



# Coastal Adaptation Decision Pathways Project



Developing Flexible Adaptation Pathways for the Peron  
Naturaliste Coastal Region of WA



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The Peron-Naturaliste Partnership (PNP) is a collaboration of nine Local Governments between Cape Peron and Cape Naturaliste in south-west WA who recognise the potential vulnerability of the regions coastline due to climate change impacts.

The vision of the PNP is to empower a resilient regional community to reduce risks and optimise opportunities presented by climate change.



The Project: Developing Flexible Adaptation Pathways for the Peron Naturaliste Coastal Region of Western Australia assessed potential adaptation strategies to respond to coastal hazards arising from climate change induced sea level rise in the region. This partnership approach to tackling climate change includes the PNP local governments' and the Western Australia State Government Department of Transport, Department of Planning, Department of Water and the Department of Environment and Conservation.



**Australian Government**  
**Department of Climate Change**  
**and Energy Efficiency**

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Figure 1: Peron Naturaliste Partnership region



## Introduction

This Fact Sheet provides a brief overview of the Project, which involved three phases.

**Phase 1** - a synthesis of coastal hazards affecting the region.

**Phase 2** - a regional-based assessment of impacts, comparing present day conditions with those projected at snapshots in time up to 2110.

**Phase 3** - a detailed locally-based assessment at four case study areas of impacts and potential responses, which will change over time.

### Phase One - Hazard Mapping

Phase One of the Project was the development of coastal hazard mapping. This mapping was specifically developed for economic assessments of adaptation options at regional and local case-study scales, which are Phases Two and Three. Hazards mapped included projected coastal inundation and erosion for time frames up to 2110. The approach used was a synthesis of existing coastal hazard studies, including extreme water level distributions derived from tide gauges and a regional erosion study.

### Phase Two - Region-Wide Assessment

Phase Two of the Project involved developing an indicative understanding of the overall resource cost of adaption to coastal climate risks within the region as a whole, rather than to design strategy. This does not mean the cost of "saving" every inch of coastline, but rather the cost, in general terms, of protecting those assets where the value at risk exceeds the cost of protection.

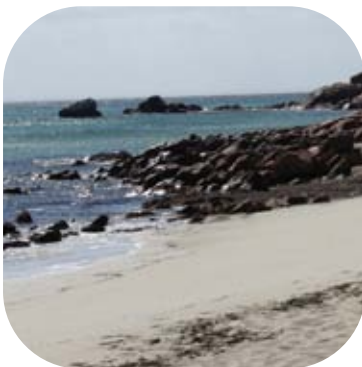
### Phase Three - Case Studies

Phase Three of the Project included detailed work on four case study sites. Unlike the region-wide analysis, the case studies included temporal (effects occur on an annual basis) and spatial (differentiate between locations and consider assets together that would be protected together) elements. The case study areas were; Mandurah, Siesta Park-Marybrook, Peppermint Grove Beach and Eaton-Australind.

Perhaps the key element in the case studies is how the analysis was undertaken, as the methodology is as important as the outcomes. The methodology considered two key aspects associated with adaptation to climate change.

1. It is often not necessary to act immediately in response to climate change, and thus any methodology needs to be able to encapsulate the ability of decision-makers to wait before acting and perhaps more importantly, to provide an input into the decision of when to invest.

2. Climate change is subject to considerable uncertainty and it is crucial that this uncertainty be brought to the centre of the analysis. If it is not, solutions might be optimised to a single "most likely" scenario, but not be robust to even small changes that will inevitably occur to projected scenarios in the future.



## Key Messages

- This work is innovative and it is the first time that much of the work such as the methodology used for the hazard mapping and economic assessment has been undertaken. As such the detail of the results needs to be carefully considered. This is a crucial step forward and in many ways is just the beginning. Further research is required before any 'on ground' work will occur, if it is in fact, deemed necessary.
- One aspect that will need to be examined further is the erosion hazard mapping. The mapping used was derived from the downscaling of a regional recession study. This method constrained the reliability of the hazard assessment. Key locations including Quindalup-Busselton, Bunbury, Mandurah and Rockingham are not well represented by the model. As these are the most developed areas this has impacted upon the economic assessment. The erosion modeling needs to be refined to a higher resolution to identify underlying rock features and inclusion of alongshore controls such as headlands and groynes to better represent the local scale.
- This is primarily an 'economic assessment' and social and environmental variables have not been considered to the extent required to make well informed comprehensive decisions. For example, the market value used for agricultural and conservation land could be considered to be relatively low when compared to urban areas.
- A collaborative approach that involves all levels of government and stakeholders is required to effectively address this complex issue. The PNP will continue to highlight this matter and engage all parties to meet this challenge.

## Project Outcomes

It is important to note that the results of this project need to be carefully considered as there are a number of caveats, which are outlined in the 'Key Messages' section. The results do however provide an indication of the potential extent of coastal hazards and associated risks across the region.

Coastal erosion and inundation hazard lines were mapped at a regional scale and for the four case study areas. To address these potential hazards, adaptation options were also identified and costed. In summary, the Project identified that until 2110 in the Peron Naturaliste Region:

- Erosion is a far more pervasive issue than flooding;
- Approximately 800 hectares of urban and commercial land may be subject to an increase in flooding risk;
- Approximately 200 metre wide strip is at risk from erosion along the majority of the coastline;
- The value at risk of the affected assets along this section of coastline is approximately \*\$1.2 billion; and
- Approximately \*\$1.1 billion of assets can be saved, at a cost of around \$120 million.

The Project Reports are available upon request from the relevant PNP local government.

\*Based on best market observations



## Conclusions and Next Steps

This Project proposed several next steps. One key initial step is to review the Hazard Mapping undertaken for Phase One of the Project as a number of limitations and issues were highlighted. The economic modelling would then be updated with the reviewed hazard assessment. In terms of processes associated with adaptation, the most crucial next step is discussions within, and between, the nine local governments and their communities. Furthermore, it is important to acknowledge that this Project is primarily an 'economic assessment', and although social and environmental values were included, decisions are not made considering the economic value alone. Further analysis of all variables needs to be considered in the decision-making process.

This Project has been innovative and has generated a great deal of new learning's, knowledge and sharing of information and resources for the partnership. The PNP will continue to work together and with all levels of government to ensure that this significant investment is maximised to build a resilient regional community.

For further information please contact the relevant PNP local government or alternately:

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