years. The observed rates of MSL at Fremantle are similar to those estimated globally (Table1). Over the long term (1897-2004) the global MSL rise rate was 1.44 mm/yr in comparison to 1.54 mm/yr at Fremantle for the same period. When we extend the time period to 2022 rate of rise increases to 1.7 and 1.9 mm/yr, globally and Fremantle, respectively. Since 1990 these rates increase to 4.2 mm/yr (global) and 3.8 mm/yr (Fremantle) due to the increased contribution of ice melt. Hence, we need to remember that the over different time scales the processes that contribute to MSL rise changes with a corresponding change in the rate of increase.

Table 1: Comparison between global and Fremantle mean annual sea level rise at different time scales

Period	Annual sea level rise	Location
Jan 1870 to Dec 2004	1.44 mm/yr	Global
20th century	1.7 ± 0.5 mm/yr	Global
Jan 1993 to Jul 2008	2.6 ± 0.6 mm/yr	Global
Jan 2007 to Dec 2022	4.2 ± 0.3 mm/yr	Global
Jan 1900 to Dec 2022	1.9 mm/yr	Fremantle
Jan 1990 to Dec 2022	3.8 mm/yr	Fremantle

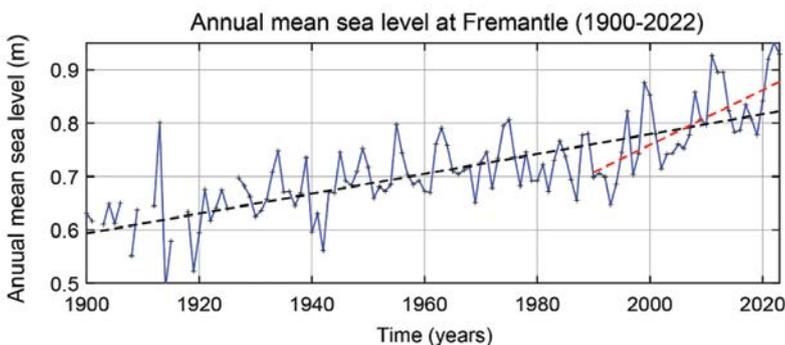


Figure 1: Time series of Fremantle sea level (one year running mean), 1900-2022. The black and red dashed lines represent the linear trends 1900-2020 (1.9 mm/yr) and 1990-2022 (3.8 mm/yr), respectively.

What is the CHRMAP proposing?

- Bank stabilisation using nature-based solutions in the Murray Delta Island foreshore areas and foreshore reserves along the Murray River.
- Further analysis of the erosion effects from boat wakes in the Murray River.
- Planning approaches to manage the risk from inundation and erosion. These include a Local Coastal Planning Policy and a Special Control Area.
- Ongoing shoreline monitoring at key locations where erosion is considered a key risk.
- Various further studies, including, but not limited to: private riverfront properties, effluent disposal systems, ground truthing, and heritage protection

How will my property be affected?

If your property lies within the mapped proposed Special Control Area, your home lies in an area that may become impacted by erosion and/or inundation (refer to map 1).

Most properties are only likely to be impacted by minor nuisance flooding. Some may be more at risk from erosion associated with major storm surge events. The CHRMAP outlines how these risks can be managed.

What is the Shire going to do to help?

The CHRMAP proposes various options to mitigate the impacts of projected erosion and inundation. These include shoreline protection measures, monitoring programs, further studies to appropriately inform decision making and changes to the planning framework to locate and devign development to minimise exposure to coastal risks.

By having an adopted plan, the Shire will be in a better position to secure external funding to assist with mitigation works.

Will this affect my rates?

There are recommendations to apply either a specified area rate or seek an upfront contribution from property owners that front the shoreline where the Shire proposes to coordinate shoreline protection works to partially cover the cost of works, where these works would directly protect the landowner's private property. This recommendation would require further work to determine the extent of any rate or contribution and further consultation with landowners before it could be introduced.

Having a CHRMAP in place however would allow the Shire to access greater federal and state funding which would limit the need for the Shire to look at private funding contributions.

What is a Special Control Area?

An area where the Shire can require planning approval for new development, in this case development that may be impacted by coastal erosion or inundation. This will ensure new development is designed and located in a way that considers the future risk of coastal processes and climate change. Many properties within the proposed SCA are already subject to minimum building levels associated with the river flood plain that are in excess of those needed for protection from coastal inundation. In the majority of cases it will also be possible for bank stabilisation works to be put in place and maintained to protect against erosion.

Why is there a provision proposed to allow property to be removed?

While the proposed SCA does include a provision that would enable a notice to be issued to require the removal of a building, this would only occur where coastal processes had impacted the area to an extent where:

- The bank had eroded so far that a building was at risk of damage under storm conditions
- Road access or public utility services are no longer available to a building
- Onsite effluent systems cannot effectively operate due to high water levels.

These circumstances represent an extreme situation where other mitigation measures have not been successful.

Will the CHRMAP affect my insurance?

Insurance premiums consider a range of factors in pricing risk. The Industry conducts its own studies to inform the knowledge around risk from flooding and erosion. Further information on the role of the insurance in coastal adaptation can be found [here](#).

Is the Shire proposing to resume private property into the public domain?

No.

Why is the CHRMAP not focusing on the Dawesville Cut?

Whilst the CHRMAP has considered the influence of the Dawesville Channel it is not a dedicated study the effects of its opening on the Peel-Harvey system. The opening of Dawesville Channel has improved the water quality issues within the estuary by allowing greater tidal exchange with the ocean. However, this has also increased the opportunity for ocean surges to enter the estuary in extreme events. The Dawesville Channel has increased the general tidal range inside the Peel-Harvey estuary, compared with the pre-opening period (before 1994). This has driven erosion to higher levels of the shoreline. Coupled with this is the influence of higher saltwater intrusion into the estuary which has led to plants / vegetation dying off due to salt intolerance.

What about erosion caused by boats?

The CHRMAP recommends that a study be undertaken on the impact of vessel wakes on erosion.

Commenting on the draft CHRMAP

Consultation is open until September 29th 2023.

Submissions should be sent for the attention of the Chief Executive Officer either by:

Email to mailbag@murray.wa.gov.au or **Post** to PO Box 21, Pinjarra 6208.

Have questions?

If you have any questions what is proposed or what the impacts on your property we will be hosting one on one sessions for anybody who has any specific questions at the Shire office every Tuesday and Thursday from 9am to 2pm until the end of consultation, please contact the Shire front counter on 95317777 to book an appointment. If for some reason these days don't suit please call and we will endeavour to make alternative arrangements.



Shire of Murray

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**View the CHRMAP
summary guidance
document [here](#)**