Capel to Leschenault CHRMAP

Chapter Report: Coastal Assets and Community Values

Peron Naturaliste Partnership

14 July 2022

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Client	Peron Naturaliste Partnership
Client Project Manager	Joanne Ludbrook
Water Technology Project Manager	Joanna Garcia-Webb
Water Technology Project Director	Chris Beadle
Authors	Chris Charles, Joanna Garcia-Webb
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Ground Floor
430 Roberts Road
Subiaco WA 6904
Telephone (08) 6555 0105
ACN 093 377 283
ABN 60 093 377 283

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Joanne Ludbrook
Coastal Adaptation Coordinator
Peron Naturaliste Partnership
3 Peel St, Mandurah WA 6210

Via email: peronnaturalistepartnership@mandurah.wa.gov.au

Dear Joanne

Chapter Report: Coastal Assets and Community Values

We are pleased to present the Capel to Leschenault Coastal Hazard Risk Management and Adaptation Plan Chapter Report: Coastal Assets and Community Values. If you have any queries, please do not hesitate to contact me on (08) 6555 0105.

Yours sincerely

Joanna Garcia-Webb
Senior Principal Coastal Engineer | Western Australia Regional Manager
Joanna.garcia-webb@watertech.com.au
WATER TECHNOLOGY PTY LTD

EXECUTIVE SUMMARY

It is internationally recognised that the mean sea level has been rising globally since the nineteenth century and is predicted to rise at an increasing rate in the future (IPCC 2021). Rising sea levels and intensifying storm activity will increase the risk of coastal inundation (temporary coastal flooding), storm erosion and long-term shoreline recession. State governments across Australia have introduced statutory obligations that require local governments to consider and plan for these hazards. In Western Australia (WA), the governing policy is the Western Australian Planning Commission's (WAPC) State Planning Policy No. 2.6: State Coastal Planning Policy (WAPC, 2013, herein referred to as "SPP2.6"). SPP2.6 recommends management authorities develop a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) for land use or development that is potentially vulnerable to coastal hazards. Specific guidelines have been developed to assist in this process (WAPC, 2019).

SPP2.6 requires adequate risk management planning is undertaken where existing or proposed development is in an area at risk of being affected by coastal hazards over the 100-year planning timeframe. SPP2.6 and the CHRMAP Guidelines provide the risk assessment framework to be applied to identify risks that are intolerable to the community, and other stakeholders such as local governments, indigenous and cultural interests, and private enterprise. Risk Management measures are then developed according to the adaptation hierarchy outlined in SPP2.6.

The Peron Naturaliste Partnership (PNP) comprises membership of nine local government authorities. The PNP's Coastal Adaptation Pathways Project identified the coastal areas of Capel, Leschenault and Greater Bunbury as being particularly exposed to coastal hazards and climate change, which triggered the need for this CHRMAP. The aim of the present study is therefore to investigate the nature and severity of coastal hazards which are likely to affect these regions from Capel to Leschenault over future planning horizons. Refer Figure 1-1 for locality and study area extent.

The objective of this CHRMAP project is to increase knowledge and understanding of coastal hazard risks, and identify risk management and adaptation measures for implementation. The outcomes will be used to inform local and state government policies, strategies and plans, including (but not limited to); planning strategies, community strategic plans, drainage strategies, asset management plans, emergency management plans, and foreshore management plans. The project will adhere to the WAPC (2019) guidelines with scope and deliverables to be consistent with the objectives identified by these guidelines and SPP2.6. The project will identify the strategic direction for coastal adaptation scenarios from the present-day to 2120 (100 yrs. management time frame), and identify an implementation plan to achieve this direction. Overall, this CHRMAP will develop a flexible adaptation pathway for the region and serve as a key reference for management, planning and policy making for the short-term (0-15 years), medium-term (15-30 years), and long-term (100 years).

This report presents the Coastal Values and Community Assets Chapter Report, which identifies the assets and community values within the coastal hazard zone. The flow chart displayed in Figure 1-2 indicates where this component sits with reference to the greater study; the 'Coastal Values and Community Assets' phase corresponds to the bottom half of the bubble shaded in red.

All the assets in the coastal hazard zone were identified and classified into 9 categories as listed below. Risks to these assets will be considered by applying the success criteria in the Vulnerability, Risk Analysis and Evaluation phase of the project (refer Figure 1-2 for project phases).

- Roads
- Residential land
- Commercial land and assets
- Public and community assets not located in the foreshore reserve e.g., car parks, recreational facilities

- Developed foreshore reserve, including coastal, estuary and river foreshore areas
- Undeveloped foreshore reserve, including coastal, estuary and river foreshore areas
- Environmental
- Agricultural / rural lands
- Aboriginal heritage

The link below presents the hazard and asset information together overlain on an aerial photograph for ease of viewing. All information layers can be turned on and off, and it is possible to zoom in on sites within the study area. Clicking on an asset displays its category, planning horizon in which it is predicted to become affected, and the Management Unit. It is recommended that each Steering Group member view the link to gain further understanding of assets at risk within their jurisdictions.

https://watech.maps.arcgis.com/apps/webappviewer/index.html?id=d43c39fda97d426ea6192d1a7a8543cf

Tables containing a breakdown of assets by Management Unit, category and planning horizon are presented in Appendix A and Appendix B for erosion and inundation respectively. **A summary and brief discussion of these assets is presented in Table 3-1**.

Community and stakeholder involvement is a critical component of the CHRMAP process, as it defines what and how much value is placed on assets within the study area. This will inform the adaptation planning process and ensure all needs are considered. As such, the project contains a high level of community and stakeholder engagement. This provides ownership of the CHRMAP with those that it affects, and acceptance of its outcomes. The engagement is discussed further in Section 4 and Appendix C.

The values collated from the engagement to date have been used to generate the success criteria for the vulnerability and risk assessment component of the CHRMAP. These will be key to the whole CHRMAP as it is these that will ultimately drive the selection of adaptation options. It is important that a comprehensive approach be applied at this stage of the project, in order to provide a CHRMAP applicable to all stakeholders.

The success criteria are defined below. These criteria will be revised during the course of the CHRMAP to ensure the final document reflects all stakeholder views.

- Conserve, enhance and maintain the natural environment and character of the study area
- Facilitate and promote public usage and enjoyment of the natural environment, coast, estuaries and rivers
- Protection of the cultural values of the coastline
- Manage impacts to the existing residential areas from erosion and inundation
- Maintain critical infrastructure supporting the community (roads, utilities).
- Manage and maintain coastal infrastructure that provides access to the water and supports the lifestyle enjoyed by people in the region
- Retain the widest possible range of risk management options for future users of the coast

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1 INTRODUCTION

It is internationally recognised that the mean sea level has been rising globally since the nineteenth century and is predicted to rise at an increasing rate in the future (IPCC 2014). Rising sea levels and intensifying storm activity will increase the risk of coastal inundation (temporary coastal flooding), storm erosion and long-term shoreline recession. State governments across Australia have introduced obligations that require local governments to consider and plan for these hazards. In Western Australia (WA), the governing policy is the Western Australian Planning Commission's State Planning Policy No. 2.6: State Coastal Planning Policy (WAPC, 2013, herein referred to as "SPP2.6"). SPP2.6 recommends management authorities develop a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) for land use or development that is vulnerable to coastal hazards. Specific guidelines have been developed to assist in this process (WAPC, 2019).

One of the key objectives of SPP2.6 is to establish coastal foreshore reserves which include allowances for the protection, conservation and enhancement of coastal values across the state. Risk assessment processes are then utilised to identify risks that are intolerable to the community, and other stakeholders such as local governments, indigenous and cultural interests, and private enterprise. Adaptation measures are then developed according to the preferential adaptation hierarchy outlined in SPP2.6.

The Peron Naturaliste Partnership (PNP) comprises membership of nine local government authorities. The PNP's Coastal Adaptation Pathways Project identified the coastal areas of Capel, Leschenault and Greater Bunbury as being particularly exposed to coastal hazards and climate change, which triggered the need for this CHRMAP. The aim of the present study is therefore to investigate and plan for coastal hazards which are likely to affect these regions from Capel to Leschenault – refer Figure 1-1 for locality and study area extent.

This CHRMAP project is expected to increase knowledge and understanding of coastal hazard risks and identify risk management and adaptation measures for implementation. The outcomes will be used to inform local government policies, strategies and plans, including (but not limited to); planning strategies, community strategic plans, drainage strategies, asset management plans, emergency management plans, and foreshore management plans. The project will adhere to the WAPC (2019) guidelines with scope and deliverables to be consistent with the objectives identified by these guidelines and SPP2.6. The project will identify the strategic direction for coastal adaptation scenarios from the present to 2120 (100-year management time frame), and identify an implementation plan to achieve this direction. Overall, this CHRMAP will develop a flexible adaptation pathway for the region and serve as a key reference for management, planning and policy making for the short-term (0-15 years), medium-term (15-30 years), and long-term (100 years).

This report presents the Coastal Values and Community Assets Chapter Report, which identifies the assets and community values within the coastal hazard zone. The flow chart displayed in Figure 1-2 indicates where this component sits with reference to the greater study; the 'Coastal Values and Community Assets' phase corresponds to the bottom half of the bubble shaded in red.

Delivery of this project will occur over 9 stages (as summarised in Figure 1-2), each of which represents a key hold point. The staged approached is developed according to the PNP's scope and is in line with the CHRMAP Guidelines (WAPC, 2019).

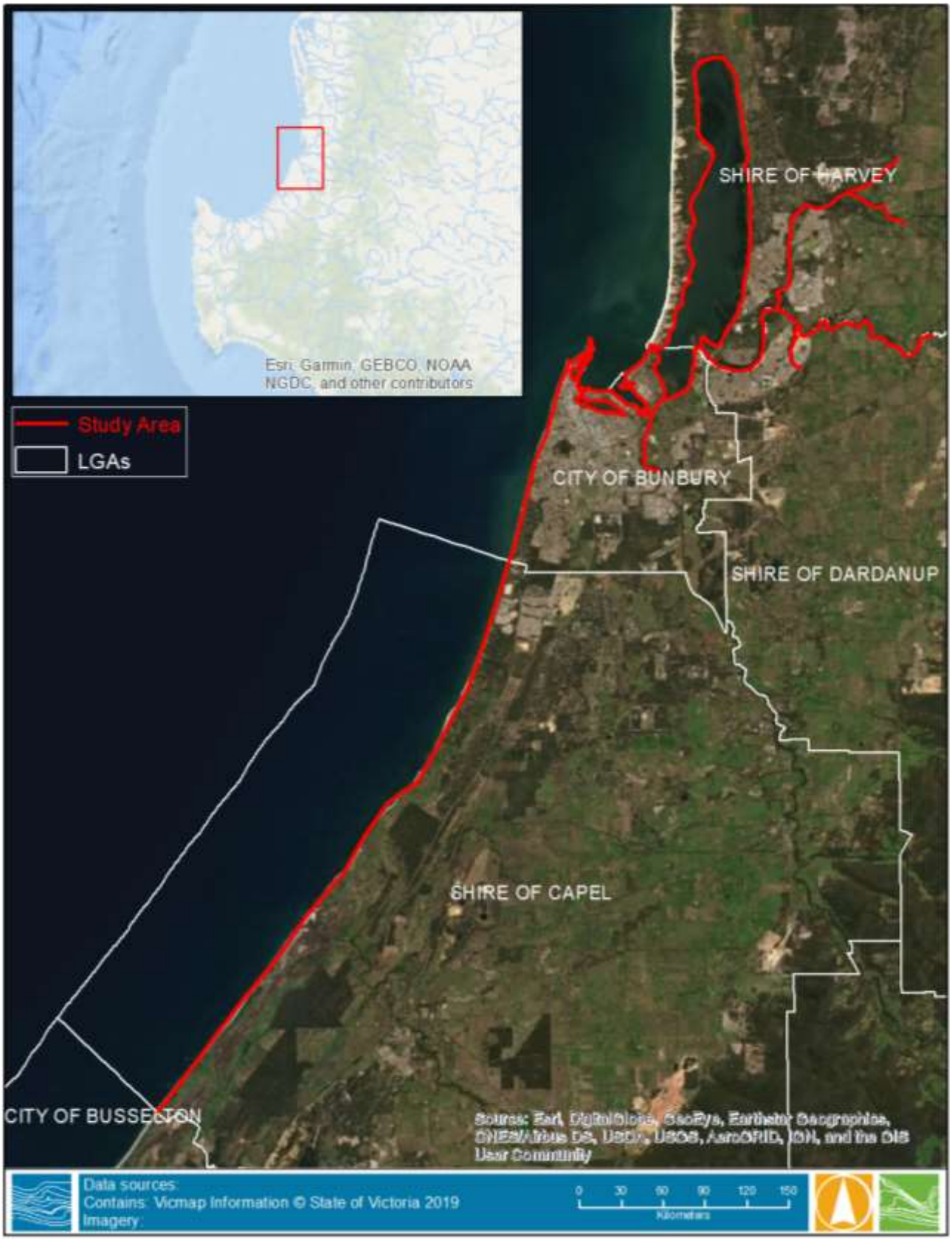


Figure 1-1 Project Area

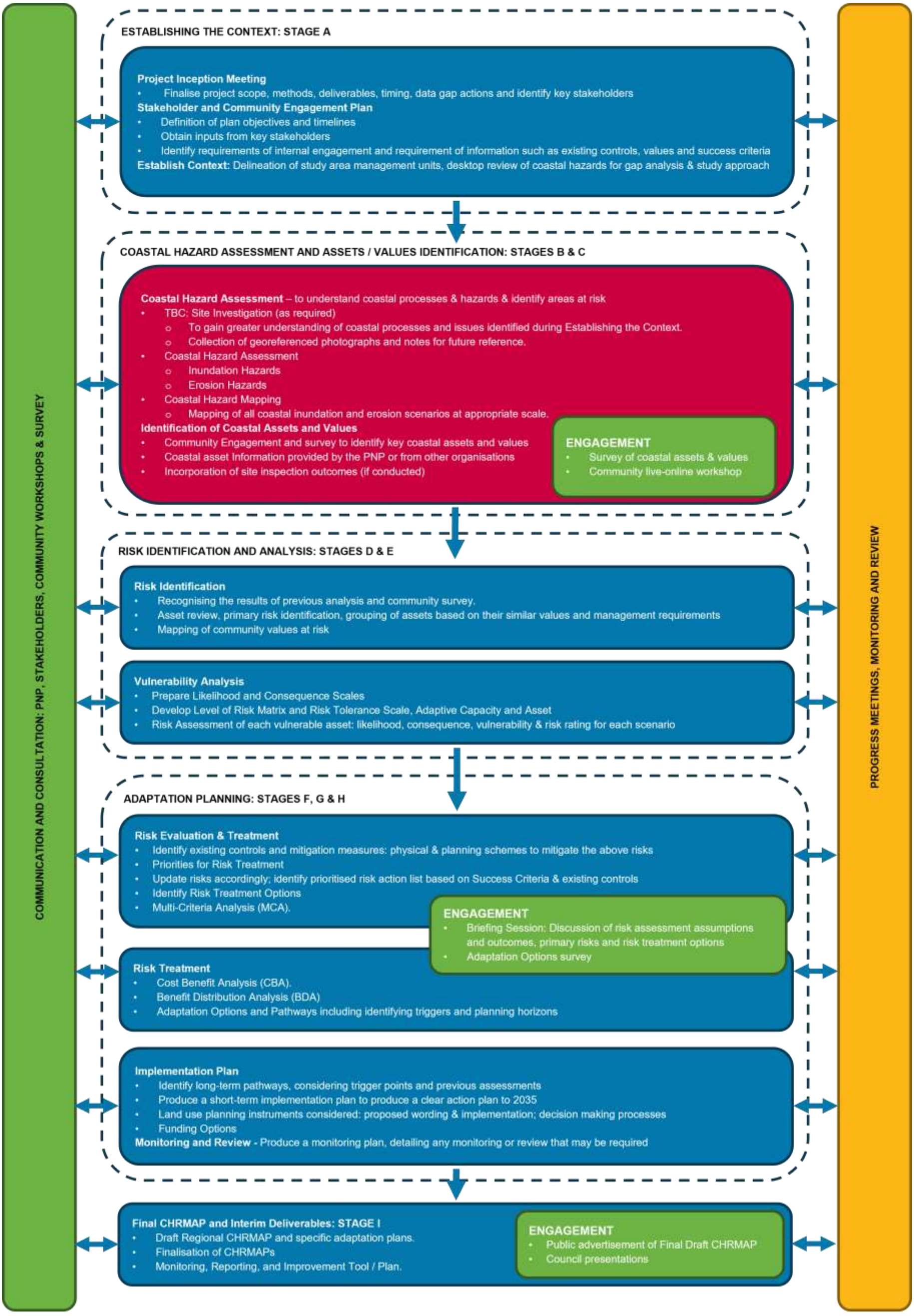


Figure 1-2 CHRMAP Methodology Flow Chart (adapted from WAPC, 2019)

2 MANAGEMENT UNITS

A project Steering Group has been established to oversee preparation and completion of the CHRMAP, including review of project deliverables. The Steering Group plays an advisory role in the project and consists of various representatives. The members of project steering group and key stakeholders are summarised in Table 2-1.

Table 2-1 Steering Group members

Organisation	Role of organisation in study area
PNP	Regional facilitator and client project manager.
Shire of Capel	Local coastal land and riverine shoreline manager.
City of Bunbury	Local coastal, riverine shoreline, and estuarine/inlet land manager.
Shire of Harvey	Local coastal, riverine shoreline, and estuarine land manager.
Shire of Dardanup	Local riverine shoreline land manager.
Department of Biodiversity, Conservation & Attractions (DBCA)	Local coastal, riverine shoreline, and estuarine land manager. Data custodian.
Southern Ports, Bunbury	Local coastal land manager; data custodians.
Department of Planning, Lands & Heritage (DPLH)	Technical scoping, advice and review; data custodians, presence required by funding agreement for project
Department of Transport (DoT)	Local coastal land manager; and technical scoping, advice and review; data custodians.
Department of Water & Environmental Regulation (DWER)	Technical scoping, advice and review; data custodians.

To facilitate the coastal hazard assessment and development of adaptation options, the study area is delineated into several management units which are determined according to a set of factors:

- Jurisdiction boundaries
- Presence of coastal assets and relevant stakeholders
- Coastal processes and potential hazard types.

For Shire of Capel, the shoreline can be divided into three primary management units:

- MU1 - Peppermint Grove Beach
- MU2 - Capel Coast (coastal reserve and farmland)
- MU3 - Dalyellup Beach

For City of Bunbury, the shoreline can be divided into five primary management units:

- MU4 - Bunbury S
- MU5 - Bunbury (including Five Mile Brook district, Koombana Bay, Leschenault Inlet)
- MU6 - Bunbury Port
- MU7 - The Cut

- MU81 – Bunbury E

Shire of Dardanup does not have an open coast. Primary hazards are potential riverbank erosion and inundation of lowlands along the Collie River. The area is defined as an individual management unit:

- MU10 - Collie River S.

For Shire of Harvey, the shoreline can be subdivided into two primary management units:

- MU9 - Leschenault Estuary
- MU11 - Collie River N, consisting of lands on the northern side of Collie River and along the Wellesley River and Brunswick River

Open ocean coast within Shire of Harvey is excluded from the scope of this CHRMAP.

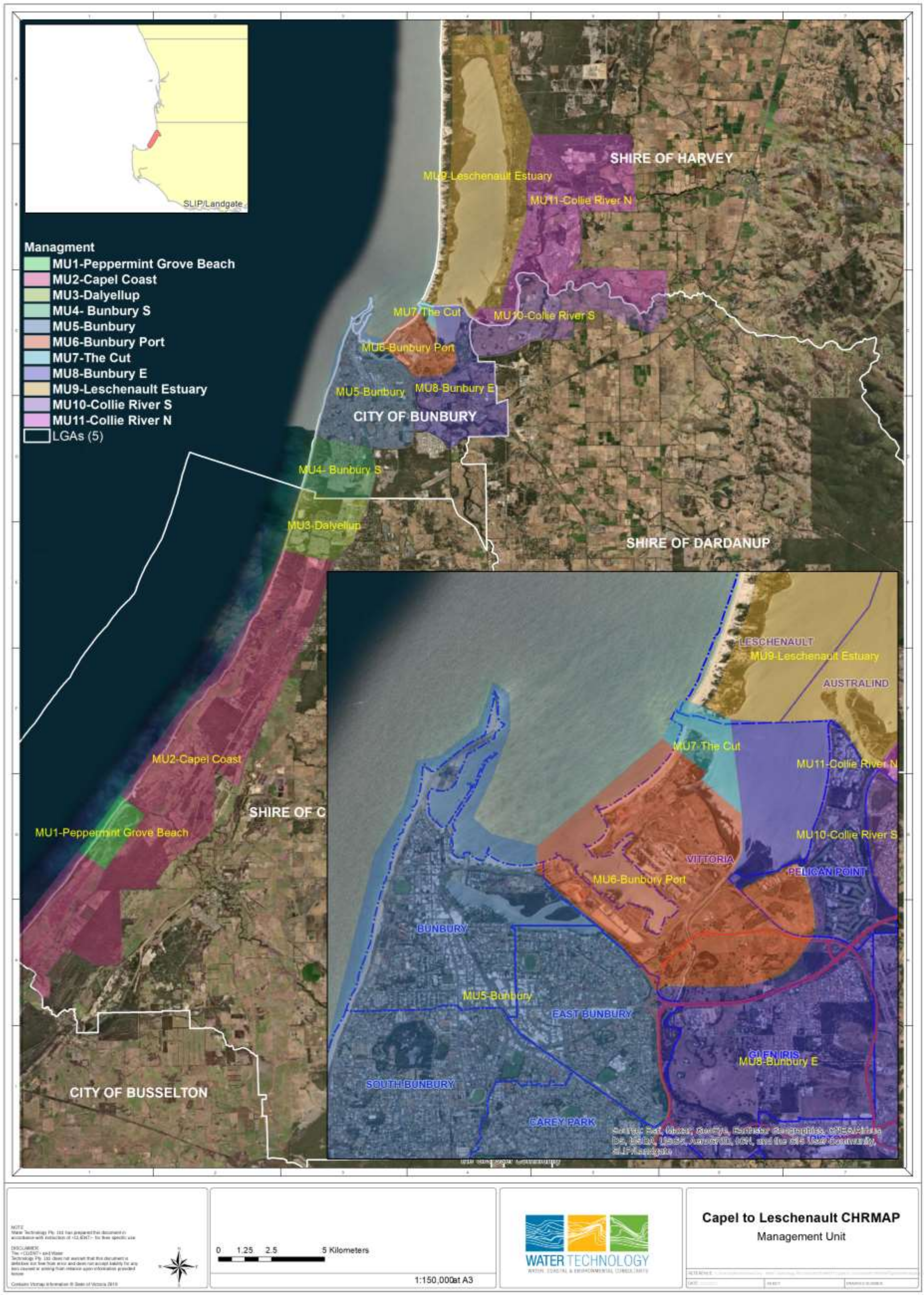


Figure 2-1 Study Area and Management Units

3 IDENTIFICATION OF COASTAL ASSETS

3.1 Collection Methodology

Coastal assets were identified in the following ways:

- Asset information was provided in excel and spatial file formats for use in this study by Steering Group members. These were imported into the GIS database developed for the project, and used as the basis for the coastal asset identification.
- Landgate assets database, for example for roads.
- The coastal values survey(s) and other engagement activities to identify additional assets of importance and value to the community.
- Site visit to investigate locations where information was not clear from the desktop assessment.
- Manual identification of further assets from aerial photography (e.g., developed areas of foreshore reserve)

3.2 Asset Classifications

At the time of identification, each asset was categorised into a classification. This aims to simplify the adaptation planning process in subsequent phases of the project. The study team grouped assets as follows:

- Roads
- Residential land including both occupied and vacant land
- Commercial land and assets e.g., Bars, shops, markets etc.
- Public and community assets not located in the foreshore reserve e.g., car parks, recreational facilities
- Developed foreshore reserve, including coastal, estuary and river foreshore areas
  - Reserve containing public assets, e.g., car parks, public ablutions, playgrounds, walkway, access structures
- Undeveloped foreshore reserve, including coastal, estuary and river foreshore areas
- Environmental
  - Contaminated sites
  - DBCA data. This includes habitat areas potentially suitable for Matters of National Environmental Significance (such as Carnaby's Cockatoo's and Western Ringtail Possums), Threatened and Priority Ecological Communities, and known locations of threatened flora.
- Agricultural / rural lands
- Aboriginal heritage

One of the main challenges of this CHRMAP is the numerous assets and management zones. This asset classification was developed to address the main coastal adaptation issues and key locations, and enable a simple yet effective method for adaptation planning.

3.3 Asset Data

The link below presents the hazard and asset information together overlain on an aerial photograph for ease of viewing. All information layers can be turned on and off, and it is possible to zoom in on sites within the study area. Clicking on an asset displays its category, planning horizon in which it is predicted to become affected and the Management Unit. It is recommended that each Steering Group member view the link to gain further understanding of assets at risk within their jurisdictions.

https://watech.maps.arcgis.com/apps/webappviewer/index.html?id=d43c39fda97d426ea6192d1a7a8543cf

Tables containing a breakdown of assets by Management Unit, category and planning horizon are presented in Appendix A and Appendix B for erosion and inundation respectively. **A summary of the totals for a selection of key asset types and a brief discussion is presented in Table 3-1**.

This asset data will be assessed in the vulnerability assessment, and subsequent stages of the CHRMAP.

Table 3-1 Summary of hazards to assets (refer Appendix A and Appendix B for full list of predicted asset numbers at risk by category. If categories not mentioned within table, they are not identified as at risk in the corresponding MU)

Management Unit	Summary	Snapshot of Assets at Risk
MU1 – Peppermint Grove	▪ Peppermint Grove is particularly vulnerable to erosion hazard as there is only a 50-100 m wide reserved sand dune. Residential properties are predicted to be within the erosion hazard zone by 2120. ▪ In 2120, the land depression behind the residential area will be under constant risk of inundation. The majority of the residential properties are not predicted to be affected by inundation. The existing sand dune acts as a natural barrier for coastal inundation. The inundation model assumes ocean water enters the land depression through Capel River and culvert openings, rather than by breaching of the dunes along the open coast.	▪ Peppermint Grove Road at risk of inundation ▪ By 2120, 39 environmental assets at risk from erosion; 54 by inundation ▪ 154 residential properties predicted to be impacted by erosion by 2120 ▪ 30 residential properties predicted to be impacted by inundation by 2120 ▪ 19 agricultural / rural lots predicted to be impacted by inundation by 2120 ▪ Undeveloped foreshore, public and community assets are at risk from both inundation and erosion from the present day
MU2 – Capel Coast	▪ Most of the assets at risk of erosion are environmental and undeveloped foreshore ▪ Agricultural / rural lots are predicted to be impacted by both erosion and inundation. ▪ The inundation extent extends across the land depression adjacent to Capel River. In the north of the management unit, inundation is minimal. ▪ The dominant land use of rural / agricultural and regional open space is reflected in the assets-at-risk totals	▪ Approximately 30 roads at risk of inundation by 2120 ▪ By 2120, 116 environmental assets at risk from erosion; 200 by inundation ▪ 136 agricultural / rural lots predicted to be impacted by inundation by 2120; 55 by erosion ▪ 6 Aboriginal Heritage assets in the erosion hazard zone from the present day ▪ Undeveloped foreshore, public and community assets are at risk from both inundation and erosion from the present day
MU3 – Dalyellup	▪ Erosion is the main risk for this MU, with residential and environmental categories the most affected. ▪ Inundation is not a high risk in this management unit	▪ By 2120, 42 environmental assets at risk from erosion; 4 by inundation ▪ 64 residential properties predicted to be impacted by erosion by 2120 ▪ The SLSC car park is predicted to be in the erosion hazard zone by 2035. ▪ The treatment ponds of the Bunbury Wastewater Treatment Plant are predicted to be in the erosion hazard zone by 2120. ▪ Developed foreshore, public and community assets are at risk from erosion from 2035; undeveloped foreshore by the present day
MU4 – Bunbury S	▪ Erosion is predicted to impact natural assets within this management unit. ▪ Inundation is not a high risk in this management unit.	▪ By 2120, 12 environmental assets at risk from erosion; 7 by inundation ▪ Developed and undeveloped foreshore is at risk from erosion from the present day; public and community assets are by 2120
MU5 – Bunbury including open coast, Koombana Bay and Leschenault Inlet	▪ Erosion is a significant risk from the present day to both built and natural assets along the western coast of the City of Bunbury. ▪ Inundation is a significant risk across much of this management unit. The inundation risk is predicted to increase from present day to 2120. By 2120, the 1-year ARI is predicted to inundate a significant residential and commercial area. ▪ Environmental, public and community assets are also predicted to be significantly impacted by inundation	▪ Approximately 340 roads at risk of inundation by 2120; 57 by erosion ▪ By 2120, 141 environmental assets at risk from erosion; 277 by inundation ▪ 267 residential properties predicted to be impacted by erosion by 2120 ▪ 2106 residential properties predicted to be impacted by inundation by 2120 ▪ By 2120, 8 commercial assets at risk of erosion, 500 from inundation ▪ 4 Aboriginal Heritage assets in both hazard zones from the present day ▪ Developed and undeveloped foreshore, public and community assets are at risk from erosion and inundation from the present day
MU6 – Bunbury Port	▪ By 2120, the land at the entrance to the inner Port is completely within the erosion hazard zone ▪ Inundation is the main risk in this management unit. ▪ It is noted that a high-level study using policy setbacks provides no additional value to the planning and management of lands along the Preston River.	▪ Approximately 8 roads at risk of inundation by 2120; 3 by erosion ▪ By 2120, 90 environmental assets at risk from erosion; 78 by inundation ▪ 2 agricultural / rural lots predicted to be impacted by erosion by 2120, 4 by inundation ▪ By 2120, 13 commercial assets at risk of erosion, 7 from inundation ▪ Developed and undeveloped foreshore, public and community assets are at risk from erosion from the present day ▪ Public and community, undeveloped foreshore at risk of inundation from the present day

Management Unit	Summary	Snapshot of Assets at Risk
MU7 – the Cut	▪ The Cut entrance is at risk of erosion and inundation by 2120 (assuming seawalls are not maintained). ▪ Natural assets are at risk in this management unit	▪ By 2120, 129 environmental assets at risk from erosion; 91 by inundation ▪ The undeveloped foreshore reserve is at risk of erosion and inundation from the present day
MU8 – Bunbury E including Vittoria Bay, Pelican Point and Districts along Preston River	▪ Inundation is the biggest risk for this management unit ▪ The areas surrounding Preston River and the Estuary are at risk of inundation from the present day. ▪ It is assumed the canal infrastructure will be maintained; however, the canal properties are at risk from erosion along the river and estuary fronts by 2120. ▪ Foreshore Park and the commercial properties on Estuary Drive are predicted to be in the coastal erosion hazard zone by 2120.	▪ Approximately 19 roads at risk of erosion by 2120; 79 by inundation ▪ By 2120, 104 environmental assets at risk from erosion; 145 by inundation ▪ 92 residential properties predicted to be impacted by erosion by 2120 ▪ 409 residential properties predicted to be impacted by inundation by 2120 ▪ By 2120, 2 commercial assets at risk of erosion, 8 from inundation ▪ By 2120, 4 Aboriginal Heritage assets at risk of erosion, 7 by inundation ▪ Public and community, developed and undeveloped foreshore at risk of erosion and inundation from the present day
MU9 – Leschenault Estuary	▪ Inundation along the eastern shoreline of the estuary is a risk from the present day. This affects foreshore reserve and residential / commercial assets. ▪ Significant portions of land may be permanently inundated by 2120. The majority of this is foreshore reserve, with the exception of the Australind Tourist Park.	▪ Approximately 37 roads at risk of erosion by 2120; 25 by inundation ▪ By 2120, 359 environmental assets at risk from erosion; 314 by inundation ▪ 86 residential properties predicted to be impacted by erosion / permanent inundation by 2120 ▪ 170 residential properties predicted to be impacted by inundation by 2120 ▪ 43 agricultural / rural lots predicted to be impacted by inundation by 2120, 33 by erosion ▪ 2 Aboriginal Heritage assets at risk from both erosion and inundation from the present day ▪ Undeveloped foreshore at risk of erosion from the present day ▪ Public and community assets at risk of inundation from the present day; from erosion by 2050
MU10 Collie River S	▪ Inundation is mainly within the foreshore reserve (within CHRMAP study area bounds). ▪ Erosion lines may impact some residential properties; however, these properties are at the limit of these areas so highly sensitive to the somewhat subjective definition of the HSD. – It is noted that a high-level study using policy setbacks provides no additional value to the planning and management of lands along the Collie River.	▪ Approximately 7 roads at risk of erosion by 2120; 5 by inundation ▪ By 2120, 57 environmental assets at risk from erosion; 54 by inundation ▪ 14 residential properties predicted to be impacted by erosion by 2120 ▪ 36 residential properties predicted to be impacted by inundation by 2120 ▪ 3 commercial properties at risk of inundation from the present day ▪ 2 Aboriginal Heritage assets at risk from inundation from the present day ▪ Public and community assets at risk of erosion and inundation from the present day
MU11-Collie River N	▪ Inundation is mainly within the foreshore reserve (within CHRMAP study area bounds). ▪ Erosion lines may impact some residential properties; however, these properties are at the limit of these areas so highly sensitive to the somewhat subjective definition of the HSD. – It is noted that a high-level study using policy setbacks provides no additional value to the planning and management of lands along the Collie River.	▪ Approximately 13 roads at risk of erosion by 2120; 7 by inundation ▪ By 2120, 57 environmental assets at risk from erosion; 58 by inundation ▪ 49 residential properties predicted to be impacted by erosion by 2120 ▪ 35 residential properties predicted to be impacted by inundation by 2120 ▪ Undeveloped foreshore, public and community assets at risk of erosion and inundation from the present day

4 COMMUNITY VALUES ASSESSMENT

The full engagement outcomes summary report can be viewed in Appendix C. A summary is provided below.

4.1 Engagement Process

The engagement activities for this stage of the project included:

- Use of an interactive project tool (Social Pinpoint) to answer CHRMAP value survey questions and pin values and comments spatially on a project map;
- Hard copy surveys mirroring the online component;
- Community workshop held on 2nd September 2021 in a location in each of the four LGAs and linked online to discuss coastal processes, map community values and understand issues and concerns of the community for the study area;
- Direct engagement with Traditional Owners and Indigenous representatives.
-
- Stakeholder meetings

In the preliminary stage of engagement, stakeholders could visit an online project page with a mapping tool and survey to drop pins and comment on activities they value and their locational preferences for these activities on the map. Participants could also respond to a survey and provide any other feedback on how they use the different areas of the coastline. The survey was available online and in hard copy at the LGA administration centres.

The survey and mapping tool was open from 26th July 2021 to 10th September 2021. In addition, people could provide survey responses in hard copy.

The project team received 84 CHRMAP values survey responses online, 97 hard copy survey responses (a total of 181 survey responses) and 56 ‘pins’ were placed on the map. Whilst ‘place of residence’ was not included in the survey, more than 50% of respondents visited locations in the Shire of Capel most often, and approximately 30% of respondents visited beaches in the City of Bunbury most often.

Stakeholders were further engaged through the following:

- Social media posts
- Key briefings with the Project Steering Group (PSG) including administrative and elected members from PNP, the four LGAs, the Department of Planning, Lands and Heritage and the Department of Transport
- Briefings to key staff members and Executive Management at the LGAs.

28 people attended the workshop.

In total more than 150 participants contributed to this stage of engagement, with an approximate reach of more than 445 local community members and organisations.

4.2 Community Values Survey Summary

The community told the project team that the coastal zone is important to them for many recreation, social and cultural reasons. A total of 181 survey responses were received.

Survey responses indicate coastal and estuarine and riverine areas are valued for activities like walking, swimming, snorkelling, diving, boating, exploring with the family, and coastal vegetation and landforms. Protecting the environment was also highly valued.

Another strong theme was around coastal erosion and climate changes being observed by respondents.

4.3 Community Values Workshop Summary

Key coastal, estuarine and riverine values identified by workshop participants are as follows:

- Beaches and estuarine areas for activities like walking, swimming, snorkelling, exercise, views, fishing, surfing, 4WDing
- Wetlands and environmental areas for their flora and fauna diversity which participants could view.
- Coastal views, walks and scenery.
- Coastal vegetation and the natural environment generally.
- Opportunities for observing wildlife at various locations and protecting habitat for these communities and species.

Key issues and concerns / risks to the coastal values:

- Beach erosion and its environmental, social and financial impacts
- Vegetation retention, revegetation and the need to do more to protect coastal areas from erosion came up multiple times in the different LGAs.
- Environmental protection was generally very highly valued.
- Sea level rise and climate change was also a key discussion point at the workshop, with participants wanting to see decision makers actively addressing climate change impacts.
- Contamination and pollution impacts on fauna and flora and the health of waterways from industrial activities along the coastline and river environment, including the port at Bunbury.
- Protection of coastal wetlands that mitigate against impacts of extreme events and that are home to birds and wildlife
- Biodiversity and habitat loss
- Human impact on the coastal and estuarine natural assets and values to the community

5 SUCCESS CRITERIA

The values collated from the engagement to date have been used to generate the success criteria for the vulnerability and risk assessment component of the CHRMAP. These will be key to the whole CHRMAP as it is these that will ultimately drive the selection of adaptation options. It is important that a comprehensive approach be applied at this stage of the project, in order to provide a CHRMAP applicable to all stakeholders.

The success criteria are defined in Table 5-1. These criteria will be revised during the course of the CHRMAP to ensure the final document reflects all stakeholder views.

Table 5-1 Success criteria

- Conserve, enhance and maintain the natural environment and character of the study area
- Facilitate and promote public usage and enjoyment of the natural environment, coast, estuaries and rivers
- Protection of the cultural values of the coastline
- Manage impacts to the existing residential areas from erosion and inundation
- Maintain critical infrastructure supporting the community (roads, utilities).
- Manage and maintain coastal infrastructure that provides access to the water and supports the lifestyle enjoyed by people in the region
- Retain the widest possible range of risk management options for future users of the coast

APPENDIX A
ASSETS IN EROSION HAZARD ZONE

Table A-2 Predicted assets in the erosion hazard zone, grouped by management unit & planning horizon

Management Unit	2020	2035	2050	2120
MU1-Peppermint Grove Beach	**40**	**52**	**54**	**231**
Roads		3	3	21
Residential	2	3	3	154
Commercial				
Public and Community		1	1	2
Foreshore - Developed				
Foreshore - Undeveloped	10	15	15	15
Environmental	28	30	32	39
Agricultural / Rural				
Aboriginal Heritage				
MU2-Capel Coast	**104**	**114**	**121**	**197**
Roads				6
Public and Community		1	3	4
Foreshore - Undeveloped	7	7	9	10
Environmental	71	79	82	116
Agricultural / Rural	20	21	21	55
Aboriginal Heritage	6	6	6	6
MU3-Dalyellup	**18**	**30**	**31**	**112**
Residential		4	4	64
Commercial		1	1	1
Public and Community		3	3	3
Foreshore - Developed		1	1	1
Foreshore - Undeveloped	1	1	1	1
Environmental	17	20	21	42
MU4- Bunbury S	**10**	**11**	**11**	**16**
Public and Community				2
Foreshore - Developed	1	1	1	1
Foreshore - Undeveloped	1	1	1	1
Environmental	8	9	9	12
MU5-Bunbury	**110**	**130**	**183**	**564**
Roads	10	16	21	57
Residential		4	33	267
Commercial	3	3	4	8

Management Unit	2020	2035	2050	2120
Public and Community	5	5	14	50
Foreshore - Developed	14	15	18	20
Foreshore - Undeveloped	14	15	15	16
Environmental	60	68	74	141
Aboriginal Heritage	4	4	4	4
PORT				1
MU6-Bunbury Port	**85**	**99**	**99**	**136**
Roads	3	3	3	3
Commercial	9	13	13	13
Public and Community	2	2	2	2
Foreshore - Undeveloped	6	6	6	6
Environmental	49	56	56	90
Agricultural / Rural				2
PORT	16	19	19	20
MU7-The Cut	**29**	**119**	**119**	**130**
Foreshore - Undeveloped	1	1	1	1
Environmental	28	118	118	129
MU8-Bunbury E	**119**	**127**	**141**	**256**
Roads	9	10	13	19
Residential	3	3	11	92
Commercial		2	2	2
Public and Community	16	17	17	22
Foreshore - Developed	4	4	4	5
Foreshore - Undeveloped	8	8	8	8
Environmental	76	80	82	104
Aboriginal Heritage	3	3	4	4
MU9-Leschenault Estuary	**317**	**342**	**384**	**591**
Roads	7	9	16	37
Residential		1	15	86
Commercial				5
Public and Community			6	27
Foreshore - Undeveloped	41	41	41	42
Environmental	266	285	296	359
Agricultural / Rural	1	4	8	33
Aboriginal Heritage	2	2	2	2

Management Unit	2020	2035	2050	2120
MU10-Collie River S	**65**	**77**	**86**	**104**
Roads	2	4	4	7
Residential			6	14
Public and Community	6	7	7	8
Environmental	57	66	69	75
MU11-Collie River N	**60**	**61**	**79**	**128**
Roads	4	4	6	13
Residential	1	1	17	49
Public and Community	3	3	3	6
Foreshore - Undeveloped	3	3	3	3
Environmental	49	50	50	57
TOTAL	957	1162	1308	2465

APPENDIX B
ASSETS IN INUNDATION HAZARD EXTENT

Table B-3 Predicted assets in the present-day inundation hazard zone, grouped by asset type & management unit

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
MU1-Peppermint Grove Beach	**83**	**5**	**13**	**29**
Roads	2			
Residential	2		1	3
Commercial	1			
Public and Community			1	2
Foreshore - Developed				
Foreshore - Undeveloped	1	1		4
Environmental	54	4	11	18
Agricultural / Rural	23			2
Aboriginal Heritage				
MU2-Capel Coast	**404**	**87**	**157**	**116**
Roads	30	9	18	5
Commercial			1	
Public and Community	1			4
Foreshore - Undeveloped	5			
Environmental	227	48	97	78
Agricultural / Rural	135	30	41	28
Aboriginal Heritage	6			1
MU3-Dalyellup	**4**	**1**	**0**	**0**
Environmental	4	1		
MU4- Bunbury S	**9**			
Foreshore - Developed	1			
Foreshore - Undeveloped	1			
Environmental	7			
MU5-Bunbury	**195**	**45**	**275**	**1494**
Roads	22	2	14	173
Residential	20	36	95	1023
Commercial	8		1	112
Public and Community	42	2	41	78
Foreshore - Developed	18	1	6	10
Foreshore - Undeveloped	16		1	
Environmental	65	4	117	97

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
Aboriginal Heritage	4			1
MU6-Bunbury Port	**89**	**6**	**106**	**19**
Roads	3		5	3
Commercial	8	5	3	
Public and Community			6	
Foreshore - Undeveloped	6			
Environmental	57	1	50	10
Agricultural / Rural	1		4	
PORT	14		38	6
MU7-The Cut	**30**	**3**	**89**	**2**
Foreshore - Undeveloped	1			
Environmental	29	3	89	2
MU8-Bunbury E	**221**	**68**	**342**	**155**
Roads	17	8	49	20
Residential	10	38	218	106
Commercial	9		3	4
Public and Community	27	1	23	13
Foreshore - Developed	5		1	
Foreshore - Undeveloped	8			
Environmental	139	18	34	11
Agricultural / Rural			11	1
Aboriginal Heritage	6	3	3	
MU9-Leschenault Estuary	**398**	**136**	**173**	
Roads	18	12	15	
Residential	5	32	92	
Commercial			4	
Public and Community	6	10	9	
Foreshore - Undeveloped	41			
Environmental	291	68	43	
Agricultural / Rural	35	14	10	
Aboriginal Heritage	2			
MU10-Collie River S	**58**	**27**	**32**	**31**
Roads	1	4		
Residential		7	25	19
Commercial		2		

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
Public and Community	6	5	1	1
Environmental	51	9	6	11
MU11-Collie River N	**71**	**3**	**23**	**31**
Roads	3	1	4	2
Residential	3		9	26
Public and Community	4	1	2	1
Foreshore - Undeveloped	3			
Environmental	58	1	8	2
TOTAL	1562	381	1210	1877

Table B-4 Predicted assets in the 2035 inundation hazard zone, grouped by asset type & management unit

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
MU1-Peppermint Grove Beach	**84**	**5**	**13**	**34**
Roads	2			1
Residential	2		1	3
Commercial	1			
Public and Community			1	2
Foreshore - Undeveloped	2	1		5
Environmental	54	4	11	21
Agricultural / Rural	23			2
MU2-Capel Coast	**405**	**92**	**157**	**121**
Roads	30	11	18	6
Commercial			1	
Public and Community	1			4
Foreshore - Undeveloped	5			
Environmental	227	48	97	80
Agricultural / Rural	136	33	41	30
Aboriginal Heritage	6			1
MU3-Dalyellup	**4**	**1**	**0**	**0**
Environmental	4	1		
MU4- Bunbury S	**9**			
Foreshore - Developed	1			
Foreshore - Undeveloped	1			

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
Environmental	7			
MU5-Bunbury	**195**	**47**	**276**	**1675**
Roads	22	2	14	183
Residential	20	37	96	1166
Commercial	8		1	115
Public and Community	42	2	41	81
Foreshore - Developed	18	2	6	14
Foreshore - Undeveloped	16		1	
Environmental	65	4	117	115
Aboriginal Heritage	4			1
MU6-Bunbury Port	**91**	**13**	**106**	**19**
Roads	3	2	5	3
Commercial	9	6	3	
Public and Community			6	
Foreshore - Undeveloped	6			
Environmental	58	3	50	10
Agricultural / Rural	1	2	4	
PORT	14		38	6
MU7-The Cut	**30**	**6**	**89**	**2**
Foreshore - Undeveloped	1			
Environmental	29	6	89	2
MU8-Bunbury E	**242**	**154**	**342**	**161**
Roads	18	11	49	20
Residential	23	99	218	112
Commercial	9		3	4
Public and Community	27	3	23	13
Foreshore - Developed	5		1	
Foreshore - Undeveloped	8			
Environmental	145	36	34	11
Agricultural / Rural		1	11	1
Aboriginal Heritage	7	4	3	
MU9-Leschenault Estuary	**447**	**182**	**199**	**5**
Roads	20	15	18	
Residential	18	45	102	2
Commercial		1	4	

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
Public and Community	9	12	12	1
Foreshore - Undeveloped	41			
Environmental	314	88	53	2
Agricultural / Rural	43	21	10	
Aboriginal Heritage	2			
MU10-Collie River S	**64**	**52**	**32**	**31**
Roads	2	5		
Residential	1	9	25	19
Commercial	1	3		
Public and Community	6	11	1	1
Environmental	54	22	6	11
Aboriginal Heritage		2		
MU11-Collie River N	**72**	**7**	**23**	**31**
Roads	4	2	4	2
Residential	3		9	26
Public and Community	4	1	2	1
Foreshore - Undeveloped	3			
Environmental	58	4	8	2
TOTAL	1643	559	1237	2079

Table B-5 Predicted assets in the 2050 inundation hazard zone, grouped by asset type & management unit

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
MU1-Peppermint Grove Beach	**84**	**5**	**15**	**38**
Roads	2			2
Residential	2		1	3
Commercial	1			
Public and Community			1	3
Foreshore - Undeveloped	2	1	1	6
Environmental	54	4	12	22
Agricultural / Rural	23			2
MU2-Capel Coast	**405**	**92**	**162**	**138**
Roads	30	11	18	8
Commercial			1	

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
Public and Community	1			4
Foreshore - Undeveloped	5			
Environmental	227	48	100	93
Agricultural / Rural	136	33	43	32
Aboriginal Heritage	6			1
MU3-Dalyellup	**4**	**1**	**0**	**0**
Environmental	4	1		
MU4- Bunbury S	**9**			
Foreshore - Developed	1			
Foreshore - Undeveloped	1			
Environmental	7			
MU5-Bunbury	**195**	**47**	**308**	**2052**
Roads	22	2	16	218
Residential	20	37	115	1466
Commercial	8		2	134
Public and Community	42	2	45	102
Foreshore - Developed	18	2	6	14
Foreshore - Undeveloped	16		1	
Environmental	65	4	123	117
Aboriginal Heritage	4			1
MU6-Bunbury Port	**91**	**13**	**108**	**19**
Roads	3	2	5	3
Commercial	9	6	3	
Public and Community			6	
Foreshore - Undeveloped	6			
Environmental	58	3	50	10
Agricultural / Rural	1	2	4	
PORT	14		40	6
MU7-The Cut	**30**	**6**	**89**	**2**
Foreshore - Undeveloped	1			
Environmental	29	6	89	2
MU8-Bunbury E	**242**	**154**	**385**	**165**
Roads	18	11	57	20
Residential	23	99	244	116
Commercial	9		6	4

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
Public and Community	27	3	28	13
Foreshore - Developed	5		1	
Foreshore - Undeveloped	8			
Environmental	145	36	34	11
Agricultural / Rural		1	12	1
Aboriginal Heritage	7	4	3	
MU9-Leschenault Estuary	**447**	**182**	**229**	**7**
Roads	20	15	21	
Residential	18	45	124	2
Commercial		1	4	
Public and Community	9	12	13	1
Foreshore - Undeveloped	41			
Environmental	314	88	57	4
Agricultural / Rural	43	21	10	
Aboriginal Heritage	2			
MU10-Collie River S	**64**	**52**	**41**	**31**
Roads	2	5		
Residential	1	9	30	19
Commercial	1	3		
Public and Community	6	11	1	1
Environmental	54	22	10	11
Aboriginal Heritage		2		
MU11-Collie River N	**72**	**7**	**37**	**31**
Roads	4	2	5	2
Residential	3		22	26
Public and Community	4	1	2	1
Foreshore - Undeveloped	3			
Environmental	58	4	8	2
TOTAL	1643	559	1374	2483

Table B-6 Predicted assets in the 2120 inundation hazard zone, grouped by asset type & management unit

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
MU1-Peppermint Grove Beach	**84**	**5**	**43**	**88**
Roads	2		1	10
Residential	2		4	30
Commercial	1			
Public and Community			4	4
Foreshore - Undeveloped	2	1	2	12
Environmental	54	4	30	30
Agricultural / Rural	23		2	2
MU2-Capel Coast	**405**	**92**	**294**	**209**
Roads	30	11	27	20
Commercial			1	
Public and Community	1		4	7
Foreshore - Undeveloped	5		1	1
Environmental	227	48	190	140
Agricultural / Rural	136	33	70	40
Aboriginal Heritage	6		1	1
MU3-Dalyellup	**4**	**1**	**0**	**0**
Environmental	4	1		
MU4- Bunbury S	**9**			
Foreshore - Developed	1			
Foreshore - Undeveloped	1			
Environmental	7			
MU5-Bunbury	**195**	**47**	**2822**	**3232**
Roads	22	2	311	340
Residential	20	37	1558	2106
Commercial	8		509	491
Public and Community	42	2	150	126
Foreshore - Developed	18	2	15	15
Foreshore - Undeveloped	16		1	
Environmental	65	4	277	153
Aboriginal Heritage	4		1	1
MU6-Bunbury Port	**91**	**13**	**143**	**27**
Roads	3	2	8	5
Commercial	9	6	3	

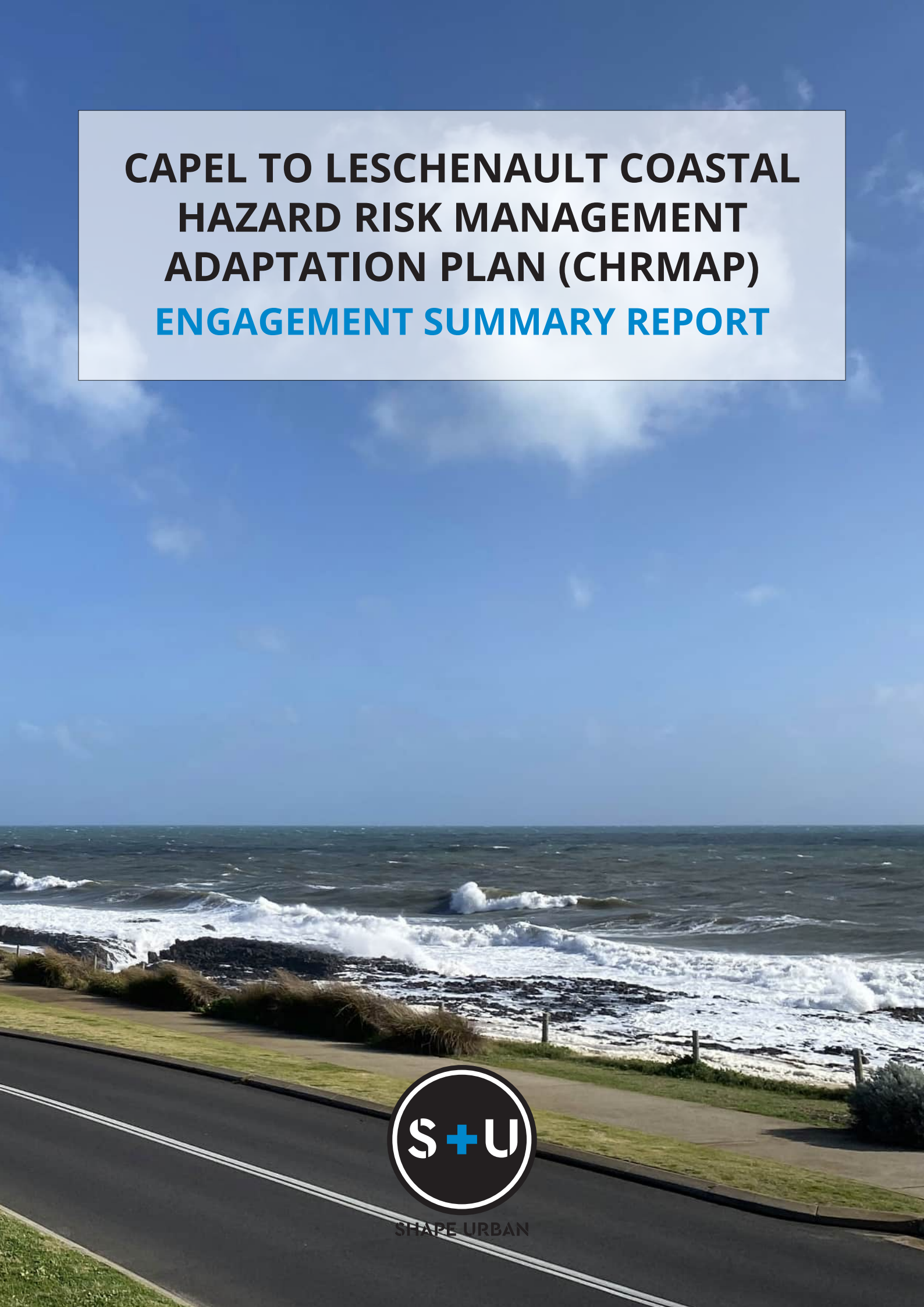
Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
Public and Community			6	
Foreshore - Undeveloped	6			
Environmental	58	3	78	16
Agricultural / Rural	1	2	4	
PORT	14		44	6
MU7-The Cut	**30**	**6**	**91**	**2**
Foreshore - Undeveloped	1			
Environmental	29	6	91	2
MU8-Bunbury E	**242**	**154**	**590**	**184**
Roads	18	11	79	21
Residential	23	99	409	126
Commercial	9		8	8
Public and Community	27	3	35	15
Foreshore - Developed	5		1	
Foreshore - Undeveloped	8			
Environmental	145	36	42	13
Agricultural / Rural		1	12	1
Aboriginal Heritage	7	4	4	
MU9-Leschenault Estuary	**447**	**182**	**316**	**15**
Roads	20	15	25	1
Residential	18	45	170	2
Commercial		1	4	
Public and Community	9	12	17	1
Foreshore - Undeveloped	41			
Environmental	314	88	87	10
Agricultural / Rural	43	21	13	1
Aboriginal Heritage	2			
MU10-Collie River S	**64**	**52**	**51**	**34**
Roads	2	5		
Residential	1	9	36	19
Commercial	1	3		
Public and Community	6	11	3	2
Environmental	54	22	12	13
Aboriginal Heritage		2		
MU11-Collie River N	**72**	**7**	**54**	**33**

Management Unit	1-year ARI	10-year ARI	100-year ARI	500-year ARI
Roads	4	2	7	2
Residential	3		35	28
Public and Community	4	1	2	1
Foreshore - Undeveloped	3			
Environmental	58	4	10	2
TOTAL	1643	559	4404	3824

APPENDIX C
ENGAGEMENT OUTCOMES REPORT

CAPEL TO LESCHENAULT COASTAL HAZARD RISK MANAGEMENT ADAPTATION PLAN (CHRMAP)

ENGAGEMENT SUMMARY REPORT



SHAPE URBAN

EXECUTIVE SUMMARY

The Capel to Leschenault coastline is highly valued by the people who call it home, however the coastal areas are subject to erosion and inundation risks, which will have a significant impact on its communities over time.

The Peron Naturaliste Partnership (PNP), the City of Bunbury and the Shires of Capel, Dardanup and Harvey have partnered with the Department of Biodiversity, Conservation and Attractions, Department of Water and Environmental Regulation and Southern Ports Authority to develop a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) to understand how these changes can be best managed into the future.

In 2019 a CHRMAP was prepared for the Koombana Bay area that examined erosion risks and adaptation options, but this is the only location. The Koombana Bay CHRMAP will be considered in the context of the broader CHRMAP area in this study.

A critical part of this project is the engagement with the local community and relevant stakeholders. Given the coastline's susceptibility to coastal erosion, extreme weather events and climate change risks, the stakeholder engagement for the project has been shaped to facilitate an understanding of coastal challenges, hazards and risks, understand how the community values assets along the coastline and the value they place on protection for those assets.

These values will help inform the management actions and adaptation strategies for use and protection of the management units that make up the project area's coastal zone. The coastal zone for this project includes the coastline and low-lying areas around the Leschenault Inlet and Estuary and associated rivers including the Preston/ Collie River.

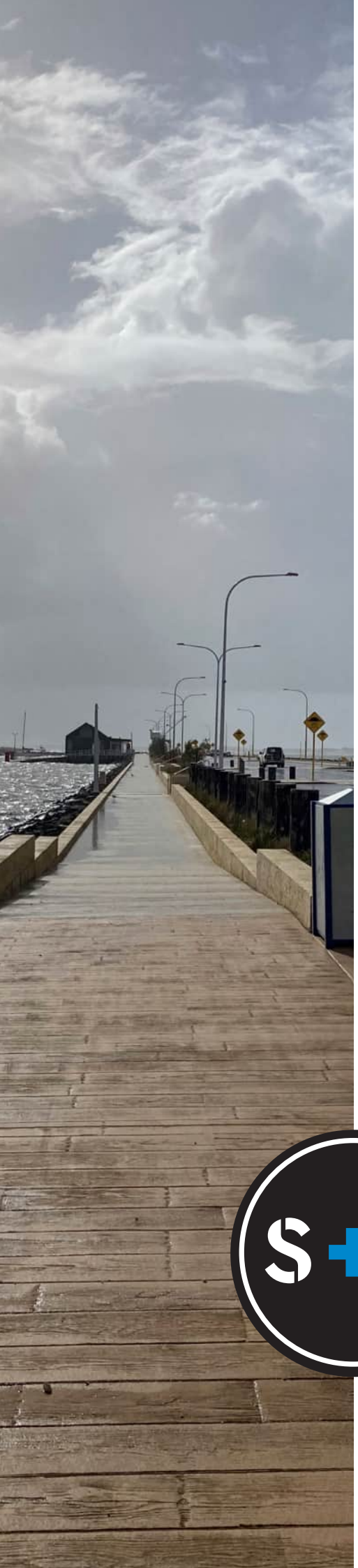
This engagement summary report presents outcomes of the engagement undertaken to collect community coastal values for the coastal townsites in the City of Bunbury, Shire of Capel, Shire of Dardanup and Shire of Harvey.

A workshop was undertaken in a nominated location in each of the local government areas and linked online on 2 September 2021.

Key values from online and in-person engagement are the use of coastal and estuarine areas for activities like walking, swimming, boating, family time; wanting to see/ the need for retention of coastal vegetation and landforms; protection of the environment; observation of coastal erosion occurring and a desire to see this be addressed.

This report will be updated as engagement for the project progresses and the community values are translated into coastal assessments, trade-offs, risks and adaptation approaches.

We thank all those who were involved in generating these values via the online engagement platform (Social Pinpoint), social media or email, and through the workshopping processes.



CONTENTS

1.0 INTRODUCTION

1.1 BACKGROUND

The Capel to Leschenault coastline is highly valued by the people who call it home, however the coastal areas are subject to erosion and inundation risks, which will result in coastline changes over different time periods and have a significant impact on its communities over time. There will also be further changes as a result of climate change, such as sea level rise and more severe storm events.

Balancing the community's desire to live near the coast and managing the impacts of coastal processes is therefore becoming more important.

The Peron Naturaliste Partnership (PNP), the City of Bunbury and the Shires of Capel, Dardanup and Harvey have partnered with the Department of Biodiversity, Conservation and Attractions (DBCA), Department of Water and Environmental Regulation (DWER) and Southern Ports Authority (SPA) to develop a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) for the area to understand how these changes can be best managed into the future.

The study area sits across four local government areas (LGAs), namely the Shire of Harvey, City of Bunbury, Shire of Dardanup, and Shire of Capel (Figure 1 refers). The study areas consists of sand and mixed coasts, estuaries and inlets (e.g. Leschenault Inlet), rivers (Collie River and Preston River), and numerous areas of important coastal infrastructure under the management of different government organisations (including Port of Bunbury, Koombana Bay Sailing Club, Casuarina Harbour, jetties, groynes, seawalls, bridges).

The region has been identified in Western Australia as an erosion hotspot and is considered a priority for coastal hazard assessment and management planning.

A critical part of this project is the engagement with the local community and relevant stakeholders. Preliminary stakeholder engagement aims to raise awareness of the project, gather knowledge of how the community values assets along the coastline and ensure that concerns and aspirations are properly understood.

These values and concerns will help inform the selection of appropriate adaptation strategies to respond to the coastal risks in later stages of the project.

This report details the engagement and workshops undertaken in the preliminary engagement stage.

This report will continue to be updated as more engagement work is undertaken.

1.2 ENGAGEMENT ACTIVITIES

The engagement activities for this stage of the project included:

- use of an interactive project tool (Social Pinpoint) to answer CHRMAP value survey questions and pin values and comments spatially on a project map;
- hard copy surveys mirroring the online component;
- a community workshop held in a location in each of the four LGAs and linked online to discuss coastal processes, map community values and understand issues and concerns of the community for the study area; and
- stakeholder meetings.

Figure 1 - Capel to Leschenault CHRMAP Study Area

1.3 PURPOSE OF THE REPORT

The purpose of this report is to summarise the stakeholder engagement process undertaken through the preliminary engagement phase. It includes activities undertaken, the information presented and modes of engagement.

The report details feedback received. Responses from the engagement and the community workshop are detailed through the report. All individual comments from online and hard copy surveys and the workshop can be found unedited in the Appendices section of this report.

1.4 ENGAGEMENT SUMMARY

In the preliminary stage of engagement stakeholders could visit an online project page with a mapping tool and survey to drop pins and comment on activities they value and their locational preferences for these activities on the map.

Participants could also respond to a survey and provide any other feedback on how they use the different areas of the coastline. The survey was available online and in hard copy at the LGA administration centres.

The survey and mapping tool was open from 26 July 2021 to 10 September 2021. In addition, people could provide survey responses in hard copy.

The project team received 84 CHRMAP values survey responses online, 97 hard copy survey responses (a total of 181 survey responses) and 56 'pins' were placed on the map.

Stakeholders were further engaged through the following:

- Social media posts
- Key briefings with the Project Steering Group (PSG) including administrative and elected members from PNP, the four LGAs, the Department of Planning, Lands and Heritage and the Department of Transport
- Briefings to key staff members and Executive Management at the LGAs.

28 people attended the workshop.

In total more than 150 participants contributed to this stage of engagement, with an approximate reach of more than 445 local community members and organisations.

The community's values and other stakeholder feedback received will be used to inform the development of adaptation options for the study area.

The project team will also be looking to schedule targeted meetings with identified key stakeholders as part of the next engagement stage.

This report will be updated with these outcomes and the outcomes of additional engagement as the project progresses.

2.0 PRELIMINARY FEEDBACK

2.1 ONLINE ENGAGEMENT

The PNP's website was used to provide a summary of the project and direct the community to a dedicated project page (https://getinvolved.mysocialpinpoint.com.au/capel-to-leschenault-chrmap).

The community could view project information, frequently asked questions, access the survey, register for project updates, register for the workshop or do a combination of these things.

Online engagement is measured by splitting the level of interaction into three groups; aware, informed and engaged.

Aware

The total number of participants aware of the project through the online engagement tools can be measured by the number of people that viewed at least one page of the website relating to the project. 1,443 participants visited at least one page of the project online.

Informed

Of those who were aware, a smaller group were informed further about the project. This can be measured by the number of interactions with the pages. These people numbered 445.

Engaged

The total who contributed or engaged by using one of the tools was 114. From these, 114 engaged contributors submitted a total of 84 survey responses and 56 pins were placed.

Other

The LGAs also offered the community the opportunity to fill in the CHRMAP Values survey that was on the Social Pinpoint project page in hard copy. 97 hard copy surveys were received, resulting in a total of 181 surveys being completed.

2.2 SOCIAL MEDIA

The four LGAs used social media, specifically Facebook, to promote the project and any engagement activities. The following statitstics show the amount of engagement generated by social media activity:

- Shire of Capel - 6 August 2021 - post received 3 likes
- City of Bunbury - 11 August 2021 - post received 227 reactions, 47 comments and 43 shares. Reactions to the City of Bunbury post were 201 likes, 21 love, 3 laugh, 1 surprised and 1 care
- Shire of Harvey - 23 August 2021 - post received 7 likes, 1 comment and 2 shares
- Shire of Capel - 27 August 2021 - post received 4 likes and 2 shares
- Shire of Dardanup - 30 August 2021- no feedback (noting the workshop was hosted on 2 September 2021).

Comments on City of Bunbury post related to erosion and the loss of beaches and views to date, a desire to declare a climate emergency, how vegetation contributed to values (both the coastal processes benefit and impacting viewsd), and observations of other LGAs that had used physical controls like groynes and sand fill, and the negative impacts of these measures.

One respondent wanted to see a carpark that is easily accessible to be able to view the ocean.

2.3 CHRMAP SURVEY

The community told the project team that the coastal zone is important to them for many recreation, social and cultural reasons.

The coastal zone for this project includes the coastline and low-lying areas around the Leschenault Inlet and Estuary and associated rivers including the Preston/ Collie River.

A survey was set up to understand the importance of the study area to the community for a range of activities, and the importance to the community of being able to undertake these activities.

The CHRMAP survey asked the community 15 individual questions about how they use and value the coastal areas, how they value different adaptation responses, and their relationship to the coastal townsites.

Two additional questions asked respondents about their age and gender.

A total of 181 survey responses were received. The following section summarises the responses to the survey questions.

Q1 - Within the project area which area do you visit the most?

Peppermint Grove Beach was the most popular response to this question (76 mentions). The next most popular location was Dalyellup Beach (58 mentions), followed by Koombana Bay (15 mentions). Leschenault Inlet, Lighthouse Beach and Forrest Beach all received (10 mentions) .

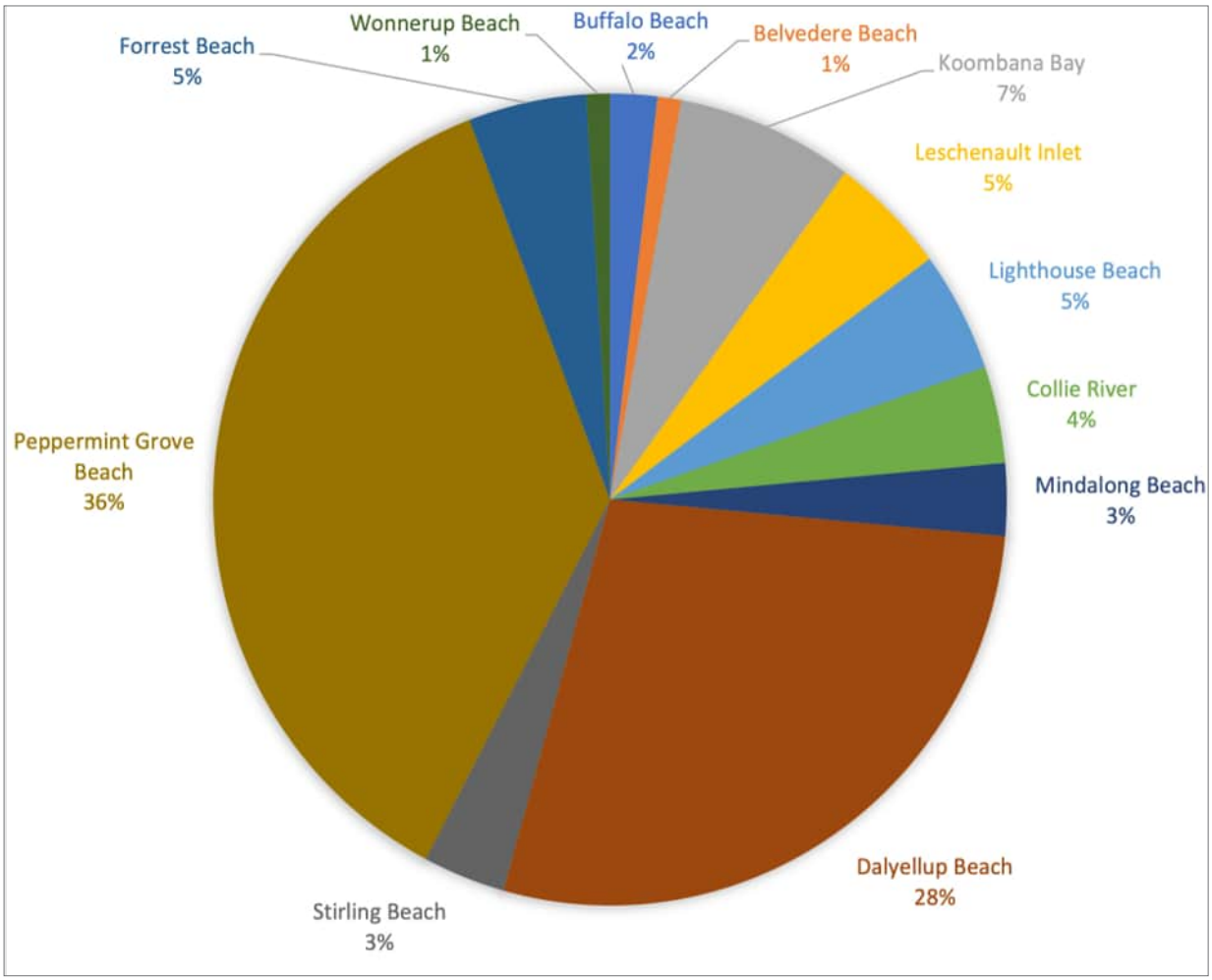


Figure 2 - Question 1

Q2 - How often do you visit the beach, foreshore area and/or Leschenault Inlet and Estuary?

The frequency of visitation to areas varied. 68 respondents visited weekly (37%), 61 respondents visited daily (33%), 29 visited monthly (16%) and 23 visited occasionally (12%).

Three respondents visited these areas rarely (2%).

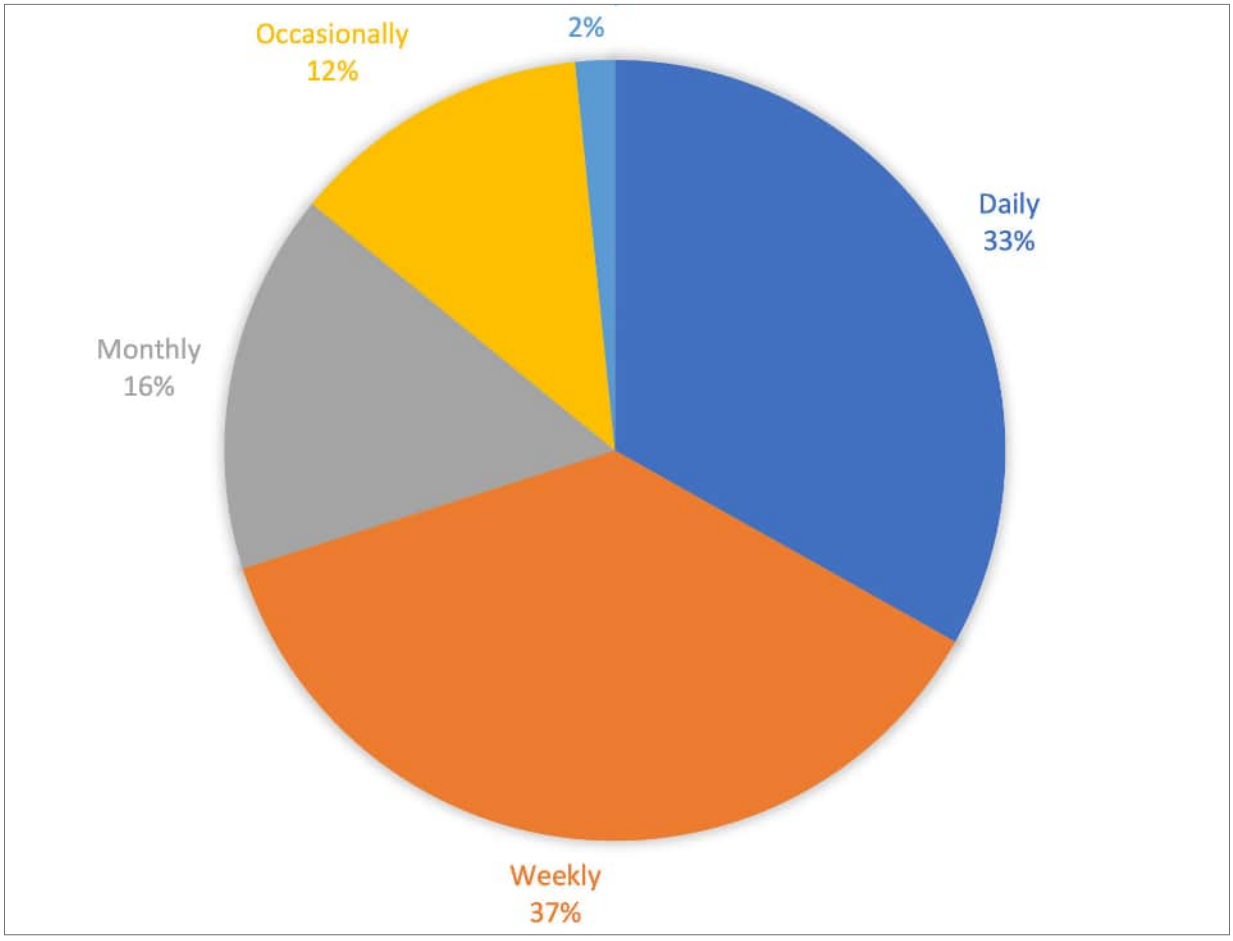


Figure 3 - Question 2

Q3 - What do you use the beach, foreshore area and/or Leschenault Inlet and Estuary for?

People were able to select multiple options regarding what they use the beach or foreshore areas for.

Beach based activities was the most popular use with 136 mentions, followed closely by water based activities (128 mentions). Foreshore based and nature based activities were also well represented, with 111 and 100 mentions respectively.

The beach, water, foreshore and nature based activities comprise a variety of reasons, as depicted in Figure 4 below.

9 respondents selected the 'Other' option and provided responses about what they used these areas for. Responses included being a landowner adjacent to the coast, for exercise (noting this was a beach based activity option), dog walking, photography, for views, rowing and to use the sailing club.

Two respondents did not want to see any more development on the coast and suggested no four-wheel driving be permitted.

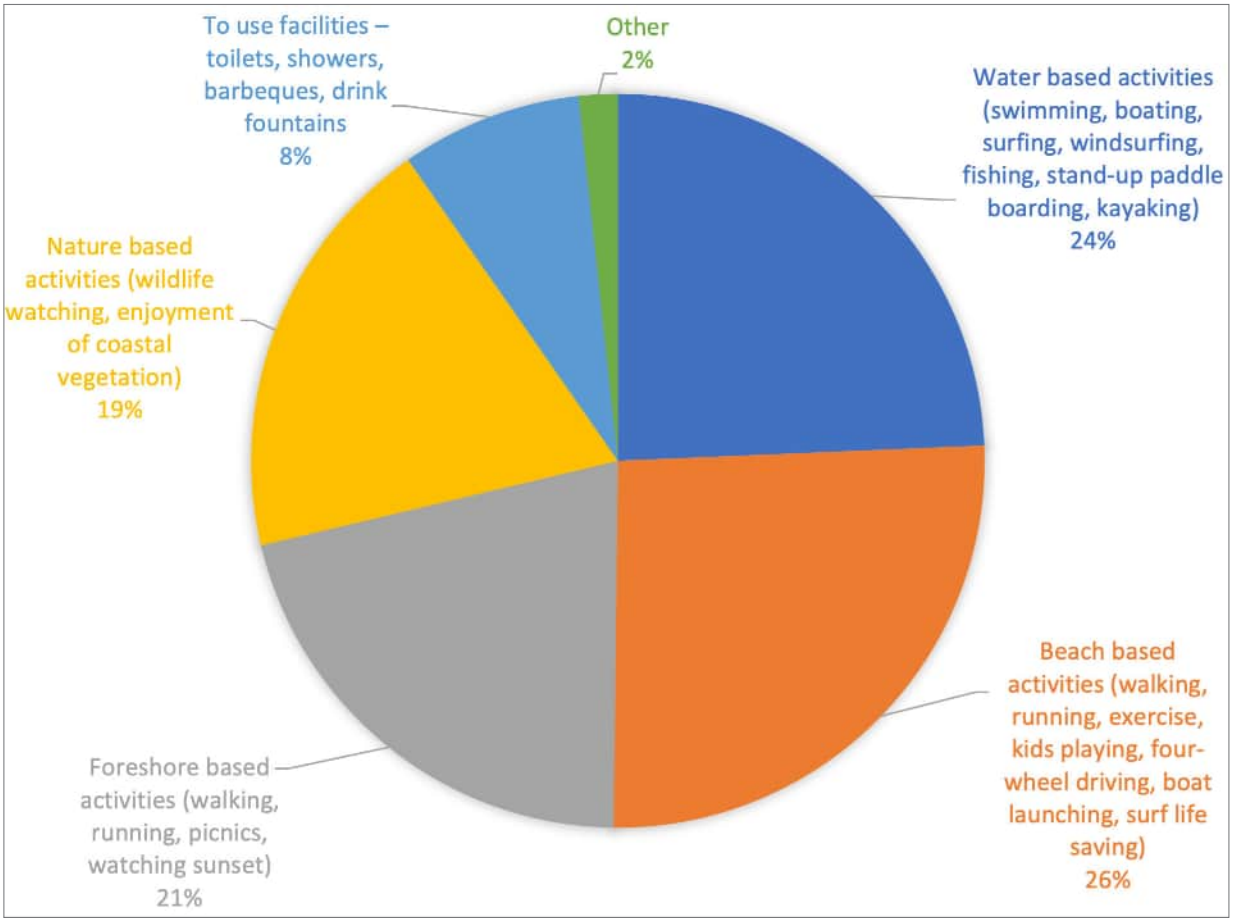


Figure 4 - Question 3

Q4 - How would you describe your understanding of coastal erosion and coastal flooding?

85 respondents (46%) had a general awareness of coastal erosion and flooding, 62 (34%) had a good understanding, and 26 (14%) had a very good understanding.

Nine respondents (5%) were uncertain about coastal erosion and flooding and one (1%) was not at alll aware.

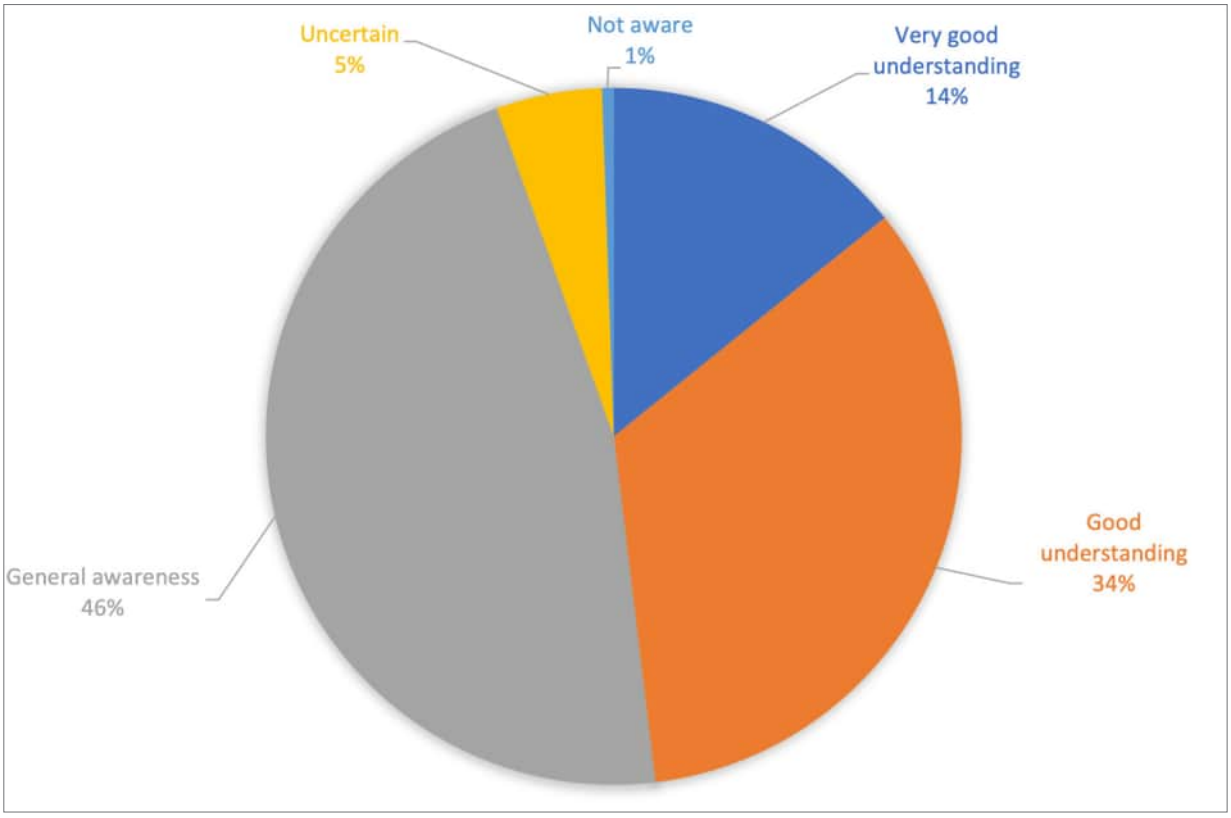


Figure 5 - Question 4

Q5 - What do you consider to be the most important values of the Capel to Leschenault project area?

Respondents were asked to rank a selection of 10 values in order of importance to them from one (1) to 10.

When averaged across all responses, the most important values to respondents were:

1. Preserving the natural environment and ecological ecosystems ;
2. Retention of natural landscapes not interrupted by human-made structures; and
3. Opportunities to use beaches for passive recreation activities (e.g. swimming and walking).

The ranking for all ten options are shown at Figure 6.

1. Preserving the natural environment and ecological systems
2. Retention of natural landscapes, not interrupted by human-made structures
3. Opportunities to use beaches for passive recreation activities (e.g. swimming and walking)
4. Ongoing provision of beaches and foreshore reserves for current and future generations
5. Ensuring that all residents and visitors are able to access the beach and foreshore
6. Conservation of heritage sites
7. Opportunities to enjoy the coastal landscape (e.g. viewing platforms and interpretive signage)
8. Opportunities to use public foreshore facilities (e.g. toilets, showers, picnic and BBQ facilities)
9. Opportunities to use facilities that support active recreation (e.g. boat ramps and jetties)
10. Opportunities to use for commercial operations that support the local economy (e.g cafes, jetties and tourism activities)

Figure 6 - Question 5

Q6 - On a scale of 1 to 5 (where 1 is strongly disagree and 5 is strongly agree), how do you feel about the following options for coastal management?

Respondents were asked to rate nine coastal management approaches from 1 (strongly disagree) to 5 (strongly agree).

These responses follow.

Preserve dunes, revegetate foreshore reserves and do not remove beach wrack (seaweed) to lower the risk of coastal erosion

A majority of respondents (100 strongly agree votes and 50 agree votes) were in favour of preserving dunes, revegetating foreshore reserves and not removing beach wrack.

Six respondents strongly disagreed and two disagreed with this management approach.

Three respondents didn't have a positive or negative view on this management approach.

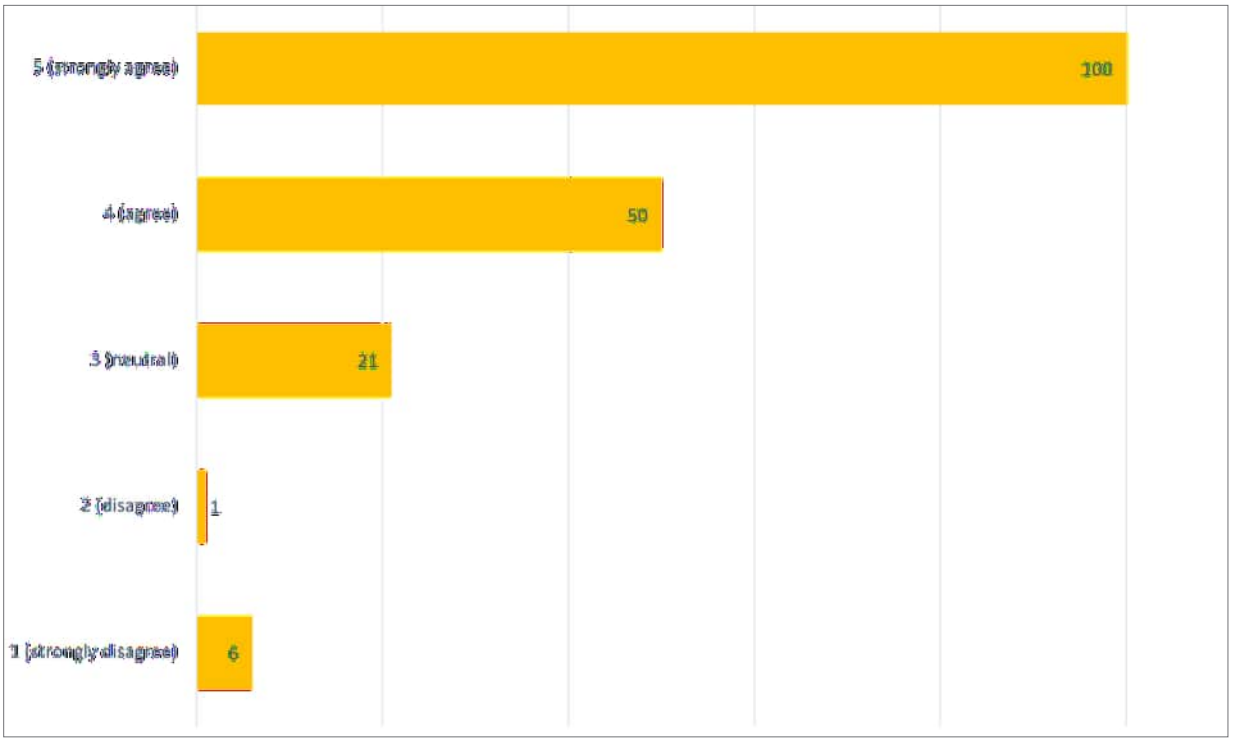


Figure 7 - Preservation to lower risk of coastal erosion

Landowners should be allowed to protect their property where they have demonstrated there will be no impact on the adjoining coast

76 respondents agreed that landowners should be allowed to protect their property where they have demonstrated there will be no impact on the adjoining coast.

This was the most favoured response, followed by 55 respondents who strongly agreed with this management approach.

Two respondents disagreed with this management approach, one strongly disagreed and three respondents were neutral about this management approach.

Figure 8 refers.

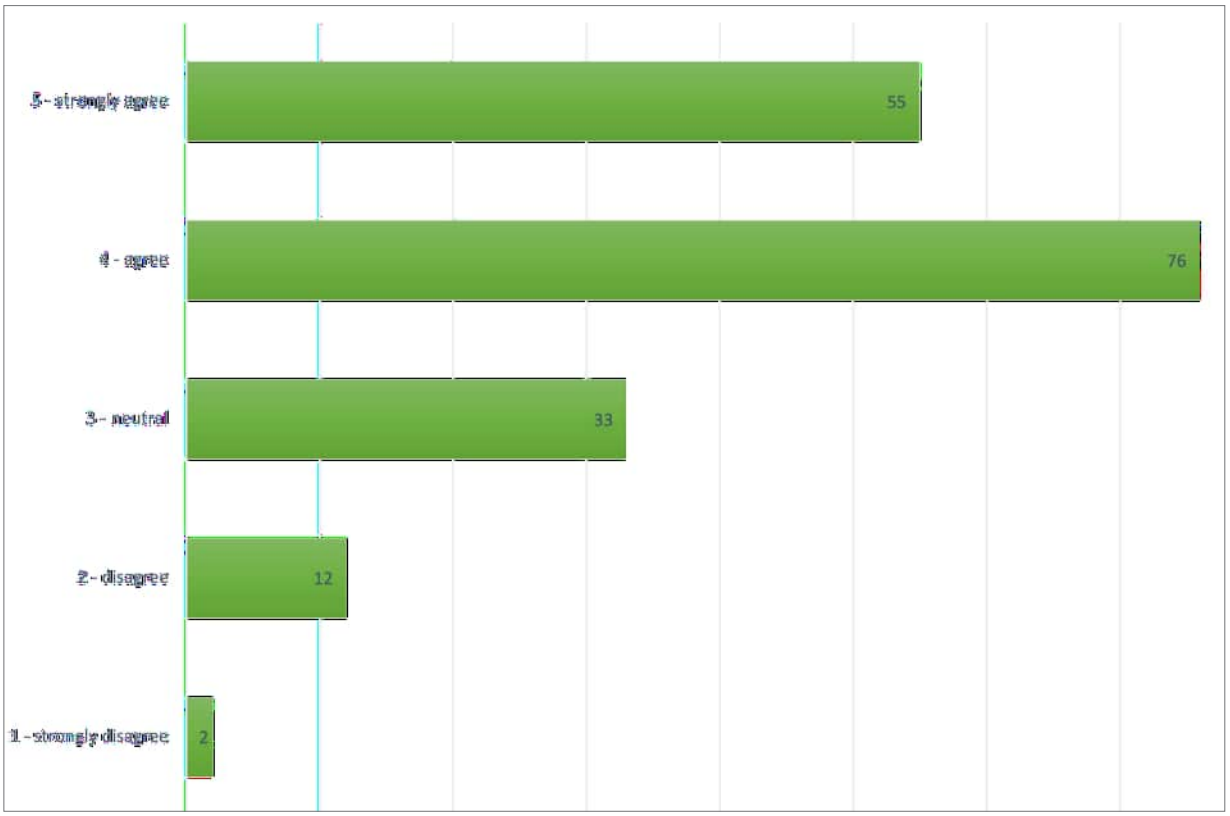


Figure 8 - Protect private property with demonstration of no coastal impact

Beneficiaries of protection works should bear the capital and maintenance costs of those works

Responses to this question were distributed broadly from strongly disagree to strongly agree. Percentages have thus been used to differentiate how respondents felt about this management approach.

33% of respondents were neutral about beneficiaries of protection works bearing the costs of these works. 28% of respondents agreed with the management approach and 15.8% strongly agreed.

9.7% of respondents strongly disagreed and 15.8% strongly agreed with the premise of this management approach.

The distribution of these responses suggest that this may require further discussion during the next engagement stage.

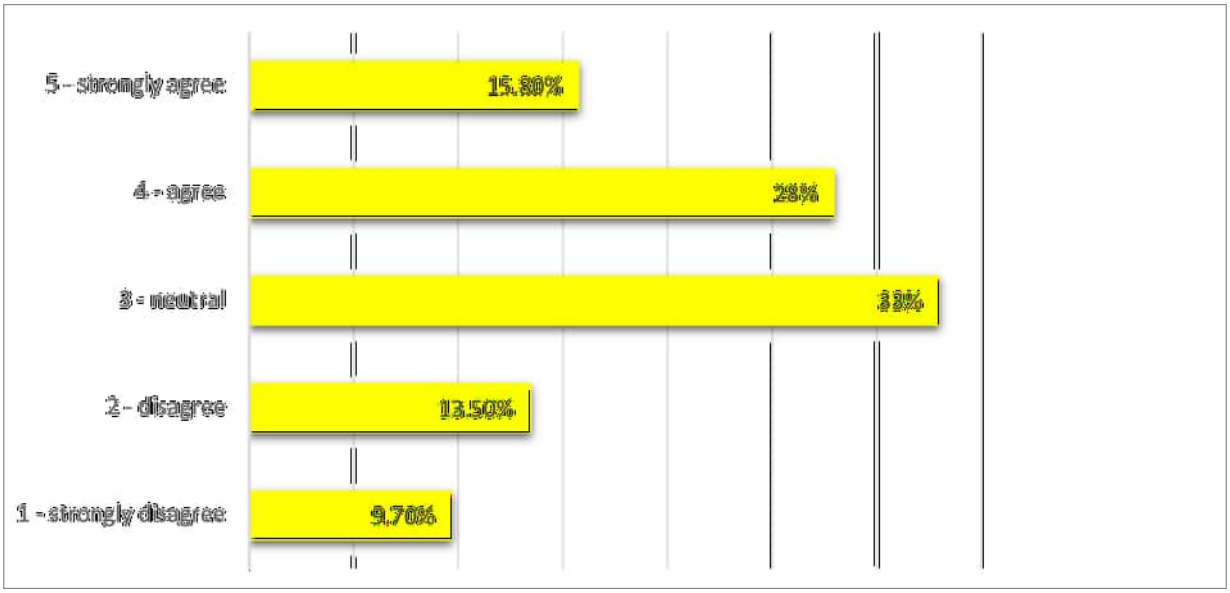


Figure 9 - Beneficiaries of protection works should bear cost

Protect private property from erosion, even if this results in the loss of public foreshore reserve and beach access

Responses to this question were also distributed broadly. Percentages have thus been used to differentiate how respondents felt about this management approach.

28.7% of respondents disagreed that private property should be protected from erosion even if it results in the loss of public foreshore reserve and beach access. 18.6% strongly disagreed with this management approach.

14.9% agreed and 12.8% strongly agreed with this management approach.

5% were neutral.

This response suggests that this approach should also be discussed further during the next engagement stage.

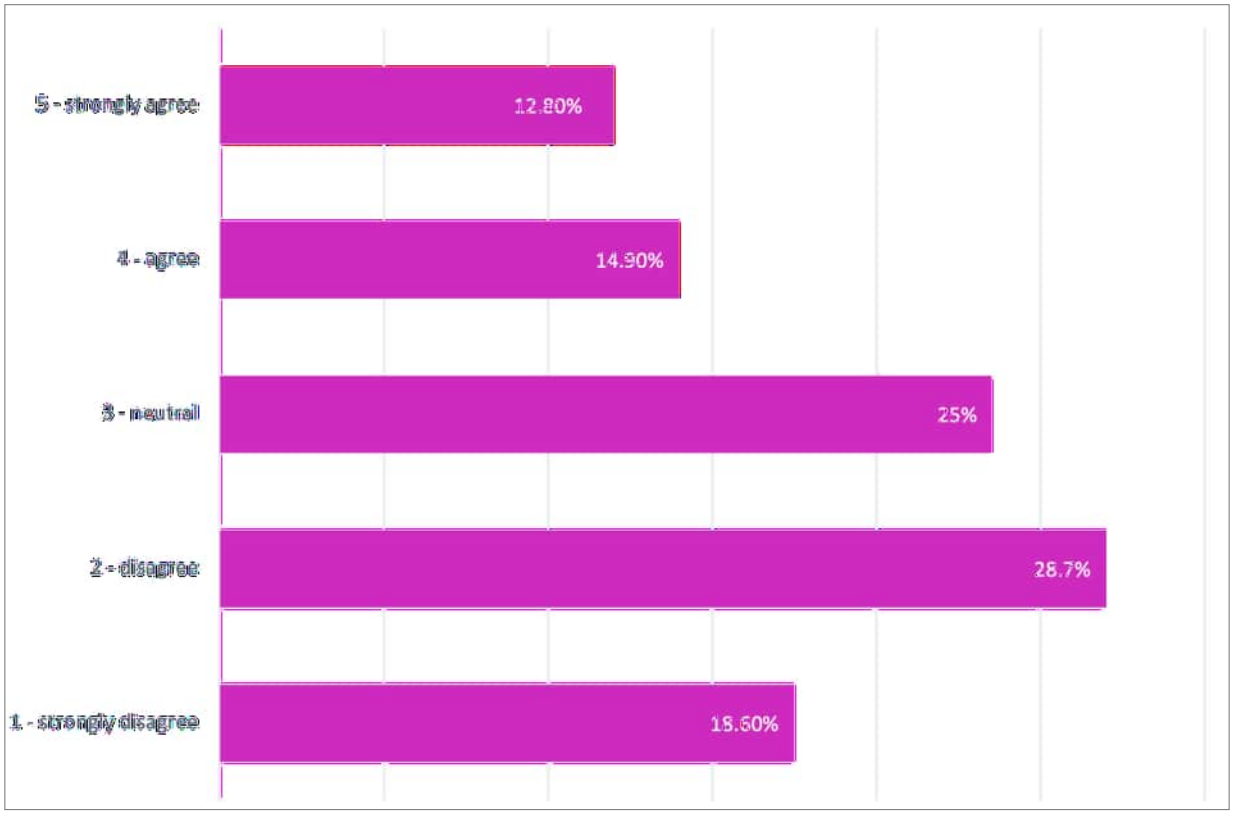


Figure 10 - Protect private property from erosion at all costs

Allow approved land uses in developed areas until erosion becomes intolerable

Respondents generally disagreed that approved land uses should be allowed in developed areas until erosion becomes intolerable.

65 respondents strongly disagreed with this management approach, and another 57 disagreed with it.

18 respondents agreed with this approach and 12 strongly agreed with this approach.

30 respondents were neutral.

This management approach will need further consideration ,and potentially discussion around how this might be progressed.

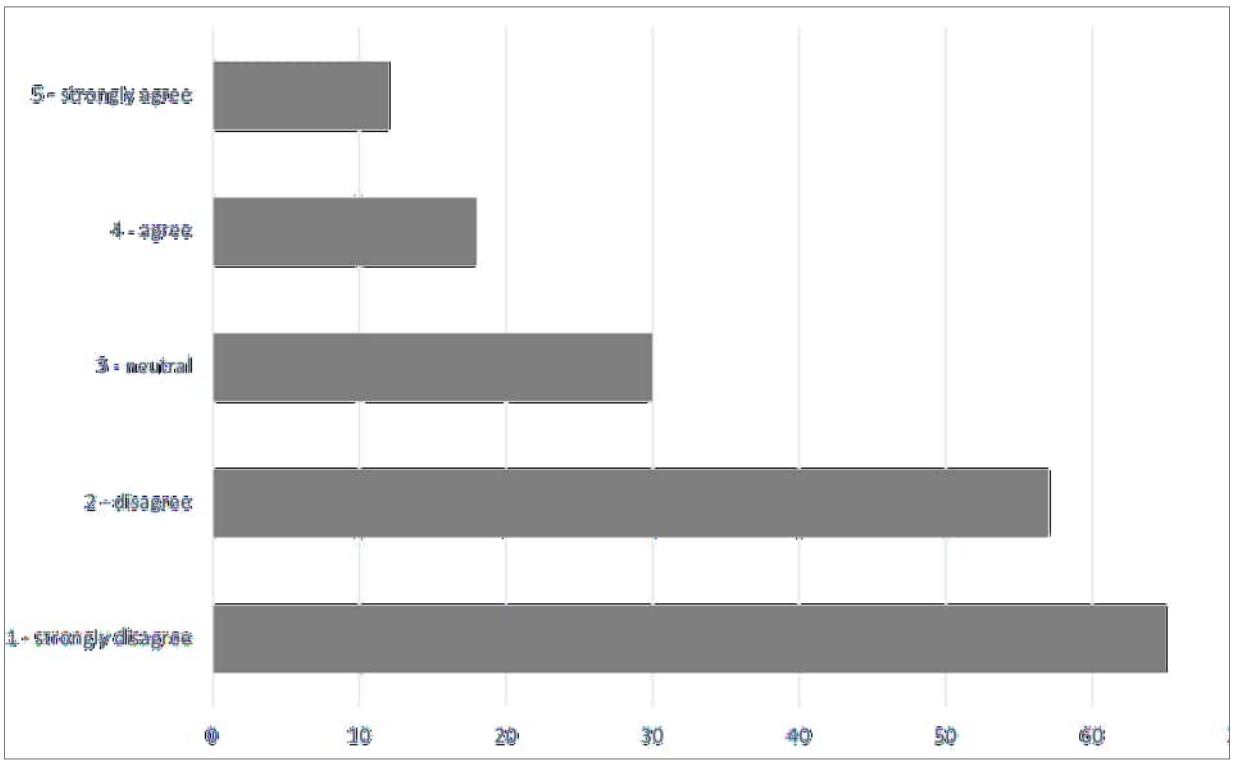


Figure 11 - Allow approved uses until erosion is intolerable

Retain public access to beaches and foreshore reserves and preserve coastal dunes and vegetation for future generations

There was strong agreement (115 polled for strongly agree and 49 polled for agree) from respondents about retaining public access to beaches and foreshore reserves and preserving coastal dunes and vegetation for future generations.

Only four respondents strongly disagreed with and six disagreed with this management approach.

Four respondents were neutral about this management approach.

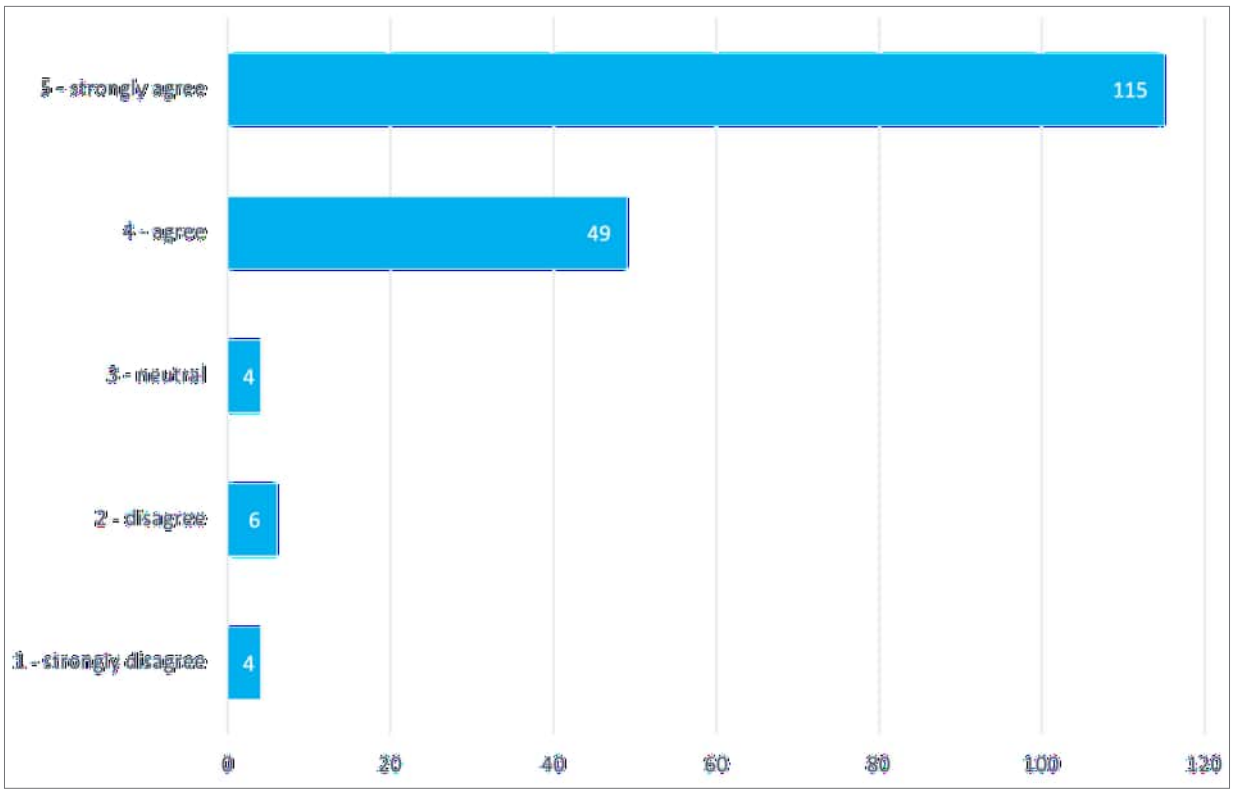


Figure 12 - Retain public access and protect dunes and vegetation for future generations

Relocate assets away from the coast and let natural processes take their course

This management approach also received a range of responses from stakeholders.

Of the 181 responses, 11% (20 votes) strongly agreed with the management approach and 26.52% (48 votes) agreed.

12.71% of respondents (23 votes) strongly disagreed with the management approach and 26% (47 votes) disagreed with it.

23.76% of responses (43 votes) were neutral about this management approach.

Relocation (retreat) is a complicated management approach and needs to be considered carefully against other community outcomes.

The project team will discuss this and other management approaches and the trade-offs involved with the community after vulnerability and risk profiles have been undertaken for the various coastal and estuarine assets in the study area.

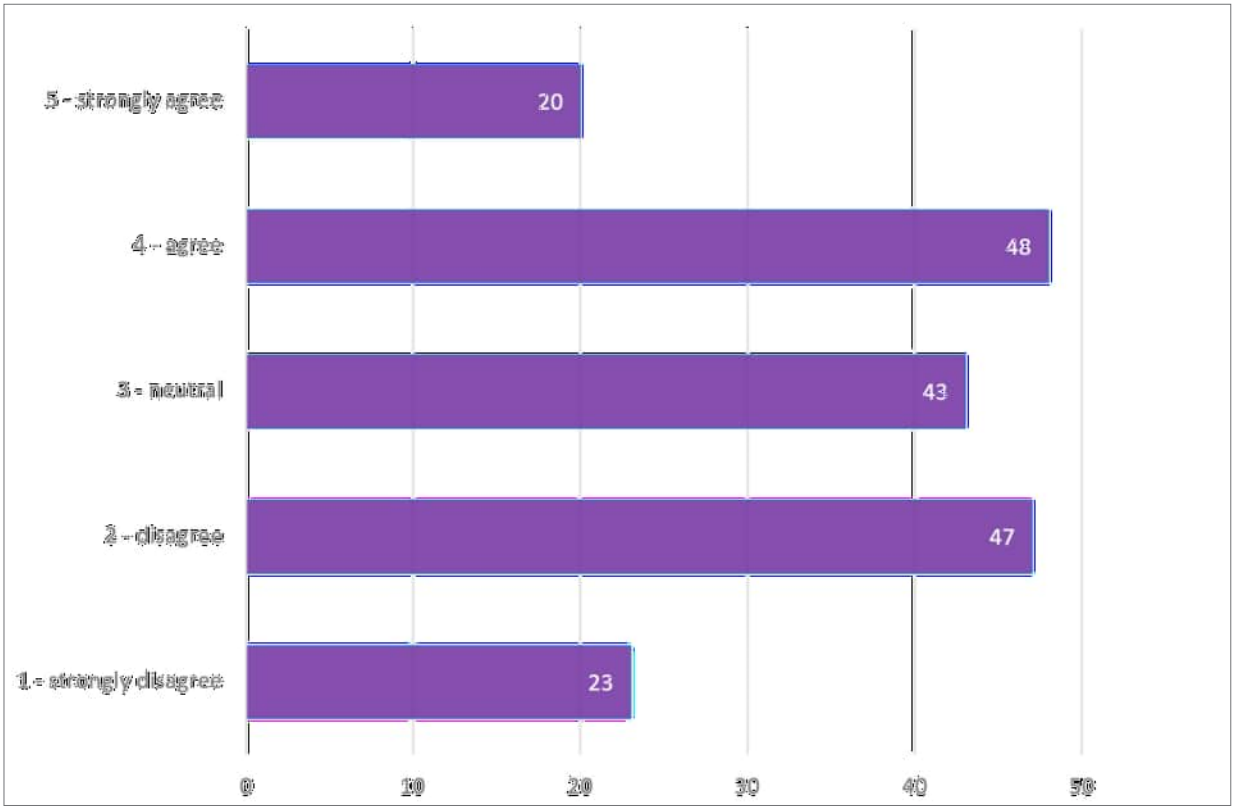


Figure 13 - Relocate assets away from coast

Do not allow more intensive development (such as units where there is a single house) in hazard areas

There was largely support for not allowing more intense development in hazard areas - 97 respondents strongly agreed and 56 agreed.

Six respondents strongly disagreed and seven disagreed with this management approach.

13 respondents were neutral about the approach.

This management approach will be discussed further when the project team consults with the community and stakeholders about adaptation options for the study area.

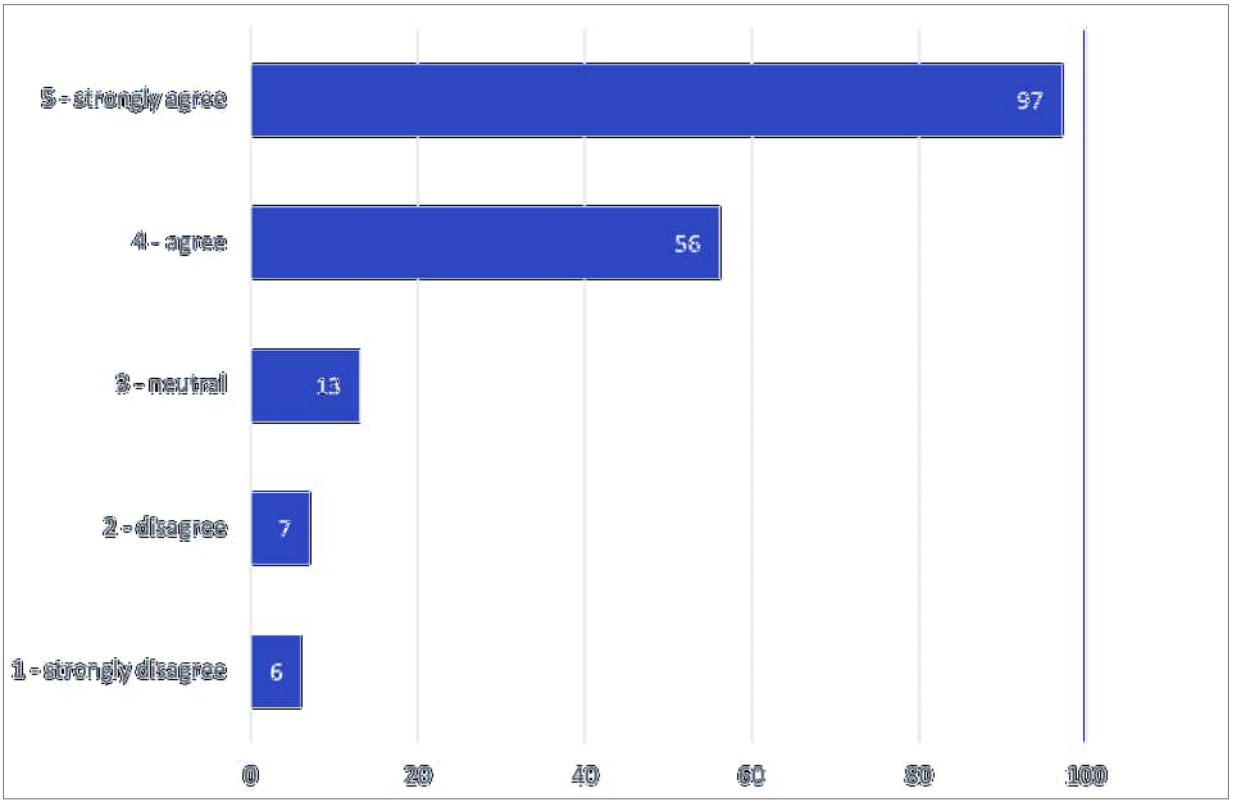


Figure 14 - Do not allow more intensive development in hazard areas

Private landowners should be informed about the risk of erosion when purchasing or developing in hazard areas

119 responses strongly agreed that private landowners should be informed about the risk of erosion when purchasing or developing in hazard areas.

53 responses agreed with this approach.

This was the vast majority of responses, with only three (3) polled strongly disagreeing with the approach, two (2) polled disagreeing and three (3) neutral polls.

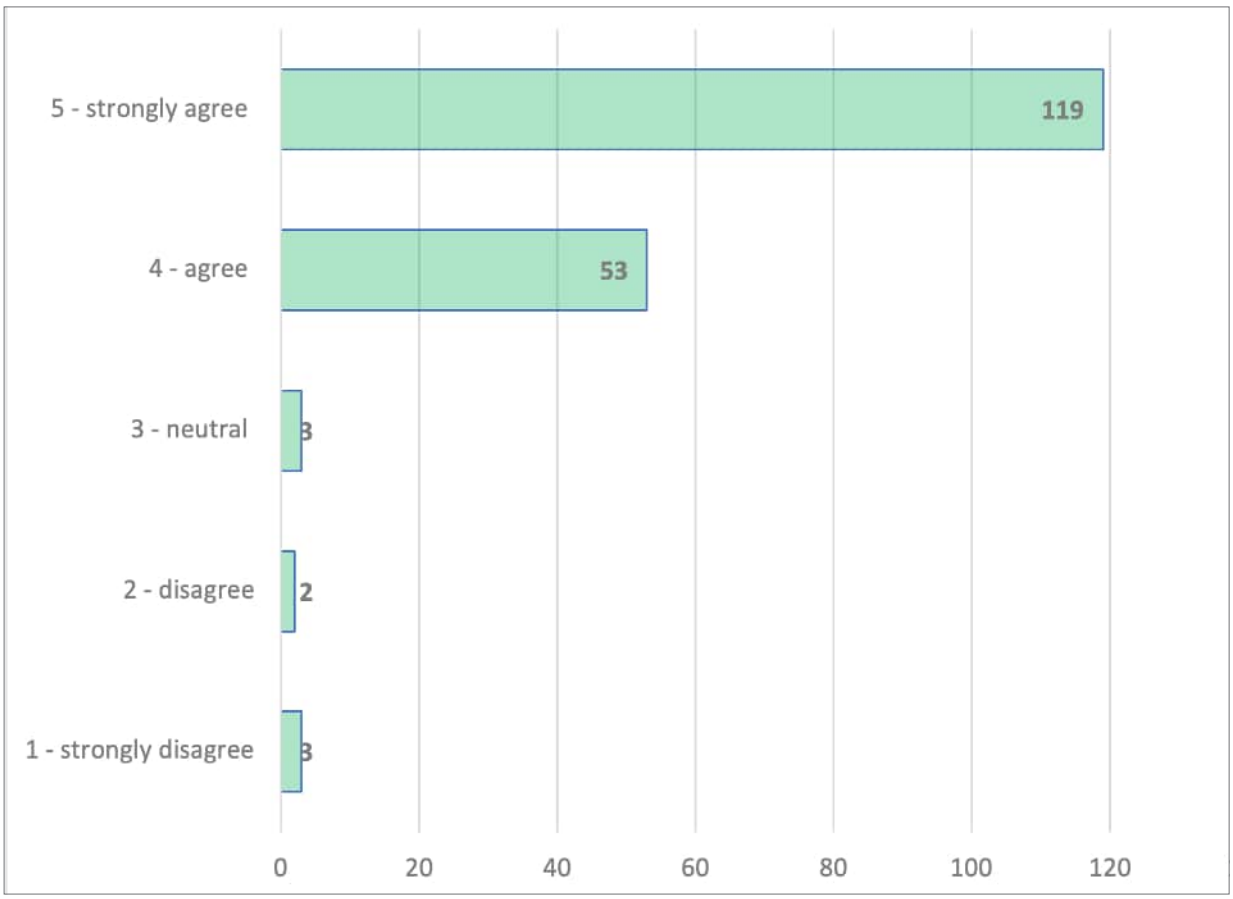


Figure 15 - Inform purchasers or developers of erosion risks in hazard areas

Q7 - How would you describe your connection to the Capel to Leschenault coast?

151 respondents to this question are landowners.

Nine respondents rent in the area, 16 are rate payers (own property but are not residents) and six work in the area.

six respondents are holidaying in the area.

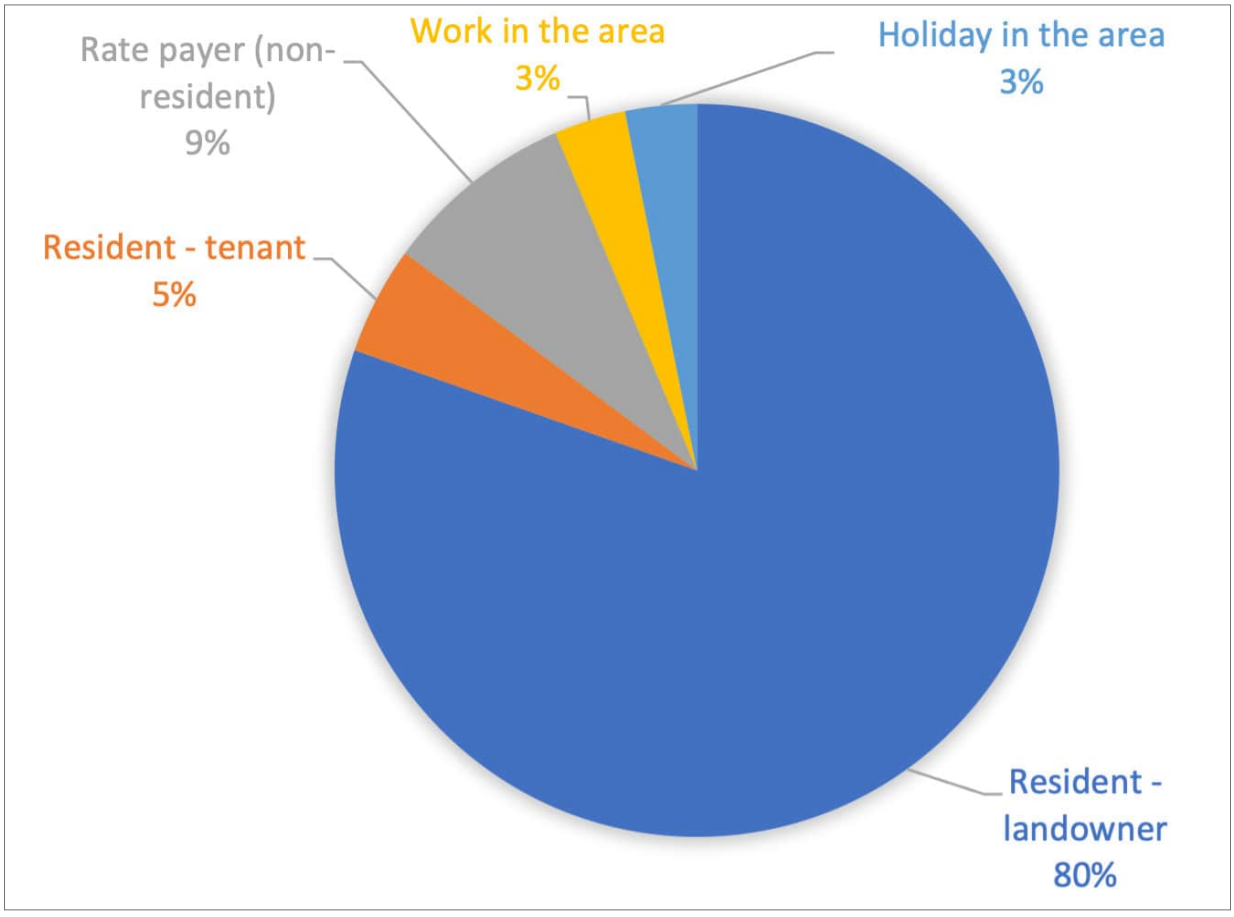


Figure 16 - Question 7

Q8 - How would you describe yourself?

81 survey respondents were female, 96 were male, one identified as non-binary and three said they would prefer not to say.

Q9 - What age bracket applies to you?

24% of respondents were 66+ years old.

32% were in the 56-65 age bracket, 20% were in the 46-55 age bracket and 12% were in the 36-45 age bracket.

7% of respondents were in the 26-35 age bracket, 1% (one person) was in the 18-25 age bracket and 1% (one) was in the 0-10 age bracket.

2% of respondents (six people) preferred not to say.

The overall sample of respondents is representative of the demographic population of the LGAs.

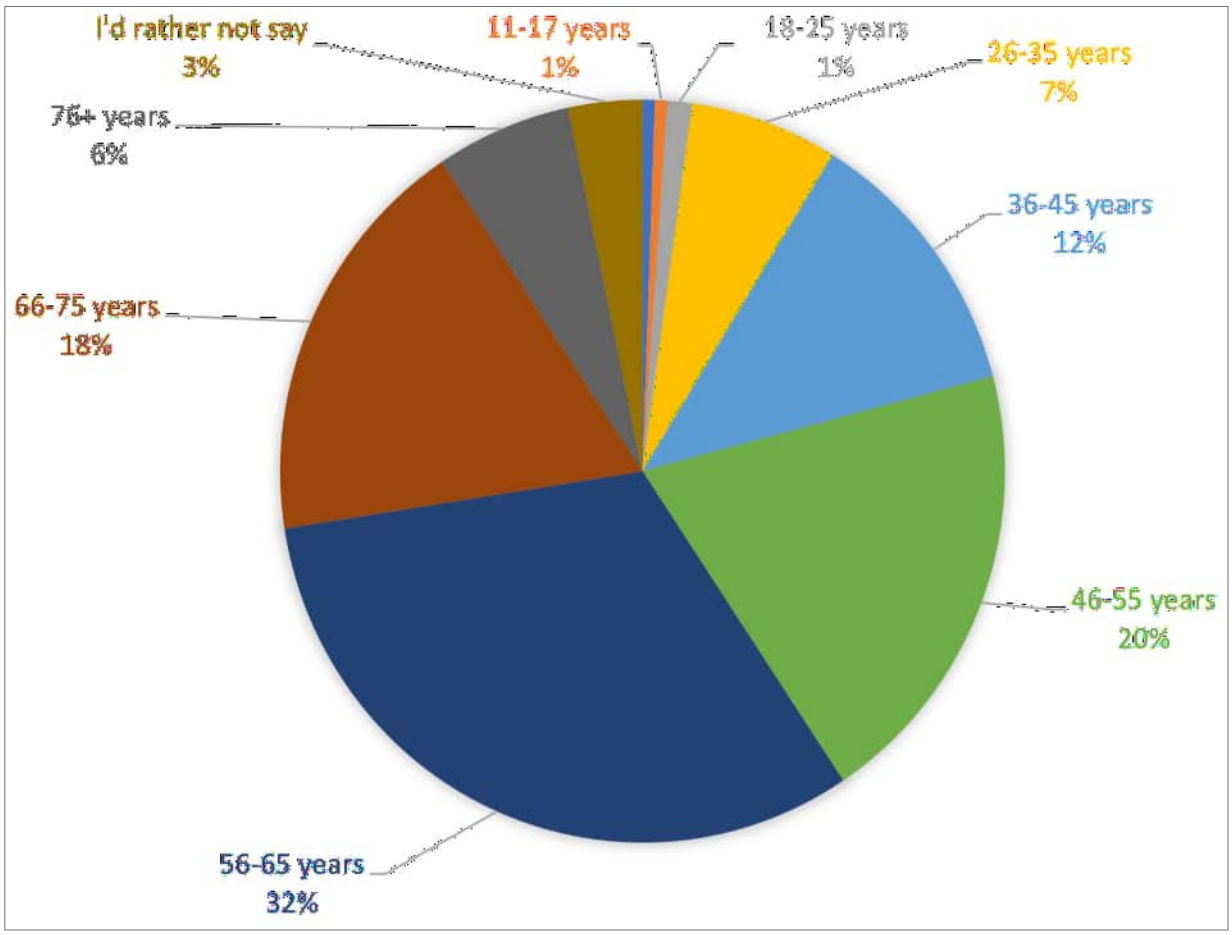


Figure 17 - Question 9

2.4 MAP AND COMMENTS

Respondents had the choice to place a 'pin' on a map provided on the project page and make a comment regarding that location.

Figure 18 illustrates the web portal mapping tool comments received. It shows where feedback was provided across a number of themes represented by the pin options.

A total of 56 comments were received on the interactive map. These were generally broadly distributed, with a larger clustering of comments around the Bunbury coastline and Peppermint Grove Beach in Capel.

The pins related to the following five category options:

- Water based activities (e.g. swimming, boating, surfing, windsurfing, fishing)
- Beach based activities (e.g. four-wheel driving)
- Foreshore based activities (e.g. walking, running, picnics, bbqs, watching sunset)
- Nature based activities (e.g wildlife watching, enjoyment of coastal vegetation)
- Something else/other (please describe)

Of the 56 comments received, these are broken down as follows:

- 15 water based comments - mainly discussing swimming, kayaking, and boating values
- Six beach based comments - with a few people discussing 4WDing, dog walking and exploring areas with the family
- 11 foreshore based comments - speaking to similar activities by respondents (walk/swim/cycle/walk dogs/watch sunset/watch wildlife)
- 14 nature based comments - largely around retention/ protection of vegetation and coastal landforms
- Nine something else/ other comments - these comments had a focus on the need for recognition of coastal erosion or protection of vegetation and the environment.

The breakdown of comments received in the different LGAs is outlined below:

- Harvey - 11 comments
- Bunbury - 27 comments
- Dardanup - three comments
- Capel - 15 comments

Key themes from the comments received are consistent with survey responses; these were around valuing the coastal and estuarine areas for activities like walking, swimming, boating, exploring with the family, and wanting to see/the need for retention of coastal vegetation and landforms and the protection of the environment.

Another strong theme was around coastal erosion and climate changes being observed by respondents.

The full list of unedited comments 'pinned' on the map can be found at Appendix A. These are broken down into the different LGAs.

Figure 18 - Interactive online mapping tool

3.0 WORKSHOP

A community workshops was held on Thursday 2 September 2021 from 5.30pm to 8pm. The workshop was a hybrid online-in person event, with the online and in person locations all linked to be run as a single session.

The in person locations were:

- Shire of Harvey Australind Council Chambers
- Shire of Dardanup Eaton Council Chambers
- City of Bunbury Council Chambers
- Shire of Capel Council Chambers

Participants nominated the location they would like to attend, with locations being hosted by staff from the respective Local Government.

Members from the consultant project team hosted the workshop online, supported by the project manager at PNP.

The workshop provided community members with the opportunity to establish and record their coastal values for their local areas and to let the project team know their issues and concerns.

3.1 WORKSHOP FORMAT

Facilitation was undertaken by Shape Urban and Water Technology presented coastal information.

At the start of the session, the project team provided attendees with basic information on CHRMAPs and coastal processes, the key coastal issues for each of the LGAs and what hierarchy of adaptation options, as provided for by the Western Australian Planning Commission's CHRMAP Guidelines (WAPC, 2019).

The project team also shared the draft key findings from the online engagement with workshop attendees.

The project team reminded participants about the coastal planning that has already been undertaken (context).

Following the presentation, the workshops comprised two interactive activities:

1. **Establishing coastal values** - workshop participants were asked to identify values important to them on a map at their table. Each location got a map that was focused on their LGA. Participants had to place blue dots on the map and link these back to numbers on a sheet. At the end of this exercise participants presented their established values back to the larger workshop group.
2. **Issues/ concerns** - the project team asked participants to mark on the same map (using orange dots) any issues or concerns they had along the coast or river frontages, or to identify things that have changed that affect them. Participants were asked to work together to create a comprehensive list. At the end of the activity, participants shared their feedback with the larger workshop group.

Section 3.3 discusses the outcomes of each of the activities.

The workshop presentation is at Appendix B.

3.2 WORKSHOP ATTENDEES

There was a total of 27 community member attendees at the workshop. In addition, members from the project team, PNP and LGAs also attended.

3.3 WORKSHOP OUTCOMES

3.3.1 Establishing coastal values

Participants were asked to think about a place that they loved to go to (in the coastal zone) and to write that on their sheet. They were asked to consider why those places are important to them, what they do there, and what physical aspects of the place are important to them.

The project team advised participants that these places and spaces can be any type of activity, e.g. an area for community use, an important cultural place, an environment that matters to them.

Participants at each location were given task sheets as templates to list these places and match numbered dots they placed on the maps.

The coastal values are broken down into the four LGAs. However, the comments and values cut across LGAs and should be read more generally to make up the study area.

Harvey

Valued places and activities, and why these are important to attendees are:

TBD

The mapped values for Harvey are at Figure 19.

The full set of unedited responses are at Appendix C.

Figure 19 - Coastal values exercise for Harvey

Bunbury and Dardanup

Important coastal values have been combined for Bunbury and Dardanup given responses on the night were marked beyond LGA boundaries. Additionally, there were only three attendees at the Dardanup location and one had to leave halfway through, so this combination of values gives a comprehensive understanding of coastal values for both LGA locations.

Valued places and activities, and why these are important to attendees are:

- Nyadup Rocks (Rocky Point) for surfing through autumn/ winter/ spring (#10)
- Northern end of Back Beach (#12)
- The Outer Harbour (inside the Port area) for surfing through winter and fishing; Dalyellup Beach for the surf club, swimming and fishing; Big Swamp for walking and running; Koombana Beach for swimming and dining (#9)
- Bunbury Cut for surfing, fishing, jet ski use, feeding point for dolphins (#4)
- The beach In the northern section of the Seabird coastline - very important to families and kids and is a regionally accessed beach (#11)
- BP Groyne for surfing and swimming (#14 and #15)
- The Bay for surfing, swimming and fishing (#16)
- Leschenault Inlet for running, walking, cafes, bird watching (#18)
- Pelican Point - important for migratory shorebirds (#52)
- Leschenault Estuary as one of the main coastal wetlands in the area with high environmental value (#21)
- Beaches and dune systems in Back Beach, Belvedere Peninsula, Dalyellup Beach, Peppermint Beach - habitat for diverse species of coastal animals and protection from impacts of sea level risk due to climate change (#23 and #24)
- Hungry Hollow for recreation (#48)
- The mouth of the Collie and Preston rivers - prime feeding areas for migratory shorebirds (#41)
- Bunbury Port (#30)
- Quindalup dune system and its ecology (#34)
- Manea Park for walking, flora and fauna, photography, orchids (#30)
- Tuart forest - a peaceful place to run and walk, unique vegetation and fauna (#112)

Other comments related to locations that people wanted to see protected in response to sea level rise and that people valued for environmental reasons.

The mapped values for Bunbury are at Figure 20.

The full set of unedited responses are at Appendix D.

Figure 20 - Coastal values exercise for Bunbury and Dardanup

Capel

Comments made at the Capel workshop also cover some of the Bunbury LGA.

Valued places and activities, and why these are important to attendees are:

- Peppermint Grove Beach for running, walking, swimming, fishing (#B2)
- Stratham Beach for water sports, fishing and walking (#3)
- Back Beach for watersports, walking, surf life saving(#2)
- Ocean Drive for driving to work and cycling for exercise Good swimming near the lookout at the northern end of Lancelin (#2)
- Dalyellup Dunes - access to beach, however has been reducing over years - insufficient action to protect the dunes (#4)
- Tuart Forest - environment, walking, wildlife, trees (#B1)
- Capel Coast - concerns about contamination on the coast (#J2 and #J3)
- Capel Coast - sensitive Aboriginal history (#J2)
- Dalyellup Beach and Parks - 4WDing (#D5)
- Between the ocean and the drain if there is a blow out there is loss of land) (#81)
- Capel River Wetlands (Mallokup Wetlands) - important home for water birds and other communities, high aesthetic value, rich organic adjacent agricultural land (#CRW)
- Beach north of Capel River mouth - last 'wild' coast with reef and near shore snorkelling, bird watching, cray fishing - narrow beach needs protection from 4WDs (#P1)
- Capel River mouth and beach for walking, swimming, taking visitors to see it (value the scenery and bird life) (#B1)
- Minningup Beach for walking, swimming, value scenery and bird life (#B2)
- Stirling Wetlands - importance of historical swan nesting, vegetation for swan nesting - need for fox control (#B3)

Other comments related to revegetation by community members at Peppermint Grove Beach and observations that for the first time a primary dune has been 'blown out' (#77) .

The mapped values for Capel are at Figure 21.

The full set of unedited responses are at Appendix E.

Figure 21 - Coastal values exercise for Capel

Summary

The workshop identified some key coastal values for the LGAs - namely:

- Beaches and estuarine areas for activities like walking, swimming, exercise, views, fishing, surfing, 4WDing
- Wetlands and environmental areas for their flora and fauna diversity which participants could view. These places were also used for views, walks and to enjoy the scenery.
- Vegetation retention and revegetation and the need to do more to protect coastal areas from erosion came up multiple times in the different LGAs.
- Environmental protection was generally very highly valued.
- Sea level rise and climate change was also a key discussion point at the workshop, with participants wanting to see more done in this space.
- Appreciation of wildlife at various locations and the need to protect habitat for these community and species to continue to frequent these locations.

These reasons *why* workshop participants value various features provide better understanding and insight to assess what assets have the greatest need or priority for adaptation and management.

3.3.2 Issues/ Concerns

After the initial task to establish coastal values, feedback was shared by each workshop location key values were discussed. The discussion included participants' issues and concerns about some of the values and the risks participants saw to those values remaining.

The project team then asked participants to comment on issues or concerns about the coast or river frontages, or to identify things that have changed in those areas that affected participants.

Similar to Task 1, participants were asked to list issues, number those issues and then place an orange 'dot' with the same number on the same maps they had used for Task 1. Figures 19, 20 and 21 refer.

Harvey

Issues/ concerns or things that have changed that affect participants are:

- TBD

The mapped values for Harvey are at Figure 19.

The full set of unedited responses are at Appendix F.

Bunbury and Dardanup

Issues/ concerns or things that have changed that affect participants are:

- Beach erosion - eroding of sand dunes, loss of sand. Also loss of infrastructure that supports enjoying the beach and natural environment e.g. beach stairs closed off (#114)
- Beach erosion 2 - drop in value of properties - massive impact to the natural assets of Bunbury (#114)
- Seagrass - the amount of seagrass that is ripped up and deposited on the beach during storms - the loss of seagrass beds (#3)
- The Port - the effects of the port activities, like tankers coming in and out, pollution are of concern - possible risk of inundation at the port and what this would mean for Koombana Bay and the dolphin population (#116)
- Groundwater and soil contamination from the Port (#42 and #43)
- Sand movement changing ocean conditions (#5)
- Sand through carparks and gardens (#7)
- Climate change causing stronger storms causing more damage (#3)
- Pollution in the Estuary (#6)
- Estuary is critical for migratory shorebirds especially
- Impact of 4WDing on beaches
- Hungry Hollow - very little beach to walk on or swim at - worried about increasing visitors and the human and storm impact on beaches, paths and vegetation (#47)
- Destruction of natural coastal wetlands that protect from extreme events (#48)
- Contaminated lands and highly contaminant industries close to the coast (#48)
- Contaminated sites - Dalyellup Waste Residue Disposal Facility and its close proximity to the high tide line and housing development and the drinking water extraction site (#41)
- Biodiversity loss (#32)
- Habitat loss (#30)
- Urban sprawl inland (#33)
- Loss of access to beach for recreation (#35)
- Loss of cultural sites (#36)
- Human impacts e.g. litter, human movement through planted areas, development close to beach, pollution (#39)
- Impact of marine based developments on health of waterways and marine fauna (e.g. flushing of inlet) (#40)

The mapped values for Bunbury and Dardanup are at Figure 20.

The full set of unedited responses are at Appendix G.

At the Dardanup location, two of the three workshop participants spoke to the local government project staff about their concerns about possible pollution and contamination along the coastline that may impact on the groundwater quality.

Capel

Issues/ concerns or things that have changed that affect participants are:

- Human impact e.g. Driving on the beach and making new tracks through dunes. This combined with more adverse weather events is causing major erosion of dunes that protect inland vegetation and homes etc (#14)
- Dalyellup - lack of education about coastal erosion or signage/ fencing to limit erosion by informing (#A)
- Dalyellup - due to erosion from residents and storms there is a need to help re-establish vegetation to help stabilise dune systems (#B)
- Dalyellup - loss of access to beach during winter and erosion of dunes (#C)
- Shire has drainage on to beach which backfills and causes erosion (#B1)
- Wetlands and farmlands becoming saline due to drains left open at Capel River (#B2)
- Peppermint Grove Beach - primary dune attacked for the first time in 50 years (#77)
- Recognition of multiple ownership (private, government, unallocated Crown land, public open space) and how we can get them to work together
- Salt water ingress through the cuts (#PA1)
- Salting land - salinity (#PA2)
- Elimination of beach/ habitat in relatively wild coastline (#PA3)
- Capel/ Stirling Wetland inundation north and south of Capel River - need to protect bird life especially swans (#B2)
- Tuart Forest National Park still capable of natural regeneration if kangaroos kept out - also, underground water level has dropped due to sand mining projects and quotas for farming, which affects forest vegetation (#B3)

Summary

The workshop identified some key issues/ concerns across the LGAs - these are:

- Beach erosion and its environmental, social and financial impacts
- Contamination and pollution impacts from the port at Bunbury and other industrial activities along the coastline on fauna and flora and the health of waterways
- Destruction to coastal wetlands that protect from extreme events and that are home to birds and wildlife
- Biodiversity and habitat loss
- Human impact on the coastal and estuarine natural assets and values to the community

3.3.3 Other - Workshop Questions

Workshop participants across the four LGAs asked the following questions at the workshop. Project team responses are provided in italics below each question.

Are erosion and inundation the only two major risks?

The coast is shaped by many forces - the ocean, the wind, the structure of the rock and earth along different parts of the coast, and the impact of people and their activities. Coastal landscapes and risks to these therefore are a result of a combination of erosion, inundation, transportation (of coastal materials) and the impacts of humans on those coastal areas.

Climate change and sea level rise are also a risk to coastal areas.

How do you factor changes with time, flexibility in options for climate change?

State Planning Policy 2.6 - State Coastal Planning Policy (SPP 2.6) factors in a mean sea level rise of 0.9 metres over 100 years. The technical personnel from the project team will establish the sea level rise for the study area as well as vulnerabilities, levels of risk and triggers, all of which will assist with putting in place planning measures to address these risks.

Aware of any planning responses for shires that have already have CHRMAPS completed e.g. Wanneroo?

Yes, the project team has worked with other LGAs that have prepared CHRMAPs with differing planning responses to suit locations, level of risk and triggers. They will use this information as well as work with the community to develop planning responses that are appropriate for the study area requirements.

Sites are at risk from erosion and inundation. The list of the state's contaminated sites is on the Contaminated sites Register held by DWER. The interaction of ingress of sea water into contaminated groundwater at these sites could have significant impacts on contamination migration, potentially impacting Priority protection zones for drinking water areas that currently exist in the project area. As there are a number of registered contaminated sites within the project area, will the CHRMAP be considering specific impacts to these sites as a matter of importance due to the increased public and environmental health risk of impacts to these sites?

Yes, the project team will factor this into the CHRMAP process and, working with the community, propose responses that are appropriate to the study area.

Why the problem, climate change, is not included in the website introduction of the project and also it's mention like 15 minutes into to explanation of the project in the workshop? Climate Change is the problem. We are trying to adapt to the impacts, but the problem is climate change. It is important to be transparent with the community.

This has now been updated on the website. Climate change is explicit in the CHRMAP guidelines and used as a basis for determining the vulnerability and risk analysis.

Why traditional owners are not present in the workshops? Are the aboriginal heritage areas being considered and protected?

The project team are speaking to Traditional Owners separately, to establish their values and concerns in the study area.

To evaluate the risk, will storm surges and extreme sea events be considered together with SLR? Having in account that extreme events occurrence rate is increasing due to climate change.

Yes, the project team will consider these events as part of its coastal assessment.

Explain the rationale of combining areas for the CHRMAP in the face of different characteristics.

The PNP is working with four of its LGAs (Harvey, Bunbury, Dardanup and Capel) to prepare this CHRMAP in accordance with the requirements of SPP 2.6 and the State Coastal Hazard Risk Management and Adaptation Planning Guidelines (2019).

The study area is being broken up into management units (MU) that will represent a similar coastal landforms and locations so that each MU can be assessed according to associated risks and vulnerabilities, and according proposed treatments/ solutions can address specific contextual requirements.

Interest has been shown generally by the community in this stage of the planning - how will you get an idea of what is valued by those not yet paying attention?

The project team, the four LGAs and the PNP ran a range of engagement and communication activities to understand community value, including direct emails to hundreds of known contacts, social media posts, the PNP project website, the Social Pinpoint project page, community survey, and workshops to reach as broad a range of community members as possible about their values.

Hard copy surveys were also distributed at a few locations in the LGAs.

There will also be additional opportunities to be involved and provide feedback as part of this project - feedback on this engagement report, direct feedback to the LGAs, by email and on social media.

We encourage you to provide us with feedback on any values in the study area you don't believe have been covered in the engagement report. These values will help inform Stage F - Risk Evaluation and Stage G - Risk Treatment.

Updating FAQs

These questions and responses will be shared in the form of Frequently Asked Questions (FAQs) on the project website. The PNP and four LGAs will direct stakeholders and community members to these FAQs.

CONCLUSION

The engagement undertaken to date provides a strong understanding of what the community values in each of the four LGAs in the study area.

The multi-engagement approach has allowed for a thorough investigation of community values at different sections of the coastline.

There was strong alignment from stakeholders on coastal values and issues/ concerns, across the four LGAs.

This is centred around:

- Beaches and estuarine area values for activities like walking, swimming, exercise, views, fishing, surfing, 4WDing
- Wetlands and environmental area values for their flora and fauna diversity, walks and to enjoy the scenery.
- Vegetation retention and revegetation and the need to do more to protect coastal areas from erosion
- Environmental protection values
- Sea level rise and climate change concerns, and how this is being addressed by the LGAs
- Concerns around the impact of erosion and its environmental, social and financial impacts
- Concern about contamination and pollution impacts from industrial activities along the coastline on fauna and flora and the health of waterways
- Destruction to coastal wetlands that protect from extreme events and that are home to birds and wildlife
- Biodiversity and habitat loss concerns
- Concerns about human impact on the coastal and estuarine natural assets and values to the community

All of the discussions regarding values and issues/ concerns, and suggestions by stakeholders to address the priority issues will help the project team develop a suitable draft multi-criteria analysis (MCA) process.

The content provided to the stakeholders introduces the community to the complexity of the decisions that have to be made to protect the values they love. This will include things like costs, lifetimes of adaptation options, impacts and other trade-offs like private versus public asset protection.

In the following stages, the feedback provided will enable the development of a robust assessment process in line with the community feedback, with a further opportunity for the community to influence outcomes later in the project.

In particular, Stage E will involve the project team working with the community and stakeholders to review identified risks and vulnerabilities, proposed treatment options, and community preferences for different adaptation options.

NEXT STEPS

This report summarises the preliminary engagement undertaken with the community as part of Phase 1 of the project to understand community values for the study Area. It included online engagement and a workshop that was in-person and linked online to increase the opportunity to attend.

The community's values , issues/ concerns and other stakeholder feedback received will be used to inform the development of a draft MCA process for the study area.

The project team will also be looking to schedule targeted meetings with identified key stakeholders as part of this preliminary engagement stage.

This report will be updated with these outcomes and the outcomes of additional engagement as the project progresses and the community values are translated into coastal assessments, trade-offs, risks and adaptation approaches for the study area.


2P
NO TICKET
REQUIRED

APPENDICES

- Appendix A: Map Comments
- Appendix B: Workshop Presentation
- Appendix C: Harvey Task 1 Comments
- Appendix D: Bunbury and Dardanup Task 1 Comments
- Appendix E: Capel Task 1 Comments
- Appendix F: Harvey Task 2 Comments
- Appendix G: Bunbury and Dardanup Task 2 Comments
- Appendix H: Capel Task 2 Comments

APPENDIX A

MAP COMMENTS - HARVEY

Comment Type	Comment
Water based	Crabbing, watch amazing sunsets
Nature based	Cycling from Australind next to the Cathedral Avenue is very enjoyable. This 'cycling' path could be extended to the Leschenault Peninsula and ultimately to the Cut.
Foreshore based	Swimming cycling walking dolphin watching
Beach based	4wdriving, take family up beach with dog for picnic, swim, relax, interact with wildlife
Foreshore based	My family and I are regular campers and visitors to this spot,at least twice a week for the last 20+ years, we travel via boat and camp via boat as well as it was originally a boat only camping, lately more 4wd area driving through the fence, which I often repair, it is these types of campers that are tearing up the camps and lighting fires, such as the one that got away last year & always leave rubbish, can the fence be repaired?? I'm willing to help anyway?
Nature based	This area has been underutilised for a long time and I think it sound be improved so that it can be used and appreciated by the complete community. This doesn't include a residential canal development that can be accessed by a select few.
Nature based	Important area to preserve as part of the Kalgulup Regional Park, for flora and fauna, but there are also opportunities for recreational development (e.g. walk paths and bird watching hut)
Nature based	Migratory shorebird feeding grounds
Foreshore based	I have great concern about all the blue metal rocks that have been dumped along the river bank in this area as I believe there are much better alternatives to blue metal rocks that are totally foreign to the area and greatly diminish the beauty as well as reducing the wildlife not only on the bank but most specifically the river! Was any impact studies done before doing this??? Is the shire planning to continue to do this???
Nature based	Nice area to walk. The bushland provides an opportunity to enjoy nature close to home. It would be great if a cycle path could be developed here connecting Collie River Park with the Paris Road bridge over the Brunswick River.
Nature based	Open space often grazed by kangaroos. The scenery and wildlife can be enjoyed from Eaton Drive. More area here should be spared from urban development and included in the Kalgulup Regional Park. Great opportunity to develop a cycle/walk path from Leicester Reserve to the bridge to Treendale through a wide open area.

MAP COMMENTS - BUNBURY

Comment Type	Comment
Nature based	Bird Watching
Water based	Swimming, running the dog on the beach, scurfing, cooling off in summer
Water based	Fishing with kids, running
Water based	Swimming cycling walking running dolphin watching
Water based	Fantastic for families! Would be great to have jumping platforms or more youth activities and options in the summer
Water based	Sailing at the yacht club - Launching boats off the sandy beach area.
Water based	Surfing/swimming
Foreshore based	Walking , Bicycle , Leisure relaxation and enjoyment of outdoors , nature observations , photography and studies inclusive of citizen science habitat ecology observations recorded on iNaturalist database for reference
Nature based	Ongoing nature photography , acquiring images , identification of genus and species , seasonal processes , habitat and ecology characteristics , also with observations recorded on iNaturalist database (CSIRO) for reference purposes , particularly terrestrial Flora and Avian , avian , insects , arachnids , and currently inclusive of Mosquito identification relating to Blood Borne Disease Vector research , as well as Mangrove (Avicennia marina) Seasonal observations throughout recent 2020 , 2021
Something else/Other	Citizen Science , ongoing observations and recording of seasonal cycles and growth of Avicennia Marina (Grey Mangrove) , recording of observations on iNaturalist database (CSIRO). The Mangroves are of international interest and currently of interest for research for Climate Change / Tidal Zones and Natural Carbon Management. A.marina is recognised as Estuarine/Tidal Zone growth and is supported interdependently in conjunction with the Tidal Wetlands , also under current ongoing observations
Beach based	Love this area and exploring the rock pools with the kids. There's grass and vegetation on the sand/beach and it feels secluded and away from the road
Water based	Surf Life Saving Competitions, Swimming, Old Boys swim races, fitness training, surfing, paddling, body surfing, interacting with dolphins
Foreshore based	Walking , Beach , outdoor leisure, activity and relaxation , also intending to make inclusive of some nature observations in future.

Comment Type	Comment
Something else/Other	Fragile and narrow dune vegetation area, infrastructure in close proximity to ocean
Foreshore based	cycling running watching the sunset
Water based	Love this area for the family & Dog
Water based	Put an artificial reef here to help with dune erosion! It will provide ecosystem restoration on land and sea, and it will create surf and diving opportunities for commercial and pubic use. Why would you not?
Nature based	Kids love exploring here
Nature based	daily connection with nature
Water based	Swimming/surfing
Water based	Paddle ski
Foreshore based	Walking along the beach with my kids and dog is a daily activity fir my family
Nature based	Great place to walk and for other kinds of outdoor recreation. This is an ideal location for orienteering, which hopefully will be allowed again.
Something else/Other	Walking , outdoor activity leisure , enjoy nature and with ongoing local wetlands habitat ecological observations
Nature based	Local Nature Study and Research on coastal Wetlands Habitat Ecology , Observations inclusive of ongoing acquisition of Images , Identification of genus and species for Flora , Avian , Pollinators , Water Birds , including insects eg wasps bees. Observations recorded and listed on iNaturalist database for reference.
Something else/Other	Citizen Science , ongoing local Wetlands habitat ecology study and research , Observations inclusive of Images and Genus / species listings recorded on iNaturalist database for reference , Seasonal processes etc
Foreshore based	Walking , outdoor activity leisure relaxation and appreciation of natural habitat

MAP COMMENTS - DARDANUP

Comment Type	Comment
Foreshore based	With regard to the proposal for car park and road realignment, is it really necessary? I believe a better option would be to have no car parking there and all parking at the club and that area regenerated back to original bush to encourage more wildlife. As putting more cars there with parking leaning towards the river will encourage oil and fuel from cars to run directly to river and contaminate, there is ample space around the club for parking.
Water based	Paddling, admiring wildlife
Water based	I'd really like to see the health of the Collie River improved to a point whereby it could be used for purposes other than boating. Having lived in Eaton for the past 45 plus years I find it disappointing to have witnessed the gradual degradation of this waterway to its current level.

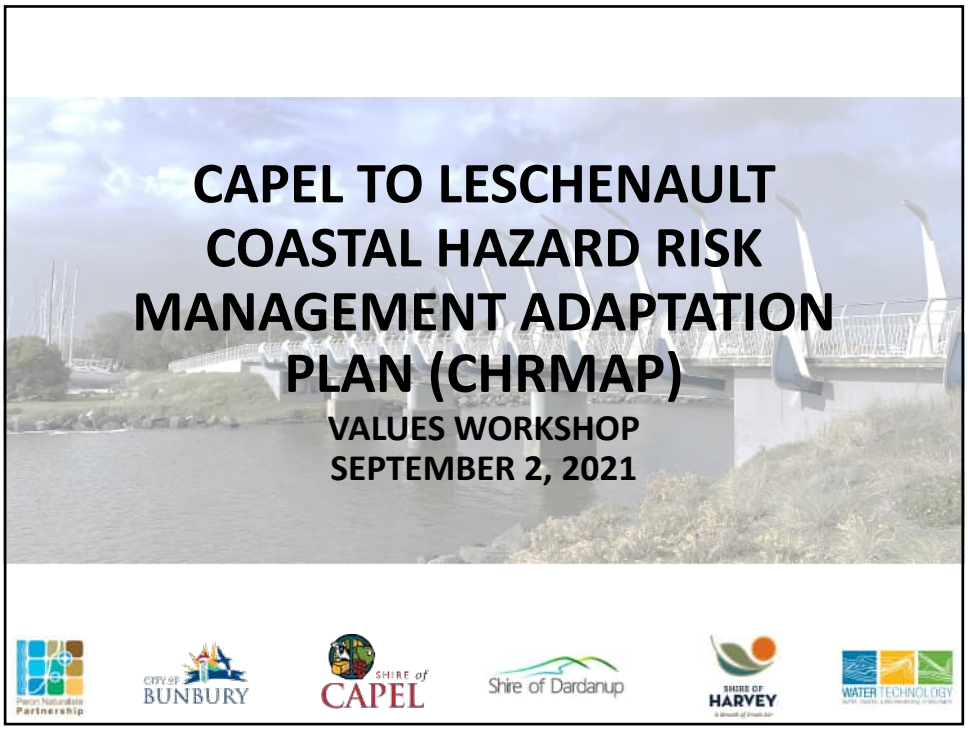
MAP COMMENTS - CAPEL

Comment Type	Comment
Foreshore based	Walking , MTB , outdoor leisure relaxation among nature
Nature based	walking running mountain biking watching wildlife and native flora
Something else/Other	Seriously worried that most of the residents in this area may not have taken note of the impact coastal erosion and inundation will have on the whole area , that they think it's just about the shoreline. People need to recognise that its crucial we encourage and support the shire to plan and make provision now, make sure we are building the resources, financial and otherwise, to take action so the lifestyle we enjoy can be protected by taking constructive and less invasive steps
Foreshore based	swimming walking/running on beach watching sunset and wildlife
Beach based	Vehicle access to (driving on) the Dalyellup beach is one of the most important things in my life and in many of my friends. It is the main reason why I life in Dalyellup. It is a myth that everyone can walk long distances on sand while carry things. To enjoy the beach and engage in activities like fishing paddle boarding etc. you have a few thing to transport like chairs and SHADE. Please leave the 4x4 access at Dalyellup as is. We are happy with the way it is now.
Something else/Other	Read a lot of scaremongering lately that only the particular patch of basalt in Gelorup (despite there being a big belt of basalt right through the SW) can possibly save us from inundation. This convenient position of people wanting the BORR out of Gelorup is damaging and misleading , ignores the range of constructive steps we should all be taking, infers all we can do is duck for cover behind a high hard wall.
Beach based	Such a special place to bring my dogs and unwind. An unspoilt, looked after beach area with a wealth of wills life to enjoy
Beach based	Read a big announcement in local press in May by Cr. Southwell that council had a plan to open up the "secret" beach coast between Dalyellup and Forrest Beach for cars to drive along etc etc. He said the plan would come to council in JUne. So far, thank heavens, it hasn't. No-one else in the shire seems to know anything about it either, except the May press splurge. Hopefully such a plan will be subject to the planning you are doing. It seemed to have quite opposite intentions.
Nature based	Reef snorkelling
Beach based	swimming snorkelling wildlife watching

Comment Type	Comment
Something else/Other	Parts of these wetlands at Mallokup are at sea level in height with very salty water located at shallow depths below. They will likely further increase in salinity. New management options and development restrictions in low lying areas needs to be considered.
Water based	kayaking
Nature based	From Mt Stirling lookout you can see bird filled wetlands, the world's best Tuart forest and the famous coastline from the tip of the Geographe bay, along the Busselton coastline to the dunes of Bunbury.
Something else/Other	We are all so used to the road and drainage infrastructure through the low wetland areas behind the sandhills that we take it for granted, we think it's all about the shoreline. If there is not planning to maintain and meet challenges to infrastructure through rising water levels, then the issue wont be about recreation, we just plain won't be able to live there.
Something else/Other	This is the site of the Higgins Cut, an attempt some 120 years ago to divert water from the Capel River into the ocean. The mouth of the cut silted up very quickly but it now poses a risk to the farmland inland as a rising sea could cause erosion of the mouth of the cut and allow large volumes of seawater to flow inland

APPENDIX B

WORKSHOP PRESENTATION


CAPEL TO LESCHENAULT
COASTAL HAZARD RISK
MANAGEMENT ADAPTATION
PLAN (CHRMAP)
VALUES WORKSHOP
SEPTEMBER 2, 2021
Peron Naturaliste Partnership
CITY OF BUNBURY
SHIRE of CAPEL
Shire of Dardanup
SHIRE OF HARVEY
WATER TECHNOLOGY

1


Welcome!
Peron Naturaliste Partnership
CITY OF BUNBURY
SHIRE of CAPEL
Shire of Dardanup
SHIRE OF HARVEY
WATER TECHNOLOGY

2

This meeting is a bit different!

Your local team will look after you and make sure the feedback is shared – your 'Host' will have welcomed you

The consultant team is online:

Shape Urban - Anna Kelderman

Water Technology – Joanna Garcia-Webb

3

Welcome

A spot of housekeeping….

- Mobile Phones
- Bathrooms
- Emergency procedures
- We will be recording this session so that others can review – please advise your 'host' if you would like us to us to obscure you when we complete the recording
- Try and be COVID safe - keep 1.5m away from others if possible, use the hand sanitiser, and please make sure you practice good hygiene if sneezing!
- Write down as much as you can!

4

Introductions

Who are you?

Where do you live?

What is your main interest?

5

6

What are we doing?

7

Our Remit

Our coast is highly valued. It provides places and spaces to live, do business, be active and enjoy.

However, the coast is vulnerable to natural coastal processes such as waves, storms and sea level rise, and to the changes that people make to the coastline (buildings, hard coastal structures and dune/beach changes).

As the coastline begins to change, it can impact the infrastructure in the 'coastal zone' and how the coast can be used.

8

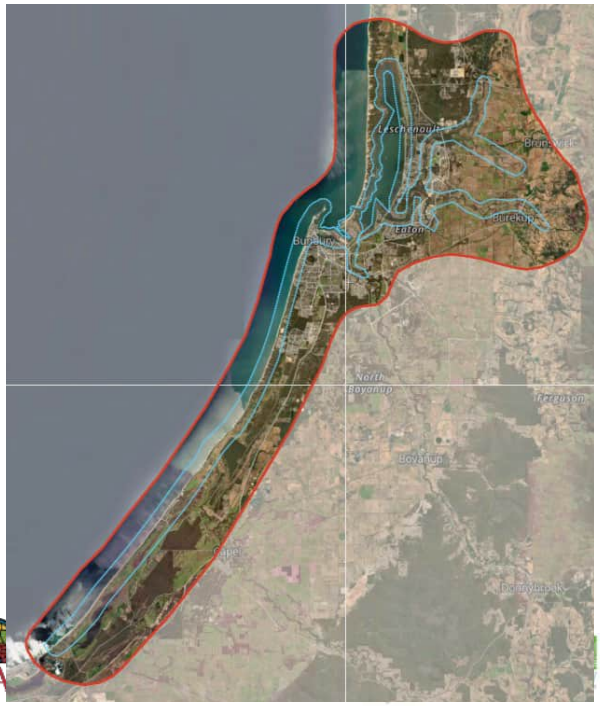
Some coastal planning has already been done…

- Koombana Bay CHRMAP (2019) - will be considered in the context of the broader CHRMAP
- *Shire of Harvey Ocean coastline (north of the Cut, Belevedere Beach and Binningup etc)*
  - *Not part of this project study area*
- PNP Coastal Monitoring & Other Studies in Project Area
  - Considered and included in analysis in this project

9

Our Remit

The CHRMAP will establish adaptation options that balance the values and needs of the community along the ocean and river front coastline and consider economic, social and environmental considerations



10

Why are we doing the project?

This project will help us to understand 'coastal hazards' and 'risks' that may impact the coastal zone in the future and what the options are for managing those

The coastal zone for this project includes the coastline and low-lying areas around the Leschenault Inlet and Estuary and associated rivers including the Preston/Collie River.

11

CHRMAP…

What on earth is a CHRMAP??

- Coastal Hazard Risk Management Adaptation Plan
- Hard to say…
- Char-map, Cher-map, croomp, adaptation plan

12

CHRMAP…

A strategic plan to meet *coastal hazard challenges…*

- Identifies vulnerable public and private assets
- Aims to preserve community values for current & future generations
- Informs community and decision makers
- Required under *State Planning Policy 2.6 – Coastal Planning*

A plan for the next 100 years

13

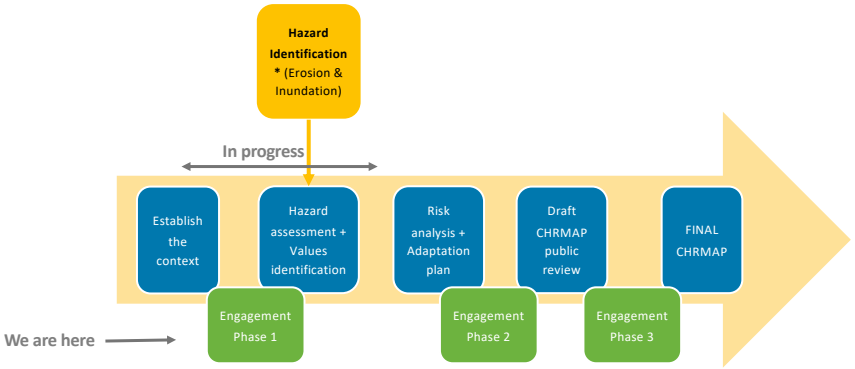
CHRMAP…

The key components of a CHRMAP are:

- Understanding the local environment and community values
- Assessing how much things can cope with the impact of climate change
- Identifying the risks (likelihood of an event occurring and the consequences of that event occurring)
- Analysing the findings and evaluating the management options
- Identifying the adaptation options
- Identifying funding options, monitoring and review of frameworks

14

CHRMAP…



15

Coastal hazard challenges

The key challenges on the coast are **erosion** and **inundation**

Predicted Sea Level Rise will increase both!

16

Sea Level Rise

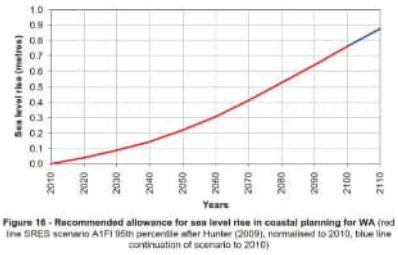
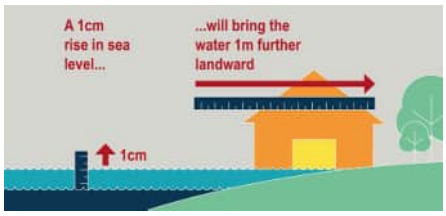


Figure 16 - Recommended allowance for sea level rise in coastal planning for WA (red line SRES scenario A1FI 95th percentile after Hunter (2009), normalised to 2010, blue line continuation of scenario to 2010)



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Risk

18

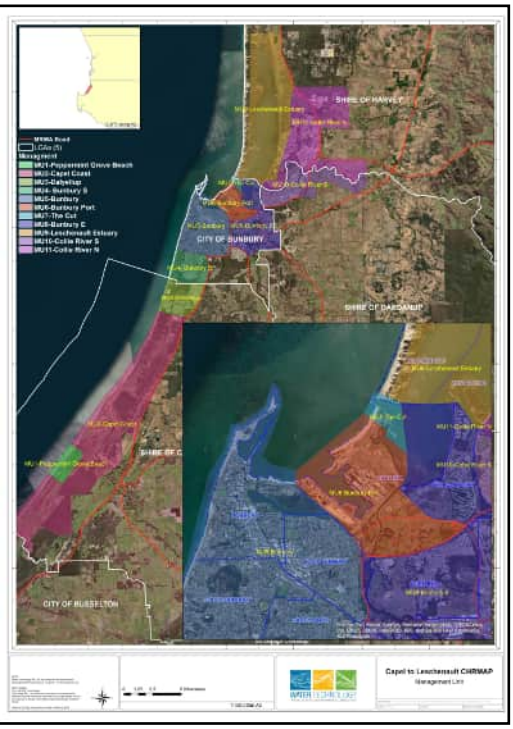
Vulnerability

19

Hazard Identification

Predicting the *risk* of **erosion** + **inundation** with sea level rise

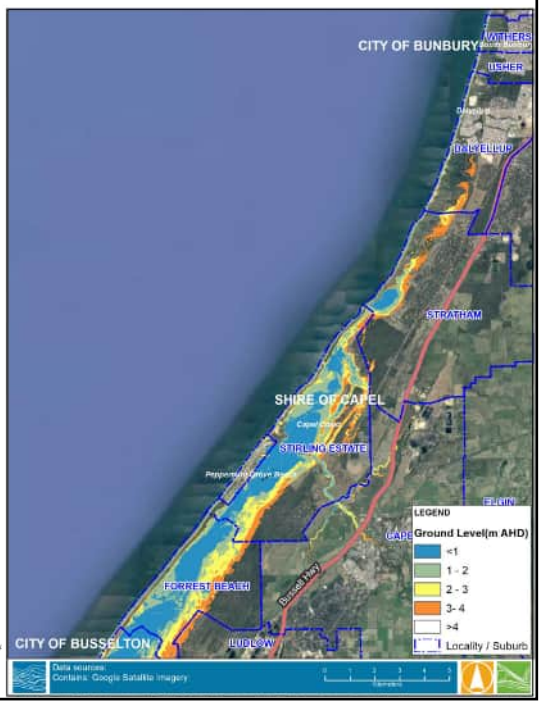
- ***In progress***
- Large study area split into Management Units for adaptation planning, primarily split by jurisdiction
  - Different coastal hazards in each unit
- Hazard mapping will indicate the **zone of risk** – not the predicted future shoreline!



20

Key Issues – Shire of Capel

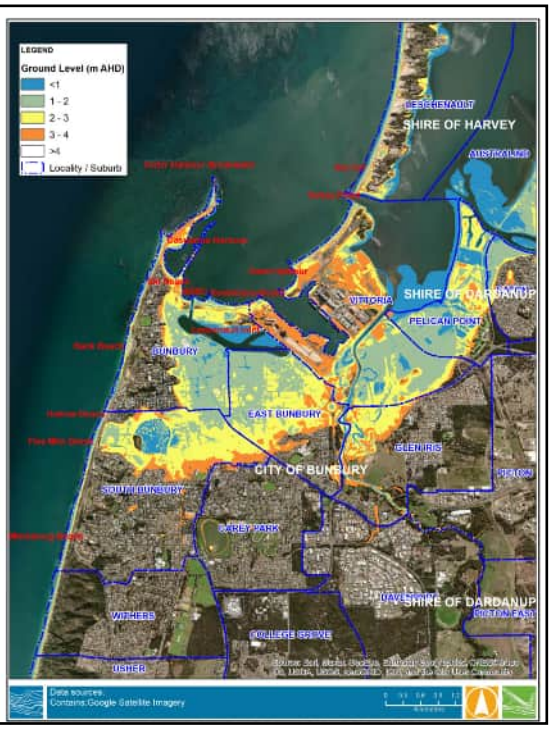
- Low lying land behind coastal dune system
- Dunes act as a natural levee at present
  - Pressure on the dunes will increase (SLR), while their ability to withstand will decrease (erosion)



21

Key Issues – City of Bunbury

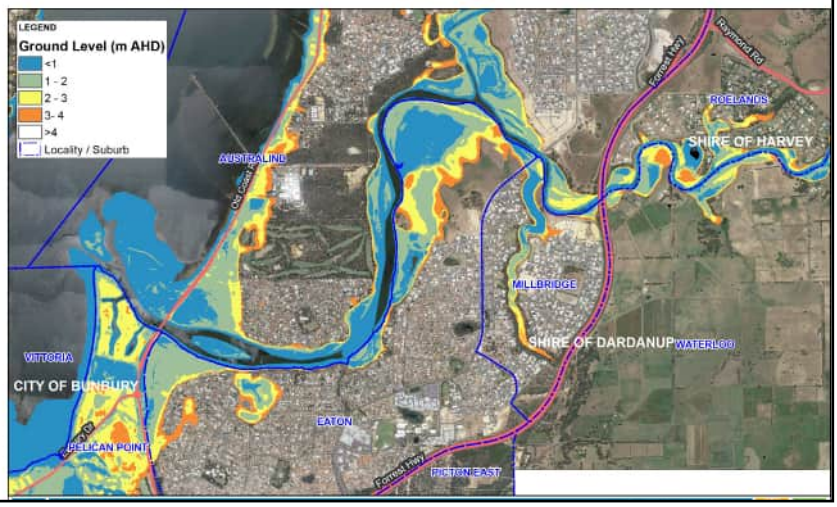
- Low lying land across much of City
- Highly developed coastline
  - Proximity of infrastructure and assets on open coast along west of LGA



22

Key Issues – Shire of Dardanup

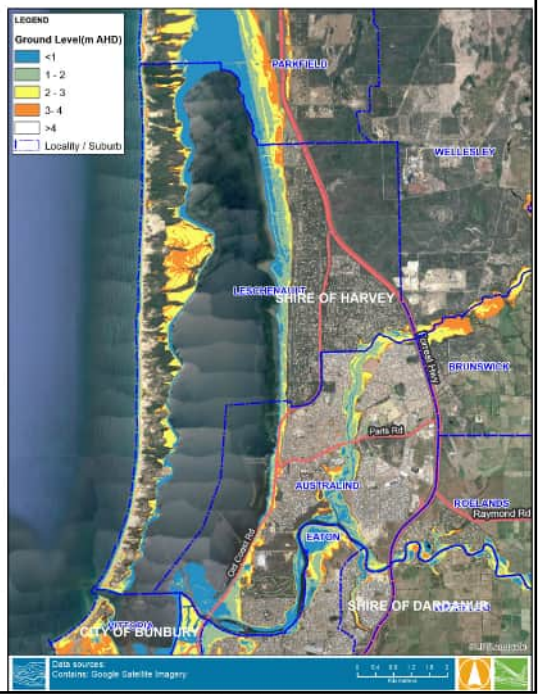
- Mobile riverbanks (potential erosion)
- Low lying land along banks of Collie River
  - Potential inundation due to SLR
  - SLR impacts not likely to extend far upstream



23

Key Issues – Shire of Harvey

- Low lying land adjacent to Leschenault Estuary
- Mobile riverbanks (potential erosion)
- Low lying land along banks of Collie River
  - Potential inundation due to SLR
  - SLR impacts not likely to extend far upstream



24

Adaptation Options

25

Adaptation Options

Hierarchy of Controls:

- **Avoid** – Options which aim to eliminate the risk of coastal hazards by avoiding development
  Managed Retreat – Options which progressive retreat/relocate development
  Accommodation – Options which seek to enhance assets to cope with the temporary impacts
  Protection – Options which seek to artificially protect the coast

26

Adaptation Options

27

Q&A

Take a moment to think of any questions for Joanna or Anna

Anna will call on each room (alphabetically) to ask questions – write down any questions you might have and give them to your host – they will type it in the Q&A box and we will answer them

28

29

So…What will you influence?

Through this process you will help us to refine:

- The preferred option for each at-risk asset
- Better understanding of community values (more measureable)
- Future information sharing, better tools for describing and explaining hazard management

30

What are we doing today?

- Discussing the places you value and why
- Getting a better idea of key issues and concerns
- Considering areas that you would prioritise for hazard management and adaptation

31

Task 1 - Values

Think about a place that you love to go – write on your sheet –

- **why it is important**
- **what do you do there**
- **what physical aspects of the place are important**

Can be an area for community use, an important cultural place, and environment that matters to you etc

(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to avoid doubles!)

32

Share feedback

Tell us what's important -

Anna will call on each room (alphabetically) to share feedback

33

Task 2 – Issues/Concerns

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you

(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to avoid doubles!)

34

Share feedback

Tell us what's important -

Anna will call on each room (alphabetically) to share feedback

35

Next Steps…

- Finalising the engagement phase (open to September 10)

- https://getinvolved.mysocialpinpoint.com.au/capel-to-leschenault-chrmap/map#/sidebar/tab/about
- Reviewing and reporting on feedback
- Providing a project update

36

Next Steps…

- Completing hazard mapping
- Identifying valued assets
- Identifying risks
- Assessing management options
- **Another opportunity for the community to be involved in the process, considering adaptation options and the implications of various solutions**

37

Thank you!!

38

APPENDIX C

HARVEY TASK 1 COMMENTS

APPENDIX D

BUNBURY AND DARDANUP TASK 1 COMMENTS

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important
(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

2) OCEAN DRIVE - Very close to the Beach Beach. BUNBURY MAJOR SERVICES ARE UNDER THIS ROAD - WATER. POWER. ETC. ETC. ETC. RAILROAD WALL THIS IS A MAJOR CARRIAGE WAY

8. Sand DUNES, OCEAN SIDE OF LESCH. ESTUARY - MASSIVE AMOUNTS TOXIC MUD BURRIED IN DUNES. PIPED - FROM ORIGINALLY - LA PORT. MANUFACTURER OF TITANIUM - OXIDE.

7. BIG SWAMP. HAS DRIED OUT IN RECENT SUMMERS. ~~EAST OF~~ WETLAND EAST OF BIG SWAMP. HAS MORE WATER IN IT THAN SEEN BY NON & TERM LOCALS EVER.

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important

(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

(10) • Nyadup Rocks (Rocky Point)
- Swim through summer

(12) • Nothern End of Back Beach (Sidewash)
- Surf through Autumn. / Winter / Spring.

(9) • Outer Harbour. (~~Port~~ Inside Port Area)
- Surf through winter
- Fishing

• Dalyellup Beach. - surf club / Swim.

• Maidens Reserve. - Walking / Running

• ~~Dal~~ Dalyellup Beach (off coast)
Fishing / Free diving.

• Big Swamp.
- Walking / Running

• Koombana Beach.
- Swimming / ~~Dn Water~~ Dining

(11) • Bunbury Cut.
- Surfing / Fishing / Jet Ski Use.

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important
(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

(14) (14)
- BP Beach / Groyne. (Southern Side)
  - Surf / Swim / Walk.

(15)
- BP Groyne. - Northern Side.
  - Surf / Swim

(16)
- The Bay. - Surf. / Swim / Fish.

(17)
- Inside Port. Northern End.
  - Surf / Fish / Crabbing.

(18) (18)
Leschenault ~~Bas~~ Inlet.
- Run around / Walk / Cafe's

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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4 KOOMBANA BAY
5 LESCHENAULT ESTUARY
6 BACK BEACH.
7 BIG SWAMP.
50 PRESTON RIVER

LEARNT to SWIM AS A CHILD IN THE BAY, AND THE DOLPHINS.
CRABBED IN THE ESTUARY
SWAM & SURFED AT THE BACK BEACH.
THE WILDLIFE AT BIG SWAMP ARE PRECIOUS AND NEED TO BE PROTECTED
ALL THESE PLACES ARE IMPORTANT to BUNBURY AND ITS RESIDENTS
THEY MAKE BUNBURY WHAT IT IS.
THEY ARE ALL PART OF THE NATURAL HISTORY AND ENVIROMENT OF BUNBURY.
WITHOUT THEM BUNBURY WOULD NOT BE BUNBURY.
THE LOCAL FLORA IS ALSO OF GREAT IMPORTANCE.

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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Leschenault Inlet
Birdwatching. Shorebirds - losing shorelines with full tides this winter. Critical for feeding, roosting + NESTING for at least 3 species
The Mangroves as a fish nursery - inundation this winter
See

Loch Estuary
as above
loss of fringing vegetation, casuarinas etc + samphire due to chronic erosion of sand + wind severity in winter
See

Bunbury Back Beach
loss of beach
Erosion of dune + dune vegetation - long established
Not much coastal replanting + revegetation projects for 20 years, not encouragement to community to respect foreshore vegetation

(OR 51)
Venezia Lagoon (52) Pelican Pt
** Important for our migratory shorebirds for feeding, roosting, sanctuary –

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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LESCHENAULT ESTUARY (21)
One of the main coastal wetlands in the area, with high environmental value. Waterbirds, dolphins, long migratory shorebirds

BIG SWAMP PARK (22)
A great example of recovered degraded wetland, with high numbers and diversity of waterbirds. Some of the few paperbark wetland left.

BEACHES & DUNE SYSTEMS IN BACK (23)
BEACH & BELVEDIRE PENINSULA (BUFFALO BEACH) → DALYELUP BEACH, PEPERMINT BEACH
~~They are~~ Some are nearly pristine systems, offer habitat for diverse species of coastal animals and protect us (for now) from the impacts of sea level rise due to climate change.

MAIDENS DUNE SYSTEM (24)
The only fully developed dune system left within the city boundaries

END OF BACK BEACH → FOR SURF. (25)

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

(48)

Area of Interest:

Hungry Hollow - I have lived within 200m of this area for many years of my life. Over the time it has been a key recreational area. socially, emotionally

Physical aspects - VERY CONCERNED physically re soil erosion and the proximity of urban areas / roads etc. The erosion of the area has forced people to swim elsewhere ie Koombana

(49)

how lying areas of East Bunbury - lack of drainage. flooding roads - danger with traffic

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important

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39 Belvedere bar (dunes between the Leschenault Estuary and the ocean) This is important as sea level rise and erosion may lead to new "cuts" being formed giving inflow of seawater into the Estuary and potentially significant influence on Estuary biota.

40 The cut. feeding zone for dolphins, prime influence point between Estuary and Ocean.

41 Mouth of Preston and Collie Rivers. Prime feeding areas for migratory shorebirds. Seawater incursion and erosion will impact significantly.

42 Big Swamp Bunbury. Fresh water ecosystem. Saltwater incursion will impact freshwater environment

43 Back beach Bunbury (the whole Beach) worried that engineering control options (eg. groynes) will impact natural coastal processes eg longitudinal Coastal drift and seaweed wrack deposition

44 Bunbury dunes and infrastructure close to ocean- future of this infrastructure eg. Roads and houses and the cost and impact of protection options

45 Saltwater incursion on groundwater reserves and freshwater ecosystems

46 Impact of dune erosion in general on nesting sites for coastal bird life

47 Impacts on coastal veg communities eg tuart forest and fauna eg western ringtail possum

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important
(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

34 - Quindalup dune system & its ecology.
38 - Tuart forest within project area.
37 - Coastal wetlands south of Bunbury unique flora & flora.
35 - Banksia woodland within project area.

Unique to southern Swan Coastal Plain.

* CONTAMINATED SITES *.

29 - Dalyellup Waste Residue Disposal facility contaminated site, contaminated groundwater beneath, UNLINED SITE.

30 - BUNBURY PORT.
31 - TRONOX PROCESSING PLANT.

32 - DRINKING WATER EXTRACTION SITES. clean water. "
33 - BUNBURY WASTE WATER TREATMENT PLANT. - important infrastructure.

36 - Allocated development areas within local shire town planning schemes need review after CHRMAP completion.

in

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important
(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

26 ○ Mindalong Beach
~ Important to me as it's a local beach (close to [redacted] home) where I walk my dog, ride my bike & do bush walking in adjacent maiders Reserve)

27 ○ Koombana Bay
~ Important for recreation (on water), dolphin spotting, walks and access to cafes

28 ○ Mangrove Care (Leschenault Inlet)
~ Important as it contains southernmost mangrove population; bird habitat; etc.
~ I walk there, do rowing and frequent restaurants, pubs & cafes there

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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(111) Maidens Reserve - walk along trails, photography Solitude. I most value the Natural environment flora & fauna.

(7) Big Swamp - walking, bird watching, photography I most value the natural environment.

(4) Koombana Bay - walking, dolphin Centre, Dolphin watching, visiting cafes, BBQ's, social events, triathlon.

(13) Collie River walking path. Walking, photography Bird watching.

(1) Back Beach - walking, sunsets

(30) Manea Park - Walking, flora & fauna, photography, orchids

(31) Tuart Forest Walk - Walking, cycling, natural environment, bird watching, photography.

The majority of things I value are the natural environment for walking, solitude, flora & fauna, photography.

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important
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3 • Koombanay bay : Swimming & walking along the beach.

111 • Haidens reserve: I walk along the trails, enjoy the patches of bush. Sometimes I walk or run along the beach.

112 • The Tuart forest : A very peaceful place to run and/or walk. The vegetation and fauna is unique.

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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(1) The Bunbury Ocean Beach - just south of the "Hollow". I walk my dog there, take sunset photos, and enjoy the Beach during the warmer months. (At Hayward Street)

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important

(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

(88) SUP & crabbing around the island. Dolphins, birds & sunsets → magic!

APPENDIX E

CAPEL TASK 1 COMMENTS

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important
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17

I LIVE AT PEPPY BEACH, SOME 70 METRES FROM THE BEACH. I GET UP EARLY AND GO TO THE BEACH MOST MORNINGS. I RUN THE LENGTH OF THE BEACH. IN THE SUMMER MY PARTNER & I SWIM ALONG THE BEACH, SOME DAYS UP TO 4 KILOMETRES.

THE WIND AND THE WAVES CHANGE THE BEACH AND THE DUNES BUT PEOPLE CLIMBING THE FRAGILE DUNES, FOUR WHEEL DRIVES, WEEDS AND RABBITS ARE CAUSING MUCH EROSION.

CLIMATE CHANGE IS ACCELERATING EROSION.

(6)

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important

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(1) AK My Home 47 Hutt Drive on Dalyellup Dunes. (and other residential homes)	- Accomodation - Beach access → stairs, walk dog etc. - Dunes ~~[illegible]~~ ✓ (would like to know how to assist in protecting dunes + keeping people in Dalyellup know + act on limiting erosion). I think a lot of people do not the level of risk to the dunes + the behaviours required to limit erosion.
(2) AK Back Beach / Ocean Drive	- water sports / walking. - Surf life saving - Drive to work - Cycle along road for exercise and with cycle club.
(3) AK Stratham Beach.	- water sports - fishing - walking · Forests · Farms · Residential · Beach access.
(4) AK. Dalyellup Dunes ~~[illegible]~~	~~[illegible]~~ ~~Walking~~ ~~[illegible]~~ - Access to beach has been reduced over last 2 years. - Concern dunes have been eroded by 8m over last 2 winters and have not recovered during summer. - Insufficient action to protect dunes or to inform public on how to protect the dunes such as signs to inform or fencing to protect dunes or vegetation to protect dunes.

~~[illegible]~~

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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B1

TUART FORREST

ENVIROWMENT

WALK WILDLIFE TREES.

PEPPI

B2

BEACH

SWIMMING, FISHING, WALKING

PEPPI

TASK 1

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important

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My Place

TASK 2 on LHS

J1

Peppermint Grove Beach for swimming - walking - being

- natural
- accessible
- undeveloped
- beautiful

+++ Protect / Preserve Dunal Ecology +++

- Concerns
  - Cars + Vehicles chewing it up
  - Car Park Incundation

Capel Coast

J2

- Dalyellup People Not Paying Attention + it will impact them —

J2

Small Shire what priority will be given to Capels needs ??

J3

Development Continues in Dalyellup — Planning is proper management + part of the AVOID

J3

the people who would VALUE it being done properly aren't there yet!!!

How is the Study collecting Info Required from LGAs

eg Re Contaminated Sites

Planning Regulations

- What part will this Map have in Decision making or is it up to the councils

Sensitive Aboriginal History

Cooperation + Collaboration + Reconciliation Action Planning

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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B1 7(FARM + BEACH DUNE EROSION CAUSED BY VEHICLES IN DUNES - SINGLE DUNE SYSTEM POTENTIAL TO OPEN FARMLAND TO OCEAN
B 1

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important

(number the item on your sheet and then place a blue 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

05 81 DALYELLUP BEACH & PARKS LAND INFILL NEW HOUSING SITES WE HAVE LAND AT DOUNGUP BETWEEN OCEAN & GOVT DRAIN IF BLOWOUT WE LOSE LAND. (4 WHEEL DRIVE)

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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CRW

Capel River Wetlands.
Important home and refuge for thousands of water birds and other natural communities.

High aesthetic value.
Some walking, some canoing, some horseriding, some photography.

The adjacent agricultural land is rich organic sediments which are very productive for pasture, crops, grazing.

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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Beach N of Capel river mouth: last "wild" coast with best near shore reef snorkelling. Very narrow beach needs protection from vehicles. (no vehicles should be)

We snorkel, watch birds, crayfish along this coastline.

PI

CRW

PI

6

Mallokup wetland (wetlands near Capel Bridge).

Great Birdwatching & Major swan nesting area.

CRW

PI

4

4

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

Think about a place that you love to go – tell us - why it is important, what do you do there, what physical aspects of the place are important
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B1

Capel river mouth and beach
Visit, walk on beach, swim
Take visitors there
Value the natural scenery there and bird life.
Swim on the reef. Sadly over last 40yrs big decline in fish and decline in ocean species on reef

B2

Minninup beach at end of Rich Rd
Same points as above

B3

Stirling wetlands 1km north and south of Capel River
Importance of historical swan nesting area.
About 100 swans nests. Swans need to be considered - vegetation for nesting.
Need for fox control
Ten years ago there were 550 swans on lake Moore 1km nth of Capel River. Since then swan numbers declining. They need nesting sites

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK ONE

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77

We have lived on the waters edge (within 100Mtr) for Fifty 50 years and love every aspect of it. Each year we plant six coastal trees, and place cottage on blow outs caused by Rabbits.

Between 1971 and 1973 as Exploration Manager for Norseman Titanium N.L we undertook a coastal drilling programme to the Sand dunes between Location 179 Stratham and Wonnerup dead water at 50ft x 50ft hole centres (excluding located A2)

" I Love every aspect of Peppermint Beach "
Swimming Fishing beach fishing. walking. barbecues.

This week ending 31st Aug is the first time in 50 years that a PRIMARY dune has been attacked near the Northern Toilet Block

Rex Barber Minim Egg / Norman Egg

APPENDIX F

HARVEY TASK 2 COMMENTS

APPENDIX G

BUNBURY AND DARDANUP TASK 2 COMMENTS

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

114 Beach Erosion – eroding of sand dunes, losing sand. But also loss of infrastructure that supports enjoying the beach & natural environment – beach stairs that are still closed off. Back beach.

3 Sea grass - amount of sea grass that is ripped up & deposited on beach during storms. My concern is loss of seagrass beds NOT the grass being on the beach.

116 Port – the effects of the Port concern me. The effect of tankers coming in & out, pollution Possible effects of inundation at the Port & what this would mean for Koombana Bay & the Dolphin population.

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

114	• Beach erosion : Drop on value of properties & of course, a massive impact to the natural assetts of Bunbury.
115	• Damage to seagrass habitats in Koombana bay.
Lastly, as a group, is there one issue you would say is the most important to manage in your area?	

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

(2) (11) • Erosion to sand dunes / beaches
(5) (12) (1) • Sand movement changing ocean conditions
(7) (3) • Sand through carparks / gardens
(14) • Beach access is more difficult due to erosion
• Limited Beach access.

• Erosion damaging vegetation / fauna in general along all coastline

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

(3) CLIMATE CHANGE CAUSING STRONGER STORMS CAUSING MORE DAMAGE (1) POLLUTION IN KOOMBANA BAY SEA LEVEL RISE 6. POLLUTION IN THE ESTUARY
Lastly, as a group, is there one issue you would say is the most important to manage in your area?

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

See previous list of comments - Task 1.

Can't get to the beach!
Beach too short –
Too many ~~rock~~ rocks exposed - uncomfortable
Wind too wild + ongoing winds 2020 + 2021 winters. More severe than previous

Estuary -
Pt Mornington & Ruri deltas
Pt Douro
crucial for our migratory shorebirds
especially - 21+ species to Arctic Circle to nest.
* Fairy Terns - nesting shorebirds - bait fish eaters
* Red-capped Plovers " forage at low tide
* Pied Oystercatchers "

4 WD's smashing beaches, dunes
NOT ALL
But there are mavericks, very damaging
Driving there beach nesting activity
Destroyed Fairy Tern nesting colony at the Cut in late 2020.

* Beach nesting birds are an indicator of coastal health. *

Lastly, as a group, is there one issue you would say is the most important to manage in your area? Water drains on beach front

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

(47)

Hungry Hollow - major concern personally - soon there will be very little beach to walk / swim at.

Having seen the damage of Cyclone Alby to road / beaches / buildings previously - worried that we're not prepared for future events.

Concerned that as the increasing traffic along beach front will also possibly bring more people - tramping out paths through established vegetation - particularly as many paths have been closed this winter due to storms.

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

48

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

DESTRUCTION OF NATURAL COASTAL WETLANDS THAT PROTECT US FROM EXTREM EVENTS AND SLR.

ALL CONTAMINATED LANDS AND HIGHLY CONTAMINANT INDUSTRIES CLOSE TO THE COAST. (TRONOX, INNER HARBOUR LAND ETC)

HARD STRUCTURES DO NOT ALLOW FOR NATURAL COASTAL WETLANDS TO RECEED?

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

Contaminated sites.

41 Dalyellup Waste Residue Disposal facility
- unlined industrial waste disposal
- contains material that contains heavy metals and radioactive material.
- site is in very close proximity to the high tide line ~~and~~, housing development and the Dalyellup Drinking water extraction site. The ingress of seawater may impact the bio availability of contaminants increasing mobility within groundwater. The coastal aquifer is not protected in this area increasing risk.

42 Port, Bunbury groundwater + soil contamination

43 outer port soil contamination

44 TRONOX site soil + groundwater contamination

45 impacts on drinking water

46 Proposed development within the project zone should be deferred until CHRMAP completion

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

30 loss of habitat. This will impact flora and fauna population;

31 Groundwater contamination from salt water. will impact freshwater ecosystems and drinking water

32 Biodiversity loss. General detriment to environment.

33 Urban sprawl inland

34 Groundwater contamination from contaminated sites

35 loss of access to the beach for recreation

36 loss of cultural sites

37 Threats to coastal living

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

(38)	Erosion (eg through storm events) – limiting access & enjoyment
(39)	Human impacts – evidence of (eg litter, human movement through planted areas, development close to beach, pollution)
(40)	Impact of marine-based development on health of waterways (eg flushing of Inlet) & marine fauna

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

APPENDIX H

CAPEL TASK 2 COMMENTS

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

POPULATION PRESSURE MEANS THE SMALL PERCENTAGE OF PEOPLE WHO DO THE WRONG THING IS BECOMING A LOT OF PEOPLE. THESE ARE THE ONES DRIVING ON THE BEACH AND MAKING NEW TRACKS THROUGH THE DUNES AND THIS COMBINED WITH MORE ADVERSE WEATHER EVENTS ARE CAUSING MAJOR EROSION OF DUNES THAT PROTECT INLAND ENVIRONMENT AND HOMES ETC.

14

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

Dalyellup.

(A) Lack of education about coastal erosion and signage / fencing to limit erosion to Marm

Dalyellup

(B) Re-Vegetation - due to erosion from residents and from storm erosion there is a need to help re-establish vegetation to help stabilise the dune systems.

Dalyellup

(C) Loss of access to beach during winter and erosion of dunes (e.g. (stairs) (about 5m ~~5m~~ to 10m over last 2 years ~~depending area~~ along The beach in Dalyellup

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

PNP Leschenault to Capel Coastal Hazard Risk Management Adaptation Plan – Workshop - TASK TWO

Tell us about an issue or concern that you have along our coast or river frontages or identify things that have changed that affect you.
(number the item on your sheet and then place a orange 'dot' with the same number on the large map on the wall – check with others to make there are no doubles!)

SHIRE HAS DRAINAGE OUTO BEACH - IT BACK FILLS & CAUSES EROSION

B1

DUNE PLANTING & REVEGETATION DOES NOT HOLD

EROSION GETS WORSE B2

HAVE YOU DONE A SEISMIC SURVEY OF COAST ??

DETERMINE ROCK TYPE

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

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8 1 SINGLE DUNE SYSTEM SERIOUS DUNE BLOW OUT CAUSED BY VEHICLES COMING OFF BEACH
8 2 WETLANDS + FARMLAND BECAME SALINE BECAUSE OF DRAINS LEFT OPEN AT CAPEL RIVER - IT IS IMPROVING
Lastly, as a group, is there one issue you would say is the most important to manage in your area?

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BENCH BLOW OUT 81
Lastly, as a group, is there one issue you would say is the most important to manage in your area?

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77

Right now! the sea has attacked a primary dune the first we have seen in 50 years at Peppermint Grove Beach

77

My biggest concern is what this study intends to do about rising sea Levels "Concrete Turnbacks"? "Groins" Groynes.

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

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Recognition of multiple ownership of beach land & how can we get them all working together

- private landowners
- government property
- unallocated crown land
- public open space

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

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Salt water ingress through the cuts. (eg. Capel) PA1
Salt water rising from ground behind dunes eg salting land. PA2
Elimination of Beach / habitat in relatively wild coastline. PA3
Lastly, as a group, is there one issue you would say is the most important to manage in your area?

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B1 Capel River mouth and saltwater surge upstream

B2 Capel/Stirling wetland inundation
South and north of Capel River
Need for protection of bird life
especially swans which return
for decades of where they were hatched.

B3 Tuart Forest National Park
Minninup Forest is still capable
of natural regeneration if
Kangaroos are kept out in last 30 years
Under ground water level has dropped due
to 3 sand mining projects + huge quotas
for farming
Lower water table affects forest vegetation

Lastly, as a group, is there one issue you would say is the most important to manage in your area?

SHAPE URBAN

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Melbourne

15 Business Park Drive
Notting Hill VIC 3168
Telephone (03) 8526 0800

Sydney

Suite 3, Level 1, 20 Wentworth Street
Parramatta NSW 2150
Telephone (02) 9354 0300

Brisbane

Level 5, 43 Peel Street
South Brisbane QLD 4101
Telephone (07) 3105 1460

Adelaide

1/198 Greenhill Road
Eastwood SA 5063
Telephone (08) 8378 8000

Perth

Ground Floor, 430 Roberts Road
Subiaco WA 6008
Telephone (08) 6555 0105

New Zealand

7/3 Empire Street
Cambridge New Zealand 3434
Telephone +64 27 777 0989

Wangaratta

First Floor, 40 Rowan Street
Wangaratta VIC 3677
Telephone (03) 5721 2650

Geelong

51 Little Fyans Street
Geelong VIC 3220
Telephone (03) 8526 0800

Wimmera

597 Joel South Road
Stawell VIC 3380
Telephone 0438 510 240

Gold Coast

Suite 37, Level 4, 194 Varsity Parade
Varsity Lakes QLD 4227
Telephone (07) 5676 7602

watertech.com.au