

KEMPSEY SHIRE COASTAL MANAGEMENT PROGRAM

Prepared by Salients for Kempsey Shire Council

Final for Adoption
18th March 2025



Kempsey Shire Council acknowledges the land of the Thunggutti / Dunghutti Nation.

We pay respect to Elders past and present.

We acknowledge the role of emerging leaders to continue to guide us in the future.

We acknowledge the Stolen Generations and the need to change practices to be inclusive.

This land always was and always will be Thunggutti / Dunghutti land.

KEMPSEY SHIRE COASTAL MANAGEMENT PROGRAM

Authors	Elizabeth Nevell, David Wainwright
Prepared For	Kempsey Shire Council
Version	FINAL FOR ADOPTION
Date	18/03/2025

DOCUMENT CONTROL

				Distribution ¹			
				KEMPSEY SHIRE COUNCIL	DCCEEW		
Version	Date	Checked	Issued				
DRAFT	27/11/2023	DJW	EN	E	E		
EXHIBITION DRAFT	07/05/2024	DJW	EN	E	E		
FINAL EXHIBITION DRAFT	24/06/2024	DJW	EN	E	E		
FINAL FOR ADOPTION	18/03/2025	DJW	EN	E	E		

Kempsey Shire Council has prepared this document with financial and technical assistance from the NSW Government through its Coastal and Estuary Grants Program. This document does not necessarily represent the opinions of the NSW Government or the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW). The Coastal Management Program has been prepared by Salients for Kempsey Shire Council.

¹ 'E' refers to electronic distribution; numerals refer to number of hard copies.

EXECUTIVE SUMMARY

The Kempsey Shire Coastal Management Program (CMP) establishes a long-term strategy for coordinated land management in the coastal zone of Kempsey Shire. This includes managing approximately 80 kilometres of open coast, Killick Creek estuary at Crescent Head, Korogoro Creek estuary at Hat Head, Saltwater Creek and Lagoon at South West Rocks, and the Macleay River Estuary, including Kempsey, Stuarts Point, Fishermans Reach, and Back Creek.

Key motivations for implementing the CMP include addressing ongoing threats to the natural coastal environment, cultural heritage and built infrastructure, and the uncertainty posed by climate change. These need to be managed in a constrained funding environment. Kempsey Shire Council (KSC), consistent with the Coastal Management Act 2016 (CM Act) and its related Coastal Management Manual (CMM), is responsible for preparing and implementing the CMP, including monitoring and annual reporting on actions and outcomes. The CMP was developed following a five-stage process outlined in the CMM.

Development of the CMP involved extensive risk assessment and consultation to identify and evaluate potential management actions. The CMP preparation was guided by KSC and the Department of Climate Change, Energy, the Environment, and Water (DCCEEW) and involved consultation with other state government agencies and stakeholders to ensure their support and funding for the CMP's execution. Community and stakeholder engagement played a significant role throughout the development stages of the CMP.

The CMP recommends modifications to the maps referenced by State Environmental Planning Policy (Resilience and Hazards) 2021 (RH SEPP). Modifications to the existing mapped coastal wetland and littoral rainforest area are proposed as an action in the CMP. The CMP also includes an action to prepare a planning proposal to adopt new coastal vulnerability mapping that was completed as part of the Stage 2 studies.

The CMP includes a Coastal Zone Emergency Action Subplan (CZEAS) to outline emergency responses to coastal hazards to protect human life and public safety, minimise damage to property and assets, minimise impacts on social, environmental, and economic values, and not create additional hazards or risks.

The CMP addresses various key issues within the Kempsey coastal zone, such as the complexity of managing the coastal zone between stakeholder groups, catchment impacts on water quality, and the health of riparian and wetland vegetation.

Key issues that the CMP aims to address are listed within this document. This is followed by a description of the actions included in the forward plan of works. Projected forward expenditure on the CMP actions is presented in Table E1.

Table E1 Projected Expenditure on the CMP (to Nearest \$1000)

Year	KSC Funds	External Funds
2024/25	\$200,000	\$360,000
2025/26	\$142,000	\$244,000
2026/27	\$267,000	\$494,000
2027/28	\$137,000	\$234,000
2028/29	\$224,000	\$487,000
2029/30	\$204,000	\$367,000
2030/31	\$189,000	\$337,000
2031/32	\$165,000	\$291,000
2032/33	\$100,000	\$161,000
2033/34	\$110,000	\$181,000
Total	\$1,738,000	\$3,156,000

Total expenditure over ten years is expected to be \$4,894,000.

CONTENTS

1	INTRODUCTION	8
1.1	The Kempsey Coastal Management Program	8
1.2	CMP Vision and Objectives	11
1.2.1	Vision Statement	11
1.2.2	Objectives.....	12
1.3	Why is this CMP Required?	12
1.4	Roles and Responsibilities of KSC and Public Authorities.....	13
1.5	How was the CMP Developed?	13
1.5.1	Stage 1: Identify the Scope of the CMP	14
1.5.2	Stage 2: Risks, Vulnerabilities and Opportunities	16
1.5.3	Stage 3: Identify and Evaluate Options.....	17
1.5.4	Stage 4: Prepare, Exhibit, Finalise and Certify	18
1.5.5	Community and Stakeholder Engagement	18
1.6	Projected Population Growth, Demographics, and Changes to Coastal Land Use	19
1.7	Whether the CMP Identifies Recommended Changes to the Relevant Planning Controls, Including any Proposed Maps	20
1.8	Maps	21
2	A SNAPSHOT OF ISSUES.....	22
2.1	Coordination between stakeholder groups	22
2.2	Conflicting land use requirements	22
2.3	4WDs on beaches	24
2.4	Proliferation of informal access tracks by vehicles and pedestrians.....	25
2.5	Incomplete / absent consideration and / or knowledge of Indigenous values and sites	25
2.6	Lack of sufficient / appropriate waterway access points and facilities	26
2.7	Lack or loss of public foreshore access and facilities	26
2.8	Poor or out of date mapping of important ecological communities.....	27
2.9	Additional controls required within Kempsey LEP, DCP, and KSC policies	28
2.10	Introduction of invasive species and weeds	29
2.11	Clearing, fragmentation and degradation of habitats.....	29
2.12	Stormwater discharge and runoff	30
2.13	Catchment interactions with flood mitigation infrastructure and operations.....	31
2.14	Derelict mine discharges, mining, and other extractive industrial activities.....	32
2.15	Sedimentation of waterways	32
2.16	Ongoing management of Back Creek.....	33
2.17	Stock Access: Damage to soil structure and loss of wetland vegetation.	34
2.18	Foreshore and bank erosion (including degraded / failing bank protection structures).....	34
2.19	Agricultural diffuse source runoff	35

2.20	Catchment flooding and ICOLL entrance management	36
2.21	Exposure to coastal erosion hazards.....	37
2.22	Exposure to coastal inundation hazards	37
3	ACTIONS TO BE IMPLEMENTED BY KEMPSEY SHIRE COUNCIL OR BY PUBLIC AUTHORITIES	40
3.1	LGA-Wide Actions	40
3.1.1	A1: Natural Resources Consultative Group (NRCG) Support for Kempsey CMP	40
3.1.2	A2: Community Education Program	41
3.1.3	A3: Coastal Focused Weed Management.....	42
3.1.4	A4: Integration of Planning Instruments.....	45
3.1.5	A5: Coastal Usage Assessment	47
3.1.6	A6.1: Coastal Asset Procedures	48
3.1.7	A6.2: Coastal Asset Management.....	49
3.1.8	A7.1: Estuary Stormwater Quality Investigation and Plan	50
3.1.9	A7.2: Estuary Stormwater Quality Improvements	51
3.1.10	A8.1: Bank Management Assessment and Implementation Plan	51
3.1.11	A8.2: Bank Management Improvements.....	53
3.1.12	A9.1: Water Quality Improvement Monitoring Program Design	54
3.1.13	A9.2: Water Quality Improvement Monitoring Program.....	55
3.1.14	A10: Manage Estuary Entrances.....	56
3.1.15	A11: Community Conservation and Restoration Programs	57
3.1.16	A12: Revised Maritime Infrastructure Assessment.....	58
3.1.17	A13: Protection and Management of Migratory and Threatened Shore and Water Birds	59
3.1.18	A14: Revised Coastal Hazard Assessment.....	60
3.1.19	A15: Revised Coastal Wetland and Littoral Rainforest Mapping	61
3.1.20	A16: Indigenous Values and Mapping	62
3.2	Open Coast Actions.....	63
3.2.1	A17.1: Coastal Monitoring Installation	63
3.2.2	A17.2: Coastal Monitoring Program	63
3.3	Killick Creek Actions	64
3.3.1	A18: Willow Street Coastal Vulnerability Adaptation Plan.....	64
3.4	Macleay River Actions.....	66
3.4.1	A19: Masterplan for Mattys Flat and Macleay River Entrance	66
3.4.2	A20: Produce Macleay River Estuary Riverbank Restoration Guide	68
4	BUSINESS PLAN	70
4.1	Intent of the CMP.....	70
4.2	Cost and Funding Arrangements.....	70
4.3	Program for Delivery	72
5	COASTAL ZONE EMERGENCY ACTION SUBPLAN	74
6	MONITORING, EVALUATION AND REPORTING PROGRAM	75

6.1	Monitoring of CMP Delivery.....	75
6.2	Trigger Points, Thresholds, and Key Indicators	81
7	REFERENCES	82
APPENDIX A	COASTAL ZONE EMERGENCY ACTION SUBPLAN	84
APPENDIX B	DEFERRED ACTIONS	85
APPENDIX C	COASTAL VULNERABILITY AREA	102

FIGURES

Figure 1	Kempsey Coastal Zone (North)	9
Figure 2	Kempsey Coastal Zone (South)	10
Figure 3	Stages in Preparing and Implementing a CMP (Source: NSW Government, 2018).....	14
Figure 4	Representative Locations of Key Issues	39
Figure 5	Location of Works, Action A3: Coastal Focussed Weed Management	44
Figure 6	Potential Locations for Upgrades at Mattys Flat, Extract from Royal Haskoning DHV (2021)	67
Figure 7	Representative Locations of Management Actions	69
Figure 8	Integrated Planning and Reporting Framework.....	78
Figure 9	Collombatti-Clybucca Management Areas from the Macleay River Floodplain Prioritisation Study (Water Research Laboratory, 2023)	92

TABLES

Table 1	Summary of Stage 2 Studies	16
Table 2	Kempsey Coastal Zone Population	20
Table 3	Schedule of Maps.....	21
Table 4	Locations and nature of weed management works, Action A3	43
Table 5	Projected Expenditure on the CMP.....	72
Table 6	Program for Delivery	73
Table 7	CMP Action Performance Measures	79
Table 8	Trigger points, Thresholds and Key Indicators	81

SUPPORTING DOCUMENTS

Supporting Document 1	Kempsey Shire CMP Development of Vision Statement
Supporting Document 2	Stage 1 Scoping Studies
Supporting Document 3	Stage 2 Studies
Supporting Document 4	Entrance Management Plans
Supporting Document 5	Stage 3 Report
Supporting Document 6	Checklist of CM Act Objects and Objectives
Supporting Document 7	Community Stakeholder and Engagement Strategy
Supporting Document 8	Macleay River Estuary Management Plan Marine Infrastructure Assessment

GLOSSARY

ANZECC	Australian and New Zealand Environment and Conservation Council
ASS	Acid Sulfate Soils
CM Act	Coastal Management Act 2016
CMM	Coastal Management Manual
CMP	Coastal Management Program
CVA	Coastal Vulnerability Area
CWLR	Coastal Wetland and Littoral Rainforest
CZEAS	Coastal Zone Emergency Action Subplan
DCP	Development Control Plan
DPIRD	Department of Primary Industries and Regional Development
CZMP	Coastal Zone Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment, and Water
ICOLL	Intermittently Closed and Open Lakes and Lagoons
IP&R Framework	Integrated Planning and Reporting Framework
KSC	Kempsey Shire Council
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
MEMA	Marine Estate Management Authority
MEMS	Marine Estate Management Strategy
MCEF	DCCEEW – Marine Coast Estuary and Flood
MIDO	Maritime Infrastructure Delivery Office
NPWS	National Parks and Wildlife Service
NRCG	Natural Resources Consultative Group
POM	Plan of management
RH SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
TfNSW	Transport for NSW

1 INTRODUCTION

1.1 The Kempsey Coastal Management Program

The purpose of the Coastal Management Program (CMP) is to set the long-term strategy for co-ordinated land management within the coastal zone of Kempsey Shire. This includes approximately 80km of open coast, Killick Creek estuary at Crescent Head, Korogoro Creek estuary at Hat Head, Saltwater Creek and Lagoon at South West Rocks, and the Macleay River Estuary, including Kempsey, Stuarts Point, Fishermans Reach, and Back Creek.

The location of the Kempsey coastal zone is shown in Figure 1 and Figure 2, for the northern and southern extents of the Kempsey coast, respectively. The area considered by this CMP comprises the coastal zone within the Kempsey Local Government Area (LGA). A section of the coastal zone within Kempsey LGA is associated with Connection Creek, which links the Macleay River Floodplain to the Hastings River Estuary to the south as shown in Figure 2. This section is excluded from the Kempsey CMP and will instead be included in the Port Macquarie – Hastings CMP.

The Kempsey coastal zone lies within two sediment compartments:

- *Nambucca – South West Rocks* (Sedimentary Compartment No. NSW01.02.05), which is shared with Nambucca Valley Council.
- *South West Rocks – Port Macquarie* (Sedimentary Compartment No NSW01.03.01), which is shared with Port Macquarie Hastings Council.

The boundary between the two sediment compartments is at Lagers Point.

Kempsey Shire Council (KSC) has adopted multiple Plans of Management (POM) for the coast and estuaries in the past. These include:

- Kempsey Coastal Zone Management Plan (BMT WBM, 2016)
- Macleay River Estuary Coastal Zone Management Plan (GeoLINK, 2012)
- Korogoro Creek Estuary Management Plan (Tefler and Birch, 2009)
- Saltwater Creek and Lagoon Estuary Management Study and Plan (WBM, 2006)
- Killick Creek Estuary Management Study and Plan (WBM Oceanics Australia, 2006)

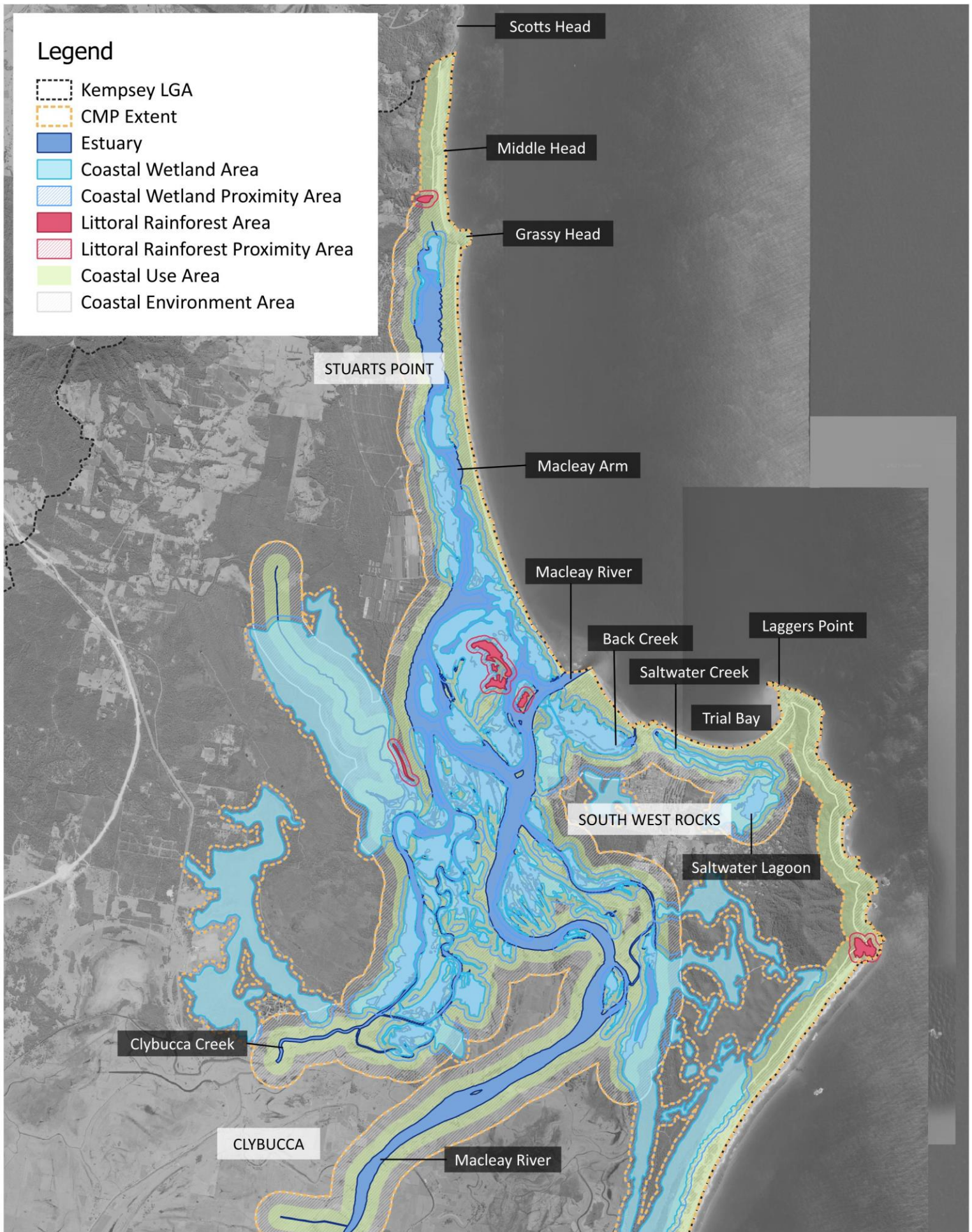


Figure 1 Kempsey Coastal Zone (North)

Kempsey Coastal Management Program

Z:\BusinessShare\Them\Projects\P00205_KempseyCMPStage4\GIS\CoastalZone.qgz

0 1 2 3 4 km

REV C
DRAWN EN
CHECK DJW

Salients

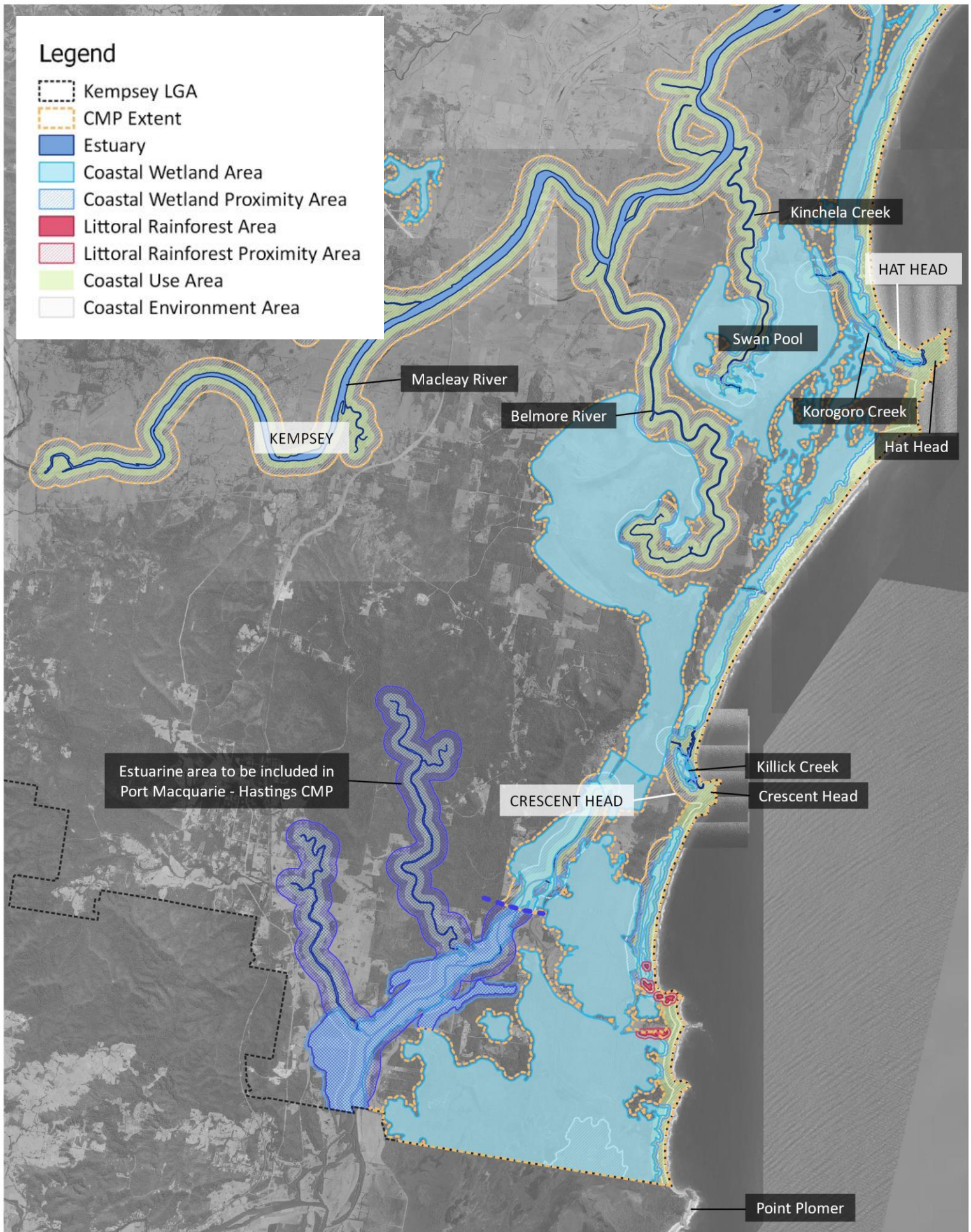


Figure 2 Kempsey Coastal Zone (South)

Kempsey Coastal Management Program

Z:\BusinessShare\Them\Projects\P00205_KempseyCMPStage4\GIS\CoastalZone.qgz

REV	B
DRAWN	EN
CHECK	DJW



Development of the CMP began in 2020. Initially, individual CMPs were to be prepared for each estuary, with scoping studies completed for the Macleay River, Saltwater Creek, Korogoro Creek and Killick Creek estuaries and the open coast. This approach was reconsidered, with the preferred approach being a single CMP covering the entire Kempsey coastal zone. Drafting of this CMP was undertaken in 2023, with ongoing consultation with the community and state government stakeholders.

The CMP has been developed in accordance with the requirements of the *Coastal Management Act 2016* (the CM Act) and Coastal Management Manual (State of NSW and Office of Environment and Heritage, 2018).

The coastal zone is defined by the CM Act and includes four coastal management areas:

- 1 Coastal wetlands and littoral rainforests area: land with hydrological and floristic characteristics of coastal wetlands or littoral rainforests, and adjoining land.
- 2 Coastal vulnerability area: land subject to coastal hazards.
- 3 Coastal environment area: land containing and adjoining coastal features such as coastal waters, estuaries, coastal lakes, and lagoons.
- 4 Coastal use area: land adjacent to coastal features where development is or may be carried out.

The CM Act outlines management *objectives* for each of these areas. The different coastal management areas are mapped in the State Environmental Planning Policy (Resilience and Hazards) 2021 (RH SEPP). The RH SEPP sets out the development controls for each coastal management area. However, as of November 2023, there is no coastal vulnerability area mapped for the Kempsey LGA in the RH SEPP.

Maps showing the extents of the presently mapped coastal management areas for the LGA are presented in Figure 1 and Figure 2.

1.2 CMP Vision and Objectives

1.2.1 Vision Statement

A vision statement for the Kempsey CMP was developed considering the vision statements within the Stage 1 scoping studies, KSC's Community Strategic Plan, and the objects of the CM Act. Development of the vision statement is detailed in Supporting Document 1. The vision of the Kempsey CMP is as follows.

Our connection to the coast inspires us to enhance and protect the cultural and natural values of the coastal environment, creating a safe, active, and prosperous community now and into the future. We will achieve this through informed governance and sustainable resourcing.

1.2.2 Objectives

It is a requirement of the NSW Coastal Management Manual (CMM) that CMPs give effect to the objects of the CM Act and the objectives for the different coastal management areas specified by the Act. Supporting Document 6 (CMP Checklist) demonstrates how the objects of the CM Act, the objectives for each of the coastal management areas, and the objects of the Marine Estate Management Act were considered in developing management actions.

1.3 Why is this CMP Required?

The future management of the Kempsey coastal zone will be undertaken within a context of (likely) limited financial resources, ongoing threats to the natural coastal environment, cultural heritage and built infrastructure, and ongoing climate change uncertainty. A CMP will help to mitigate some of these factors. Specifically:

- A CMP provides a long-term strategy, developed with inputs from a cross section of government stakeholders and thus enables coordinated management of the coast and estuaries within a local government area.
- A CMP presents an opportunity to manage the coastal zone proactively and to ensure that there is alignment with other local and regional planning instruments and initiatives.
- A CMP allows for community involvement in management and decision making, supporting community connection and the acknowledgement and protection of cultural values.
- A CMP will provide a degree of exemption from liability to local councils under Section 733 of the Local Government Act 1993.
- A gazetted CMP unlocks funding opportunities via the NSW Government's Coast and Estuary Grants funding stream (presently on a 1:2, local:state government contribution basis).

The risks of not developing a CMP are substantial and potentially place KSC in a position where it is unable to meet its obligations and commitments in terms of financial sustainability, climate change adaptation, and emergency management. Without an understanding of key issues, it is impossible to adequately budget for their management. The CMP process integrates with KSC's Integrated Planning and Reporting (IP&R) framework, allowing the recommended actions to be prioritised and resourced in a transparent way. This approach removes the risk of CMP actions competing in an inequitable way with other KSC priorities.

The CMP must be formally endorsed by all other government agencies required to take responsibility for actions, either in terms of funding or resource allocation. Thus, it provides a strong degree of certainty for KSC that the interagency actions within the Plan can and will be delivered.

1.4 Roles and Responsibilities of KSC and Public Authorities

KSC is responsible for preparation of the CMP in accordance with the requirements of the CM Act and CMM. KSC must implement the CMP through its IP&R Framework and/or land use planning system according to law. The CMP must be monitored and reported on, with annual reporting required for planned actions and their outcomes. Local Environmental Plan (LEP) and Development Control Plan (DCP) land use planning controls for the coastal zone should give effect to management objectives identified in the CMP.

Public authorities must have agreed to any actions identified in the CMP as their responsibility for funding and implementation, or that affect their land or assets prior to certification. When preparing, developing, or reviewing Plans of Management, all public authorities must have regard to the CMP to the extent that it is relevant to exercising their functions.

1.5 How was the CMP Developed?

The CM Act states that a CMP needs to be prepared in accordance with the CMM. The CMM outlines a 5-stage process as shown in Figure 3.

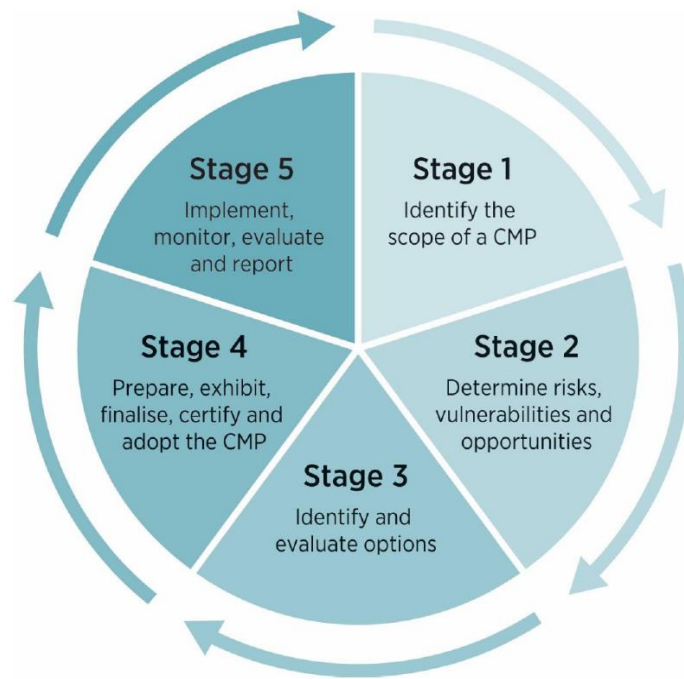


Figure 3 Stages in Preparing and Implementing a CMP
(Source: NSW Government, 2018)

1.5.1 Stage 1: Identify the Scope of the CMP

Several scoping studies were prepared during Stage 1. The scoping studies are attached as Supporting Document 2 and include the following:

- Killick Creek Estuary CMP Stage 1 Scoping Study (BMT, 2020a)
- Korogoro Creek Estuary CMP Stage 1 Scoping Study (BMT, 2020b)
- Macleay River Estuary CMP Stage 1 Scoping Study (BMT, 2020c)
- Saltwater Creek and Lagoon CMP Scoping Study (Water Technology and Molino Stewart, 2020)
- Open Coast Scoping Study for Kempsey CMP (prepared during Stages 2 and 3) (Salients, 2023)

The primary purpose of the scoping studies was to identify the required focus for the CMP and the steps required in preparing that CMP. The scoping studies considered existing information to review any progress already made in managing issues in coastal areas. Key tasks completed as part of the scoping studies were:

- Gathering an understanding of the community and identifying stakeholders. Developing an engagement strategy for later stages and beginning development of a shared understanding of the existing coastal management situation. Identifying the organisations and communities

that need to be involved in the CMP process and who holds responsibility for various issues that are likely to be involved.

- Determining the strategic context of coastal management for the area being considered and establishing the purpose, vision, and objectives of the CMP, identifying an appropriate scope, and expected key outcomes from the CMP.
- Determining the spatial extent of management areas, and which of the four management areas need to be considered by the CMP.
- Considering where coastal management areas overlap and how the hierarchy of management objectives outlined in the CM Act would operate. For the CMP, objectives relating to coastal wetlands are more important than those relating to the coastal vulnerability area, and objectives relating to coastal vulnerability area are more important than those relating to the coastal environment area (where those areas overlap). These in turn are more important than the objectives relating to the coastal use area.
- Reviewing the issues previously identified, current coastal management arrangements and progress made with existing actions. Determining where further or different action is required via a first-pass risk assessment. The threats identified during the first pass risk assessments completed during Stage 1 relate to:
 - Impacts of floodplain management.
 - Sea level rise inundation.
 - Wetlands and other habitats.
 - Sedimentation and entrance condition.
 - Catchment influences on water quality.
 - Riparian and bank condition.
 - Public safety.
 - Community connection with the coast.
 - Governance and engagement.
 - Antimony, arsenic, and other contamination.
 - Fishery productivity.
 - Cultural heritage.
 - Coastal hazards.

- Identifying the knowledge gaps and preparing the business case for filling those gaps. The business cases also included a forward program for preparing the CMP.

1.5.2 Stage 2: Risks, Vulnerabilities and Opportunities

Stage 2 involved technical investigations to address data gaps identified by the scoping studies. The completed studies are provided as Supporting Document 3 and are summarised in Table 1.

Entrance management studies and plans were also developed during Stage 2. The draft entrance management plans are provided as Supporting Document 4 and include:

- Korogoro Creek Entrance Management Plan (Water Technology and Molino Stewart, 2022a)
- Killick Creek Entrance Management Plan (Water Technology and Molino Stewart, 2022b)
- Saltwater Creek Entrance Management Plan (Water Technology and Molino Stewart, 2022c).

Table 1 Summary of Stage 2 Studies

Study	Purpose and Outcomes
Back Creek, South West Rocks – Review of Entrance Management Considerations (Water Technology and Molino Stewart, 2022d)	<ul style="list-style-type: none"> • The purpose of the study was to identify and assess management options if the existing dredge license for Back Creek is not renewed. • Three management options were recommended along with a decision-making framework for the options.
Review of Kempsey LGA – Miscellaneous Estuary Entrances & Outlets (Water Technology and Molino Stewart, 2022e)	<ul style="list-style-type: none"> • Provides an overview of several estuaries and their present entrance management. • The study examined entrances for which new entrance management plans were not prepared in 2021-2022. This includes Rowes Cut, Ryans Cut, Big Hill, Grassy Head, and Goolawah Lagoon.
Saltwater Creek and Lagoon Estuary CMP Stage 2 Hydrodynamic Processes Assessment (Alluvium, 2021a)	<ul style="list-style-type: none"> • This study addressed several data gaps identified in Stage 1 relating to the hydrodynamic processes in Saltwater Creek and Lagoon. • Investigated processes such as tides, wave climate, hydrology, estuary flooding, stratification, entrance conditions, and impacts of climate change.
Saltwater Creek and Lagoon Estuary CMP Stage 2 Water Quality Assessment (Alluvium, 2021b)	<ul style="list-style-type: none"> • Investigated water quality in the Saltwater Creek and Lagoon estuary. • Identified several water quality risks and recommended draft management actions for inclusion in the CMP.

Study	Purpose and Outcomes
Saltwater Creek Vegetation Mapping and Condition Assessment (Eco Logical Australia, 2021)	<ul style="list-style-type: none"> • Vegetation survey and mapping around Saltwater Creek was completed. • Several management recommendations were made regarding restoration, future development, and catchment issues, threatened species, and revision of the CM SEPP coastal wetland and littoral rainforest area mapping.
Kempsey Coastal Vulnerability Area assessment (Jeremy Benn Pacific, 2021)	<ul style="list-style-type: none"> • This study developed a coastal vulnerability area map for Kempsey LGA. • Certification of the coastal vulnerability area mapping under the RH SEPP is proposed as a management action in the CMP.

1.5.3 Stage 3: Identify and Evaluate Options

During Stage 3, issues identified in the Stage 1 scoping studies were reviewed and consolidated. A detailed risk assessment followed to pinpoint the highest priority issues. The risk assessment was informed by the Coastal Vulnerability Study completed during Stage 2, which considered hazards for present, 2050, and 2100 planning horizons. Potential management options were developed for those issues identified as priority issues by the risk assessment.

A long list of over 150 potential management actions was compiled from actions identified during the risk assessment and several other sources. This list included uncompleted tasks from the Coastal Zone Management Plan (CZMP) and previous estuary management plans, recommended actions from the scoping studies and other relevant studies, and input from the community and stakeholders.

All management options were subject to an assessment for viability, feasibility, and acceptability, following the guidelines of the CMM. The remaining options following this evaluation were forwarded to stakeholders for their feedback, from which a shortlist of actions was compiled. Shortlisted actions were subject to a final evaluation of planning, legal and organisational constraints, and taken forward to a Business Plan.

The Stage 3 report describes the detailed risk assessment and the development and assessment of management options and is included as Supporting Document 5.

Taking advantage of unforeseen opportunities as they arise should not be stifled by the CMP process. Adaptability is important, alongside a general awareness among estuary management agencies of where other agencies are active. During later stages of development of this CMP,

several additional management actions which were accepted by the relevant stakeholders as being feasible, viable, practical, and highly likely to provide suitable benefits were identified. While these were not subject to the detailed assessment outlined above, the management actions have been qualitatively considered and align with the objectives of the CMP, promote the objects of the CM Act and are consistent with the objectives of the RH SEPP. These actions have been included within the CMP on the proviso that a responsible agency for the action and funding source could be confirmed.

1.5.4 Stage 4: Prepare, Exhibit, Finalise and Certify

The CMP has been prepared under the guidance of KSC and the Department of Climate Change, Energy, the Environment, and Water (DCCEE). Furthermore, other state government agencies have been contacted to confirm that they are committed to supporting execution of the CMP, including providing funding where necessary and possible.

A CMP must be placed on public exhibition and any comments of relevance considered and addressed. Following exhibition, the CMP is finalised and submitted to KSC for adoption. Once adopted by KSC, the CMP is forwarded to the Minister for the Environment for certification.

1.5.5 Community and Stakeholder Engagement

Consultation has been an important feature through Stages 1-3 of the CMP development process. A Community and Stakeholder Engagement Strategy was prepared to guide consultation activities and is provided as Supporting Document 7.

During Stage 1, engagement focussed on informing, consulting, and involving the community in the preparation of the scoping studies, through media releases, online surveys, drop-in centres, and workshops. State government agencies were also consulted. Face-to-face engagement was limited due to COVID-19, and virtual engagement methods through KSC's 'Your Say Macleay' platform were utilised. These activities underpinned the identification of issues considered in the preliminary risk assessment during the scoping studies.

During preparation of the technical studies completed during Stage 2, engagement was primarily limited to the scientific community and relevant State Government agencies. Significant stakeholder and community engagement was undertaken during preparation of the estuary entrance management studies and plans, in the form of media releases, an online survey, and workshop.

Stage 3 engagement related to identification and evaluation of management options to address the coastal risks and opportunities identified in Stages 1 and 2. Stage 3 engagement included media releases, three face-to-face community workshops to brainstorm potential management actions, and an online survey to obtain feedback on management options.

Stage 3 also involved ongoing teleconferencing, phone, and email correspondence with state government agencies, which continued through Stage 4.

1.6 Projected Population Growth, Demographics, and Changes to Coastal Land Use

Communities within Kempsey's coastal zone include Crescent Head, Hat Head, South West Rocks, Fishermans Reach, Stuarts Point, and Grassy Head along the open coast, and Kempsey situated by the Macleay River estuary. Table 2 outlines the key demographics and expected growth for these areas.

The population of the Kempsey LGA is projected to grow by 5,421 between 2020 to 2041, with an anticipated need for 2,790 new dwellings. It is expected that most of this growth will occur in South West Rocks, which is considered to be a major hub for future residential and commercial growth (Kempsey Shire Council, 2023a).

South West Rocks, including Arakoon and Jerseyville, is the main settlement along the Kempsey coast, located east of the Macleay River with a population of 5,628. South West Rocks has been the focal growth area in the Kempsey Shire in recent years and is projected to increase by 35% from 2022-2036. This is around three times the average growth expected for Kempsey overall. It is anticipated there will be a need for some 1,600 additional dwellings in South West Rocks by 2041².

Crescent Head is the southernmost township within the Kempsey LGA. At the 2021 census Crescent Head had a population of 1,633. The population of Crescent Head is projected to grow by 13% between 2022 and 2036.

Hat Head had a population of 365 reported in the 2021 census, which is around 1% of the population of the Kempsey Shire. Future growth is expected to be minimal in Hat Head. The township of Hat Head is low-lying, situated between Korogoro Creek and the dune.

² <https://www.kempsey.nsw.gov.au/Your-Valley/Ongoing-works-in-the-shire/Major-projects/South-West-Rocks-Structure-Plan>

North of the Macleay River entrance are the smaller settlements of Fishermans Reach (2021 Population: 144), Stuarts Point (766) and Grassy Head (85). These areas have a projected growth of 4.6% between 2022 and 2036.

Table 2 Kempsey Coastal Zone Population

Locality	Population (2021) ³	Median age (2021)	Projected growth 2022 - 2036 ⁴
Crescent Head	1,633	52	13%
Hat Head	365	60	< 1%
South West Rocks	5,628	58	35%
Kempsey	11,073	39	7%
Stuarts Point and District	995	57	4.6%

1.7 Whether the CMP Identifies Recommended Changes to the Relevant Planning Controls, Including any Proposed Maps

The CMM, as a mandatory requirement, specifies that a section must be included in a CMP with the title *“Whether the CMP identifies recommended changes to the relevant planning controls, including any proposed maps”*. This section addresses that requirement.

The RH SEPP includes mapping of the four coastal management areas. Currently, no coastal vulnerability area is mapped for the Kempsey LGA. Coastal vulnerability mapping for Kempsey was completed as part of the Stage 2 studies, and modification of the RH SEPP to adopt this mapping is recommended by the CMP. Inaccuracies in the coastal wetlands and littoral rainforest mapping were also identified and the CMP recommends amendments.

³ <https://abs.gov.au/census/find-census-data/quickstats/2021/UCL113006>, Accessed 13/09/2022.

⁴ <https://forecast.id.com.au/kempsey/about-forecast-areas?WebID=10>, Accessed 13/09/2022.

In summary:

The Kempsey Shire CMP recommends modifications to the RH SEPP mapping. Recommended modifications comprise new coastal vulnerability area mapping and modified coastal wetlands and littoral rainforest mapping.

1.8 Maps

This document includes several maps to show the extent of CMP coverage, the different coastal management areas as mapped by the RH SEPP, and indicative locations of key issues and management actions included in the CMP. Maps are included in the relevant sections of the CMP as shown in Table 3.

Table 3 Schedule of Maps

Map Title	Page Number
Kempsey Coastal Zone (North)	9
Kempsey Coastal Zone (South)	10
Representative Locations of Key Issues	39
Locations of Works, Action A3: Coastal Focused Weed Management	44
Representative Locations of Management Actions	69

2 A SNAPSHOT OF ISSUES

The following section summarises key management issues for the Kempsey coastal zone. Management issues were first identified during the Stage 1 scoping studies and were then subject to a detailed risk assessment in Stage 3. The following issues are those identified as priority issues during the Stage 3 detailed risk assessment. Spatial representation of these issues is shown in Figure 4 at the end of Section 2.

2.1 Coordination between stakeholder groups

ASSESSED RISK LEVEL

Medium

RELATED ACTIONS

A1

Governance of Kempsey's coastal zone is complex due to the involvement of multiple agencies, sometimes with conflicting priorities. In addition to KSC, key stakeholders include DCCEE, NSW Fisheries, NPWS, LLS, and TfNSW. Each agency has their own management plans and policies, and challenges arise when overlapping interests cause inconsistencies in management approaches. Along the coastline, aside from the townships, land is largely part of the NPWS estate, from the southern LGA boundary to South West Rocks. North of South West Rocks, the coastline is mostly Crown land to the northern LGA border.

The Kempsey coast has been managed under the Kempsey CZMP, which contains nineteen key actions. KSC and other agencies have made considerable progress on most actions, however in some instances, actions have been hindered by governance issues associated with land ownership and responsibility.

2.2 Conflicting land use requirements

ASSESSED RISK LEVEL

Present: Medium

Emerging: High

RELATED ACTIONS

A5, A13

Balancing the various interests and activities along the Kempsey coastline poses significant management challenges. The Open Coast Scoping Study (Salients, 2023) identified a range of user conflicts arising from activities like off-leash dogs, horse riding, 4WDs, and more passive beach use. Other values that need to be considered include those of local residents and businesses, boat users, campers, day-trippers, recreational fishers, and the impact of all of these on the environment. The Kempsey coastal zone is also home to threatened species like the Australian Pied Oystercatcher and White-bellied sea-eagle, adding another layer to the

management complexities. Several locations exist within the Kempsey coastal zone where conflict is occurring between users and environmental needs.

Key points of conflict include:

- Laggery Point / Trial Bay: User conflict, particularly between day-use visitors and camping, and sedimentation issues. Construction of the breakwater at Laggery Point is one contributing factor to the pattern of accretion and erosion at Trial Bay / Front Beach.
- Korogoro Creek: The area is frequented by a mix of visitors from local businesses to campers, boat users, and 4WD enthusiasts. Hat Head and South Smokey Beach were marked by the Macleay Coast Migratory and Threatened Shorebird Species Survey as critical areas for shorebirds. Additionally, unchecked 4WD access, especially via the boat ramp, harms the neighbouring vegetation.
- Killick Creek: Popular activities range from swimming and kayaking to birdwatching. Key points of conflict arise from the boat ramp located next to the swimming zone, the navigation channel that intersects the surfing area, and the proximity of the Crescent Head Surf Life Saving Club and Caravan Park to the estuary's mouth. Additionally, 4WDing and dog walking is popular around the creek, posing threats to migratory birds.



Korogoro Creek at Hat Head is popular for boating, swimming, and dog walking.

2.3 4WDs on beaches

ASSESSED RISK LEVEL

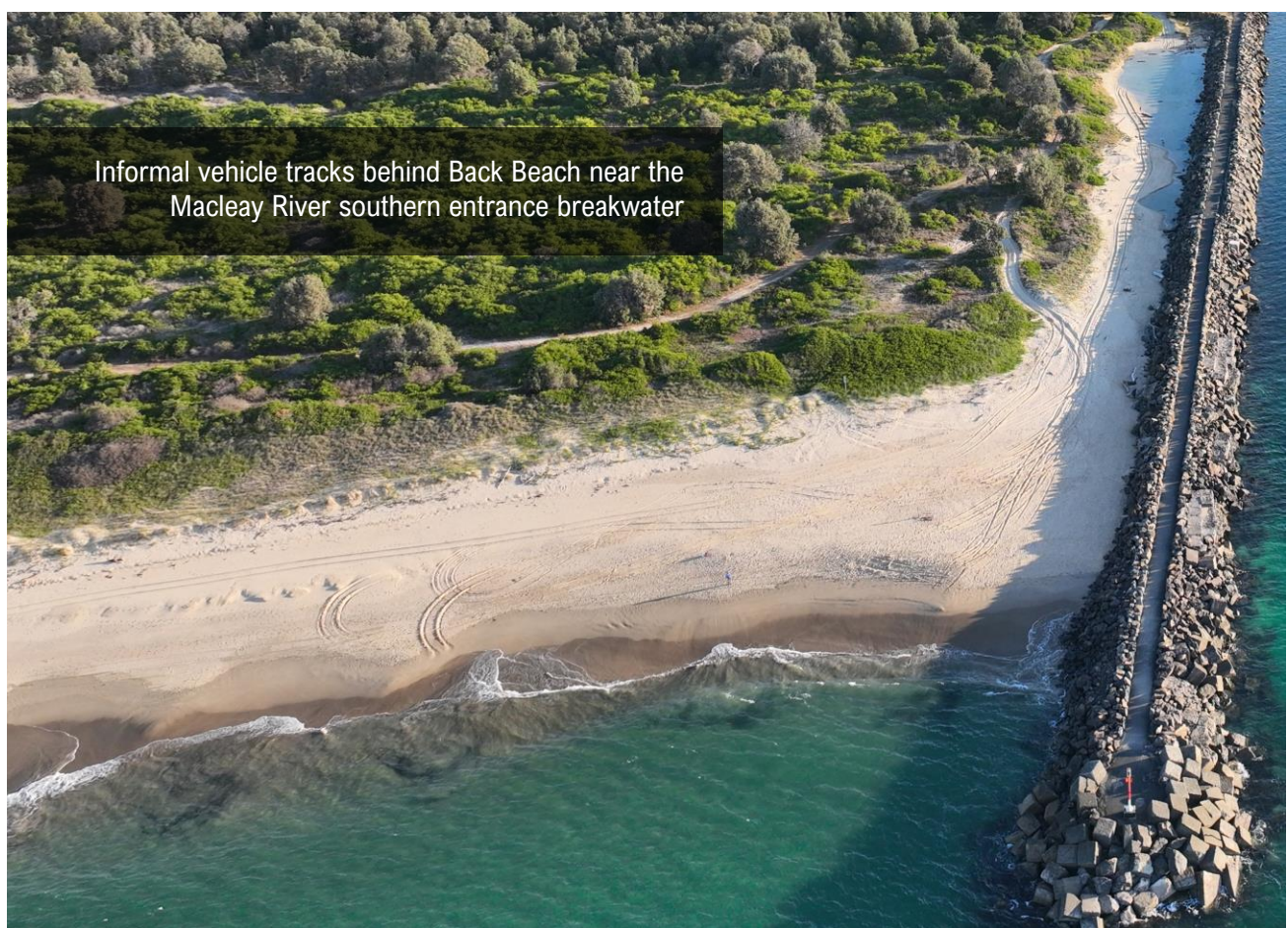
High

RELATED ACTIONS

A2, A5

Uncontrolled 4WD access along the Kempsey coastline can conflict with environmental and safety needs. The unrestricted movement of these vehicles poses a threat to the coastline's wildlife habitat and vegetation, particularly when driven on the frontal dune, endangering nesting sites of endangered shorebirds. Additional risks arise when 4WDs approach close to swimmers and other

beach users. 4WDs can also cause damage to cultural heritage sites and important Aboriginal places.



2.4 Proliferation of informal access tracks by vehicles and pedestrians

ASSESSED RISK LEVEL

Present: Medium

Emerging: High

RELATED ACTIONS

A2, A5, A19

Whilst Kempsey's beaches, estuaries and waterways have many formal access points for pedestrians and vehicles, numerous informal tracks exist. Examples are noted along the Macleay River southern breakwater, which is presently readily accessible by pedestrians, although there also exists a network of informal vehicle tracks across the sand dunes to the rear of Back Beach. Informal tracks threaten the coastline through loss of dune or riparian vegetation, habitats, and dune instability.

In addition to existing users of the estuary, the CMP stage 1 study identified the planned regional population growth throughout the Macleay region, which is likely to increase recreational usage and potentially increased trampling of habitats and bank / foreshore erosion where access is not controlled.

2.5 Incomplete / absent consideration and / or knowledge of Indigenous values and sites

ASSESSED RISK LEVEL

Medium

RELATED ACTIONS

D1

The Kempsey coastline is important to the Dughutti People. There is concern that, without proper awareness and inclusion, there may be damage to, or loss of, vital Indigenous values and cultural sites from coastal management decisions. Many culturally significant sites are located near water or estuary mouths, making them particularly vulnerable to coastal threats like erosion, sea level rise,

and increased public access. The challenge is to ensure a comprehensive understanding of these Indigenous cultural coastal values and sites. To effectively address this issue, it is essential to involve Indigenous representatives, especially from the Dughutti community, in the decision-making processes.

2.6 Lack of sufficient / appropriate waterway access points and facilities

ASSESSED RISK LEVEL

Present: Medium

Emerging: High

RELATED ACTIONS

A6, A12, A19

Waterway access points and associated facilities are essential to support both recreational and commercial activities within Kempsey's coastal zone.

The Macleay River estuary provides significant recreational boating opportunities and forms a vital component of the local tourism sector, offering activities enjoyed by a large proportion of the community. The lower estuary is also the main departure point for

commercial dive and fishing charter vessels. Commercial and recreational fishing activities and oyster farming also occur in the Macleay River estuary.

Waterway access points and facilities benefit visitors and the local community, increasing tourism and community connection to the waterway. The Macleay River, Killick Creek and Korogoro Creek all face potential capacity issues during peak periods, particularly considering their increasing appeal to visitors. These pressures may lead to uncontrolled access and will exacerbate in the future with rising population and tourism. Managing this issue aligns with the CM Act Objective to support the social and cultural values of the coastal zone and maintain public access, amenity, use and safety.

2.7 Lack or loss of public foreshore access and facilities

ASSESSED RISK LEVEL

High

RELATED ACTIONS

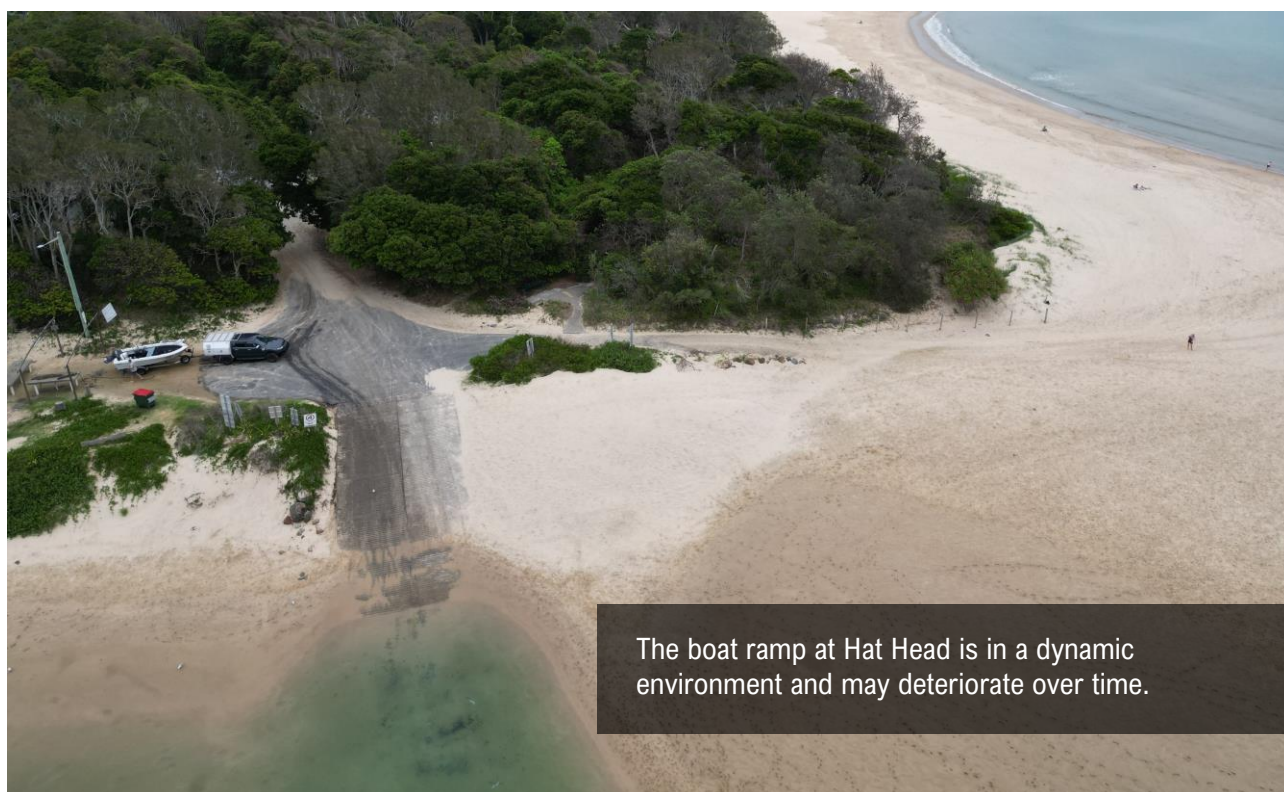
A5, A6

The region's public foreshore facilities are experiencing pressure due to increased user activity, especially during peak times. This growing demand can potentially lead to conflicts among users and a potential drop in tourism. Proliferation of informal access tracks by vehicles and pedestrians may occur if there is a lack of managed public foreshore access points. This may result in a loss of riparian

vegetation and subsequent bank instability, physical damage to saltmarsh habitat (trampling) and subsequent edge effects, and disturbance of endangered species habitat.

At Hat Head, this issue mostly relates to the boat ramp, footbridge, and formal access tracks through the dune system onto South Smokey Beach. As these are situated in such a dynamic environment, their condition is likely to decline with time, particularly with the impacts of climate change.

At Killick Creek, the existing foreshore access and facilities are heavily used at peak times. In August 2021 KSC endorsed a seven-stage approach to engage the community and finalise a brief to prepare a new design for the key public spaces of the foreshore and village centre. This included surveys to understand how carparking, open spaces, picnic areas, playgrounds, the skatepark, walkways and general connectivity can be improved. The greatest challenges to the plan have been around the most seaward area, which contain the foreshore access points and facilities that remain a management issue.



2.8 Poor or out of date mapping of important ecological communities

ASSESSED RISK LEVEL

High

RELATED ACTIONS

A4, A15, D3

In December 2021, the NSW government consolidated 45 State Environmental Planning Policies (SEPPs) into 11 SEPPs. The provisions of the previous Coastal Management SEPP now sit within the RH SEPP. The existing RH SEPP mapping of coastal wetlands and littoral rainforests date from the early to mid-1980s and has notable shortcomings, including mapped areas where these features are absent, and notable stands which the mapping misses.

Throughout the Kempsey coastal zone, the mapped areas of littoral rainforest and coastal wetlands do not represent the location, scale, and extent of these ecosystems. Some new mapping has been completed around Saltwater Creek under this CMP. That mapping identified areas of previously unmapped littoral rainforest adjacent to the creek. Similarly, there are scattered areas of littoral rainforest that have been identified to the rear of Back Beach, within the islands to the north of the Macleay Entrance, to the rear of Stuarts Point Beach and adjacent to Grassy Head and Middle Head.

Sea level rise is expected to place pressure on wetland habitats to migrate upslope, particularly for species at the edge of the tidal limit. This migration can occur where land is available, but may be restricted by hard defences, structures, urban areas, or managed environments such as farming.

2.9 Additional controls required within Kempsey LEP, DCP, and KSC policies

ASSESSED RISK LEVEL

Medium

RELATED ACTIONS

A4

The Kempsey Local Environmental Plan 2013 provides the current overarching planning framework for the LGA. Kempsey Shire's current Development Control Plan (DCP) (Kempsey Shire Council, 2013) includes, as an objective, to ensure that "development responds appropriately to environmental constraints such as ... coastal hazards". Further, it states that subdivisions of land

susceptible to coastal erosion or tidal inundation are considered designated development (i.e., requiring an environmental impact statement).

However, the DCP does not have a clearly articulated policy relating to Coastal Hazards, particularly in relation to redevelopment without subdivision. The DCP should be re-examined and modified as an action in the CMP, once the coastal vulnerability area has been mapped. There are numerous references to superseded state level policies and broad references to ensuring consistency with existing studies such as the Coastal Processes and Hazards Study within the current DCP.

2.10 Introduction of invasive species and weeds

ASSESSED RISK LEVEL

High

RELATED ACTIONS

A3, A11, D2

The invasion of weeds and pest species pose a threat to ecological values. They displace native species, often leading to the degradation and loss of natural ecosystems. Many invasive plant species will outgrow native coastal vegetation. Invasive animals can disrupt ecosystems, threatening native fauna by preying on them, competing for resources, and transmitting diseases.

The need for weed management is recognised within the Kempsey Shire Delivery Program 2022-2026 & Operational Plan 2023-2024, which includes an action to undertake inspections and identify infestations in accordance with the North Coast Weeds Action Program (NSW Local Land Services, 2022). Likewise, the CZMP included Action (8); continue to support dune care / revegetation programs at locations where vegetation is degraded, limited, or overcome by weeds.

2.11 Clearing, fragmentation and degradation of habitats

ASSESSED RISK LEVEL

High

RELATED ACTIONS

A7, A9.1, A9.2, A15

Urban development within the Kempsey coastal zone is predicted to increase with the rising population and tourism. Increased urbanisation poses significant threats to riparian and wetland habitats. Clearing these habitats can lead to bank erosion, increased runoff, poor water quality, environmental degradation, and habitat fragmentation.

The Kempsey LEP 2013 categorises land within 100m of coastal lakes and wetlands as environmentally sensitive, stipulating protective measures for these zones, especially for new developments. Inaccuracies in the current mapping of Coastal Wetland, Littoral Rainforest, and Endangered Ecological Communities potentially leaves these essential habitats vulnerable, particularly on private land. Addressing these mapping discrepancies is paramount to ensuring effective habitat protection and conservation.

There are several proposed urban release areas near Saltwater Creek and Lagoon, with a potential to harm the foreshore and riparian conditions and to exacerbate flooding risks. Proposed developments within the catchment include the Saltwater Residential Subdivision, the Belle O'Conner Residential Subdivision (Sea Spirit Lifestyle Community) and the Seascope Grove Residential Subdivision. The Saltwater Creek and Lagoon Estuary Management Study and Plan (WBM, 2006) states that all future development should "not place any additional stress on the

existing natural environment of Saltwater Creek and Lagoon” and “consider(s) the environmental sensitivity of Saltwater Lagoon and Creek”. That document also highlighted the importance of a vegetated buffer zone between urban development and waterway environments.



2.12 Stormwater discharge and runoff

ASSESSED RISK LEVEL

High

RELATED ACTIONS

A2, A7, A9.1, A9.2

Diffuse urban runoff can contribute sediment, nutrients, heavy metals, hydrocarbons, chemical compounds, faecal coliforms, and gross pollutants to waterways. These pollutants have direct impacts on water quality, affecting both human health and aquatic ecology. With several major urban developments already planned for the region, these issues are expected to intensify in the future.

Saltwater Creek, South West Rocks



2.13 Catchment interactions with flood mitigation infrastructure and operations

ASSESSED RISK LEVEL

High

RELATED ACTIONS

D5.1, D5.2, D5.3

The Macleay River Flood Mitigation Scheme relies on both Killick Creek and Korogoro Creek as flood water outlets to the ocean. This has historically impacted on floodplain wetlands, acid sulfate soils and water quality.

Flood mitigation structures are considered high-risk threats due to their potential impacts on wetland health and wetland-dependent species like juvenile fish and invertebrates. Flood waters can cause scouring of mangrove and saltmarsh communities and have been known to introduce sediments containing nutrients and sulfides. There are a range of issues which arise, including contamination of floodplain soils, acidification and deoxygenation of waterways, and fish kills.

Past flood “mitigation” activities have resulted in the drainage of wetlands, delivery of excess nutrients and acidic and deoxygenated waters, which can deteriorate water quality, cause eutrophication, and negatively impact native fauna and vegetation communities. During extreme floods, excess organic matter and eroded river sediments are flushed towards the coastline, resulting in “blackwater” events, whilst the disconnection of fresh water flushing during drier periods can lead to accumulation of organic material within the creeks and other backwaters.

2.14 Derelict mine discharges, mining, and other extractive industrial activities

ASSESSED RISK LEVEL

High

RELATED ACTIONS

A9.1, A9.2, D4.1, D4.2

The Macleay River Catchment has a long mining history dating back 140 years. Previous mining activities involved in-stream disposal of waste and tailings as well as poorly stored on-site contaminants. The University of New England (2019) sampled sediments and algal tissue from 15 locations in the lower estuary and open coast and tested for the presence of antimony and arsenic, which are introduced into the waterbody in increased concentrations as a result of gold mining. Overall, there was evidence of some accumulation, but the measurements were well below ANZECC guideline values, except for one sample collected from the high intertidal zone within Andersons Inlet (Clybucca) which recorded elevated levels of antimony.

Heavy metal enrichment may well be an issue on the floodplain, but it does not yet seem to have had a significant impact within the estuary or along the open coast. However, in the future, discharges, seepages, and runoff from previous and current extractive and industrial industries may contribute heavy metals, chemicals, and pollutants during flood and storm events, urban development, and other disturbances which remobilise contaminants from the floodplain.

2.15 Sedimentation of waterways

ASSESSED RISK LEVEL

High

RELATED ACTIONS

A8.1, A8.2, A10, D2, D8.1, D8.2

Sedimentation of waterways and estuary entrances occurs when a build-up of sand decreases the channel depth, reducing accessibility and decreasing the ability of boats to safely navigate or enter/exit the estuary. Various factors including coastal storm events, bank erosion, and runoff from urban development can contribute to sedimentation. A closure or inaccessibility of an estuary has community impacts, as well as impacts on local businesses such as fisheries and tourism.

The entrance to Back Creek has been frequently dredged on a commercial basis in recent years. Recent decreases in extraction volumes have exacerbated sedimentation concerns here. The license contains no requirement for the contractor to maintain navigable depths and has no minimum extraction limit. The historical relocation of the Macleay River entrance has also led to sediment build-up in the Macleay Arm. In Korogoro Creek, sedimentation has been observed to block drain outlets, posing potential risks during heavy rainfalls. The creek's limited tidal flushing

due to sediment accumulation at the entrance could further deteriorate water quality. Killick Creek faces potential entrance closure due to sedimentation. Such a closure would impede tidal flushing and adversely affect tourism and visitation.

2.16 Ongoing management of Back Creek

ASSESSED RISK LEVEL

High

RELATED ACTIONS

D8.1, D8.2

The entrance to Back Creek (also known as “South West Rocks Creek”) is the southernmost extent of a beach compartment which extends over 10km northwest and then north to Grassy Head. That compartment represents the historical extent over which the entrance to the Macleay River has migrated over thousands of years. Present day Back Creek, to the west of South West Rocks is now a small backwater but was once connected to the main channel of the Macleay River, before training walls were extended to block that connection.

The trained entrance to Back Creek is typically fronted by a continuous, straight bar but largely remains open to tidal influence due to a continuing commercial dredging operation licensed by NSW Crown Land. The creek is relatively shallow, both across the entrance bar and upstream of Humpty Back Bridge, where a large shoal is present. If current dredging activities were to change, it would result in a change to sediment transport/accumulation, morphodynamics and hydrodynamics, although the magnitude of change has not been quantified within a detailed study. There seems to be a high risk that Back Creek would become an intermittent estuary (ICOLL).



Back Creek is also home to the Bousfields Marsh Hopper (*Microrchestia bousfieldi*) which is listed as a vulnerable species in NSW and can only be found in the mangroves of this estuary. Poor management of the creek may result in the possible extinction of this species.

2.17 Stock Access: Damage to soil structure and loss of wetland vegetation.

ASSESSED RISK LEVEL

Present: Medium

Emerging: High

RELATED ACTIONS

A2, A8.1, A8.2, D2

Unrestricted stock access to riparian zones and wetlands has a negative impact on estuaries. Grazing and movement of livestock along these areas leads to loss or degradation of riparian and wetland vegetation, exacerbates bank erosion, and contributes nutrients and sediments to waterways.

The Macleay River Estuary has an expansive coastal floodplain wetland system, covering 60% of the Macleay's 400 km² floodplain.

These wetlands are largely responsible for the ongoing health of the estuary (GeoLINK, 2012).

Stock access can also directly introduce faecal contamination to waterways, with adverse effects on downstream aquaculture and human health.

2.18 Foreshore and bank erosion (including degraded / failing bank protection structures)

ASSESSED RISK LEVEL

Present: Medium

Emerging: High

RELATED ACTIONS

A8.1, A8.2, A19, D2

Foreshore and bank erosion can occur through trampling, over-clearing, water flow, wave action, and other natural processes. Riverbank erosion is presently managed for much of the lower Macleay River through rock armour. Beyond these areas, there is a correlation between the presence of diverse native riparian vegetation and the absence of bank erosion, supporting the increased use of riparian buffers to address erosion. Vegetation can

have a significant impact on bank erosion, with dense vegetation growing on the bank able to deflect flowing water. Roots generally increase the strength of bank material, making a bank less prone to mass failure. However, trees can also add significant weight to the tops of stream banks and may, conversely, decrease stability if undermined.

Future management should consider the soil structure, particularly near key road networks built alongside the watercourses which could isolate communities. Bank and riparian work sites

requiring protection or maintenance were identified in the Macleay Estuary Management Study (2010), which could be revised with new data to support the ongoing bank management.

2.19 Agricultural diffuse source runoff

ASSESSED RISK LEVEL

Present: Medium

Emerging: High

RELATED ACTIONS

A9.1, A9.2, D5.1, D5.2,
D5.3

Runoff from agricultural land contributes excess nutrient loads and harmful pesticides and herbicides into waterways. This can contribute to decreased water and soil quality, reduced dissolved oxygen, and impacts on human health and aquatic ecology. Nutrient discharges contribute to eutrophication, proliferation of algal blooms and aquatic weeds. These impacts extend to local businesses that are dependent on the estuary such as tourism, aquaculture, and recreation which may be at risk due to events such as periodic closures to oyster farms and fish kills.

KSC has been addressing issues relating to flood gates and drain management since 2000. The extensively modified floodplain is underlain by estuarine soils that include acid sulfate soils. The modifications have had a detrimental effect on soil and water quality. There have been several projects to attempt to improve drain water quality and enhance fish passage whilst maintaining agricultural production and flood mitigation functions.



2.20 Catchment flooding and ICOLL entrance management

ASSESSED RISK LEVEL

High

RELATED ACTIONS

A10, D8.1, D8.2

Catchment flooding is considered a major concern for Saltwater Creek and Lagoon and is largely controlled by the state of the entrance. Flooding in the estuary can pose a risk to human safety and property, and cause contamination of the creek and lagoon. Given the ICOLL at Saltwater Creek operates naturally with minimal intervention, water levels in the creek and lagoon can rise

significantly. As a result, there is an increased flood risk from the catchment during storm events. The risk will increase due to climate change, with sea level rise resulting in a higher entrance berm and consequently higher water levels within the creek and lagoon during periods of ICOLL closure.



Management of the Saltwater Creek entrance is a complex issue that aims to balance ecological, flooding and water quality considerations. Previous management plans have set out several entrance management objectives, including:

- "Ensuring that water levels in Saltwater Creek and Lagoon do not compromise the functioning of existing assets around the estuary;"
- "Ensure that any artificial manipulation of the Saltwater Creek entrance does not adversely affect the health of the estuarine environment of Saltwater Creek and Lagoon, and mimics, as much as possible, the natural wetting and drying regimes required by fringing wetlands."

The opening of the entrance remains a contentious issue due to its complex impacts on water quality, recruitment and populations of fish and wetland bird species, biodiversity, local flooding, and recreational uses of the water body.

2.21 Exposure to coastal erosion hazards

ASSESSED RISK LEVEL

Present: Medium

Emerging: High

RELATED ACTIONS

A17.1, A17.2, A14, D6

The Kempsey Coastal Processes and Hazard Definition Study was completed by BMT WBM in 2013. This study used photogrammetry and field data, from the 1940s to 2011, to analyse historical erosion events and predict their likelihood in the future. Projections for future coastal recession were made using historical data from the same timeframe, with the added factor of potential sea level rise.

The CMM requires that the assessment considers time frames up to 100 years. The data used in that study are now more than a decade old and considered planning horizons up to 2100. A new probabilistic hazard assessment over multiple planning horizons is required.

2.22 Exposure to coastal inundation hazards

ASSESSED RISK LEVEL

Present: Medium

Emerging: High

RELATED ACTIONS

A18, D6

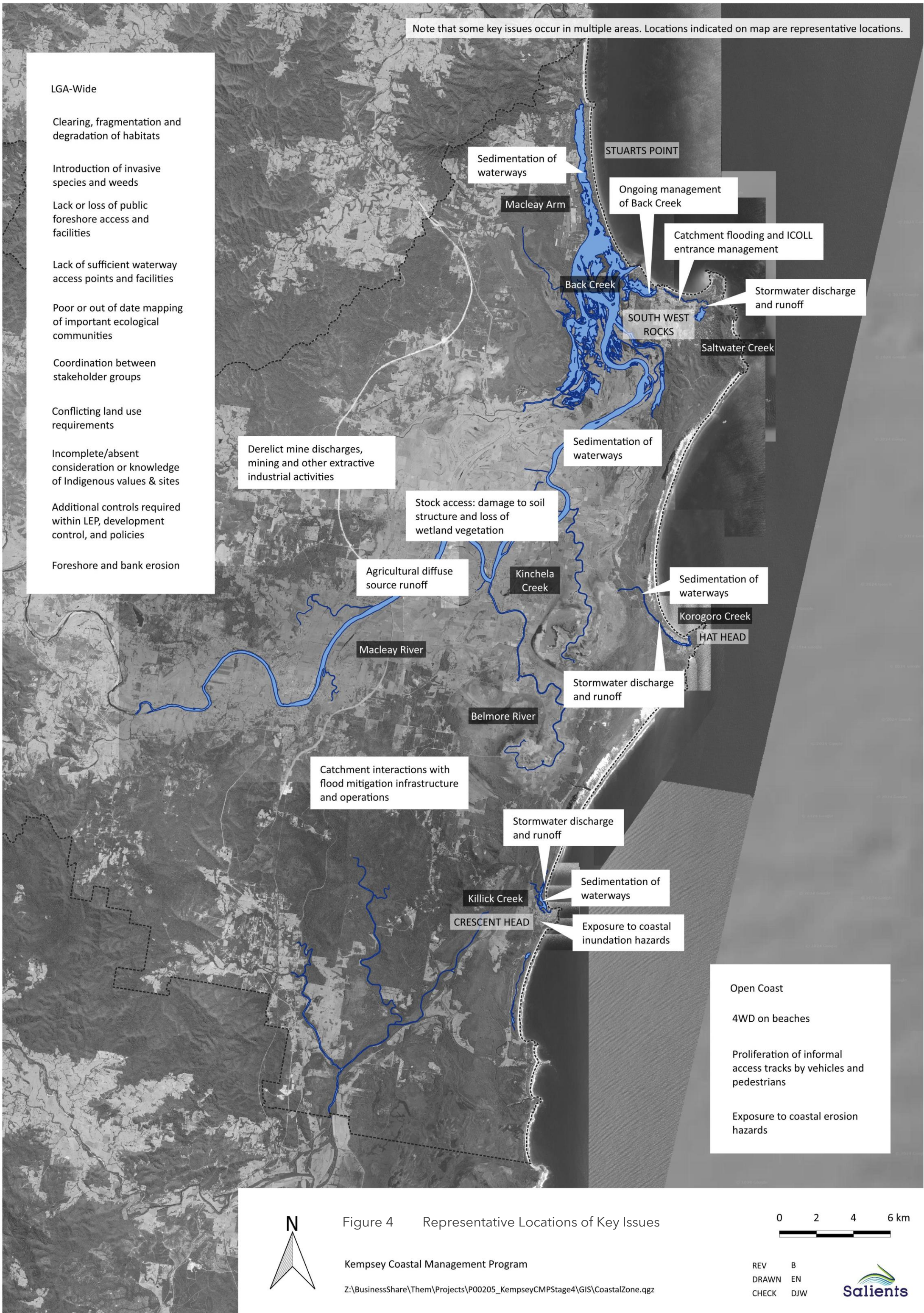
Tides and extreme sea levels were assessed during the CMP Stage 2 Coastal Vulnerability Area Assessment. That assessment indicated that, for a present-day scenario at Killick Creek, tides remain within the waterway channel and are expected to only have a significant influence on stormwater outlets. The 1% Annual Exceedance Probability (AEP) extreme sea level was shown to cause out-of-bank inundation at present day sea levels.

The present-day, 1% AEP sea level mapping from that study shows the potential for inundation of the majority of Crescent Head Holiday Park, around 20 buildings within Willow Street, Pacific Street and Belmore Street, and associated sewer and stormwater infrastructure. Given multiple buildings and assets are potentially affected, this has a moderate financial, safety and service delivery consequence, and is considered a medium risk.

Under an emerging risk scenario (i.e., 20 years), considering future sea level rise, peak tides are likely to inundate properties at the end of Willow Street, Crescent Head. This would result in relatively frequent inundation to any materials and foundations at ground level and is considered to have a “possible” likelihood. Larger storm surges would result in a broader extent of out of bank

inundation, affecting additional residential buildings along Pacific Street, Crescent Head Surf Club, and adjacent parking and public infrastructure. With more frequent and extensive tide and storm surge inundation, the risk of damage to infrastructure and assets increases.





Note that some key issues occur in multiple areas. Locations indicated on map are representative locations.

LGA-Wide

- Clearing, fragmentation and degradation of habitats
- Introduction of invasive species and weeds
- Lack or loss of public foreshore access and facilities
- Lack of sufficient waterway access points and facilities
- Poor or out of date mapping of important ecological communities
- Coordination between stakeholder groups
- Conflicting land use requirements
- Incomplete/absent consideration or knowledge of Indigenous values & sites
- Additional controls required within LEP, development control, and policies
- Foreshore and bank erosion

Sedimentation of waterways

STUARTS POINT

Ongoing management of Back Creek

Catchment flooding and ICOLL entrance management

Stormwater discharge and runoff

Back Creek

SOUTH WEST ROCKS

Saltwater Creek

Sedimentation of waterways

Derelict mine discharges, mining and other extractive industrial activities

Stock access: damage to soil structure and loss of wetland vegetation

Agricultural diffuse source runoff

Kinchela Creek

Sedimentation of waterways

Korogoro Creek

HAT HEAD

Stormwater discharge and runoff

Macleay River

Belmore River

Catchment interactions with flood mitigation infrastructure and operations

Stormwater discharge and runoff

Sedimentation of waterways

Killick Creek

Exposure to coastal inundation hazards

CRESCENT HEAD

Open Coast

4WD on beaches

Proliferation of informal access tracks by vehicles and pedestrians

Exposure to coastal erosion hazards

Figure 4 Representative Locations of Key Issues

Kempsey Coastal Management Program

Z:\BusinessShare\Them\Projects\P00205_KempseyCMPStage4\GIS\CoastalZone.qgz

REV B
DRAWN EN
CHECK DJW



3 ACTIONS TO BE IMPLEMENTED BY KEMPSEY SHIRE COUNCIL OR BY PUBLIC AUTHORITIES

3.1 LGA-Wide Actions

This section describes broadscale actions which apply across the coastal zone. Subsequent sections describe more localised CMP actions. The actions are shown spatially in Figure 7 at the end of Section 3.4.

Actions may require approvals or authorisation from relevant landowners, government agencies with statutory responsibilities or stakeholders with interest in the land, where the management action is proposed. These approvals or authorisations may be required under various legislative instruments and will be obtained prior to commencement of the management action. Where management actions are proposed on Crown land relevant authorisations and approvals may need to be obtained under the *Crown Land Management Act 2016*.

3.1.1 A1: Natural Resources Consultative Group (NRCG) Support for Kempsey CMP

Capital Costs	Nil
Annual Costs	Nil
Implementation Timeframe	Ongoing
Lead Agency	Support only
Potential Funding Sources	KSC

Description

The NRCG meet quarterly and assist KSC with consultive and engagement opportunities, including for coastal management. This action will provide ongoing support for delivery of the CMP via the NRCG. The NRCG will provide support for tasks including:

- Ensuring that there is broad understanding across government of ongoing Coastal Management matters in Kempsey Shire.

- Recording and tracking the progress of different management actions within the CMP to facilitate subsequent reporting by KSC.
- Applying for grant funding from State and Federal Government (which varies from year to year), and private sources if relevant. A primary role will be to identify funding opportunities and to access additional funding to carry out or expand upon the actions identified in this CMP.
- Tracking progress against the CMP as part of the monitoring, evaluation, and reporting program.
- Where inconsistencies in management approaches are identified, actions should be taken by the NRCG to rectify these in a way that is consistent with the CM Act. In many cases, this may take the form of appropriate correspondence to the agencies that would normally take responsibility for the identified inconsistency.

Tasks

- NRCG involvement in delivery of the CMP

3.1.2 A2: Community Education Program

Capital Costs	\$10,000
Annual Costs	\$1,000
Implementation Timeframe	1-2 years
Lead Agency	KSC
Support Agencies	LLS (resource dependent)
Potential Funding Sources	<ul style="list-style-type: none"> • KSC • DCCEEW Coast and Estuary Grants Program

Description

This action will develop and implement a community education program relating to coastal management. It will be delivered through physical signage and online material, such as short blogs or news releases by KSC. Over the lifetime of the CMP, this could shift its focus between themes of coastal and estuarine hazards, 4WDs and dogs on beaches, sea level rise, ecology, water quality etc., providing information on topics as they become relevant. An example considered during development of the CMP related to education on shorebird studies and strategies to protect shore birds. This could be aligned with the next shorebird survey, with the findings shared by KSC through their media pages. This could also link with existing information compiled by the NPWS's #sharetheshore⁵ initiative.

⁵ <https://www.environment.nsw.gov.au/news/beach-nesting-birds-share-the-shore>

Tasks

- Collaborate with NRCG members (LALC, LLS, NPWS, etc.) regarding educational opportunities, identify key messages to be conveyed, and the intended medium. This could be co-branded material that could be shared across agencies.
- Design and share/install/promote the educational resources, including releases through local media.

Constraints

- Planning Constraints: Nil if shared through online material. If physical signage is proposed, it would be permitted under the LEP in relevant land-use zones. Development consent is required if a public authority does not install signs.
- Legal Constraints: Nil if shared through online material. If physical signage is proposed near public roads it must comply with the Roads Act 1993 and TfNSW guidelines on signposting.
- Organisational Constraints: Nil if shared through online material. If physical signage is proposed, any signage installation will need to comply with the Kempsey Signage Strategy 2022.

3.1.3 A3: Coastal Focused Weed Management

Capital Costs	Nil
Annual Costs	\$180,000
Implementation Timeframe	Ongoing
Lead Agency	KSC
Support Agencies	NPWS
Potential Funding Sources	<ul style="list-style-type: none">• Environmental Levy• DCCEEW Coast and Estuary Grants Program

Description

This action targets specific coastal-related weed management, beyond KSC's current LGA-wide commitments. It will allow dedicated weed management actions to be implemented throughout the coastal zone, particularly within mapped wetlands and littoral rainforests. It will support and expand existing weed control activities conducted by KSC. Works required for Action A3 are identified as *Environmental Protection Works* for the purpose of interpretation within the RH SEPP.

Table 4 Locations and nature of weed management works, Action A3

Map Reference (Figure 5)	Location	Action
A3.1	Middle Head Beach	Weed control
A3.2	Grassy Head Beach	Weed control
A3.3	Grassy Head Reserve & headland	Weed control and revegetation
A3.4	Stuarts Point Beach	Weed control and revegetation
A3.5	Trial Bay Beach	Weed control
A3.6	Brighton Park & adjacent bushland	Weed control and revegetation
A3.7	Hat Head beach (breakout to boat ramp)	Weed control and revegetation
A3.8	Hat Head Gap Road & creek	Weed control and revegetation
A3.9	Killick Creek spit	Weed control and revegetation
A3.10	Little Nobby	Weed control and revegetation
A3.11	Big Nobby	Weed control and revegetation
A3.12	Crescent Head Back Beach (Crown Land)	Weed control
A3.13	Willow Street reserve	Weed control and revegetation
A3.14	Killick Creek	Weed control and revegetation
A3.15	Korogoro Creek	Weed control and revegetation
A3.16	Saltwater Creek	Weed control and revegetation
A3.17	South West Rocks Creek	Weed control and revegetation
A3.18	Macleay River Estuary to Belgrave Falls	Weed control and revegetation
A3.19	Kinchela Creek	Weed control and revegetation
A3.20	Belmore River	Weed control and revegetation
A3.21	Christmas Creek	Weed control and revegetation
A3.22	Easter Creek	Weed control and revegetation
A3.23	Pola Creek	Weed control and revegetation
A3.24	Gills Creek	Weed control and revegetation

Legend

-  Kempsey LGA
-  Littoral Rainforest Area
-  Littoral Rainforest Proximity Area
-  Coastal Wetland Area
-  Coastal Wetland Proximity Area
-  Estuary

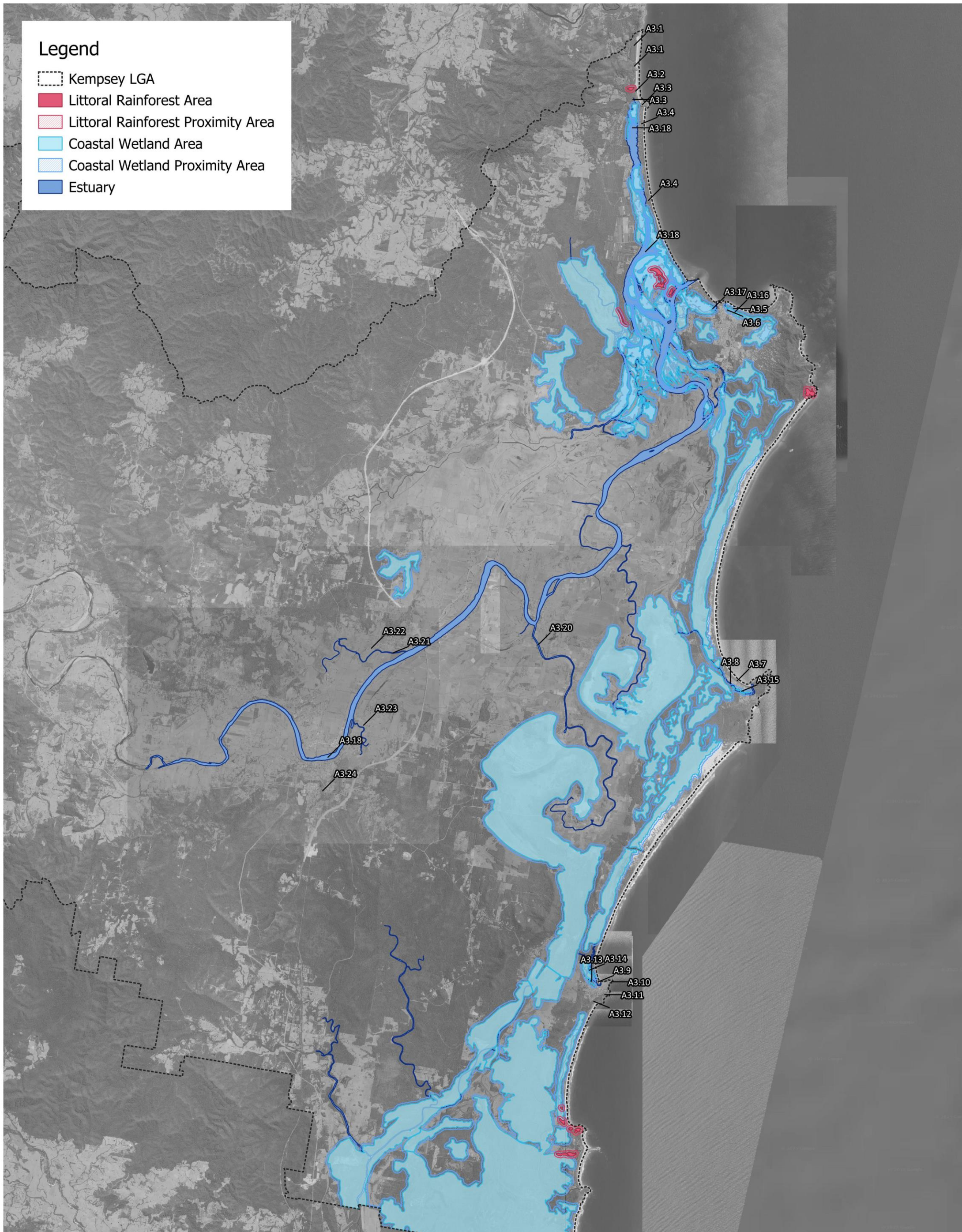


Figure 5 Location of Works, Action A3: Coastal Focused Weed Management

Kempsey Coastal Management Program

Z:\BusinessShare\Them\Projects\P00205_KempseyCMPStage4\GIS\CoastalZone.qgz

0 2 4 6 km

REV A
DRAWN EN
CHECK DJW



Tasks

- Undertake annual program of coastal-focused weed management.

Links to KSC Delivery Program 2022-2026 and Operational Plan 2023-2024 (Kempsey Shire Council, 2023b)

- EN.OP42 Inspect and control high priority species as per North Coast Weeds Action Program (WAP).
- EN.OP45 Minimise high priority weed species infestations on private rural properties.

Constraints

- Planning Constraints: Nil. The action aligns with the NSW Biosecurity Strategy 2022-2030 and the North Coast Local Land Services Strategic Plan.
- Legal Constraints: The *Biosecurity Act 2015* is tenure neutral and therefore this action applies equally to public or private lands. KSC has legislative authority under the *Biosecurity Act 2015* to undertake weed control, develop weed control plans, inspect lands, seek compliance, and conduct education.
- Organisational Constraints: Funding through KSC is likely to focus actions on a priority basis. For this CMP, these sites should be those with the highest ecological value, i.e., coastal wetlands and littoral rainforest. A condition assessment will be included that identifies sites of highest priority for weed control and that contain high priority weed species.

3.1.4 A4: Integration of Planning Instruments

Capital Costs	\$80,000
Annual Costs	Nil
Implementation Timeframe	1-2 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

KSC operates within a strategic planning framework that may be used to protect and enhance coastal values, including the Resilience and Hazards SEPP (2021) (RH SEPP), Local Environmental Plan (LEP) and Development Control Plan (DCP).

The RH SEPP establishes a strategic land use planning framework for coastal areas and supports implementation of the management objectives set out in the CM Act. It contains mapping of designated coastal management areas for the entire NSW coastline.

A coastal vulnerability area (CVA) can be used to identify land that is subject to coastal hazards such as beach erosion, shoreline recession, and tidal and coastal inundation. CVA mapping was completed as part of the CMP Stage 2. This action includes preparing and submitting a planning proposal to the Department of Planning, Housing and Industry to map the CVA within the RH SEPP. The mapped CVA from the Stage 2 studies can be found in Appendix C, and development of the CVA mapping is documented in the Coastal Vulnerability Mapping and Associated Technical Report (Jeremy Benn Pacific, 2021) (Supporting Document 3). Anticipated costs are up to \$40,000 for consultancy fees if KSC is unable to resource a planning proposal in house.

The Kempsey DCP provides detailed planning and design guidelines to support planning controls in the LEP. Multiple DCPs will span the timeframe of this CMP, including the Kempsey DCP (2013) and subsequent updates. This action will perform an audit and review of current DCP provisions, which can be compared to the recommendations within CMP documents and new mapping of CVA and CWLR land. Revised CWLR mapping is proposed as a separate CMP action (A15). Recommendations can then be made to strengthen the DCP provisions, to be incorporated by KSC in the next DCP review. Careful consideration will need to be given to ensure development behind the dune at Hat Head is suitably controlled. The DCP currently does not include any provisions relating to coastal hazards at Hat Head. The entire residential area behind the dune at Hat Head is situated within the coastal inundation hazard area mapped as part of the CVA mapping undertaken during Stage 2. Anticipated costs are up to \$40,000 for consultation and planning consultancy fees.

Tasks

- KSC to consider a planning proposal to adopt the CVA mapping under the RH SEPP (\$40,000 cost is for external consultancy to assist KSC).
- KSC to consider revised mapping and management of CVA and CWLR land as part of its DCP review and provide clearly articulated policy in relation to coastal hazards. DCP review to include a risk assessment for assets within areas affected by coastal hazards. (\$40,000 cost is for external consultancy to assist KSC).
- Identify local planning controls and supporting documents for review to ensure consistency with the CVA.

Links to KSC Delivery Program 2022-2026 and Operational Plan 2023-2024

- EN.OP41 Efficient assessment of development application in accordance with relevant legislation.

Constraints

- Planning Constraints: Nil provided the planning proposal and DCP amendments are completed as per the required processes outlined in the EP&A Act and Regulations.
- Legal Constraints: Planning instruments include statutory and non-statutory documents. Only non-statutory instruments (i.e., guidelines) can be updated/amended based on KSC approval. The DCP is a non-statutory document.
- Organisational Constraints: Planning proposals, for updating SEPP mapping, aim to change a statutory document. This will require a public exhibition and response to any submissions. SEPP mapping changes will also need to be incorporated into Planning Certificates, and this may be required prior to publication of maps within the SEPP.

3.1.5 A5: Coastal Usage Assessment

Capital Costs	\$60,000
Annual Costs	Nil
Implementation Timeframe	1-2 years
Lead Agency	KSC
Support Agencies	NPWS
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEE Coast and Estuary Grants Program

Description

There are diverse environmental, community, and cultural interests throughout the Kempsey region, which can add complexity to ongoing coastal management. This action will provide an assessment of usage, including 4WDs, beach access and use, bathing, swimming, surfing, dog walking, environmental zones, shorebird habitat and the suitability of the coastline for its current usage. The assessment will consider locations, extents, conditions, and health. In addition to that assessment, this action will include appraisal of current and future usage rates (e.g., new expansion areas within Stuarts Point) and identify conflicts, including an assessment of the adequacy of existing infrastructure for the identified usage patterns and pressures. Collaboration with key stakeholders, including NPWS and Crown Lands will ensure a coordinated approach. Outputs will include recommendations to alleviate conflict, or rationalise different use zones, and ensure compliance across KSC, NPWS, and Crown Lands through a coordinated management strategy.

Tasks

- Completion of a Coastal Usage Assessment within KSC's Operational and Delivery Plan.

Constraints

- Planning Constraints: Nil constraints with proposed assessment. Any resulting future actions would need to consider planning/legal and organisational constraints.
- Legal Constraints: Nil constraints with proposed assessment. Any resulting future actions need to consider planning/legal and organisational constraints.
- Organisational Constraints: Nil constraints with proposed assessment. Any resulting future actions need to consider planning/legal and organisational constraints.

3.1.6 A6.1: Coastal Asset Procedures

Capital Costs	\$80,000
Annual Costs	\$15,000 every 3 years
Implementation Timeframe	1-2 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEE Coast and Estuary Grants Program

Description

KSC manages a wide range of coastal-related assets that often require specialised management approaches. This may include beach and estuary access ways, viewing platforms, seawalls and revetments, marine infrastructure (pontoons/wharves/ landings), and waterway structures.

This action aims to enhance KSC's current asset management procedures through additional guidance and inspections for the practical management of coastal assets. This will provide a greater understanding of the types of coastal assets owned or managed by KSC, the types of inspections that can be undertaken for a coastal asset and assign a frequency of inspections based on an asset's level of service. It will present a consistent coastal assets condition and risk assessment, and develop a consistent approach to repair defects, improve asset condition or restore an asset's level of service. Following agreement of the coastal-specific framework, a baseline condition assessment will be undertaken with residual lifetime estimates and recommended repairs/renewals. Repeat visual condition surveys will then be undertaken to record asset condition, in accordance with the inspection recommendations.

Tasks

- Clarify ownership of coastal assets to identify the full suite of assets which are the responsibility of KSC.

- Prepare a Coastal Asset Management Process Manual within the Operational and Delivery Plan. This will include a baseline condition assessment for all KSC managed coastal protections, including rock revetments, seawalls, and beach and waterway access points. New reporting templates and mapping will be developed, and residual lifetime estimates undertaken to develop an upgrade strategy.
- Develop recommendations for repairs, renewals, decommissioning or new infrastructure.

Links to KSC Delivery Program 2022-2026 and Operational Plan 2023-2024

- EN.OP68 Undertake rehabilitation and renewal program for flood mitigation infrastructure, including structures and levees, and riverbank protection at various locations within the Shire to improve resilience to flooding impacts (\$300,000).

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil.
- Organisational Constraints: Requires integration with KSC's Asset Management System.

3.1.7 A6.2: Coastal Asset Management

Capital Costs	\$250,000
Annual Costs	Nil
Implementation Timeframe	5-10 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none"> • KSC • DCCEEW Coast and Estuary Grants Program

Description

KSC manages beach and estuary accessways, viewing platforms, seawalls and revetments, marine infrastructure (pontoons/wharves/landings), and waterway structures. Following development of coastal asset management procedures, baseline condition assessments, residual lifetime estimates, and recommendations for repairs, renewals, or decommissioning, this action implements the identified actions. This action is limited to ancillary coastal development and routine maintenance works or repairs, and not coastal protection works.

Tasks

- Implement identified renewal actions.

3.1.8 A7.1: Estuary Stormwater Quality Investigation and Plan

Capital Costs	\$240,000
Annual Costs	Nil
Implementation Timeframe	1-5 years (staged)
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

Stormwater discharge and runoff is a priority issue for all coastal estuaries. This action will undertake an estuary stormwater quality investigation and plan for Killick Creek, Korogoro Creek, Saltwater Creek and the Macleay River (including the Macleay Arm). It will review and summarise existing reports to assist in informing priority catchments, review treatment approaches for implementing water quality improvement solutions, and identify priority interventions with costing.

Tasks

- KSC to undertake an estuary stormwater quality investigation and plan for Killick Creek, Korogoro Creek, Saltwater Creek and the Macleay River (including the Macleay Arm) within Operational and Delivery Plan.
- Enter priority upgrades into Operational Plan.

Links to KSC Delivery Program 2022-2026 and Operational Plan 2023-2024

- EN.OP32 Implement stormwater defect remediation program.
- EN.OP33 Construction of stormwater network at selected locations according to the agreed program.
- EN.OP34 Undertake environmental water quality monitoring in Macleay River Catchment.
- EN.OP35 Implement regular maintenance program for environmental areas that have previously been remediated including: Boyters Lane, Gills Creek & Jerseyville Park.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

3.1.9 A7.2: Estuary Stormwater Quality Improvements

Capital Costs	\$250,000
Annual Costs	Nil
Implementation Timeframe	5-10 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC Operational Plan• Environmental/Stormwater Levy• DCCEEW Coast and Estuary Grants Program

Description

Stormwater discharge and runoff has been identified as a priority issue for all coastal creeks. Following completion of an estuary stormwater quality investigation, priority interventions will be planned. This action implements the identified actions.

Tasks

- Implement identified stormwater improvement actions on a priority basis for its inclusion within KSC's Operational & Delivery Plan.

3.1.10 A8.1: Bank Management Assessment and Implementation Plan

Capital Costs	\$100,000
Annual Costs	Nil
Implementation Timeframe	1-2 years
Lead Agency	KSC
Support Agencies	<ul style="list-style-type: none">• DPIRD Fisheries• Crown Lands• LLS
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

A scoping study will be completed to assess and prioritise bank management actions within each estuary. This study will update and build upon the work of Cohen (2005), which investigated the nature and extent of bank erosion and sedimentation along the Macleay River estuary. The assessment is scheduled to start in February 2025 under the DPIRD Fisheries NSW Estuary Asset Protection (NEAP) program.

The study will extend beyond the Macleay River estuary to include all waterways within the Kempsey coastal zone. Initial assessments will consider remote sensing and aerial image analysis

to identify degraded areas, followed by ground truthing. This information will be used to prioritise different lengths of eroding riverbank which require protection to limit the loss of sediment into the waterway. Any priority bank sections will be subject to an options appraisal and multi criteria assessment to support the selection of preferred works. Emphasis will be given to nature-based management options if the erosion is not threatening critical infrastructure.

Crown Lands issues licences to enable grazing along riparian land within the Kempsey LGA. Stock access to these areas can degrade the condition of riparian zones, conflicting with the objectives of proposed works in action 8.2. This action will also identify these areas to highlight priorities for excluding grazing.

The project will include the following steps:

- 1 Data collection. Desktop analysis followed by targeted field assessment of the condition of the banks, identifying areas of erosion, sedimentation, weed infestation, presence and condition of natural vegetation, areas where stock access is evident, areas where fencing is present etc. Sample and test bank material from representative severe erosion sites to identify which sites contribute to the degradation of water quality through turbidity and sedimentation. Airborne (drone) survey of strategic reaches to allow for bank loss calculations.
- 2 Data analysis. Mapping of all data collected in the field using GIS. Identification of areas which require management, prioritisation of areas, review of land tenure/ ownership and zoning to identify what types of management works can be undertaken. Review of historical data, legislative and regulatory framework for bank works.
- 3 Prioritisation of river reaches, and potential management actions / works required and prepare conceptual cost estimates for the works.

Identified works required for larger erosion issues will be implemented under action A8.2. Works involving maintenance and restoration of riparian vegetation will be managed under deferred action D2 (Appendix B).

This action will support the River Rehabilitation Project (RRP), a statewide project being delivered by LLS. The purpose of the RRP is to identify, prioritise, and implement riverbank rehabilitation works for high priority erosion sites that have been impacted by the 2021 and 2022 floods. The RRP will also provide support to impacted landholders. It will be important to coordinate with LLS to ensure that this action does not overlap with works already completed or are being completed as part of the RRP.

Tasks

- Engage specialist consultant to undertake bank condition assessment, identifying priority reaches, concept plans and costings.
- Identify where grazing licences exist over riparian land. Complete assessment and provide recommendations to the relevant state agencies for improving the condition of those areas.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Whilst KSC officers may have authority to enter private property, consultants will require approval from the landholder to undertake assessment on private land.
- Organisational Constraints: Nil.

3.1.11 A8.2: Bank Management Improvements

Capital Costs	\$225,000
Annual Costs	Nil
Implementation Timeframe	3-5 years
Lead Agency	KSC
Support Agencies	<ul style="list-style-type: none">• LLS (opportunistically, subject to funding)• DPIRD Fisheries NEAP program
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program• MEMS

Description

Following completion of the bank management assessment and implementation plan, this action will implement initial works. The bank management works will be implemented as environmental protection works. This action is intended to focus on larger bank erosion issues, where remediation will extend beyond habitat rehabilitation and revegetation.

Costing has assumed up to 150m of bank management works, potentially split across different projects (i.e., 50m sections) which will be reviewed, identified, and prioritised within the bank implementation plan. If nature-based approaches are used, nominal costing has assumed \$1,500/m, which may include log piles, rock fillets, and revegetation works. These costs are indicative and the final length and cost per metre will depend on the nature of sites which are eventually identified.

Where priority works are identified on private land, it will be necessary to consult and negotiate with landholders, to determine whether projects will be feasible during the delivery of the CMP. LLS will be a key partner in undertaking that consultation. Ultimately, some projects with lower priority may be taken up opportunistically.

Tasks

- Include identified bank management improvements within KSC's Operational and Delivery Plan on a priority basis.
- Source funding.
- Complete priority bank improvement actions.

3.1.12 A9.1: Water Quality Improvement Monitoring Program Design

Capital Costs	\$50,000
Annual Costs	Nil
Implementation Timeframe	1-2 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none"> • KSC • DCCEEW Coast and Estuary Grants Program

Description

This action will design a water quality monitoring program for coastal catchments, including the Macleay River, Killick, Korogoro, Saltwater and Back Creeks.

This task will review approaches to monitoring, including the Regional Ecohealth program and results from external/previous monitoring. Trigger levels are to be established using guidelines for fresh and marine water quality (prepared under the National Water Quality Management Strategy) and NSW Monitoring Evaluation and Reporting (MER) guidance. This should consider engaging with NSW DCCEEW who have been developing new guidelines for freshwater areas and may have similar recommendations for estuarine areas. The program design will estimate costs and approaches to implement the program. This program design will consider:

- The extent and location of sampling points.
- KSC monitoring data.
- Regional Ecohealth style program, which is a four-yearly monitoring program. The program offers a standardised monitoring program to assess the health of coastal catchments over multiple sites (both freshwater and estuarine). This program is designed to monitor water quality, geomorphic condition, riparian condition, aquatic macroinvertebrates, etc.

Tasks

- Engage a consultant to design the water quality improvement monitoring program.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

3.1.13 A9.2: Water Quality Improvement Monitoring Program

Capital Costs	Nil
Annual Costs	\$25,000
Implementation Timeframe	Ongoing
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

Following completion of the water quality monitoring design, this action will undertake the recommended monitoring. The program should provide frequent reports back to KSC, with a scorecard-type summary and assessment of any trigger level exceedances. The latter should include a statement on their potential cause to allow further investigation and remediation, which KSC could use to report back to the community to maintain transparency.

Tasks

- Implement water quality improvement monitoring program, with investigation and recommendation of remedial actions for any poor scores.
- Review, assess and follow up recommendations identified in the Ecohealth report.

Links to KSC Delivery Program 2022-2026 and Operational Plan 2023-2024

- EN.OP34 Undertake environmental water quality monitoring in Macleay River Catchment within Kempsey LGA.

3.1.14 A10: Manage Estuary Entrances

Capital Costs	Nil
Annual Costs	\$20,000 ⁶
Implementation Timeframe	Ongoing
Lead Agency	KSC
Potential Funding Sources	KSC

Description

Most of the estuary mouths throughout the Kempsey coastline are affected by shoaling, sedimentation, and erosion. They include systems that are referred to as Intermittently Closed and Open Lakes and Lagoons (ICOLLs), which can oscillate between different entrance states, and/or entrances that were constructed as flood mitigation outlets as part of the broader Lower Macleay Flood Mitigation Scheme. Management of these entrances is challenging, and KSC has developed a suite of Entrance Management Plans (EMPs) outlining how and when the estuary entrances should be managed. The EMPs adopt a flexible and adaptable approach to ensure the environmental and social values of each estuary are protected. EMPs exist for Saltwater Creek, Killick Creek, and Korogoro Creek. All management actions should be undertaken in accordance with the EMPs.

Tasks

- Manage entrances in accordance with the relevant EMP, in conjunction with available resources. Note that the EMPs are provided as supplementary documents to the CMP.

Constraints

- Planning Constraints: Nil. Exhibition and adoption of EMPs to occur as part of CMP Stage 4.
- Legal Constraints: Ensure consistency with the Coastal Zone Emergency Action Subplan (CZEAS).
- Organisational Constraints: Nil.

⁶ Expenditure will be on an 'as needed' basis.

3.1.15 A11: Community Conservation and Restoration Programs

Capital Costs	Nil
Annual Costs	\$15,000
Implementation Timeframe	Ongoing
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• Environmental Levy• DCCEEW Coast and Estuary Grants Program

Description

This existing action will continue, working with volunteer stakeholders to undertake environmental conservation and restoration projects (e.g., via Landcare, Bushcare, Coastcare, etc). This action provides for the ongoing support of Landcare programs throughout the Kempsey LGA by providing financial assistance for plants, landscaping supplies, paid staff to lead volunteer activities, training, to engage contractors, or other equipment.

Existing active community groups including (but not limited to) Hat Head Dune Care, South West Rocks Community Dune Care, Big Nobby Bush Care Group and Save Our Macleay River are regular recipients of Council's community conservation and restoration programs. Site locations for identified works are typically within those areas identified in A3: Coastal Focused Weed Management. Works conducted by these groups involve weed removal and revegetation.

Tasks

- Submission of community coastal-focused conservation and restoration projects through the state government Coast and Estuary Grants Program, targeting enhanced management and restoration of coastal threatened or endangered ecological communities and coastal management areas.
- Administering any awarded CMP funding to external / community groups.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

3.1.16 A12: Revised Maritime Infrastructure Assessment

Capital Costs	\$100,000
Annual Costs	Nil
Implementation Timeframe	3-5 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• Boating Now

Description

This action will support ongoing management and upgrades of maritime infrastructure in the Kempsey Region. The action will comprise a review of the detailed assessment of boating infrastructure and access ramps undertaken on 18 sites along the lower Macleay River as part of the Kempsey CZMP (Supporting document 8: Marine Infrastructure Assessment). The review will consider the progress made towards previous recommendations and the potential expansion of the sites based on current and projected future usage, particularly regarding passive / recreational watercraft access points. It will revise mapping of all current infrastructure facilities, assess existing usage patterns against current and future demands, identify key management issues, and develop potential management strategies and site-specific actions in response to issues. Actions will consider the responsible agency and funding methods, develop an implementation sequence, and include concept plans for priority sites. This plan will support the KSC Operational Plan actions to deliver future wharf, jetty and footbridge maintenance, or replacement programs.

Tasks

- Undertake Revised Marine Infrastructure Assessment for KSC infrastructure, including review of tasks identified in the Macleay River Estuary CZMP Marine Infrastructure Assessment, assessing progress of those tasks, and identifying priority tasks.
- Schedule priority actions into operational plan.

Links to KSC Delivery Program 2022-2026 and Operational Plan 2023-2024

- CO.OP15 Deliver wharf, jetty, and footbridge maintenance and replacement program (\$695,432).
- CO.OP13 Deliver boat ramp cleaning and maintenance program (\$180,000).
- W4789 Riverside Park Jetty Replacement (\$180,000).
- W2295 Gladstone Wharf Refurbishment (\$269,839).
- W4265 Wharves & Jetties Replacement Smithtown Wharf (\$425,603).

Constraints

- Planning Constraints: Nil. However, this action will require both TfNSW and Crown Lands (where they are the land manager i.e., below deed high water mark) approvals for works.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

3.1.17 A13: Protection and Management of Migratory and Threatened Shore and Water Birds

Capital Costs	\$15,000 (x3 monitoring rounds)
Annual Costs	Nil
Implementation Timeframe	Ongoing
Lead Agency	KSC
Support Agencies	NPWS
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

Shorebird surveys have been undertaken in the Kempsey region for multiple years, as recommended within the Macleay River Estuary CZMP, Strategy 21 (GeoLINK, 2010) and the Kempsey CZMP, Action 15 (BMT WBM, 2016). This action will continue and expand the monitoring. In addition to shorebird monitoring, the expansion will target water birds that use key coastal wetlands.

Tasks

- Undertake follow-up shorebird and waterbird surveys to gather up-to-date information on population size, species richness and the distribution of roost and foraging areas. This will be undertaken every 3-4 years.
- Continue to identify high conservation value habitat sites for shorebirds and prioritise for management.
- Continue to identify and prioritise threats at high priority sites and devise appropriate management actions.
- Continue to include shorebird habitat mapping, site prioritisation data and information on threats in reports, which can be shared with other stakeholders and KSC's NRCG.
- Continue to implement management plans at high priority sites – which requires the identification of cost requirements and integration within future budgets.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: None for the survey works. Any subsequent management action may require assessment under the relevant legislation (EP&A Act, Biodiversity Conservation Act, EPBC Act).
- Organisational Constraints: Nil.

3.1.18 A14: Revised Coastal Hazard Assessment

Capital Costs	\$120,000
Annual Costs	Nil
Implementation Timeframe	5-10 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

The CMP has been developed using erosion and recession mapping developed within the Kempsey Coastal Processes and Hazard Definition Study (KCPHDS) (BMT WBM, 2013). Completed in 2013, this project used photogrammetry and field data to understand past erosion events and their potential to occur again in the future. Through analysis of photogrammetric data spanning the 1940s to 2011, beach erosion extents were defined based upon analysis of the most eroded profiles observed within historic records. Similarly, future coastal recession was projected based on historic field data spanning 1940 to 2011, and the consideration of future sea level rise. Whilst a comprehensive study, the analysis and modelling were completed in 2011 based on data now over a decade old. An updated coastal erosion and recession study is needed, considering the latest CMM, potentially requiring probabilistic hazard assessment over multiple planning horizons. The CMM requires that the assessment considers time frames up to 100 years and possibly beyond. The prior assessment only considers the 2100 future time frame, and this will need to be updated. In the meantime, the 2050 hazards can be used as a proxy for the 20-year timeframe risks, and 2100 can be considered representative of longer term (50 - 100-year timeframes). The assessment should consider the IPCC's latest sea level rise projections.

Tasks

- Undertake shire-wide probabilistic coastal erosion and recession study.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

3.1.19 A15: Revised Coastal Wetland and Littoral Rainforest Mapping

Capital Costs	\$230,000
Annual Costs	Nil
Implementation Timeframe	1-2 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

The existing RH SEPP mapping of coastal wetlands and littoral rainforests (CWLR) within the Kempsey LGA do not represent the location, scale, and extent of these ecosystems. This action proposes new CWLR mapping and certification of that mapping under the RH SEPP.

A CWLR area can be used to manage this important environmental land. The CM Act specifies management objectives to protect coastal wetlands and littoral rainforests in their natural state, promote rehabilitation and restoration, improve resilience to the impacts of climate change including opportunities for migration, support the social and cultural values, and to promote the objectives of State policies and programs for wetlands or littoral rainforest management.

Tasks

- Background study including consolidation and review of available information, consideration of the new guidelines when they are available, and confirmation of the likely scope of mapping and associated ground truthing (\$30,000).
- Complete mapping and ground truthing to DCCEEW guidelines (\$180,000).
- KSC to prepare a planning proposal to adopt the CWLR mapping under the RH SEPP (\$40,000 estimated cost for external consultancy to assist KSC).
- Review land zoning of any new or amended CWLR mapping.
- Review relevant local planning controls within the Kempsey LEP and DCP.

Constraints

- Planning Constraints: Nil

- Legal Constraints: Nil.
- Organisational Constraints: Planning proposals, for updating SEPP mapping, aim to change a statutory document. This will require a public exhibition and response to any submissions. SEPP mapping changes will also need to be incorporated into Planning Certificates.

3.1.20 *A16: Indigenous Values and Mapping*

Capital Costs	\$80,000 (subject to funding availability)
Annual Costs	Nil
Implementation Timeframe	1-5 years
Lead Agency	NPWS
Potential Funding Source	NPWS annual budget allocations

Description

This action involves collaboration with Traditional Owners, stakeholders (including LALC) and other government departments to map and define the significance and management issues relating to the midden on the northern shoreline of the Macleay estuary running from Clybucca to Stuarts Point. It will include a literature review, mapping, and ground truthing of these areas. Ongoing consultation with the local Indigenous community will occur throughout the project to ensure their strong involvement. The findings of the mapping will be discussed between the project stakeholders to identify the next steps, which may consider management options or education opportunities.

Tasks

- Map the midden location and extent and assess its significance and any threats to its conservation.
- Develop management options, educational and Cultural opportunities.

Links to KSC Delivery Program 2022-2026 and Operational Plan 2023-2024

- CO.OP5 Work with the Aboriginal community to honour and communicate cultural heritage through placemaking, education and public art.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil preventing the action being undertaken, but KSC / state agencies should consider how the intellectual property of the Traditional Owners involved in this project will be managed. There will likely be some culturally sensitive information and locations which should remain confidential.

- Organisational Constraints: Nil.

3.2 Open Coast Actions

3.2.1 A17.1: Coastal Monitoring Installation

Capital Costs	\$20,000
Annual Costs	Nil
Implementation Timeframe	1-2 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none"> • KSC • DCCEEW Coast and Estuary Grants Program

Description

This action will install two “citizen-science” CoastSnap stations. These use low-cost community beach monitoring technology that allows beach users the ability to take and upload images from their smartphones from a single geolocated location. Nominated locations are Crescent Head Surf Club and Back Beach/Creek at South West Rocks. Once two locations are selected by KSC, initial setup costs will include camera cradles and mounting, digital and physical signage, registering sites on the CoastSnap App, and one-off ground survey of the sites to unlock the image rectification process. It will also include a one-off cost to embed the CoastSnap site onto KSC’s webpage.

Tasks

- Select locations and install CoastSnap poles.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

3.2.2 A17.2: Coastal Monitoring Program

Capital Costs	Nil
Annual Costs	\$20,000
Implementation Timeframe	Ongoing
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none"> • KSC • DCCEEW Monitoring Program

Description

This action comprises annual monitoring and review of selected coastal sites.

For the two established CoastSnap locations, the images will be used to complete shoreline analysis and produce timelapse movies. This analysis is typically undertaken by the University of New South Wales.

Ongoing beach surveys are to be undertaken at Hat Head to monitor the dune profiles, changes over time, and landward retreat. This monitoring may be shifted from a Council-led action to being included within a staged government coastal monitoring program.

New post-event dune survey is recommended immediately after any significant storms throughout the region.

Tasks

- Annual review and analysis of CoastSnap data.
- Ongoing beach survey and analysis at Hat Head to build upon annual monitoring undertaken under the Kempsey CZMP.
- Post-event dune survey following significant storms.

Links to KSC Delivery Program 2022-2026 and Operational Plan 2023-2024

- EN.OP30 Continue with the formal beach profile monitoring program for Hat Head in line with the Kempsey Coastal Zone Management Plan.

3.3 Killick Creek Actions

3.3.1 A18: Willow Street Coastal Vulnerability Adaptation Plan

Capital Costs	\$220,000
Annual Costs	Nil
Implementation Timeframe	5-10 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

A detailed coastal vulnerability adaptation plan is required for low lying areas around Willow Street, Crescent Head, with the surrounding Crown Land already inundated during coastal storms. The risk of coastal inundation and erosion are expected to increase due to sea level rise, with long-term

adaptation planning required. The Coastal Vulnerability Mapping completed in the CMP Stage 2 shows that tidal inundation is encroaching on the street from the rear, and the area is within the coastal inundation extent. The new study will review the available hazard information, undertaking a more refined analysis of potential tidal and coastal inundation, waterway instability, combined coastal / fluvial interactions and stormwater drainage, to be confirmed through site inspections.

An updated risk assessment should consider the impacts to land, buildings, linear infrastructure (i.e., drainage, water etc.), and both underground and above ground services. An options appraisal should consider a combination of land rezoning, retreat of development and infrastructure, landform adaptation through filling and raising of assets and roads, property development controls, and formalised coastal protection, which may also require upgrades to the drainage network. A multi criteria assessment and cost-benefit analysis will be undertaken to support the decision for the preferred option. Concept designs will be developed for the preferred option, and documentation to support the detailed design and approvals. The documentation will include expected construction costs, a sequence of works, and timeframe for the overall scheme.

Tasks

- Willow Street Coastal Vulnerability Adaptation Plan and Concept Design (approx. \$100,000).
- Stakeholder and community engagement, including consultation with the NSW Reconstruction Authority (approx. \$20,000).
- Ground Investigation (approx. \$40,000).
- Detailed Design and Approvals (approx. \$60,000).

Constraints

- Planning Constraints: Nil during assessment and design phase.
- Legal Constraints: Nil during assessment and design phase.
- Organisational Constraints: Nil during assessment and design phase.

3.4 Macleay River Actions

3.4.1 A19: Masterplan for Mattys Flat and Macleay River Entrance

Capital Costs	\$100,000
Annual Costs	Nil
Implementation Timeframe	3-5 years
Lead Agency	KSC
Support Agencies	<ul style="list-style-type: none">• Crown Lands• TfNSW
Potential Funding Sources	<ul style="list-style-type: none">• KSC• Boating Now• DCCEEW Coast and Estuary Grants Program

Description

This task will develop a masterplan for Mattys Flat and the Macleay River entrance. This is a high-use area used by local residents and tourists. The Macleay River entrance is the primary waterway for boating access from the South West Rocks area to offshore waters. Mattys Flat boat ramp is the key recreational boating access point to the Lower Macleay River and offshore waters, and a commercial fishing fleet operates from the Macleay River. Other high-use zones are the southern breakwater, which is readily accessible by pedestrians. However, this also provides informal access to the land between the breakwater and Back Creek, and consequently there is a network of informal vehicle tracks across the sand dunes.

Being waterfront land, the region is affected by extreme coastal processes. CVA mapping indicates New Entrance Road as being significantly inundated by tides by 2100. The mapping shows a less severe impact in 2050, affecting the end of the road leading to the car park next to the southern breakwater. Nearby, access to the boat ramp on the Macleay River at Mattys Flat is shown to be potentially affected. A combined management plan will set the strategic direction for the area. The masterplan will be developed in consultation with the Kempsey LALC.

A Plan of Management for Mattys Flat and New Entrance (Kempsey Shire Council and Land & Property Management Authority, 2010) was developed by Patterson Britton & Partners in 2006 and was reviewed by KSC in 2010. That plan proposes a total of 19 management actions including improvements to car parking, boating facilities, public access, and visitor facilities, as well as environmental protection works. Additionally, initial upgrade actions will also consider the Feasibility Investigation for Boating Access Improvements at South West Rocks (Royal Haskoning DHV, 2021), prepared for Maritime Infrastructure Development Office. Various recommendations

were made including upgrades to training walls at Macleay River Entrance, a sand bypassing system, a dedicated charter and/or cruise tender wharf, a Trial Bay Beach landing, Laggars Point Boat Ramp upgrade and upgrades to infrastructure at Mattys Flat. Of relevance to KSC is the upgrades to Mattys Flat, which includes \$2.55m of upgrades:

- A: Upgrade existing boat ramp at Mattys Flat (\$1m).
- B: Sewage pump-out at Mattys Flat (costs not split out, however may be around \$0.25m).
- C: Overflow parking at Mattys Flat (\$1.3m).

Royal Haskoning DHV (2021) identified potential locations for the upgrades which are shown in Figure 6.



Figure 6 Potential Locations for Upgrades at Mattys Flat, Extract from Royal Haskoning DHV (2021)

Detailed designs for upgrades and new infrastructure proposed by the masterplan are included as a deferred action in Appendix B.

Tasks

- Masterplan for Mattys Flat and the Macleay River entrance (\$100,000).

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil, although works should be consistent with Australian Industry standards and state guidance for boating infrastructure.
- Organisational Constraints: Nil.

3.4.2 A20: Produce Macleay River Estuary Riverbank Restoration Guide

Capital Costs	\$5,000
Annual Costs	Nil
Implementation Timeframe	1-2 years
Lead Agency	KSC
Support Agencies	Landcare
Potential Funding Sources	<ul style="list-style-type: none">• KSC• DCCEEW Coast and Estuary Grants Program

Description

This action will revise and print copies of KSC's existing Riparian Revegetation Guide for the Lower Macleay River, originally developed in 2015. Minor amendments are anticipated for contact details and website references. This guide will have information on how to plan for a regeneration project, suitable riparian plant species, ideal buffer zone widths, an explanation of any planning requirements for works within the CWLR area, available support, and useful web links.

Tasks

- Review and printing of Riparian Revegetation Guide.
- Distribute to community members.
- Publish digital copy to KSC's website.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

Note that some actions apply to multiple areas. Locations indicated on map are representative locations.

LGA Wide

- A1: NRCG Support for Kempsey CMP
- A2: Community Education Program
- A3: Coastal Focused Weed Management
- A4: Integration of Planning Instruments
- A6.1: Coastal Asset Procedures
- A6.2: Coastal Asset Management Renewals
- A7.1: Estuary Stormwater Quality Investigation and Plan
- A7.2: Estuary Stormwater Quality Improvements
- A8.1: Bank Management Assessment and Implementation Plan
- A8.2: Bank Management Improvements
- A9.1: Water Quality Monitoring Program Design
- A9.2: Water Quality Monitoring Program
- A10: Manage Estuary Entrances
- A11: Community Conservation and Restoration Programs
- A12: Revised Maritime Infrastructure Assessment
- A13: Protection and Management of Migratory and Threatened Shore and Water Birds
- A14: Revised Coastal Hazard Assessment
- A16: Indigenous Values and Mapping

A19: Masterplan for Mattys Flat and Macleay Entrance Project

A20: Produce Macleay River Estuary Riverbank Restoration Guide

A18: Willow Street Coastal Vulnerability Adaptation Plan

Open Coast

- A5: Coastal Usage Assessment
- A17.1: Coastal Monitoring Installation
- A17.2: Coastal Monitoring Program

N

Figure 7 Representative Locations of Management Actions

0 2 4 6 km

Kempsey Coastal Management Program

Z:\BusinessShare\Them\Projects\P00205_KempseyCMPStage4\GIS\CoastalZone.qgz

REV C
DRAWN EN
CHECK DJW



4 BUSINESS PLAN

4.1 Intent of the CMP

Understanding the benefits of the CMP and identifying its key beneficiaries are crucial in determining the scheduling and method for funding and implementing the various actions of the CMP.

Examination of the key management objectives for each issue demonstrates that:

- The focal coastal management areas are the coastal vulnerability and coastal environment areas.
- Where objectives aren't seen to have "environmental benefit" as the focus, such as preservation of public access or public facilities, the objectives can be seen as contributing to building or maintaining collective wealth within the community.

From these two points, most benefits are widespread and not targeted to any group or individual. The beneficiaries of the proposed CMP Actions are the broader community. Individual consideration of each proposed action also supports this conclusion.

In summary, most actions presently included in this CMP can be seen to overwhelmingly accrue benefits to public interests.

Accordingly, all funding should come from public sources (Local, State and Federal Government).

4.2 Cost and Funding Arrangements

One substantial difficulty for small local councils when planning for coast and estuary management in NSW is that future funding from grant sources, at both state and federal level, is uncertain in the medium term. Grant funding programs are normally contestable, and the likelihood of success can be affected by:

- Demand for the program.
- The rules surrounding the matching funding required changing from year to year.
- Variability in the pool of available funding, depending on other demands on public funds.

KSC most commonly uses funds from the Environmental Levy to leverage additional funding from external grants programs that provide funding for coast and estuary related management activities. KSC's Environmental Levy is not guaranteed after 2027, and funding for CMP actions beyond 2027 will be subject to KSC's resources. KSC's Operational Plan is structured around the focus areas of Environment, Economy, Community and Leadership, with coast and estuary management falling under the Environment focus area. The Operational Plan does not separate out expenditure on coast and estuary management.

Several grant programs have been identified:

- Coastal and Estuary Grants Program – DCCEEW.
- Floodplain Management Grants – DCCEEW.
- Boating Now Program – MIDO.
- Legacy Mines Program – Department of Regional NSW.

In addition to these grant sources, North Coast Local Land Services also has funds to help with environmental repair and restoration works. There may also be opportunities for KSC to access Federal grant programs. However, these tend to be ephemeral, rather than a regularly programmed funding scheme. As such, they should be considered a supplementary source of funding and should not be relied upon for completing the actions programmed into the CMP.

Consultation with state government agencies has secured advice committing to support the management actions proposed in the CMP. For contestable grants programs, KSC has secured commitment that the proposed projects will be eligible for consideration. Expenditure for the ten-year period has been outlined.

The breakdown of funding, indicating expected KSC contributions and funding from external sources for each calendar year is presented in Table 5. A more detailed breakdown of funding for all management actions is presented in Section 4.3.

Table 5 Projected Expenditure on the CMP

Year	KSC Funds	External Funds
2024/2025	\$200,000	\$360,000
2025/2026	\$142,000	\$244,000
2026/2027	\$267,000	\$494,000
2027/2028	\$137,000	\$234,000
2028/2029	\$224,000	\$487,000
2029/2030	\$204,000	\$367,000
2030/2031	\$189,000	\$337,000
2031/2032	\$165,000	\$291,000
2032/2033	\$100,000	\$161,000
2033/2034	\$110,000	\$181,000
Total	\$1,738,000	\$3,156,000

Total expenditure over ten years is expected to be \$4,894,000.

4.3 Program for Delivery

A program for delivery of the Management Actions in the CMP, including funding sources, contributions and timing is presented in Table 6. Actual timing for different actions is dependent on both the expected value to be derived from the action, the urgency surrounding the issues each action is intended to address and the availability of funds from year to year.

Table 6 highlights that operational costs are expected to be incidental to the ongoing operations of KSC and other responsible agencies, and variable over time. Variability is dependent on the urgency surrounding different issues and any opportunistic funding which may arise during CMP delivery. The effort required from the delivering agencies has been considered, but the nature of that effort makes it difficult to put a precise dollar amount against operational costs.

Table 6 Program for Delivery

	Management Options	Maintenance			Total KSC Contribution	Total External Contribution	External Funding Source	Responsibility for Delivery		Funding and Delivery Program																					
		Capital	(all years, total)	Operational						2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034												
								KSC	External	KSC	External	KSC	External	KSC	External	KSC	External	KSC	External	KSC	External	KSC	External	KSC	External	KSC	External	KSC	External		
LGA WIDE	A1	NRCG Support for Kempsey CMP		\$ -	\$ -	(1)	\$ -	\$ -		Support only																					
	A2	Community education program		\$ 10,000	\$ 9,000	(1)	\$ 6,330	\$ 12,670	DCCEEW Coast and Estuary Grants	Council	LLS	\$ 3,333	\$ 6,667	\$ 333	\$ 667	\$ 333	\$ 667	\$ 333	\$ 667	\$ 333	\$ 667	\$ 333	\$ 667	\$ 333	\$ 667	\$ 333	\$ 667	\$ 333	\$ 667	\$ 333	\$ 667
	A3	Coastal-focussed Weed Management		\$ -	\$ 1,800,000	(2)	\$ 600,000	\$ 1,200,000	Environmental Levy, DCCEEW Coast and Estuary Grants	Council	NPWS	\$ 60,000	\$120,000	\$ 60,000	\$120,000	\$ 60,000	\$120,000	\$ 60,000	\$120,000	\$ 60,000	\$120,000	\$ 60,000	\$120,000	\$ 60,000	\$120,000	\$ 60,000	\$120,000	\$ 60,000	\$120,000	\$ 60,000	\$120,000
	A4	Integration of planning instruments		\$ 80,000	\$ -	(1)	\$ 26,667	\$ 53,333	DCCEEW Coast and Estuary Grants	Council		\$ 26,667	\$ 53,333																		
	A5	Coastal usage assessment		\$ 60,000	\$ -	(1)	\$ 20,000	\$ 40,000	DCCEEW Coast and Estuary Grants	Council	NPWS			\$ 20,000	\$ 40,000																
	A6.1	Coastal asset management procedures		\$ 80,000	\$ 45,000	(1)	\$ 41,667	\$ 83,333	DCCEEW Coast and Estuary Grants	Council		\$ 26,667	\$ 53,333				\$ 5,000	\$ 10,000					\$ 5,000	\$ 10,000				\$ 5,000	\$ 10,000		
	A6.2	Coastal asset management		\$ 250,000	\$ -	(2)	\$ 83,333	\$ 166,667	DCCEEW Coast and Estuary Grants	Council													\$ 83,333	\$166,667							
	A7.1	Estuary stormwater quality investigation and plan		\$ 240,000	\$ -	(1)	\$ 80,000	\$ 160,000	Environmental Levy, DCCEEW Coast and Estuary Grants	Council					\$ 40,000	\$ 80,000			\$ 40,000	\$ 80,000											
	A7.2	Estuary stormwater quality improvements		\$ 250,000	\$ -	(2)	\$ 83,333	\$ 166,667	Council Operational Plan, Environmental / Stormwater Levy, DCCEEW Coast and Estuary Grants	Council								\$ 83,333	\$166,667												
	A8.1	Bank management assessment and implementation plan		\$ 100,000	\$ -	(1)	\$ 33,333	\$ 66,667	DCCEEW Coast and Estuary Grants	Council	DPI Fisheries, Crown Lands, LLS	\$ 33,333	\$ 66,667																		
	A8.2	Bank management improvements		\$ 225,000	\$ -	(2)	\$ 75,000	\$ 150,000	DCCEEW Coast and Estuary Grants, MEMS	Council	LLS						\$ 25,000	\$ 50,000			\$ 25,000	\$ 50,000			\$ 25,000	\$ 50,000					
	A9.1	Water quality monitoring program design		\$ 50,000	\$ -	(1)	\$ 16,667	\$ 33,333	DCCEEW Coast and Estuary Grants	Council		\$ 16,667	\$ 33,333																		
	A9.2	Water quality monitoring program		\$ -	\$ 225,000	(1)	\$ 75,000	\$ 150,000	DCCEEW Coast and Estuary Grants	Council				\$ 8,333	\$ 16,667	\$ 8,333	\$ 16,667	\$ 8,333	\$ 16,667	\$ 8,333	\$ 16,667	\$ 8,333	\$ 16,667	\$ 8,333	\$ 16,667	\$ 8,333	\$ 16,667	\$ 8,333	\$ 16,667	\$ 8,333	\$ 16,667
	A10	Manage estuary entrances		\$ -	\$ 200,000	(1)	\$ 200,000	\$ -		Council		\$ 20,000		\$ 20,000		\$ 20,000		\$ 20,000		\$ 20,000		\$ 20,000		\$ 20,000		\$ 20,000		\$ 20,000		\$ 20,000	
	A11	Community Conservation and Restoration Programs		\$ -	\$ 150,000	(1)	\$ 50,000	\$ 100,000	Environmental Levy, DCCEEW Coast and Estuary Grants	Council		\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000	\$ 5,000	\$ 10,000
A12	Revised Marine Infrastructure Assessment		\$ 100,000	\$ -	(1)	\$ 33,333	\$ 66,667	Boating Now	Council					\$ 33,333	\$ 66,667																
A13	Protection and management of migratory and threatened shore and water birds		\$ 45,000	\$ -	(1)	\$ 15,000	\$ 30,000	DCCEEW Coast and Estuary Grants	Council	NPWS			\$ 5,000	\$ 10,000					\$ 5,000	\$ 10,000								\$ 5,000	\$ 10,000		
A14	Revised Coastal Hazard Assessment		\$ 120,000	\$ -	(1)	\$ 40,000	\$ 80,000	DCCEEW Coast and Estuary Grants	Council															\$ 40,000	\$ 80,000						
A15	Revised coastal wetland and littoral rainforest mapping		\$ 230,000	\$ -	(1)	\$ 76,667	\$ 153,333	DCCEEW Coast and Estuary Grants	Council				\$ 10,000	\$ 20,000	\$ 60,000	\$120,000	\$ 6,667	\$ 13,333													
A16	Indigenous Values and Mapping		\$ 80,000	\$ -	(1)	\$ -	\$ 80,000	NPWS	NPWS										\$ 80,000												
OPEN COAST																															
	A17.1	Coastal Monitoring Installation		\$ 20,000	\$ -	(2)	\$ 6,667	\$ 13,333	DCCEEW Coast and Estuary Grants	Council				\$ 6,667	\$ 13,333																
	A17.2	Coastal Monitoring program		\$ -	\$ 200,000	(1)	\$ 66,667	\$ 133,333	DCCEEW Monitoring Program	Council		\$ 6,667	\$ 13,333	\$ 6,667	\$ 13,333	\$ 6,667	\$ 13,333	\$ 6,667	\$ 13,333	\$ 6,667	\$ 13,333	\$ 6,667	\$ 13,333	\$ 6,667	\$ 13,333	\$ 6,667	\$ 13,333	\$ 6,667	\$ 13,333		
	A18	Willow Street Coastal Vulnerability Adaptation Plan		\$ 220,000	\$ -	(1)	\$ 73,333	\$ 146,667	DCCEEW Coast and Estuary Grants	Council										\$ 73,333	\$146,667										
MACLEAY RIVER																															
	A19	Masterplan for Mattys Flat and Macleay entrance precinct		\$ 100,000	\$ -	(1)	\$ 33,333	\$ 66,667	Boating Now, DCCEEW Coast and Estuary Grants	Council	Crown Lands					\$ 33,333	\$ 66,667														
	A20	Produce Macleay River Estuary Riverbank Restoration Guide		\$ 5,000	\$ -	(1)	\$ 1,667	\$ 3,333	DCCEEW Coast and Estuary Grants	Council		\$ 1,667	\$ 3,333																		
TOTAL		\$ 2,265,000	\$ 2,629,000		\$ 1,737,997	\$ 3,156,003				\$200,000	\$360,000	\$142,000	\$244,000	\$266,999	\$494,001	\$137,000	\$234,000	\$223,666	\$487,334	\$203,666	\$367,334	\$188,666	\$337,334	\$165,333	\$290,667	\$100,333	\$160,667	\$110,333	\$180,667		

- (1) Operational costs include expenses associated with staff salaries, ongoing costs, internal overheads, and costs associated with the normal functioning of local government and other state agencies. In most cases, these are provided as an 'in-kind' contribution, as required, and are absorbed within the normal operational budget of the responsible agencies.
- (2) Essentially, the approach here is similar to (1), except that where contractors are used to complete on-ground works of any kind, the operational cost would be a nominal 10% of the contract cost.

5 COASTAL ZONE EMERGENCY ACTION SUBPLAN

The CM Act (section 15(1)(E)) outlines that a coastal zone emergency action subplan (CZEAS) must be included in a CMP if the local council's local government area contains land within the coastal vulnerability area (CVA), and beach erosion, coastal inundation or cliff instability is occurring on that land.

Clause 15(3) of the CM Act states that a CZEAS is:

"A plan that outlines the roles and responsibilities of all public authorities (including the local council) in response to emergencies immediately preceding or during periods of beach erosion, coastal inundation or cliff instability, where the beach erosion, coastal inundation or cliff instability occurs through storm activity or an extreme or irregular event."

KSC is yet to formalise a CVA as defined in the CM Act and the RH SEPP. This is proposed by way of a planning proposal as an action in this CMP. Whilst a CZEAS is not currently compulsory, KSC has decided to prepare this subplan as part of the CMP (see Appendix A).

The purpose of a CZEAS is to identify and facilitate the implementation of appropriate responses to emergencies related to certain coastal hazards that will protect human life and public safety, minimise damage to property and assets, minimise impacts on social, environmental, and economic values, and not create additional hazards or risks.

6 MONITORING, EVALUATION AND REPORTING PROGRAM

6.1 Monitoring of CMP Delivery

Beyond implementing actions, the CMP requires ongoing monitoring, evaluation, and reporting (MER). The objective of this process is to maintain focus on program implementation, highlight successful actions and provide early warning of potential problems. The responsibility for the MER program will sit mostly with the NRCG, chaired by KSC, with membership from relevant public authorities.

The implementation of CMP actions for which the KSC is to take responsibility, including the MER program, will be through the Integrated Planning and Reporting (IP&R) System. The IP&R framework provides a means by which State Plans and Strategies, and KSCs Community and Strategic Plans are activated into meaningful operational projects, with progress reported back to stakeholders and the community. The IP&R framework is shown in Figure 8. The CMP will form one of the “Other Strategic Plans” within this framework.

The Kempsey Shire Council 2042 Community Strategic Plan (2022) and Delivery Program 2022-2026 and Operational Plan 2023-2024 (Kempsey Shire Council, 2023b) were reviewed in 2022. The CMP integrates with the IP&R Framework as follows:

- The updated Community Strategic Plan is consistent with the vision and key objectives of this CMP.
- Preparation of the CMP is included in the Operational Plan as action EN.OP41.
- Several management actions within the CMP address actions included in the Delivery Program and Operational Plan. Those actions from the Delivery Program and Operational Plan include:
 - A7.1: Estuary Stormwater Quality Investigation and Plan, A7.2: Estuary Stormwater Quality Improvements:
 - EN.OP32: Implement defect remediation program for stormwater.
 - EN.OP33: Construction of stormwater network at selected locations according to the agreed program.
 - EN.OP34: Undertake environmental water quality monitoring in Macleay River Catchment.

- EN.OP35: Implement regular maintenance program for environmental areas that have previously been remediated including: Boyters Lane, Gills Creek & Jerseyville Park.
- A17.2: Coastal Monitoring Program:
 - EN.OP36: Continue with the formal beach profile monitoring program for Hat Head in line with the Kempsey Coastal Zone Management Plan.
- A3: Coastal Focussed Weed Management:
 - EN.OP42: Inspect and control high priority species as per North Coast Weeds Action Program (WAP).
 - EN.OP45: Minimise high priority weed species infestations on private rural properties.
- A12: Revised Maritime Infrastructure Assessment
 - W4789: Riverside Park Jetty Replacement.
 - W2295: Gladstone Wharf Refurbishment.
 - W4265: Wharves & Jetties Replacement Smithtown Wharf.
- Under the IP&R framework, KSC produces an Annual Report documenting the progress of key project actions within the Delivery and Operational Plan. It is via this mechanism that the progress and outcomes of the CMP will be reported to stakeholders and the community.

To facilitate the monitoring required by the IP&R Framework, progress of CMP management actions against the Business Plan Delivery Table (Table 6) will be tracked by the NRCG. More specifically, the NRCG's role includes:

- Evaluation of all actions including those which are not included in the IP&R framework.
- Determining the implementation status of all actions, including:
 - Identifying the cause of delay for any actions that have failed to be implemented within projected timeframes and developing compensatory actions to facilitate future implementation.
 - Updating the Business Plan Delivery Table to reflect any changes in timeframe or funding for delayed actions.
- Evaluating completed actions against the performance measures for that action and the relevant objectives of the CM Act. Did the action perform as expected? What worked? What could be improved upon? Does the action require ongoing monitoring or subsequent actions?

- Identifying potential funding opportunities for upcoming actions and reporting on submitted funding applications.

The NRCG will review the Business Plan Delivery on at least an annual basis, with quarterly review and planning of actions within the current and upcoming implementation phases.

The entire CMP must be reviewed at least every 10 years. However, due to the number of studies required to progress this CMP, a thorough review after around two years will be required, with the timing of that review set to enable provision of new actions into the next round of Delivery Program Planning (around 2026).

A suitable mechanism for completing the review would be to re-visit the CMP risk assessment to determine if:

- Key risks have been addressed or moved to a lower priority through implementation of the CMP actions.
- Any new risks have arisen.
- Any existing risks have escalated in priority.
- New actions can be considered.

Table 7 outlines the recommended performance measures and stages associated with different actions that could be used to gauge whether the actions have been successfully implemented. These measures are indicative and will depend largely on decisions made by the NRCG and its member agencies regarding how different actions will be most appropriately implemented as delivery of the CMP progresses.

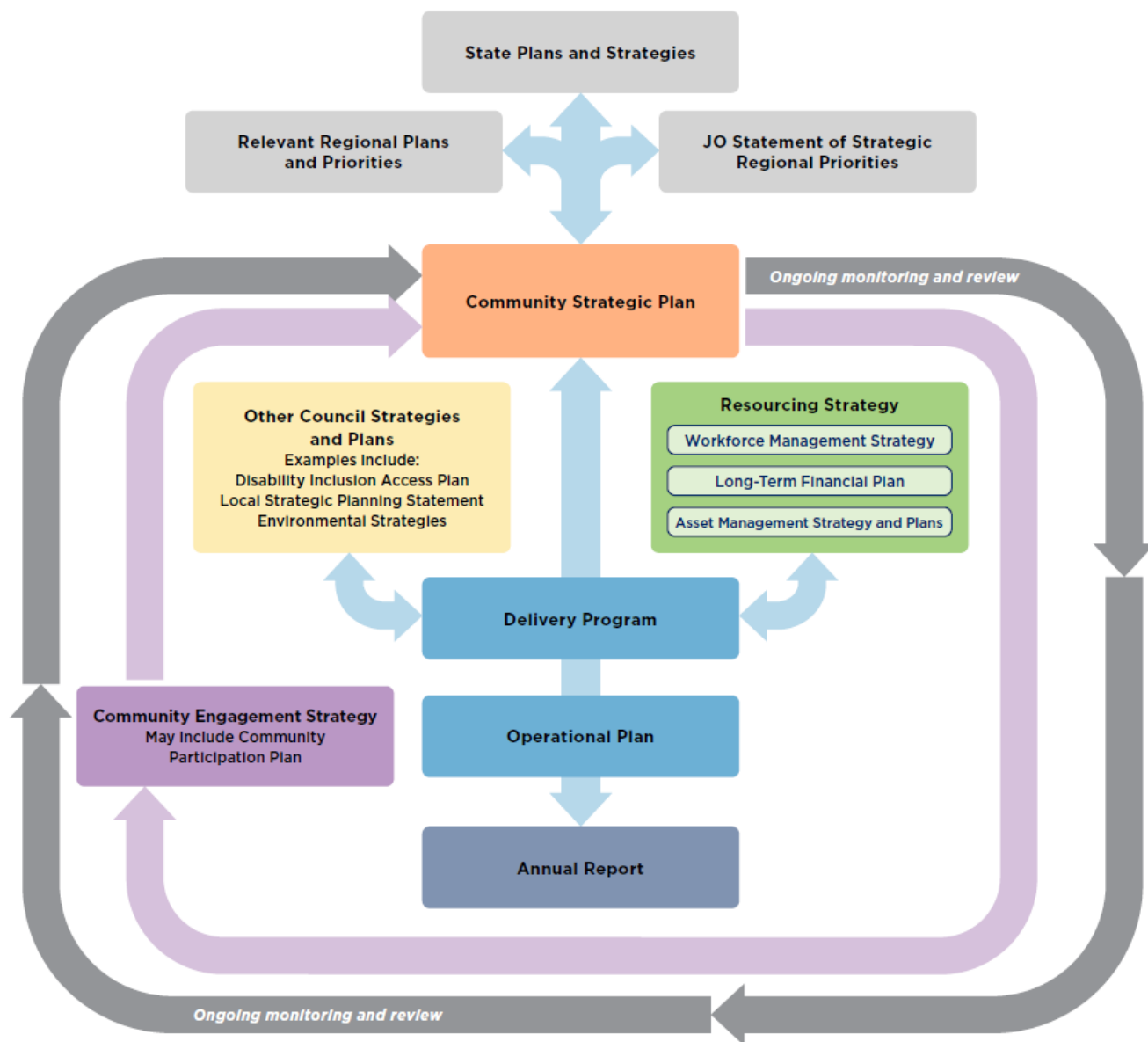


Figure 8 Integrated Planning and Reporting Framework⁷

⁷ <https://www.olg.nsw.gov.au/councils/integrated-planning-and-reporting/>

Table 7 CMP Action Performance Measures

Management Action		Performance Measures
A1	NRCG Support for Kempsey CMP	<ul style="list-style-type: none"> Regular meetings with minutes kept. Progress of CMP actions tracked.
A2	Community Education Program	<ul style="list-style-type: none"> Identified educational opportunities and messaging and development of education materials. Distributed educational materials.
A3	Coastal Focused Weed Management	<ul style="list-style-type: none"> Prioritisation of areas for treatment. Preparation of maps in GIS showing treated areas and areas identified for future treatment. Record of works completed, including photographs, costs and follow-up inspections, issues encountered etc. Timetabling and facilitation of follow-up maintenance. Follow-up maintenance completed.
A4	Integration of Planning Instruments	<ul style="list-style-type: none"> Consultant engaged to prepare a planning proposal to adopt CVA mapping under RH SEPP. Consultant engaged to prepare a planning proposal to adopt new CWLR mapping under the RH SEPP. Consider CVA and revised CWLR mapping in review of the DCP.
A5	Coastal Usage Assessment	<ul style="list-style-type: none"> Completion of Coastal Usage Assessment.
A6.1	Coastal Asset Procedures	<ul style="list-style-type: none"> Coastal Asset Management Process Manual prepared. Recommendations for repairs or renewals.
A6.2	Coastal Asset Management Renewals	<ul style="list-style-type: none"> Completion of required repairs and/or renewals.
A7.1	Estuary Stormwater Quality Investigation and Plan	<ul style="list-style-type: none"> Completion of an estuary stormwater quality investigation and plan. Priority upgrades added to Operational Plan.
A7.2	Estuary Stormwater Quality Improvements	<ul style="list-style-type: none"> Implementation of identified stormwater improvement actions on a priority basis.
A8.1	Bank Management Assessment and Implementation Plan	<ul style="list-style-type: none"> Consultant engaged to complete a bank condition assessment and management plan.
A8.2	Bank Management Improvements	<ul style="list-style-type: none"> Bank improvement actions included within Operational and Delivery Plan. Completion of bank improvement actions.
A9.1	Water Quality Monitoring Program Design	<ul style="list-style-type: none"> Consultant engaged to prepare a water quality monitoring program.
A9.2	Water Quality Monitoring Program	<ul style="list-style-type: none"> Water quality monitoring program implemented. Recommendations made for remedial actions to address any identified issues.

Management Action		Performance Measures
A10	Manage Estuary Entrances	<ul style="list-style-type: none"> Ongoing management of estuary entrances in accordance with the relevant EMP.
A11	Community Conservation and Restoration Programs	<ul style="list-style-type: none"> Application for funding for coastal conservation and restoration projects through Coast and Estuary Grants program. Distribute funding to community groups.
A12	Revised Maritime Infrastructure Assessment	<ul style="list-style-type: none"> Completed review of the Marine Infrastructure Assessment. Priority actions added to Operational Plan.
A13	Protection and Management of Migratory and Threatened Shore and Water Birds	<ul style="list-style-type: none"> Completed three rounds of shorebird and waterbird surveys. Prioritisation of high value habitat sites. Prioritisation of threats at high priority sites and management actions identified. Implementation of management actions at high priority sites.
A14	Revised Coastal Hazard Assessment	<ul style="list-style-type: none"> Completion of a probabilistic coastal erosion and recession study.
A15	Revised Coastal Wetland and Littoral Rainforest Mapping	<ul style="list-style-type: none"> Completion of background study. Completion of CWLR mapping and ground truthing. Submit planning proposal to adopt new CWLR mapping under RH SEPP.
A16	Indigenous Values and Mapping	<ul style="list-style-type: none"> Completion of mapping and assessment of threats. Development of management options, education and Cultural opportunities.
A17.1	Coastal Monitoring Installation	<ul style="list-style-type: none"> Installation of two CoastSnap poles.
A17.2	Coastal Monitoring Program	<ul style="list-style-type: none"> Complete annual analysis of CoastSnap data. Ongoing beach survey and analysis at Hat Head. Completion of dune survey following significant storms.
A18	Willow Street Coastal Vulnerability Adaptation Plan	<ul style="list-style-type: none"> Completion of Willow Street coastal vulnerability adaptation plan and concept design. Stakeholder and community engagement. Completion of ground investigations. Completion of detailed design and approvals.
A19	Masterplan for Mattys Flat and Macleay Entrance Project	<ul style="list-style-type: none"> Masterplan for Mattys Flat and Macleay River entrance.
A20	Produce Macleay River Estuary Riverbank Restoration Guide	<ul style="list-style-type: none"> Completed review of existing Riparian Revegetation Guide. Guide distributed to community members.

6.2 Trigger Points, Thresholds, and Key Indicators

While the preceding section addresses monitoring progressive delivery of the CMP as planned, it is entirely possible that circumstances arise which prompt a change in the adopted management strategy or necessitate more timely delivery of some actions. Relevant “Trigger Points, Thresholds, and Key Indicators” which may be used to decide upon a change of program delivery are listed in Table 8. Several triggers are embedded in the Coastal Zone Emergency Action Subplan (Appendix A), where the appropriate action to be taken during an emergency is also identified. To avoid future inconsistencies as documents are revised, these triggers have not been presented in Table 8 but can be found in Table 1 of Appendix A. Triggers are normally related to specific management actions. Breach of a threshold or trigger will not necessarily require an immediate response, but these breaches should be considered when the CMP is formally reviewed at the end of its ten-year timeframe.

Table 8 Trigger points, Thresholds and Key Indicators

Related Action	Trigger Point, Threshold or Key Indicator
A8.1, A8.2	If the study proposed under Action A8.1 identifies that erosion at a location (or locations) is presenting a concerning threat to property, infrastructure, or assets , it may be necessary to bring forward implementation of bank management improvements proposed under action A8.2.
A9.2	Estuary specific water quality trigger values have been developed for the Macleay River by the NSW Government. Trigger values are published on the NSW Government Environment and Heritage website ⁸ for indicators such as total phosphorus, total nitrogen, chlorophyll-a, turbidity, electrical conductivity, dissolved oxygen, pH, and chemical contaminants. Data collected as part of the monitoring program under action A9.2 are to be regularly assessed against these thresholds. Where the water quality thresholds are exceeded , an appropriate action may be immediate investigation and diagnosis or to consider more strategic approaches as part of CMP review.
A17.2	Where shoreline analysis undertaken under action A17.2 indicates that the rate of recession is accelerating or may impact a location within three years , action would need to be taken such as planning for relocation or reconfiguration of beach access or other affected assets.
A18	Local sea level rise should be monitored by periodically reviewing published information. If it is indicated that king tides will likely become problematic around Willow Street within the next 10 years , adaptation should start promptly.

⁸ https://www.environment.nsw.gov.au/ieo/Macleay/report-02.htm#P301_24322, Accessed 30/04/2024.

7 REFERENCES

- Alluvium, 2021a. Saltwater Creek and Lagoon Estuary CMP Stage 2 Hydrodynamic Processes Assessment.
- Alluvium, 2021b. Saltwater Creek and Lagoon Estuary CMP Stage 2 Water Quality Assessment.
- BMT, 2020a. Killick Creek Estuary CMP Stage 1 Scoping Study.
- BMT, 2020b. Korogoro Creek Estuary CMP Stage 1 Scoping Study.
- BMT, 2020c. Macleay River Estuary CMP Stage 1 Scoping Study.
- BMT WBM, 2017. NSW Marine Estate Threat and Risk Assessment Report.
- BMT WBM, 2016. Kempsey Coastal Zone Management Plan.
- BMT WBM, 2013. Kempsey Coastal Processes and Hazards Definition Study.
- Cohen, T., 2005. The geomorphology of the Macleay River estuary.
- Eco Logical Australia, 2021. Saltwater Creek Vegetation Mapping and Condition Assessment.
- GeoLINK, 2012. Macleay River Estuary Coastal Zone Management Plan.
- GeoLINK, 2010. Macleay River Estuary Estuary Management Study.
- Jeremy Benn Pacific, 2021. Coastal vulnerability maps and associated Technical Report.
- Kempsey Shire Council, 2023a. Kempsey Local Growth Management Strategy 2041.
- Kempsey Shire Council, 2023b. Delivery Program 2022-2026 and Operational Plan 2023-2024.
- Kempsey Shire Council, 2022. 2042 Your Future Community Strategic Plan.
- Kempsey Shire Council, 2013. Kempsey Development Control Plan 2013.
- Kempsey Shire Council, Land & Property Management Authority, 2010. Mattys Flat and New Entrance Plan of Management.
- NSW Government, 2018. Our future on the coast. NSW Coastal Management Manual Part A: Introduction and mandatory requirements for a coastal management program.
- NSW Local Land Services, 2022. North Coast Regional Strategic Weed Management Plan 2023-2027.
- NSW National Parks and Wildlife Service, 2022. Trial Bay Visitor Precincts Coast and Foreshore Protection Strategy.
- Royal Haskoning DHV, 2021. Feasibility Investigation for Boating Access Improvements at South West Rocks (No. PA2405- RHD- ZZ- XX- RP- Z- 001).
- Salients, 2023. Open Coast Scoping Study for Kempsey Shire CMP.
- State of NSW and Office of Environment and Heritage, 2018. Our future on the Coast. NSW Coastal Management Manual Part B: Stage 1 Identify the scope of a coastal management program.
- Tefler, D., Birch, M., 2009. Korogoro Creek Estuary Management Plan.
- University of New England, 2019. Antimony and arsenic concentrations in coastal depositional zones adjacent to the mouth of the Macleay River.
- Water Research Laboratory, 2023. Macleay River Floodplain Prioritisation Study (No. WRL TR 2020/07).

Water Research Laboratory, 2021a. Pacific Highway Upgrade Biodiversity Offset Program: Hydrological assessment - Clybucca offset properties (WRL TR 2021/22).

Water Research Laboratory, 2021b. East Kinchela (Swan Pool) Remediation Feasibility Study (No. WRL TR 2021/21).

Water Research Laboratory, 2020. Clybucca Wetlands Management Options Study (WRL TR 2018/32).

Water Research Laboratory, 2017. Collombatti-Clybucca Floodplain Remediation Feasibility Study.

Water Technology, Molino Stewart, 2022a. Korogoro Creek Entrance Management Plan (No. 21010360_R03_V03_Korogoro_EMP).

Water Technology, Molino Stewart, 2022b. Killick Creek Entrance Management Plan (No. 21010360_R04_V03_KillickCreek_EMP).

Water Technology, Molino Stewart, 2022c. Saltwater Creek Entrance Management Plan (No. 21010360_R02_V03_SaltwaterCk_EMP).

Water Technology, Molino Stewart, 2022d. Back Creek, South West Rocks, Review of Entrance Management Conditions (No. 21010360_R01_V03_BackCk).

Water Technology, Molino Stewart, 2022e. Review of Kempsey LGA - Miscellaneous Estuary Entrances and Outlets (No. 21010360_R05_V03_SaltwaterCk_EMP).

Water Technology, Molino Stewart, 2020. Stage 1 Scoping Study for the Saltwater Creek and Lagoon Coastal Management Program.

WBM, 2006. Saltwater Creek & Lagoon South West Rocks Estuary Management Study & Plan.

WBM Oceanics Australia, 2006. Killick Creek Crescent Head Estuary Management Study and Plan.

APPENDIX A COASTAL ZONE EMERGENCY ACTION SUBPLAN

Kempsey Coastal Zone Emergency Action Subplan

Authors:	Emma Graham (Salients Pty Ltd)
Prepared For	Kempsey Shire Council
Version	FINAL FOR EXHIBITION
Date	17/06/2024

Document Control

Version	Date	CHECKED BY	ISSUED BY	Distribution					
				KEMPSEY SHIRE COUNCIL	DCCEW				
FIRST DRAFT	14/02/2023	DJW	EG	ELEC	ELEC				
SECOND DRAFT	13/03/2023	DJW	EG	ELEC	ELEC				
FINAL	15/05/2023	DJW	DJW	ELEC	ELEC				
EXHIBITION	17/07/2024	DJW	EN	ELEC	ELEC				

Disclaimer

This report has been prepared on behalf of and for the exclusive use of Jeremy Benn Pacific (JBP) and Kempsey Shire Council (KSC), in accordance with an agreement between JBP and Salients Pty Limited. The findings of this report may only be valid for a limited period, particularly considering changes that may occur to the physical, legal, and regulatory environments that existed when the report was written. Salients Pty Limited accepts no liability or responsibility for any use, or reliance upon, the contents of this report by any third party. Copying this report without the permission of JBP, KSC or Salients Pty Limited is not permitted.

Contents

1	Abbreviations.....	3
2	Introduction.....	4
3	Extent of the CZEAS.....	6
4	Definition of a coastal emergency.....	9
5	Overview of hazards and risks at key locations	10
5.1	Beach Erosion	10
5.2	Coastal Inundation.....	15
5.3	Cliff Instability	18
6	Roles and Responsibilities	19
6.1	Coastal emergency caused by storm activity.....	19
6.2	Coastal erosion not caused by storm activity	20
7	Coastal Emergency Actions.....	21
8	Consultation	26
9	Plan Review	27
10	References	28

Figures

Figure 1	CZEAS Extent North.....	7
Figure 2	CZEAS Extent South.....	8
Figure 3	Beach erosion north.....	11
Figure 4	Beach erosion hazard south.....	12
Figure 5	Beach access and viewing Platform: Grassy Head.....	13
Figure 6	Foreshore Near Runaway Creek: Trial Bay visitor precinct	13
Figure 7	Beach Pedestrian Access, Hat Head Holiday Park	14
Figure 8	Killick Creek Seawall, Crescent Head	14
Figure 9	Coastal Inundation North.....	16

Tables

Table 1	Responsible agencies and actions.....	21
---------	---------------------------------------	----

1 Abbreviations

BOM	Bureau of Meteorology
CM Act	Coastal Management Act 2016
CZEAS	Coastal Zone Emergency Action Subplan
CMP	Coastal Management Program
EMPLAN	Emergency Management Plan
KSC	Kempsey Shire Council
LEMC	Local Emergency Management Committee
LEOCON	Local Emergency Operations Controller
REOCON	Regional Emergency Operations Controller
RH SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
SERM Act	State Emergency and Rescue Management Act 1989
NSW SES	New South Wales State Emergency Service

2 Introduction

The Coastal Management Act 2016 (CM Act) (section 15(1)(e)) outlines that a coastal zone emergency action subplan (CZEAS) must be included in a coastal management program (CMP) if the local council's local government area contains land within the coastal vulnerability area (CVA), and beach erosion, coastal inundation or cliff instability is occurring on that land.

Clause 15(3) of the CM Act states that a CZEAS is:

"A plan that outlines the roles and responsibilities of all public authorities (including the local council) in response to emergencies immediately preceding or during periods of beach erosion, coastal inundation or cliff instability, where the beach erosion, coastal inundation or cliff instability occurs through storm activity or an extreme or irregular event."

Kempsey Shire Council (KSC) is yet to formalise a CVA as defined in the CM Act and the State Environmental Planning Policy (Resilience and Hazards) 2021 (RH SEPP). This may be done by way of a planning proposal in future. Whilst a CZEAS is not currently compulsory, Council has decided to prepare this subplan as part of the Kempsey CMP.

The purpose of a CZEAS is to identify and facilitate the implementation of appropriate responses to emergencies related to certain coastal hazards that will protect human life and public safety, minimise damage to property and assets, minimise impacts on social, environmental and economic values, and not create additional hazards or risks.

A CZEAS should:

- Provide a definition of coastal emergencies and criteria/thresholds/triggers for when a coastal emergency is occurring.
- Identify by way of a map and/or register of land and assets that are, or may be, affected by beach erosion, coastal inundation or cliff instability.
- Outline the roles and responsibilities of all public authorities (including the local council) in response to emergencies immediately preceding or during periods of beach erosion, coastal inundation or cliff instability.
- Outline any works for the protection of property affected or likely to be affected by beach erosion, coastal inundation or cliff instability triggers for emergency response actions.
- Identify any requirements for how emergency coastal protection works, within the meaning of the RH SEPP, are to be carried out.

- Outline consultation that has taken place with other public authorities in preparing the CZEAS.
- Define coastal emergency actions for the four phases of emergency management: prevention, preparation, response and recovery.
- Define a protocol for communication and engagement before, during and after an emergency event.

A CZEAS must not include:

- Matters dealt with in any plan made under the State Emergency and Rescue Management Act 1989 (SERM Act) in relation to the response to emergencies.

A CZEAS must be consistent with:

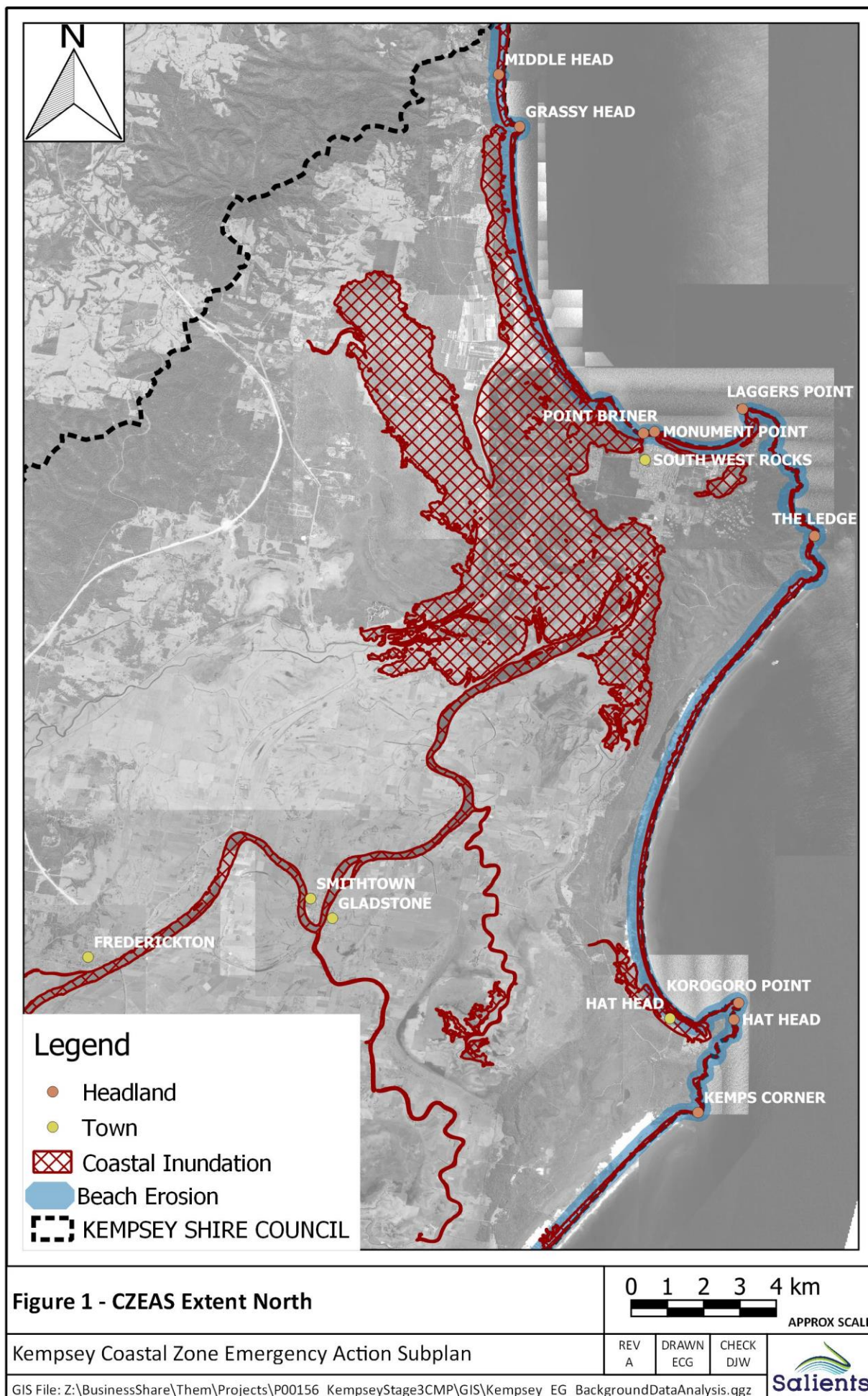
- The objects of the CM Act (s. 3).
- The relevant management objectives for the CVA (s. 7 of the CM Act) which are to:
 - Prioritise actions that support the continued functionality of essential infrastructure during and immediately after a coastal hazard emergency.
 - Improve the resilience of coastal development and communities by improving adaptive capacity and reducing reliance on emergency responses.
- The strategic direction of the CMP, specifically how the CMP proposes to manage coastal hazard risks in the CVA.

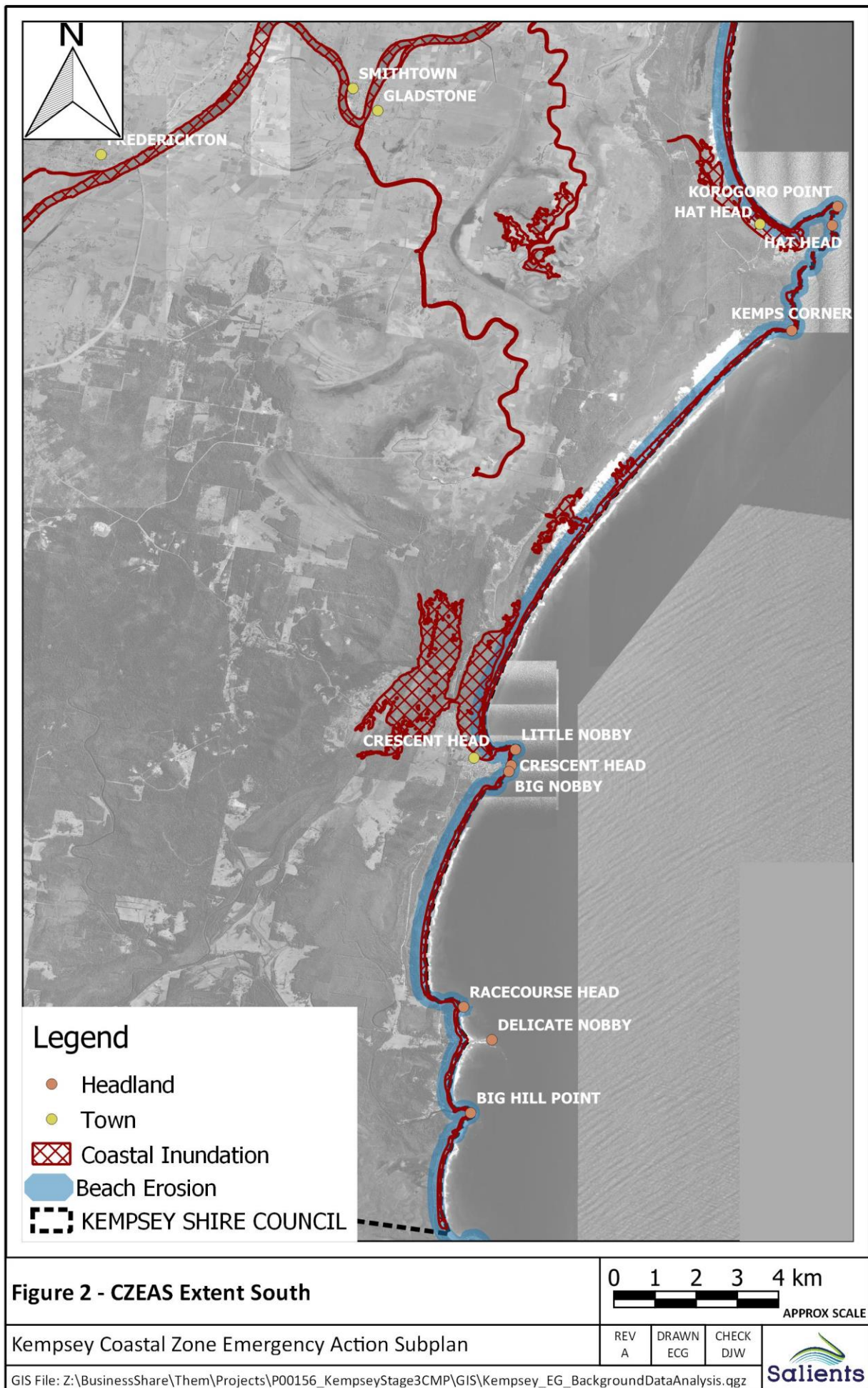
3 Extent of the CZEAS

This CZEAS applies to land mapped as being impacted by beach erosion, coastal inundation or cliff instability within the Kempsey Shire. KSC currently¹ does not have cliff instability mapped and therefore the CZEAS is limited to areas impacted by beach erosion and coastal inundation only.

The Kempsey Coastline stretches 80km from Point Plomer in the south, to Scotts Head in the north. The coastline is anchored by significant rock outcrops (from north to south) at Grassy Head, South West Rocks, Smokey Cape, Hat Head, Crescent Head, Racecourse Head and Big Hill) with beach barriers spanning between these headlands. The coastline features four key estuaries being the Macleay River, Saltwater Creek, Korogoro Creek and Killick Creek. The area to which the CZEAS applies, comprising the combined Beach Erosion and Coastal Inundation Areas are shown in Figure 1 and Figure 2.

¹ As of February, 2023





4 Definition of a coastal emergency

For this CZEAS, a coastal emergency is defined as ‘beach erosion, coastal inundation and (if mapped in future, cliff instability) occurring through storm activity or extreme or irregular events that:

- Endanger, or threaten to endanger, the safety or health of persons or animals.
- Destroy or damage, or threaten to destroy or damage property.
- Cause a failure of, or a significant disruption to, an essential service or infrastructure.

This definition of ‘emergency’ is consistent with that within the Section 4 of the SERM Act 1989.

Council does not have a quantitative trigger for a coastal emergency. Instead Council’s judgment for initiating the CZEAS will be based on:

- Monitoring of key risk locations (scheduled and/or in response to information received from emergency services, state agencies or the public).
- Discussion between agencies represented on the Local Emergency Management Committee (LEMC).
- Severity of coastal erosion warnings (either Advice (Yellow), Watch and Act (Orange) or Emergency (Red), received from NSW State Emergency Service (NSW SES) or the Australian Bureau of Meteorology (BoM).

5 Overview of hazards and risks at key locations

5.1 Beach Erosion

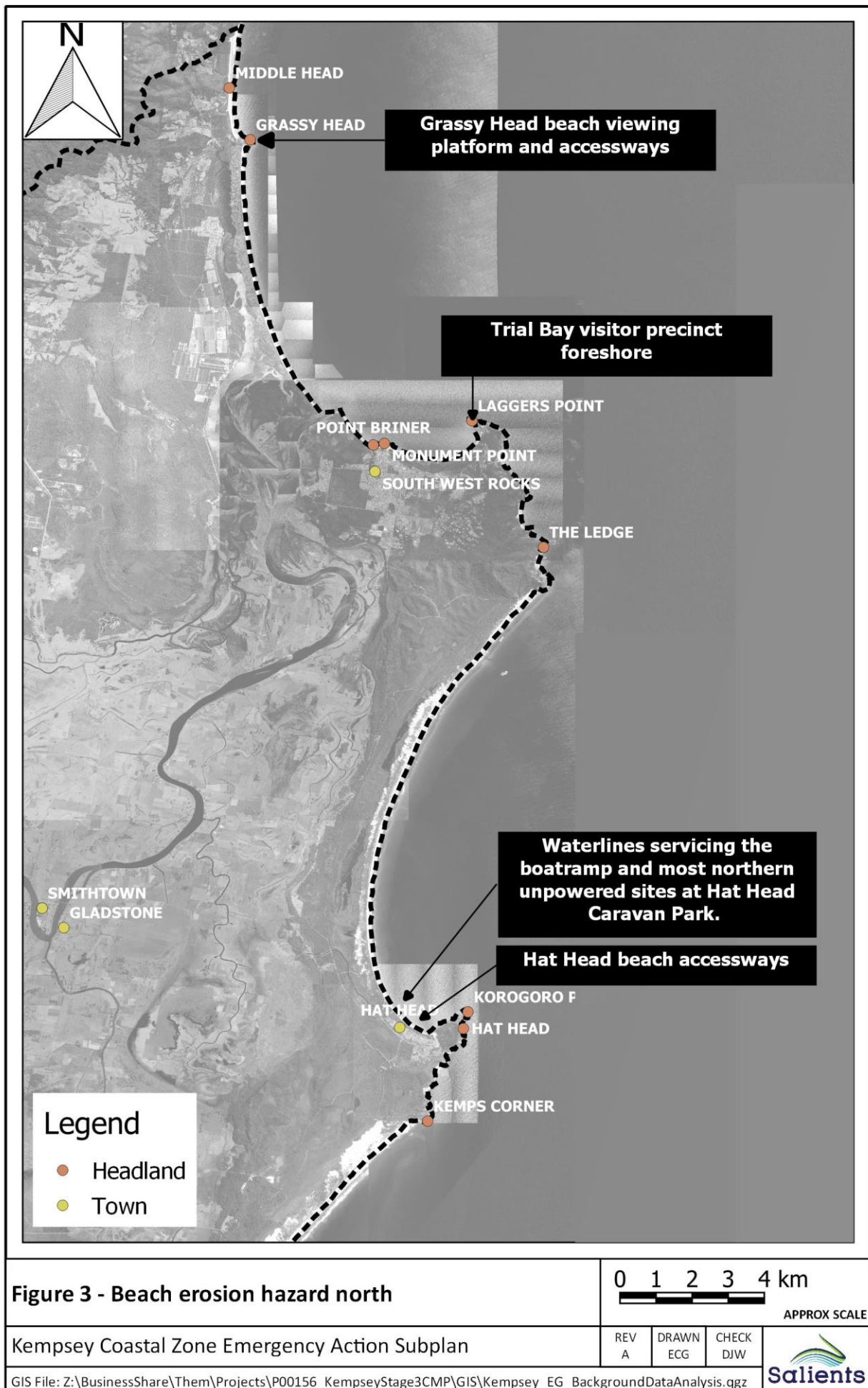
Beach erosion occurs when wind, waves, currents or elevated ocean water levels remove the sediment that comprises the beach, berm, and frontal dune system, landward of the fully accreted condition. Beach erosion may result in:

- High, unstable, near-vertical back-beach erosion escarpments.
- Damage to public and private property.
- Damage to coastal assets such as accessways, viewing platforms and surf clubs.
- Damage to poorly designed or maintained coastal protection works.

Areas identified as being at present-day risk from beach erosion during a storm are:

- 1 The existing beach access and viewing platform at Grassy Head.
- 2 The foreshore adjoining Runaway Creek in the Trial Bay visitor precinct (Arakoon National Park).
- 3 The beach pedestrian access within Hat Head Holiday Park and the water lines servicing the boat ramp and most northern unpowered sites of the caravan park.
- 4 The Killick Creek seawall / training wall at Crescent Head. The erosion threat at Crescent Head is presently mapped as being minimal on account of the seawall / training wall at the entrance to Killick Creek being robust. However, an engineer's inspection of this seawall in early 2022 indicated that there is some existing damage and potential issues with the design and layering of the revetment/seawall.

See Figure 3 and Figure 4



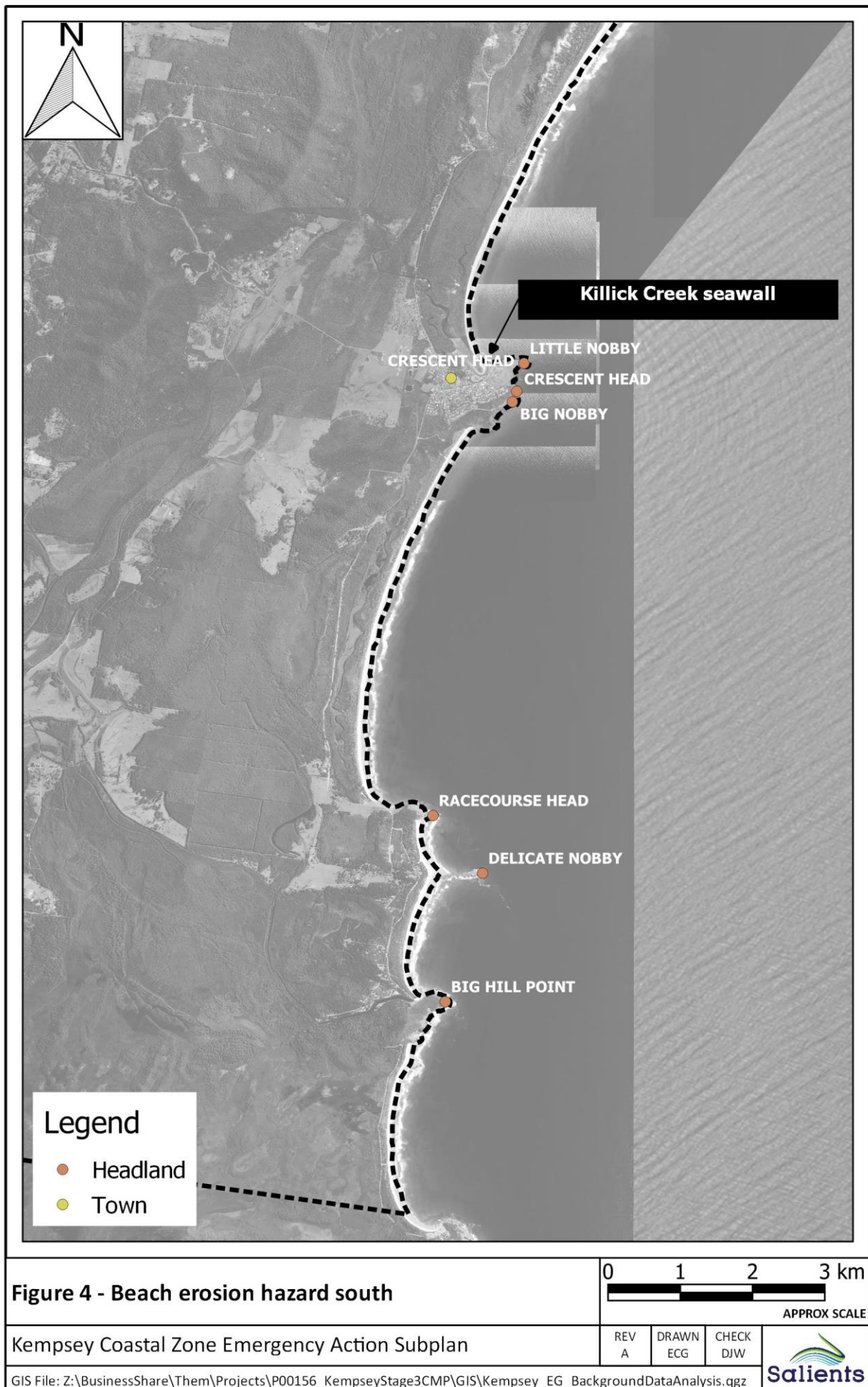




Figure 5 Beach access and viewing Platform: Grassy Head



Figure 6 Foreshore Near Runaway Creek: Trial Bay visitor precinct



Figure 7 Beach Pedestrian Access, Hat Head Holiday Park



Figure 8 Killick Creek Seawall, Crescent Head

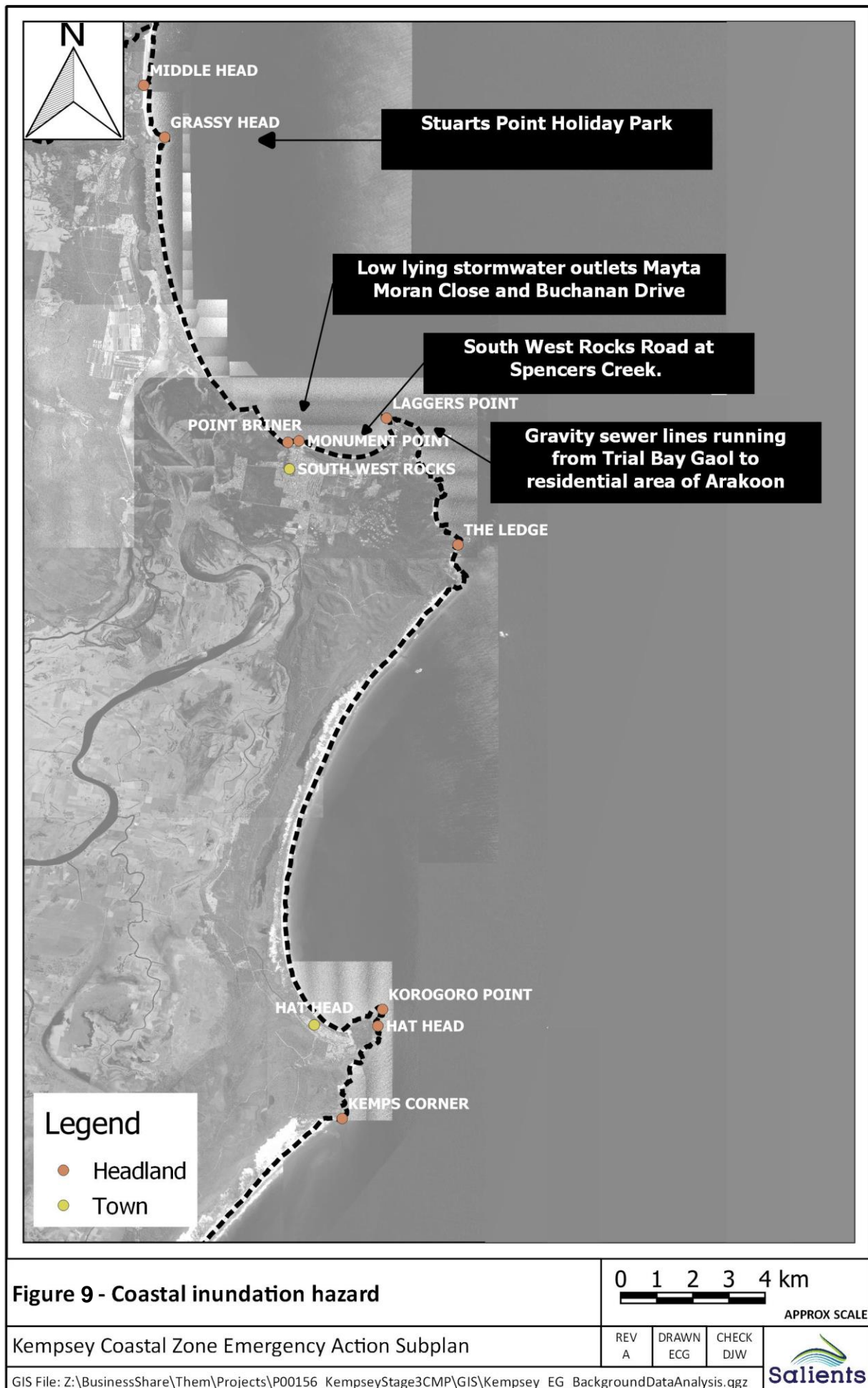
5.2 Coastal Inundation

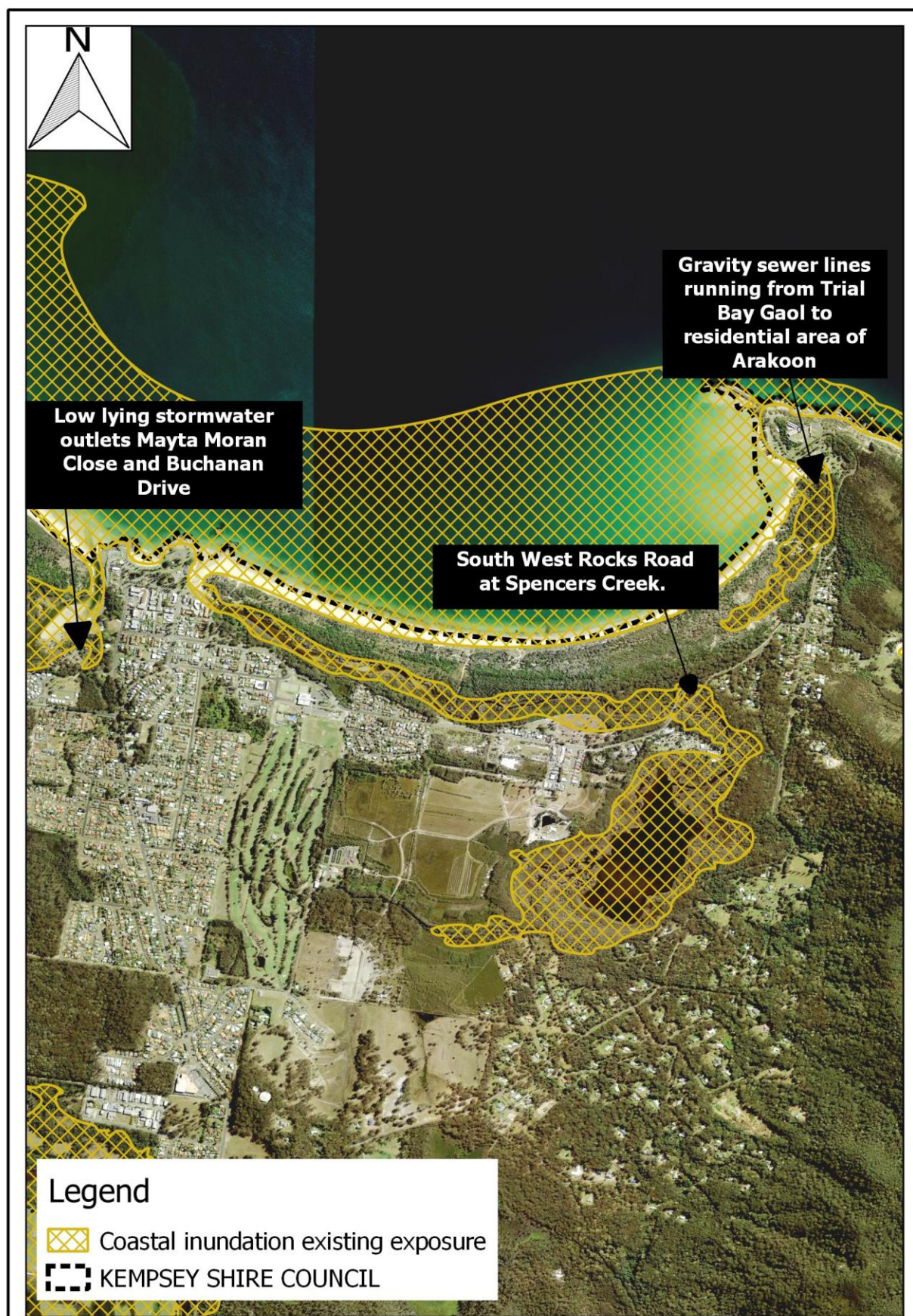
Coastal inundation occurs when a combination of marine and atmospheric processes raises water levels at the coast above normal elevations, causing land that is usually 'dry' to be inundated by seawater. This may result in inundation of roads and low-lying land adjacent to estuaries.

Areas identified as being at present-day risk from coastal inundation during a storm are:

1. Stuarts Point Holiday Park.
2. South West Rocks Road to the south of the outskirts of South West Rocks, where the road crosses Spencers Creek. South West Rocks Road is the only road access to both South West Rocks and Arakoon.
3. Low lying stormwater outlets which drain the area around Mayta Moran Close and Buchanan Drive, South West Rocks.
4. Gravity sewer lines managed by Council and running from Trial Bay Gaol to the residential area of Arakoon.

See Figure 9 for a mapped view of these assets. No assets to the south of Arakoon are subject to coastal inundation risk at this time. They may still be subject to inundation from catchment flooding, which is not addressed by this CZEAS.





Kempsey Coastal Zone Emergency Action Subplan

REV
A

DRAWN
ECG

CHECK
DJW

GIS File: Z:\BusinessShare\Them\Projects\P00156_KempseyStage3CMP\GIS\Kempsey_EG_BackgroundDataAnalysis.qgz



5.3 Cliff Instability

Cliff instability refers to a variety of geotechnical processes on coastal cliffs and bluffs, including rock fall, slumps and landslides. These events may occur without warning. For example, in December 2020 a major slip occurred near the eastern wall of Trial Bay Gaol, which led to temporary closure of the access road to the seafront day use area. A cliff instability hazard assessment has not been completed for the Kempsey coastline at this time. However, where known to occur, Section 6 of this plan may apply.

6 Roles and Responsibilities

6.1 Coastal emergency caused by storm activity

The NSW SES is the combat agency and therefore designated lead agency in a storm emergency response. Roles and responsibilities for managing a coastal emergency caused by storm, are detailed within the:

- NSW Emergency Management Plan (EMPLAN) (State Emergency Management Committee, 2018a)
- NSW State Storm Emergency Sub Plan (State Emergency Management Committee, 2018b)
- NSW State Flood Emergency Sub Plan (State Emergency Services, 2018)
- North Coast Regional EMPLAN (North Coast Regional Emergency Management Committee, 2018)
- Kempsey Shire Local EMPLAN (Kempsey Local Emergency Management Committee, 2017a)
- Kempsey Shire Flood Emergency Sub Plan (Kempsey Local Emergency Management Committee, 2017b)

While the NSW SES is the designated lead agency in a storm response, they are not responsible for planning or executing emergency beach protective works or other mitigative works. One function of the NSW EMPLAN and Storm Sub-Plan is to delegate some emergency management responsibilities relating to coastal management to the CZEAS within the CMP.

Council's responsibilities under the Storm Sub-Plan include:

- Assisting the NSW SES with reconnaissance of areas susceptible to coastal erosion and/or inundation.
- Installing temporary fencing and/or signs in areas affected by erosion where erosion has resulted in unsafe conditions (e.g., damaged beach access unsafe dune escarpments).
- Removing fencing/signs after the storm following restoration of safe access conditions.
- Coordinating coastal protection works on beaches in accordance with the SEPP (Resilience and Hazards) 2021 and any CZEAS prepared as part of a Coastal Management Program.

- After a storm, removing and/or mitigating the impact of temporary physical protective measures on the beach.
- Assisting the NSW SES with the relocation of readily moveable household and business contents in areas where coastal storms (likely to result in coastal erosion and/or inundation) are forecast or occurring.

6.2 Coastal erosion not caused by storm activity

Where coastal erosion is not caused by storm activity, then emergency management will be controlled and coordinated by the Local Emergency Operations Controller (LEOCON). The LEOCON is a Police Officer appointed by the District Emergency Operations Controller for the Local Government Area.

An example of coastal emergency not caused by storm activity is a large swell and high tide event overtopping a coastal protection structure such as a breakwall. In this instance the LEOCON, in consultation with relevant agencies, may elect to activate the Response Phase of the CZEAS based on monitoring of the coastal zone impacted by coastal hazards. A CZEAS can be implemented without enactment of a Local, Regional or State EMPLAN.

Should the coastal emergency go beyond the capabilities of local emergency services, then the LEOCON may request implementation of the local or regional EMPLANs to assist. This should only occur following agreement of the appropriate combat agency or Regional Emergency Operations Controller (REOCON). The REOCON is the Region Commander of Police appointed by the Commissioner of Police, as the Regional Emergency Operations Controller for the emergency management region.

A Council may also choose to activate their CZEAS independently based on the triggers previously described in Section 4.

7 Coastal Emergency Actions

The four recognised phases of emergency management are prevention, preparation, response and recovery. Prevention aims to decrease or eliminate the impact of the coastal hazard. Preparation is about having plans in place to 'ready' the community and agencies should a coastal emergency eventuate. Response refers to the implementation of actions to protect life and property. Finally, recovery is the steps taken post emergency to repair any residual damage. Recovery should always involve a debrief and review of the CZEAS to ensure implementation of the plan was both achievable and effective. Table 1 outlines the responsibilities of involved agencies throughout each phase of a coastal emergency.

Table 1 Responsible agencies and actions

Phase	Agency	Responsibility
Prevention	KSC	<ul style="list-style-type: none"> Implement the CMP and asset management plans to maintain and if required improve protection measures (e.g., maintenance of breakwalls). Updating coastal hazard studies as necessary. Provide NSW SES with copies of coastal hazard studies and management plans to assist with emergency planning and intelligence development. Monitor the potential progress of erosion, inundation and cliff instability, including exacerbation by ongoing sea level rise. Monitor the effects of coastal hazards on assets and development potentially at threat. Undertake community education initiatives and assist the NSW SES with community awareness programs to ensure people in locations potentially threatened by coastal hazards understand the threat and its management. Implement land-use planning tools to prevent new development in locations subject to coastal hazards.
	DPE	<ul style="list-style-type: none"> Oversee the delivery of the NSW Coastal management framework including the CM Act, RH SEPP, CMPs (includes CZEASs) and provide funding support for projects identified within CMPs. Provide technical assistance and any research findings / data to Council and other agencies to assist in identifying and managing coastal hazards.
	NSW SES	<ul style="list-style-type: none"> Undertake community awareness programs to ensure people in locations potentially threatened by coastal hazards understand the threat and its management.

Phase	Agency	Responsibility
	LEMC	<ul style="list-style-type: none"> Review and approve the CZEAS ensuring consistency with the Local EMPLAN.
Preparation	KSC	<ul style="list-style-type: none"> Develop and review the CZEAS. Develop, review and maintain the CMP in accordance with the CM Act and RH SEPP. Consult with the NSW SES in development of the CZEAS to ensure compatibility with local emergency plans and state sub plans. Provide information to the community regarding the expected event and areas likely to be impacted. Internally, Council staff with relevant responsibilities should be placed on standby when relevant weather warnings are issued and commence monitoring the impacts. Local Surf Life Saving Clubs (SLSC) should be contacted with a view to distribute advice contained in the BoM's weather warnings to people on Surf Life Saving patrolled beaches when dangerous surf conditions are predicted and to close patrolled beach areas when dangerous conditions caused by storms occur. Close accessways that could be impacted by coastal hazards, in locations identified as being at "present-day" risk when dangerous conditions are expected to occur. Identify emergency works that may be required, materials to implement and storage arrangements for items such as sand, sandbags, signs and fencing. Identify means of transporting emergency works materials to areas that could be threatened. Detail any procedures or approvals to make access ways available such as landowners consent or obtaining keys for locked gates.
	NSW SES	<ul style="list-style-type: none"> Provide information to the community regarding an expected coastal storm event and areas likely to be impacted.
	BoM	<ul style="list-style-type: none"> Provide severe weather warnings for flood, hazardous surf, abnormally high tides and severe thunderstorm.

Phase	Agency	Responsibility
Response	KSC	<ul style="list-style-type: none"> • Distribute advice contained in weather warnings to people on beaches when dangerous surf conditions are predicted, via social media, media outlets and Council lifeguards. • Increase surveillance of beach erosion and inundation hazards. • Close beaches, foreshores and headlands (and accessways) affected by beach erosion, coastal inundation or cliff instability hazards and notify the NSW SES and Surf Life Saving NSW. Use temporary fencing and signs where practical and safe to do so. • Close council managed roads affected by beach erosion, coastal inundation or cliff instability hazards. Use temporary fencing and signs where practical and safe to do so. • Where possible, isolate/close water, electrical and/or sewer infrastructure affected by beach erosion, coastal inundation or cliff instability hazards (or liaise with asset owners to enable shut down). • Where damage to access ways or walkways is identified and/ or reported to Council, take appropriate action to close off those pathways and/or advise the local community of the hazard(s). Use temporary fencing and signs where practical and safe to do so. • Where damage to assets is identified, assess the damage and any opportunities for limiting further damage, during the event, where practical and safe to do so. • Where repairs are permissible and may be readily and safely undertaken, do so at the first opportunity. • Install emergency coastal protection works to address beach erosion, coastal inundation or cliff instability, in compliance with the CM Act and RH SEPP. These works include the placement of sand or geotextile sand containers (which must be removed within 90 days) on a beach or sand dune adjacent to a beach. Council is the lead agency for this work, the NSW SES may assist with coordination. Works must only be implemented when it is safe to do so. See section 5 for sites that are or may be affected by coastal hazards. • The installation of emergency works including sand bags, fencing or signs and the closure/isolation of any beaches, roads, water or sewer infrastructure or access ways must be recorded to ensure appropriate post-emergency management.

Phase	Agency	Responsibility
	LEOCON	<ul style="list-style-type: none"> • Monitor emergency operations. • Control and coordinate the emergency management of coastal erosion that is not caused by storm activity, as per action 1.4.3 of the NSW State Storm Plan. Request a combat agency to assume control if the emergency is beyond the capacity of local resources. This should only be done following consultation with the REOCON. • Communicate with other agencies and issue information to the community throughout the event. • Provide appropriate liaison with and coordination of media. • If requested by the combat agency, coordinate resources and support. • At the appropriate time, determine that the emergency has passed and that the 'Recover' stage of the plan should commence.
	NSW SES	<ul style="list-style-type: none"> • Is the main combat agency as per the Kempsey EMPLAN for storms and flooding. • Coordinate the evacuation of people at risk. • Provide an information service to the community regarding the impact of the coastal emergency and actions for people impacted or expected to be impacted. • Not responsible for coastal protection works (such as geotextile sand containers).
	Marine Rescue NSW	<ul style="list-style-type: none"> • Assist the NSW SES with emergency warnings and conducting evacuations.
	NSW Police	<ul style="list-style-type: none"> • Where requested by the NSW SES, assist with evacuations and property protection, such as sandbagging and monitoring. • Conduct road and traffic control if required in conjunction with Council.
	DPE	<ul style="list-style-type: none"> • Provide storm damage response teams to assist the NSW SES and National Parks and Wildlife Service.
	Surf Life Saving NSW	<ul style="list-style-type: none"> • Close affected beaches and communicate closures and emergency warnings to the community.

Phase	Agency	Responsibility
Recovery	KSC	<ul style="list-style-type: none"> • Undertake an inspection of all beach accessways, beaches, foreshores and dunes to establish any damage to the access or dangers to the public in accessing and using the beach and dune areas. • Remove any threats to public safety, such as debris deposited or exposed on beaches. • Advise the community of any ongoing dangers. • Where an accessway is considered unsafe, action will be taken to close the access (top and/or bottom) and to place appropriate signs warning the access is unsafe for use. • Prioritise the work required to repair and reopen any damaged or unsafe beach accessways in accordance with the Council maintenance works schedule. • Where an erosion escarpment has been created at the back of the beach (height greater than 1.5 m), document the extent of the escarpment and at the earliest opportunity undertake a risk assessment of the likely hazard to beach users (both to persons on the beach and to persons on the dune above the scarp) from collapse of the erosion scarp (for example, onto children digging into the scarp base). Where the risk is deemed unacceptable, at the earliest opportunity undertake appropriate mitigation works which may include: <ul style="list-style-type: none"> ○ Re-grading the escarpment to a stable slope. ○ Fencing and signposting escarpments, to discourage public access (top and/or bottom) until such time as the beach recovers naturally. ○ Keeping the beach closed until such time as the risk has reduced to an acceptable level. • Monitor the condition, performance and impact of any coastal protection works. • Remove any sandbags within 90 days. • Geotechnical, structural and/or coastal engineering investigations may be required to understand residual risk following an emergency event. These should be overseen by a chartered engineer of Engineers Australia, who specialises in coastal engineering. • Replenish any emergency materials and supplies for future emergency events. • Critically review the CZEAS, communications plan and operational procedures to ensure they achieved their performance objectives. Update/Revise as necessary.
	LEMC	<ul style="list-style-type: none"> • Participate in the critical review of the CZEAS, communications plan and operational procedures following the event.

8 Consultation

This plan was prepared in consultation with Council, DPE, the LEMC and the NSW SES. In particular, Council and DPE assisted with the initial drafting, which was reviewed by the NSW SES and the LEMC prior to finalising.

The LEMC provided feedback indicating that it was happy with the draft CZEAS and confirmed that triggers were not presently used by Council and the LEMC when identifying required actions. The approach outlined in Section 4 for defining a coastal emergency is fit for purpose, given the moderate (at least for the present day) risk exposure along Kempsey's coastline. This will need to be examined carefully as this CZEAS is modified in future.

NSW SES requested only minor changes relating to nomenclature within the draft CZEAS and these have been made. Of important note is that the current NSW State Emergency Storm Plan is under review and due to be update imminently (in June 2023). The final CZEAS which accompanies the Coastal Management Program for Kempsey Shire should be checked for consistency against the updated Storm Plan before the CZEAS is adopted.

9 Plan Review

This CZEAS shall be reviewed within 5 years of adoption, however earlier review may be required if new coastal hazard studies are completed, or new scientific information becomes available. The CZEAS should also be reviewed should a change to a Local, Regional or State EMPLAN or sub-plan affect the plan requirements, particularly if this change results in an inconsistency between plans. Finally, following any coastal emergency requiring enactment of the CZEAS, a critical review should be undertaken to assess the ability of the plan to meet the performance objectives.

10 References

Kempsey Local Emergency Management Committee, 2017a. Kempsey Shire Local Emergency Management Plan.

Kempsey Local Emergency Management Committee, 2017b. Kempsey Shire Flood Emergency Sub Plan.

North Coast Regional Emergency Management Committee, 2018. North Coast Regional Emergency Management Plan.

State Emergency Management Committee, 2018a. New South Wales State Emergency Management Plan (NSW EMPLAN).

State Emergency Management Committee, 2018b. New South Wales Storm Plan.

State Emergency Services, 2018. New South Wales State Flood Plan.

APPENDIX B DEFERRED ACTIONS

While considered “feasible”, “acceptable”, and good value for money, the following actions were omitted from the CMP delivery program due to the lack of a viable funding source. During a meeting held on 22nd March 2024 with Council and the NRCG, efforts were made to determine responsibilities and potential funding sources for these actions, however no feasible funding could be identified. These actions, while not formally included in the CMP Business Plan, are documented here for future consideration as they were identified by the risk assessment process as important for addressing priority issues.

D1: Improving the Natural Condition and Ecological Function of Goolawah Lagoon

Capital Costs	Nil
Annual Costs	\$50,000
Implementation Timeframe	3-6 years
Lead Agency	NPWS
Potential Funding Sources	NPWS annual budget allocations

Description

Goolawah Lagoon is a significant coastal freshwater lagoon located between the Goolawah Beach dune system and Point Plomer Road, forming an important landscape feature within Goolawah National Park. Historically, prior to European settlement, the lagoon was a brackish barrier lake with an intermittently open and closed entrance (an ICOLL). Past sand mining activities are believed to have led to a reduction in the frequency of the lagoon's natural opening to the ocean, negatively impacting its ecological health. Prolonged closure of the lagoon, combined with elevated water levels, poses a risk to adjacent properties. Runoff from Point Plomer Road is contributing to deteriorating water quality, and both water quality and invasive weed issues are further exacerbated by the lagoon's almost permanent closure.

The Goolawah National Park, Goolawah Regional Park and Limeburners Creek National Park plan of management (2024) highlights the need to enhance the natural condition and ecological function of Goolawah Lagoon.

Tasks

- Investigate options for improving the natural condition and ecological function of Goolawah Lagoon including entrance management.

D2: Coastal Focussed Riparian Rehabilitation Partnership Program

Capital Costs	Nil
Annual Costs	\$200,000

Description

The rivers, creeks and waterways of the Macleay Valley are important social, economic, and environmental assets and play a significant part in local history and culture. Riparian vegetation is important for maintaining good water quality, establishing riverbanks, and providing habitat for animals including macroinvertebrates and fish. There are several impacts KSC wishes to address with this action, including erosion and sedimentation, loss of riverbank vegetation, weeds, and livestock access.

This action supports bank restoration within the coastal zone and will implement riparian rehabilitation works identified by the bank management assessment undertaken for action A8.1.

The location and extent of works will depend on the findings of the studies completed for A8.1. Works will likely focus on sections of the Macleay River, Belmore River, and Kinchela Creek. The scale of this rehabilitation is assumed to mainly focus on bank management, weeding and revegetation. More significant bank erosion is the subject of a separate management action (Action A8.2). Works under both actions, however, may be coordinated at some sites. Assuming a rate of \$20/m to complete the rehabilitation works, and a nominal riverbank length of 10km per year, the annual cost is estimated at \$200,000. However, the length targeted will depend on the extent of works identified from action A8.1 and the rate will vary depending on the width of riverbank to be rehabilitated.

Tasks

- Annual rehabilitation projects in identified priority subcatchments.

Constraints

- Planning Constraints: Nil provided there are no earthworks or construction activities beyond the high-water mark.
- Legal Constraints: Nil provided there are no earthworks or construction activities beyond the deed high-water mark.
- Organisational Constraints: Nil.

D3: Migration Pathways Assessment

Capital Costs	\$55,000
Annual Costs	Nil

Description

This action will identify the potential migration pathways for coastal wetlands under future sea level increases. Changes to the tidal regime due to sea level rise are expected to place pressure on wetland habitats to migrate landwards, particularly for species at the edge of the tidal limit. This migration can take place where land is available, assuming sufficient time for the habitat to shift and the absence of other constraining factors (e.g., trampling by livestock). Land may not be available to support this migration if hard defences, structures, or managed environments such as farming, rural or urban areas are present.

This action will utilise the tidal inundation mapping and updated CWLR mapping undertaken through delivery of this CMP. Spatial analysis will be used to identify the location of mapped migration pathways and potential barriers such as roads, assets or other infrastructure, or prohibitive land use zoning. An options assessment will be undertaken to allow migration of key sites, which may consider:

- Land swaps / acquisition.
- Removal of hydraulic structures such as weirs or seawalls.
- Support for “environmentally friendly” shoreline protection structures that incorporate habitat / vegetation.
- Reserving parts of foreshore parks and reserves specifically for landward migration of intertidal and riparian vegetation.

A multi-criteria assessment will then be used to select the preferred approach and prioritise works.

Tasks

- Migration pathways assessment, with prioritisation, recommendations, and costing.
- Consultation with other landholders and government agencies to assess the feasibility of recommendations.

Constraints

- Planning Constraints: Not likely to arise during assessment, but may be several planning matters to consider if the report recommends land acquisitions, removal of hydraulic structures etc.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

D4.1: Antimony and Arsenic Contamination Review

Capital Costs	\$30,000
Annual Costs	Nil

Description

This action builds on previous work to review available literature and re-establish a monitoring program. The Macleay River Catchment has a long mining history dating back 140 years. Previous mining activities involved in-stream disposal of waste and tailings as well as poorly stored on-site contaminants. To review existing data and develop the new monitoring program, coordination is needed between different stakeholders and government agencies, including NSW Food Authority, the Department of Regional NSW (via its Legacy Mines Program, LMP), and researchers at the University of New England.

Tasks

- Undertake a literature review of available research and monitoring to summarise the current understanding, including analysis against relevant thresholds and trigger levels.
- Develop a coordinated strategy between agencies to assess arsenic and antimony contamination in the estuary, floodplain, and marine environment.
- Development a monitoring program with costs, which will outline the timeframe for data collection, trigger levels, locations and extent, the latter considering the estuary, floodplain, and marine environment.
- Review funding sources, including academic opportunities such as ARC Linkage projects.

Constraints

- Planning Constraints: Nil.
- Legal Constraints: There may be a need for compulsory reporting to the EPA and public notification should the values exceed public health requirements.
- Organisational Constraints: Nil.

D4.2: Antimony and Arsenic Contamination Study

Capital Costs	\$300,000
Annual Costs	Nil

Description

The antimony and arsenic contamination review will develop a monitoring program throughout the estuary, floodplain, and marine environment. This action will implement the program, with any results elevated above trigger levels to be assessed and mitigation options proposed. The results will be shared with the NRCG, who will develop a communication strategy for the region.

Tasks

- Antimony and arsenic contamination monitoring and review.
- Assessment of levels, review of any trigger exceedances, and development of communication strategy.

D5.1: Macleay Coastal Floodplain Wetland Management (Collombatti-Clybucca)

Background

This task proposes ongoing KSC support and involvement with aspects of the NSW Marine Estate Management Strategy (MEMS) associated with the Macleay Estuary floodplain. The MEMS is a statewide strategy to protect and manage waterways, coastlines, and estuaries over a ten-year period (2018–2028). Initiative 1 of the MEMS is focused on improving water quality. Poor water quality specifically originating from diffuse agricultural runoff has been identified as one of the highest priority threats to the environmental assets within NSW estuaries (BMT WBM, 2017). Diffuse agricultural runoff was also identified as a significant threat to the social, cultural, and economic benefits derived from the marine estate.

Two major sources of poor water quality impacting the NSW marine estate are acid sulfate soils (ASS) and low oxygen 'blackwater' runoff from coastal floodplains. These impacts are particularly

pronounced within floodplains which have been drained for agriculture, such as the Lower Macleay floodplain, which was significantly altered by the Macleay River Flood Mitigation Scheme, following a major flood in 1950.

MEMA initiated the Coastal Floodplain Prioritisation Study to identify priority locations across major NSW coastal floodplains, including the Macleay, where the greatest improvements in water quality could be achieved through strategic management actions that reduce the impacts of ASS and blackwater runoff. The Macleay River Floodplain Prioritisation Study (Water Research Laboratory, 2023) was developed to provide an evidence-based assessment of 11 floodplain subcatchment drainage areas in the Kempsey LGA. The top three highest priority subcatchments in the Macleay River floodplain were identified as:

- 1 Collombatti-Clybucca
- 2 Kinchela Creek
- 3 Belmore Swamp

It is estimated that these three floodplain subcatchments account for over 50% of the overall blackwater generation risk from the Macleay's floodplain, and that the Collombatti-Clybucca subcatchment is solely responsible for approximately 70% of the corresponding acid generation risk in the Macleay. Addressing water quality issues from these three subcatchments will result in significant improvements in the overall health of the estuary.

Short and long-term management options were developed as a guide to help plan for rehabilitation, including further detailed investigation, design, and landholder consultation. The estimated costs to implement all actions recommended by WRL (2023) over the three subcatchments are of the order of \$30m and will have ongoing impacts to farmland due to lost productivity. A significant proportion of the estimated cost is for the acquisition of privately owned land. The purchase of land on this scale is not viable for KSC given current funding constraints. However, there is potential that these may arise in future.

These three sites are priority sites under the NSW Government's Blue Carbon Strategy⁹. Therefore, it seems likely that the viability of these sites to earn carbon credits will eventually be assessed.

⁹ <https://www.environment.nsw.gov.au/topics/water/coasts/blue-carbon-strategy>

Description

This action relates to management of the Collombatti-Clybucca subcatchment. Management of the remaining two priority subcatchments, Kinchela Creek and Belmont Swamp, is addressed in actions D5.2 and D5.3, respectively.

Multiple studies relating to management of the Collombatti-Clybucca wetland area have been completed. Management options from the following studies have been considered:

- Macleay River Floodplain Prioritisation Study (Water Research Laboratory, 2023)
- Pacific Highway Upgrade Biodiversity Offset Program: Hydrological assessment – Clybucca offset properties (Water Research Laboratory, 2021a)
- Clybucca Wetlands Management Options Study (Water Research Laboratory, 2020)
- Collombatti-Clybucca Floodplain Remediation Feasibility Study (Water Research Laboratory, 2017)

The Macleay River Floodplain Prioritisation Study (Water Research Laboratory, 2023) divides the Collombatti-Clybucca subcatchment into five management areas, CC1 through CC5. WRL (2023) suggested that water quality management efforts focus on areas CC1, CC2 and CC4. Of those three areas, CC1 is considered the highest priority, followed by CC2 and then CC4.

Area CC1 comprises land purchased by Transport for NSW (TfNSW) as part of the Oxley Highway to Kempsey Pacific Highway Upgrade Project, which was completed in 2013. TfNSW is required to protect wetland habitat in this area to meet offset obligations for that project. Strategies recommended in the Macleay River Floodplain Prioritisation Study (Water Research Laboratory, 2023) and the preceding Clybucca Wetlands Management Options Study (Water Research Laboratory, 2020) focus on modifications to the drainage network located within area CC1. Ownership of this land is being transferred to another public land manager with that transfer expected to occur in 2024/2025. The multi-agency *Clybucca Inter-Agency Working Group* has been investigating and managing the ongoing rehabilitation of Clybucca Wetlands and will oversee the continuing rehabilitation of these areas.

A whole government approach to the management of the floodplain is the preferred approach for areas subject to Actions D5.1, D5.2 and D5.3.

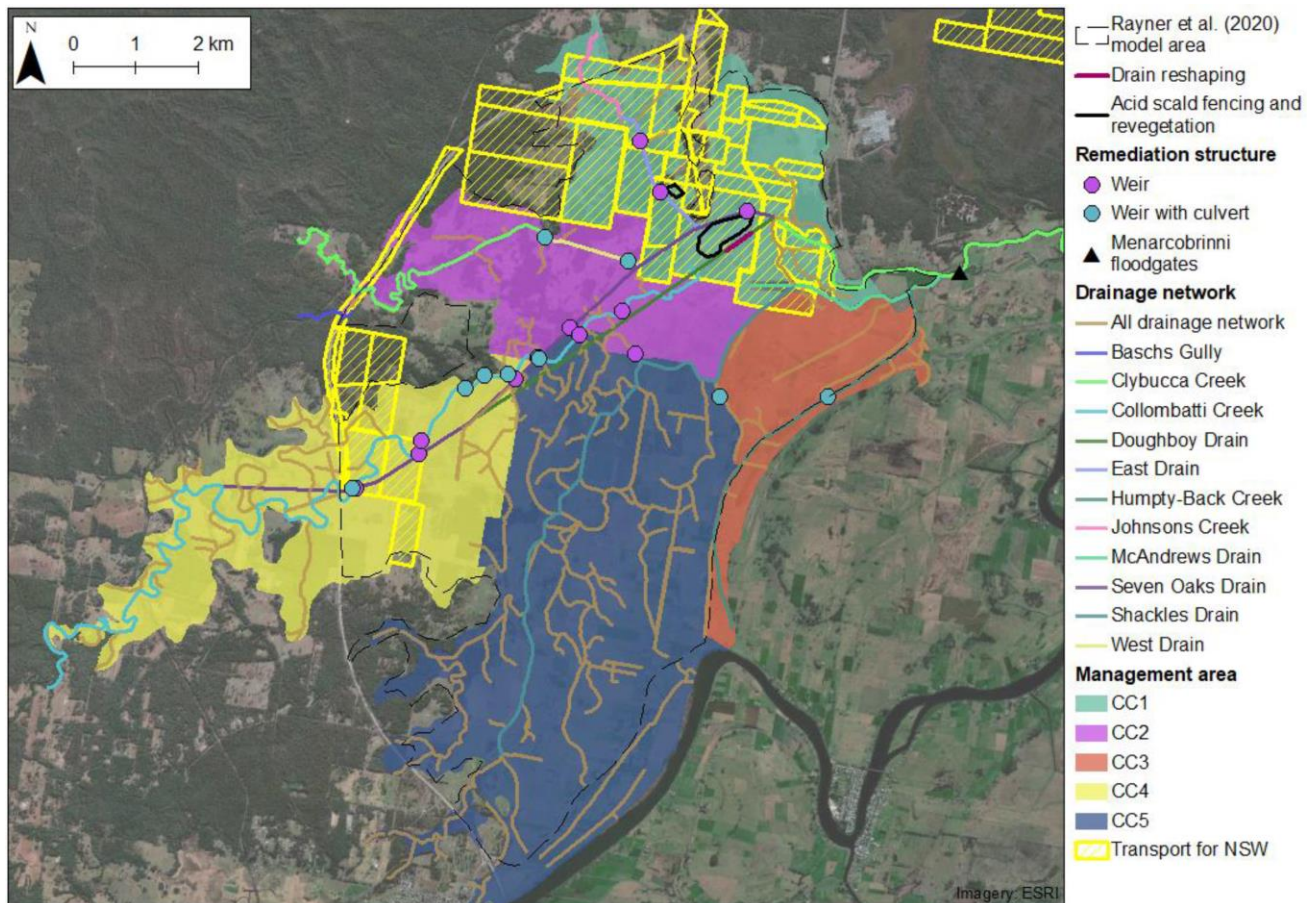


Figure 9 Collombatti-Clybucca Management Areas from the Macleay River Floodplain Prioritisation Study (Water Research Laboratory, 2023)

WRL (2023) also recommend management options for areas CC3 and CC5, although these areas are not considered as high priority as Area CC2 and CC4. WRL (2023) noted that present land use in areas CC3 and CC5 will remain sustainable in the short-term. Furthermore, some of the strategies for these areas would require acquisition of privately owned land.

Accordingly, the recommended actions focus on the requirements of areas CC2 and CC4, and other elements of this floodplain wetland where KSC has jurisdiction. For those areas, WRL (2023) recommend short and long term works, with suggested short-term works including wet pasture management and fencing for stock exclusion from wetland areas. Long-term management recommendations require acquisition of land and modification of flood gates to enable tidal flushing.

Management options for the Collombatti-Clybucca floodplain are also outlined in the Clybucca Wetlands Management Options Study (Water Research Laboratory, 2020). The management options were developed with input from the Clybucca Inter-Agency Working Group. The working

group is currently chaired by LLS and includes representatives of DPIRD Fisheries, DCCEEW, NPWS, and Crown Lands.

Option 4b from that study is the preferred option of the Clybucca Inter-Agency Working Group. The option involves modifying the Menarcobrinni floodgates to allow controlled tidal flushing upstream of the floodgates. WRL (2020) estimated the cost of design and on-ground works would be \$175,000. However, this cost does not account for additional requirements such as environmental assessments, technical investigations, consultation, or land acquisition.

A more detailed assessment of the preferred management options from the previous studies, which involve modification of flood gates for tidal flushing, is required. The preferred management options require acquisition of private land, and this should be undertaken opportunistically if funding becomes available.

Tasks

- Continue to maintain weirs on upstream sections of Seven Oaks Drain and Collombatti Creek.
- Ongoing maintenance of the Menarcobrinni floodgates.
- Detailed investigation of management options recommended by WRL (2023) for the Collombatti-Clybucca catchment, and option 4b from WRL (2020) (estimated \$70,000). Investigation to include options to refine, design, fund and facilitate implementation of actions.
- Investigate the feasibility of establishing blue carbon offsets sites (estimated \$30,000).
- Opportunistic land acquisition for wetland rehabilitation.
- Clybucca Inter-Agency Working Group to continue wetland rehabilitation efforts within areas CC1 and CC2, with support from DPIRD Fisheries, NPWS, LLS and EHG.
- Consultation with floodplain landowners regarding land management practises such as wet pasture management and construction of paddock water retention structures, land use changes (via acquisition), participation in biodiversity offset schemes. (estimated \$10,000).
- Opportunistic wetland improvement works, for example, fencing for stock exclusion from wetland and remediation areas, pest and weed management.
- Consultation with MEMA.

Constraints

- Planning Constraints: There are no planning constraints associated with the maintenance of existing assets, consultation, and communication with landholders and/or wetland rehabilitation works which are otherwise permissible under planning law, providing that appropriate investigation takes place. Subsequent actions, such as modifying the operation of the Menarcobrinni floodgates will likely require an Environmental Impact Statement to be prepared.
- Legal Constraints: Providing that land owner permission is gained for wetland improvement works, the works are permissible.
- Organisational Constraints: The absence of KSC representation from the Clybucca Inter-Agency Working Group is of concern and should be rectified.

D5.2: Macleay Coastal Floodplain Wetland Management (Belmore Swamp)

Description

This action is related to Action D5.1, which aims to address the three highest priority subcatchments identified in the Macleay River Floodplain Prioritisation Study (Water Research Laboratory, 2023). It targets the Belmore subcatchment and the recommended management options from that study for improving water quality issues related to ASS and blackwater.

WRL (2023) outlined a range of potential management options that require further investigation. They noted that extensive works have been completed within the subcatchment to mitigate ASS and blackwater, and that these works should be continued.

All land within the Belmore subcatchment is privately owned, and long-term management strategies recommended by WRL (2023) would require acquisition of privately owned land. WRL (2023) estimated that the cost of purchasing land required for remediation would be around \$13M, with the works costing an additional \$1.8M, excluding the necessary investigations needed before works can commence. Land acquisition for rehabilitation could occur opportunistically when/if funding is available.

Tasks

- Opportunistic land acquisition for wetland rehabilitation.
- Continue works opportunistically to remediate ASS and reduce risk of blackwater and promote the growth of water tolerant vegetation. Example works include infilling drains, excluding stock

from wetland areas, encouraging wet pasture, and installation of water retention structures such as weirs or drop boards. (WRL (2023) estimated total cost of \$1.1M for entire subcatchment).

- Investigate the present, individualistic management of floodgate structures on the Belmore River to determine if a revised, coordinated strategy could reduce the frequency and/or severity of blackwater events (estimated \$20,000).
- Consultation with floodplain landowners regarding land management practices such as wet pasture management and construction of paddock water retention structures, land use changes (via acquisition), participation in biodiversity offset schemes (estimated \$10,000).
- Further investigation of the conceptual long-term strategy devised by WRL (2023) to restore the natural hydrology of the Belmore catchment (estimated \$80,000).
- Investigate the feasibility of establishing blue carbon offset sites (estimated \$30,000).
- Consultation with MEMA.

D5.3: Macleay Coastal Floodplain Wetland Management (Kinchela Creek)

Description

This action is related to Action D5.1, which aims to address the three highest priority subcatchments identified in the Macleay River Floodplain Prioritisation Study (Water Research Laboratory, 2023). It targets the Kinchela Creek subcatchment and the recommended management options from that study, as well as recommendations from the related East Kinchela (Swan Pool) Remediation Study (Water Research Laboratory, 2021b), for improving water quality issues related to ASS and blackwater.

WRL (2023) ranked the Kinchela Creek subcatchment as the highest priority Macleay subcatchment for blackwater. The study recommends catchment-wide management options for Kinchela Creek. In comparison, the East Kinchela (Swan Pool) Remediation Study (Water Research Laboratory, 2021b) focused on the management of Swan Pool. Both studies noted that catchment-wide management actions would provide the most significant benefits, rather than management on a 'paddock scale'.

WRL (2021b) identified that the most effective management strategy for improving the quality of water discharged from Swan Pool would be to rehabilitate the natural floodplain hydrology and create wetland habitat. It was highlighted that, although applying broad scale strategies would

have the greatest impact on water quality, present agricultural land use poses a challenge to their implementation. WRL recommended a five-stage process for the remediation of Swan Pool, detailed in Section 5 of that report, and including the following:

- 1 Administration and planning (including identification of funding and responsibilities)
- 2 Data collection, assessment of preferred strategy and detailed design
- 3 Land use change.
- 4 Implementation
- 5 Monitoring and adaptive management

Similarly to Belmore River, the long-term management strategies recommended by WRL (2023) for the entire subcatchment would require acquisition of privately owned land, with an estimated acquisition cost of \$15.5M. Land acquisition for rehabilitation should occur opportunistically when/if funding is available.

Tasks

- Opportunistic land acquisition for wetland rehabilitation.
- Continued management of floodgates in accordance with their corresponding management plan.
- Consultation with floodplain landowners regarding land management practises such as wet pasture management and construction of paddock water retention structures, land use changes (via acquisition), participation in biodiversity offset schemes (estimated \$10,000).
- Progress the first stage from the five stage process detailed in WRL (2021b) for remediation of Swan Pool (identify funding, identify ownership, etc.) (estimated \$20,000).
- Detailed investigations of catchment-wide management options recommended by WRL (2023), for example, installing weirs or drop board structures and infilling drains (estimated \$60,000 for studies).
- Investigate the feasibility of establishing a blue carbon offset site (estimated \$30,000).
- Consultation with MEMA.

D6: Coastal Vulnerability Adaptation Plan for Figtree Lane, Mayta Moran Close and Buchanan Drive

Capital Costs	\$220,000
Annual Costs	Nil

Description

Detailed hazard adaptation planning is required for low-lying areas adjacent to Back Creek, around Figtree Lane, Mayta Moran Cl, and Buchanan Drive. The risk of coastal inundation and erosion are expected to increase due to sea level rise, with long-term adaptation planning required. The Coastal Vulnerability Mapping completed during Stage 2 of CMP development indicates coastal inundation risks increasing by 2050, with most of the area (all but three houses) at risk by 2100.

The new study will review the available hazard information, undertaking a more refined analysis of potential tidal and coastal inundation, waterway instability, combined coastal/fluvial interactions and stormwater drainage, to be confirmed through site inspections. An updated risk assessment will consider the impacts to land, buildings, linear infrastructure (i.e., drainage, water etc), and both underground and above ground services. An options appraisal should consider a combination of land rezoning, landform adaptation through filling and raising of assets and roads, property development controls, and formalised coastal protection, which may also require upgrades to the drainage network. A multi criteria assessment and cost-benefit assessment will be undertaken to support the decision for the preferred option. Concept designs will be developed for the preferred option, and documentation to support detailed design and approvals. This will include expected construction costs, a sequence of works and timeframe for the overall scheme.

Tasks

- Figtree Lane, Mayta Moran Cl, and Buchanan Drive Coastal Vulnerability Adaptation Plan and Concept Design (approx. \$100,000).
- Stakeholder and community engagement (approx. \$20,000).
- Ground Investigation (approx. \$40,000).
- Detailed Design and Approvals (approx. \$60,000).

Constraints

- Planning Constraints: Nil during assessment phase.
- Legal Constraints: Nil during assessment phase.
- Organisational Constraints: Nil during assessment phase.

D7: Detailed Designs for Mattys Flat

Capital Costs	\$300,000
Annual Costs	Nil

Description

This task follows completion of action A19: Masterplan for Mattys Flat and Macleay Entrance. This action includes new detailed designs for selected infrastructure from the new masterplan developed for action A19.

Tasks

- Detailed designs for Mattys Flat, including upgrade of existing boat ramp, sewage pump-out and overflow parking (\$300,000).

Constraints

- Planning Constraints: Works at Mattys Flat are likely to be conducted using the “Part 5” pathway of the EP&A Act. The public authority undertaking the works will need to complete a Review of Environmental Factors. The upgrade would likely require both TfNSW and Crown Lands (where the land manager, i.e., below deed high water mark) approvals. A DPIRD Fisheries permit may also be required under the Fisheries Management Act.
- Legal Constraints: Nil, although works should be consistent with Australian Industry standards and state guidance for boating infrastructure.
- Organisational Constraints: Nil

D8.1: Back Creek Sediment and Hydrodynamic Investigation

Capital Costs	\$100,000
Annual Costs	Nil
Implementation Timeframe	1-2 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">KSCTfNSW

Description

The coastal processes between the Macleay River to Laggery Point have been the subject of numerous coastal process studies and reviews between 2020 to 2022, including:

- Trial Bay Visitor Precincts Coast and Foreshore Protection Strategy (NSW National Parks and Wildlife Service, 2022), which contains assessment of coastal processes and management actions for the NPWS site at Trial Bay including erosion.

- Feasibility Investigation for Boating Access Improvements at South West Rocks (Royal Haskoning DHV, 2021), which contains a history and assessment of coastal processes in and around Trial Bay and South West Rocks and assesses management actions relating to improving boating access around this area.
- Saltwater Creek Entrance Management Plan (Water Technology and Molino Stewart, 2022c).
- Back Creek, South West Rocks – Review of Entrance Management Considerations (Water Technology and Molino Stewart, 2022d).

Whilst suitable for the particular purposes that these studies were commissioned, none of these completed a specific and detailed investigation of the sediment processes and dredging influences on Back Creek. The proposed sediment investigation will review and amalgamate other regional project descriptions and undertake new coastal process modelling. It will develop a conceptual framework of the creek and coastline, quantify the sediment budget with current sources and sinks, investigate the impact of current dredging on coastal processes, and the changes if dredging were to be halted. The study will consider entrance shoaling, potential bathymetric response, impacts on tides, storm surges, and fluvial flood events. The results of the investigation will be used to re-examine the role of Back Creek as a recreational area, environmental and habitat area, and an overflow for the Macleay River.

Tasks

- Investigate sediment processes and dredging influences on Back Creek (approx. \$100,000).

Constraints

- Planning Constraints: Nil.
- Legal Constraints: Nil.
- Organisational Constraints: Nil.

D8.2: Back Creek Options Study

Capital Costs	\$30,000
Annual Costs	Nil
Implementation Timeframe	2-3 years
Lead Agency	KSC
Potential Funding Sources	<ul style="list-style-type: none">• KSC• TfNSW

Description

Management options for Back Creek have been previously investigated by two studies: the Feasibility Investigation for Boating Access Improvements at South West Rocks (Royal Haskoning DHV, 2021), and Back Creek, South West Rocks – Review of Entrance Management Considerations (Water Technology and Molino Stewart, 2022d). This action will revisit the previous studies, considering the more advanced understanding gained from the sediment and hydrodynamic investigation completed as action D8.1. This updated assessment will consider factors not included in the previous studies such as the impacts of sea level rise on the inundation of settled areas and coastal wetlands, and the impacts to coastal wetlands should Back Creek transition into an ICOLL. The objective of this study is to provide clear and actionable guidance for managing Back Creek. Action D8.2 may well take place as a second stage to the study undertaken under Action D8.1.

Tasks

- Investigate and evaluate management options considering the findings of D8.1.

D9: Implement Coastal Management Actions from the NPWS Trial Bay Visitor Precincts Coast and Foreshore Protection Strategy

Capital Costs	\$150,000 (subject to funding availability and reserve management priorities)
Annual Costs	Nil
Implementation Timeframe	5-10 years
Lead Agency	NPWS
Support Agencies	Crown Land
Potential Funding Sources	NPWS annual budget allocations

Description

The Trial Bay Visitor Precincts Coast and Foreshore Protection Strategy was prepared in 2022. Development of the strategy involved key stakeholders reviewing the issues and developing and evaluating coastal management actions for the Arakoon National Park section of Trial Bay/Trial Bay Beach.

Key considerations were the future use and precinct planning for the Foreshore. The strategy found that Laggery Point breakwater acted as a control on the position of the Trial Bay Beach but had been damaged and reduced in length.

The Laggery Point Breakwater structure is located on Crown land. The responsibilities for the management of the Laggery Point Breakwater remain undetermined. The strategy recommends consultation occur with various stakeholders including Crown Lands to determine roles and responsibilities of all parties.

Subject to the outcomes of this consultation, the strategy recommended modelling to assess the relationship between the breakwater and the alignment of the shoreline. It also recommended condition monitoring and repair and maintenance of the breakwater.

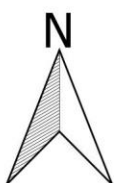
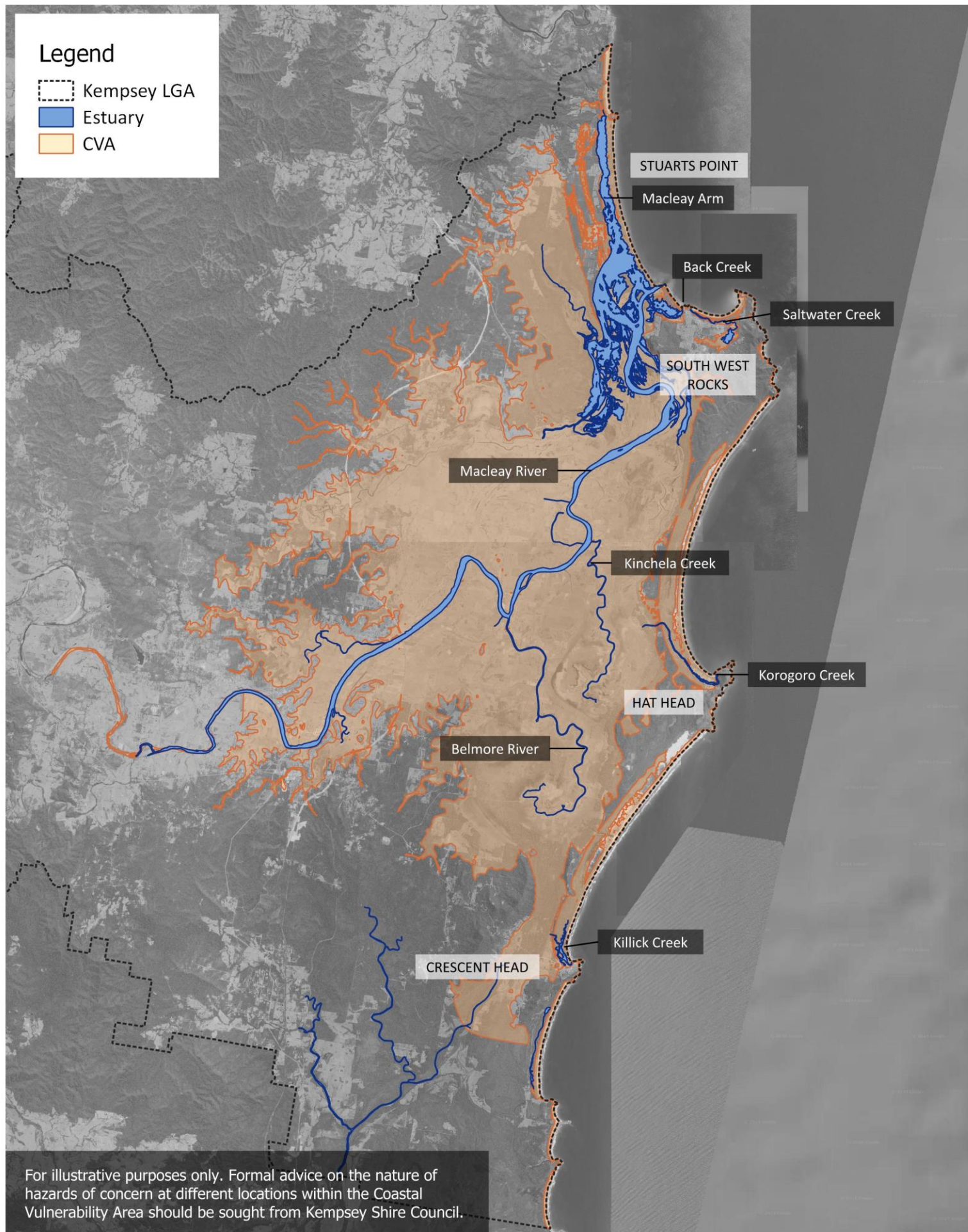
Tasks

- Work with Crown lands as landowner and other relevant stakeholders to :
 - Clarify and formalise management responsibilities for the Laggery Point Breakwater.
 - Assess the condition and stability of the Laggery Point Breakwater.
 - Identify feasible actions for breakwater maintenance to support the stabilisation of the Trial Bay foreshore.
- In conjunction with CMP action A14, Revised Coastal Hazard Assessment, undertake modelling to assess the impact the breakwater length and condition has on the Trial Bay Beach foreshore.
- Undertake dune management, revegetation and beach scraping to support foreshore management.

APPENDIX C COASTAL VULNERABILITY AREA

Legend

-  Kempsey LGA
-  Estuary
-  CVA



Coastal Vulnerability Area

Kempsey Coastal Management Program

Z:\BusinessShare\Them\Projects\P00205_KempseyCMPStage4\GIS\CoastalZone.qgz

0 2 4 6 8 km



REV A
DRAWN EN
CHECK DJW

