



**Central Coast  
Waterways**



# Stage 3 Summary Report

## Central Coast Lagoons Coastal Management Program

Central Coast Council

14 April 2026



## Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
V01	First Draft	CJB	CJB	16.03.2026
V02	Final Report	CJB	CJB	14.04.2026

## Project Details

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<b>Document Number</b>	25050067_R01_V02_Stage3Report_FinalReport



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## ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.



*Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.*

*The symbolism in the artwork includes:*

- *Seven circles representing each of the States and Territories in Australia where we do our work*
- *Blue dots between each circle representing the waterways that connect us*
- *The animals that rely on healthy waterways for their home*
- *Black and white dots representing all the different communities that we visit in our work*
- *Hands that are for the people we help on our journey*



## CONTENTS

<b>1</b>	<b>INTRODUCTION</b>	<b>5</b>
1.1	CMP Background	5
1.2	CMP Delivery and Progression	7
1.3	Approach to Stage 3	7
1.4	The Structure of this Report	9
1.5	Guiding Documents	9
<b>2</b>	<b>THE COMMUNITY CO-DESIGN PROCESS</b>	<b>10</b>
2.1	Rationale for the Community Co-design Process	10
2.2	Assembly of the CFG	11
2.3	Overview of the Co-design Process	12
2.4	CFG Workshop Summary	13
<b>3</b>	<b>COMMUNITY AND STAKEHOLDER ENGAGEMENT</b>	<b>18</b>
3.1	Overview of Community and Stakeholder Engagement	18
3.2	Community Engagement	19
3.3	Stakeholder Engagement	21
<b>4</b>	<b>STEP 1: STRATEGIC DIRECTION</b>	<b>24</b>
4.1	Vision, Purpose, and Objectives	24
4.2	Approach to Managing Catchment-Based Stressors	26
4.3	Management Themes	29
<b>5</b>	<b>STEP 2: OPTION IDENTIFICATION</b>	<b>30</b>
5.1	Strategic Approach	30
5.2	Identification of Options	31
<b>6</b>	<b>STEP 3: OPTION ASSESSMENT</b>	<b>34</b>
6.1	Overview	34
6.2	Options Long List	35
6.3	Feasibility Assessment	51
6.4	Acceptability Assessment	54
6.5	Viability Assessment	55
6.6	Options Ranking Score	58
6.7	Options Assessment Outcomes	59
6.8	Option Consolidation and Stage 4 Progression	61
<b>7</b>	<b>STEP 4: BUSINESS PLAN</b>	<b>78</b>
7.1	The Benefits of Implementing the CMP	78
7.2	Costs of CMP Implementation	78
7.3	Potential Funding Mechanisms	79
7.4	Cost-Benefit Distribution	82
7.5	Progression through to the Stage 4 CMP Business Plan	82



8	THE WAY FORWARD	83
9	REFERENCES	84

## APPENDICES

Appendix A	CFG Terms of Reference and Workshop Summary
Appendix B	Acceptability Assessment Outcomes
Appendix C	Viability Assessment Outcomes
Appendix D	Feasibility Assessment Outcomes

## LIST OF FIGURES

Figure 1-1	Locality Plan	6
Figure 1-2	The CMP process	7
Figure 1-3	The approach to Stage 3 of the CMP	8
Figure 3-1	The IAP2 spectrum of engagement (source: IAP2)	18
Figure 4-1	The Vision, Purpose, and Objectives of the CMP	24
Figure 5-1	The five strategic approaches to coastal management (adapted from the NSW Coastal Management Manual)	30
Figure 6-1	The Stage 3 options assessment process (adapted from the NSW Coastal Management Manual)	34
Figure 6-2	Calculation of feasibility score	53
Figure 6-3	Matrix of risk and complexity for selecting the level of economic assessment (source: OEH, 2018d)	56
Figure 6-4	Calculation of the options ranking score	58
Figure 6-5	Actions for Stage 4 Progression	63

## LIST OF TABLES

Table 2-1	CFG Technical Advisors	12
Table 2-2	CFG Workshop Program	13
Table 3-1	Community Drop-In Sessions	21
Table 3-2	State Agency Engagement	22
Table 4-1	Strategic objectives of the CMP	25
Table 6-1	Snapshot of Long List Information	35
Table 6-2	Long List of CMP Options	36
Table 6-3	Scale factor criteria	52
Table 6-4	Calculation of acceptability score	54
Table 6-5	Viability score weighting for options	58
Table 6-6	Options Assessment Outcomes	59
Table 6-7	Actions for Stage 4 Progression	64
Table 7-1	Summary of potential funding sources of the CMP	80



## 1 INTRODUCTION

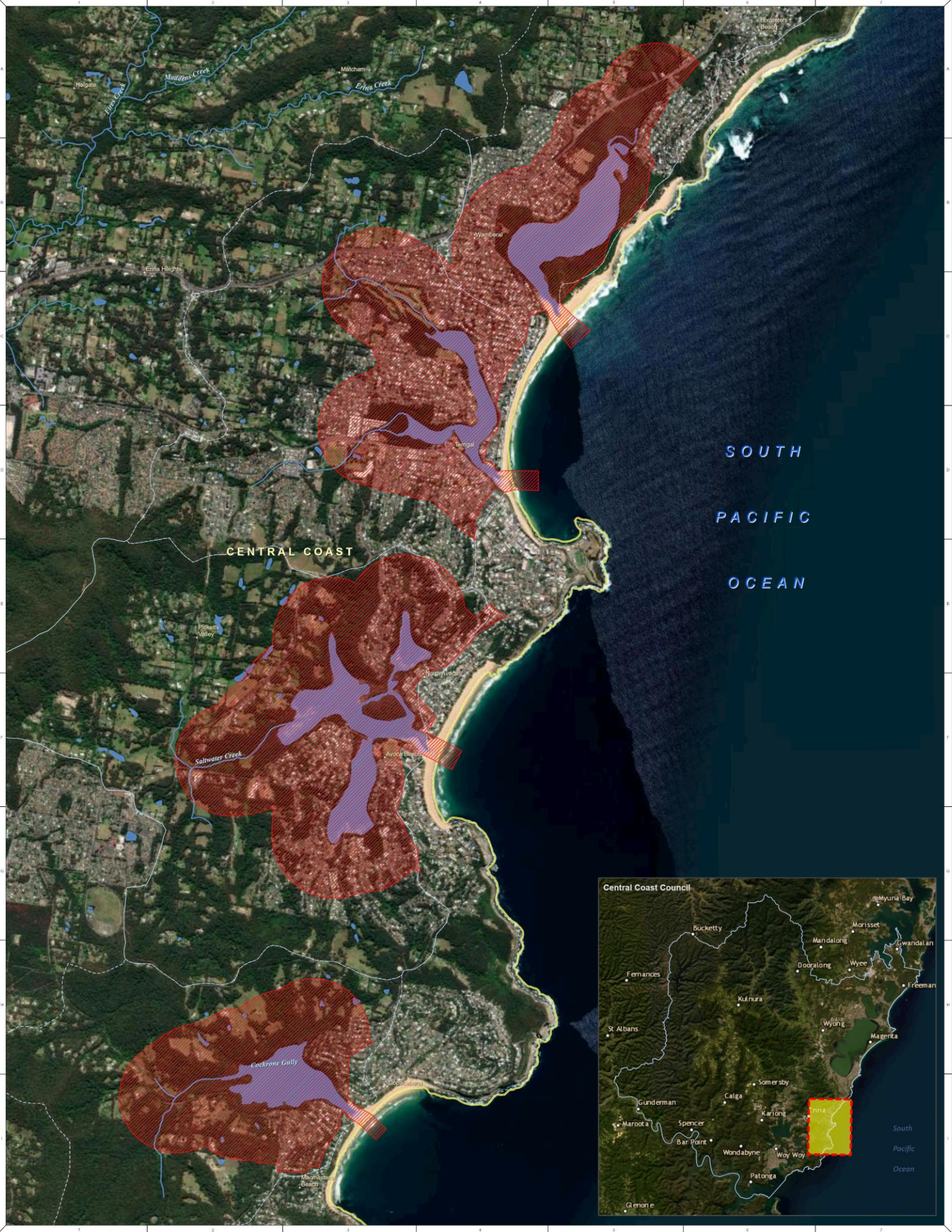
### 1.1 CMP Background

Cockrone Lagoon, Avoca Lagoon, Terrigal Lagoon and Wamberal Lagoon are important coastal lagoons within the Central Coast Local Government Area (LGA) – see Figure 1-1. Collectively referred to in this report as the Central Coast Lagoons, these waterways support a range of environmental, social, cultural and economic values. They provide important estuarine habitat, support a wide range of recreational activities, contribute to the character and amenity of surrounding communities, and form an integral part of the region's coastal landscape.

Like many coastal lagoon systems in New South Wales (NSW), these systems - hereby referred to as the Central Coast Lagoons (CLL) - are also subject to a range of pressures. These include catchment-derived water quality impacts, entrance dynamics, recreational and foreshore use pressures, and the longer-term effects of coastal hazards and climate change.

To guide this long-term management, Central Coast Council (Council) is preparing a Coastal Management Program (CMP) for the CCL. The CMP is being developed in accordance with the NSW Coastal Management Framework, the *Coastal Management Act 2016 (CM Act)*, and the State Environmental Planning Policy (Resilience and Hazards) 2021 (RH SEPP). The CMP will establish a coordinated framework for the future management of the lagoon systems and their contributing catchments. It identifies key coastal management issues, assesses the associated risks, and outlines a program of management actions to address these issues in a strategic and integrated manner.

The development of this CMP is supported by funding and technical assistance from the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW).



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Contains NSW Spatial Data © State of NSW

- Waterways / Waterbodies
- LGA Boundary
- Sub-Catchment
- Study Area

0 0.2 0.4 0.8 1.2 Kilometers

1:30,000 at A3



**Fig1.1: Locality Map**  
Central Coastal Lagoon CMP

REFERENCE: [http://www.environment.nsw.gov.au/centralcoastlagoon/centralcoastlagoon.htm](#)  
DATE: 08/10/2010 SHEET: DRAWING NUMBER:



## 1.2 CMP Delivery and Progression

The CMP is being prepared through the five-stage process prescribed in the NSW Coastal Management Manual and depicted in Figure 1-2.

Stage 1 of the CMP was adopted by Council in 2021 (Royal Haskoning, 2021). It included a review of relevant background information, a first pass risk assessment, a data gap analysis, and a forward program for the CMP.

Stage 2 delivered four technical studies to improve understanding of the threats and risks to the environmental, social, and economic values of the system, and to support informed decision-making in Stage 3. These were:

- Central Coast Recreational Use Study (Middle & Middle, 2022)
- Avoca Lagoon Processes Study 2022 (DCCEEW, 2024)
- Green and Golden Bell Frog Population Study (Callen, Maher, Tunstill, & Hayward, 2023)
- Bareena Wetland Hydrological Study (Salients, 2022)

Subsequently, the purpose of Stage 3 is to identify and assess coastal management options that can address coastal management issues such as threats, risks, and hazards, take advantage of opportunities, and give effect to the objectives of the CM Act.

This report has been prepared to fulfill the requirements of Stage 3 of the CMP process. It has been prepared on behalf of Council, and in consultation with relevant State agencies, First Nations Groups, and local communities of the CMP study area.

## 1.3 Approach to Stage 3

### 1.3.1 Requirement of the NSW Coastal Management Manual

The recommended approach to Stage 3 is set out in the NSW Coastal Management Manual (OEH, 2018d) and is summarised in Figure 1-3.

The primary objective of Stage 3 is to develop a long list of potential management options to address the risks and opportunities identified in Stages 1 and 2. These options are then assessed, ranked, and prioritised using a robust and transparent decision-making framework. The outcome is a short list of preferred management actions to progress to Stage 4 for detailed planning and, ultimately, implementation in Stage 5.

The assessment framework used in this study was designed to enable consistent, objective comparison of options, ensuring that those delivering the greatest overall benefit to the coastal zone and its contributing catchment are identified and advanced.

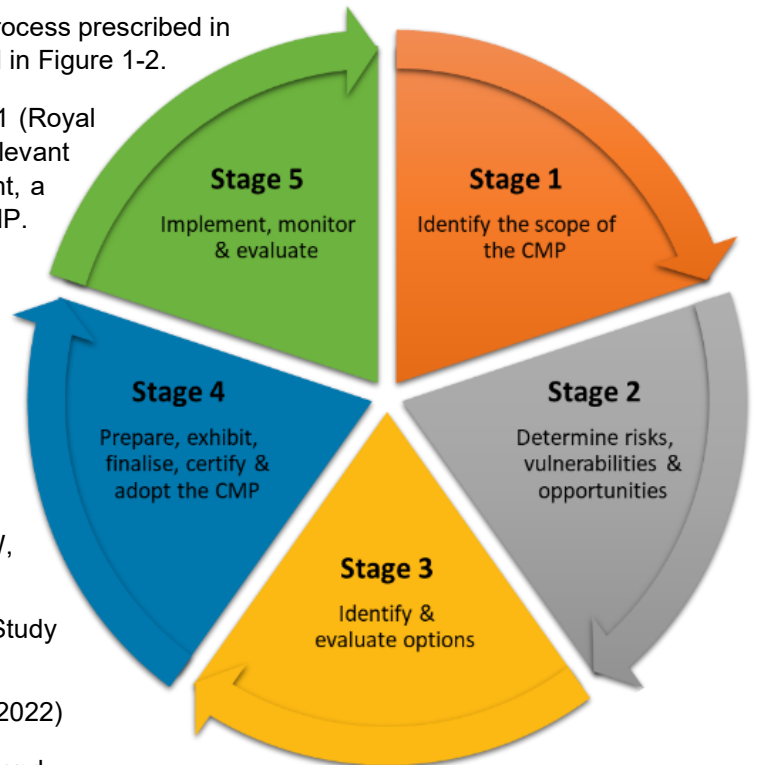


Figure 1-2 The CMP process



Figure 1-3 The approach to Stage 3 of the CMP

### 1.3.2 A Unique Approach: Community Co-design

While the NSW Coastal Management Manual provides a structured framework for identifying and assessing management options, the development of management actions for the CCL CMP has also been strongly informed by a community co-design approach.

A key component of this approach has been the establishment of a Community Focus Group (CFG) to support the development of the CMP. The CFG brought together local community representatives with an interest in the lagoon systems and provided a forum for structured collaboration throughout Stage 3.

The CFG participated in a series of five facilitated workshops, supported by ongoing communication and feedback via email between workshops. Through this process, CFG members contributed to identifying key community values and priorities, generating potential management options, and assisting in the ranking and evaluation of those options. Importantly, the CFG helped assess options through the lens of local knowledge, lived experience and community values. This process complemented the technical analysis undertaken as part of the CMP and helped confirm that the long list of management options reflects both sound coastal management practice and the priorities of the local community.

This co-design process has resulted in a more locally informed and transparent decision-making process, and has strengthened community ownership of the management actions proposed through the CMP.

A full description of this co-design process is provided in Section 2.



## 1.4 The Structure of this Report

The structure of this report reflects the staged delivery of Stage 3 of the Coastal Management Program (CMP) and documents the process undertaken to develop, assess and refine the proposed management actions.

- Section 2 summarises the CFG co-design process undertaken during Stage 3, including the approach used to collaboratively identify and refine potential management options.
- Section 3 outlines the broader community and stakeholder engagement program, including consultation with local communities, First Nations stakeholders and relevant public authorities.
- Section 4 presents the strategic direction of the CMP, including the Vision, Purpose and Objectives that guide the management of the CCL.
- Section 5 introduces the initial long list of potential management options, describing the range of ideas identified through technical analysis, community input and stakeholder engagement.
- Section 6 describes the options assessment process, including the feasibility, acceptability and viability assessments, and presents the resulting shortlist of proposed CMP actions.
- Section 7 presents the preliminary CMP Business Plan, while Section 8 outlines the next steps for progressing the CMP to certification and implementation.
- Appendices provide supporting detail for each component of Stage 3:
  - Appendix A – Community Focus Group: Terms of Reference and Workshop Summaries
  - Appendix B – Outcomes of the Acceptability Assessment
  - Appendix C – Outcomes of the Viability Assessment
  - Appendix D – Outcomes of the Feasibility Assessment

## 1.5 Guiding Documents

This report and its analysis have been undertaken in accordance with, and with a clear understanding of, the key requirements and guidance outlined in the following documents:

- *NSW Coastal Management Manual Part B: Stage 3 - Identify and evaluate options* (OEH, 2018d)
- *NSW Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions* (OEH, 2017).
- *NSW Marine Estate Management Strategy 2018 - 2028* (MEMA, 2018)
- *NSW Coastal Design Guidelines* (DPE, 2023a)
- *Coastal Crown Land Guidelines* (DPE, 2023b)
- *NSW Guide to Cost-Benefit Analysis* (NSW Treasury, 2023)
- *DPE Guidelines for using Cost-Benefit Analysis to Assess Coastal Management Projects* (DPE, 2020)
- *The Engineers Australia National Committee on Coastal and Ocean Engineering - Climate Change Adaptation Guidelines in Coastal Management and Planning* (NCCOE, 2012)
- *Guidelines for responding to the effects of climate change in coastal and ocean engineering* (NCCOE, 2017)
- *ISO 14090:2019 Adaptation to climate change - Principles, requirements and guidelines* (ISO, 2019)

These documents have informed the approach to option identification, assessment, and prioritisation throughout Stage 3 of the CMP.



## 2 THE COMMUNITY CO-DESIGN PROCESS

### 2.1 Rationale for the Community Co-design Process

The development of the CCL CMP adopted a community co-design approach to support the identification and evaluation of management actions during Stage 3 of the CMP process. The underlying driver for this approach was to develop management actions that are technically robust, locally informed, and supported by the community. The key intended benefits of the approach included:



**Informed by Local Knowledge:** Community co-design allowed the CMP to be informed by local knowledge and lived experience. The lagoon systems are used and valued by a wide range of community members, many of whom have long-standing familiarity with how the lagoons function, how they are used, and how conditions have changed over time. Drawing on this knowledge helped complement the technical studies undertaken during Stages 1 and 2 of the CMP process and helped ground-truth potential management actions against local observations and experience



**Reflective of Community Values and Aspirations:** The co-design approach helped confirm that the management actions developed through the CMP reflect community values and aspirations. The lagoons support a diverse range of environmental, recreational, cultural and aesthetic values. Engaging directly with community representatives during the development of management options helped confirm that these values were appropriately recognised and considered when identifying and evaluating potential actions.



**Driven by Community Ownership:** The approach also sought to build community ownership of the CMP as it progresses from planning into implementation. CMPs are intended to guide management over a ten-year timeframe, and successful delivery often relies on sustained community understanding and support. By involving community representatives directly in the development and evaluation of options during Stage 3, the CMP process aimed to foster informed community advocates who can support and champion the implementation of the program through Stages 4 and 5.

To support this approach, Council established a dedicated Community Focus Group (CFG) to participate in the co-design process. While broader community engagement activities were also undertaken during the CMP to provide opportunities for input from the wider community (see Section 3), the CFG provided a structured forum for more detailed discussion, collaborative problem-solving and iterative review of management options.

The focus group format enabled a consistent group of community representatives to engage with the project over an extended period of time. This continuity allowed participants to build familiarity with the lagoon systems, the CMP framework, and the technical evidence base developed through earlier stages of the project. As the process progressed, participants were able to engage with increasingly complex aspects of the CMP, including the identification, refinement and evaluation of potential management actions.

Importantly, the workshop-based program allowed ideas and potential management options to be developed and revisited over multiple sessions. This created opportunities for participants to reflect on information presented during the process, test ideas with other group members, and progressively refine options as their understanding of the issues evolved. This iterative process supported more considered and balanced discussions than would typically be possible through one-off engagement activities.



The CFG also provided a collaborative environment where community members with different interests and perspectives could discuss issues together and work towards shared solutions. This helped move discussions beyond individual concerns and towards identifying actions that addressed the broader environmental, recreational and community values associated with the lagoon systems.

While community engagement is a standard component of Coastal Management Programs, the use of a structured community co-design focus group to help generate, assess and prioritise management options represents a more collaborative and participatory approach than is commonly adopted in CMP development. By enabling deeper engagement with a consistent group of community representatives, this approach helped strengthen the transparency, credibility and community ownership of the management actions developed through the CMP process.

## 2.2 Assembly of the CFG

Membership of the CFG was established through an open expression of interest process facilitated via Council's Your Voice Our Coast online engagement portal.

This process generated strong interest from the community, with 32 applications received from individuals wishing to participate in the co-design process. In recognition of this interest, and the value of incorporating a broad range of community perspectives, all applicants were accepted into the CFG.

The resulting group represented a diverse cross-section of the community, including participants of different ages, genders, backgrounds and interests. Importantly, members were drawn from across the four lagoon catchments – Cockrone Lagoon, Avoca Lagoon, Terrigal Lagoon and Wamberal Lagoon – providing representation from each of the lagoon communities and helping capture a broad range of local perspectives and experiences associated with the systems.

To guide the operation of the group, Council prepared a Terms of Reference (ToR) for the CFG (Appendix A). The ToR established the purpose of the group, membership arrangements, meeting procedures and the roles and responsibilities of participants. In particular, it clarified that the CFG was established as an advisory group, providing community input and feedback to inform the CMP process but not acting as a decision-making body on behalf of Council. The ToR also set expectations regarding respectful participation, review of project materials, and constructive contribution to discussions and workshops. Establishing these arrangements at the outset helped provide clarity for participants and supported a structured, collaborative and transparent engagement process throughout the co-design program.

Importantly, the CFG was also supported by a series of expert technical advisors, each bringing specialist knowledge relevant to the management of coastal lagoon systems. These advisors participated in workshops to help explain key technical concepts, provide subject matter expertise, and support discussions between community members and the project team. The presence of technical advisors helped ensure that discussions were informed by the best available scientific and technical knowledge, while also providing participants with opportunities to ask questions and explore complex issues in greater depth. In addition, the advisors assisted with workshop facilitation and helped translate technical information into accessible formats to support informed participation. Table 2-1 provides an overview of the technical advisors who supported the CFG process.



**Table 2-1 CFG Technical Advisors**

Expert Advisor	Organization	Area of Expertise
Dr Dave Wainwright	Salients Pty Ltd	Coastal Hazards Entrance Management
Professor Troy Gaston	University of Newcastle	Lagoon Ecology
Dr Angus Ferguson	NSW DCCEEW	Lagoon Water Quality
Tracey Howie and Kyle Howie	Wannangini Pty Ltd	First Nations Cultural Heritage

### 2.3 Overview of the Co-design Process

The CFG participated in a structured program of workshops designed to support the development and evaluation of management options during Stage 3 of the CMP process. In total, 5 workshops were held between March 2025 and February 2026.

The co-design process was developed to complement the Stage 3 process prescribed in the NSW Coastal Management Manual (OEH, 2018d), rather than replace it. All mandatory requirements of the Stage 3 methodology were undertaken as part of the CMP, including the development of a long list of management options, the application of a structured evaluation framework, and the identification of a preferred set of management actions. The CFG workshops provided an additional mechanism to inform these steps by incorporating local knowledge, community perspectives and collaborative discussion into the option development and evaluation process.

The workshop program was designed to progressively guide participants through the key steps of the Stage 3 process. Early workshops focused on building a shared understanding of the CMP framework, identifying community values and priorities, and generating potential management options. Subsequent workshops refined and developed these options, before evaluating and prioritising them using a structured assessment framework.






Between workshops, participants were also provided with opportunities to review materials and provide feedback via email. This allowed ideas and options to be further refined between sessions and helped maintain continuity throughout the co-design process.

Table 2-2 provides an overview of the CFG workshop program. Each workshop is described in further detail in the sections that follow.

In addition to the CFG workshop program, a community information session was held on 28 May 2025 between Workshops 3 and 4. The session was designed to provide both CFG members and the wider community with a common foundation of knowledge regarding lagoon processes, values and management challenges. Topics included First Nations cultural management practices, ICOLL ecosystems, entrance management processes and logistics, lagoon water quality, ecological values, and coastal hazards. By improving participants' understanding of the technical, environmental and cultural considerations influencing lagoon management, the session helped support more informed and meaningful participation in the co-design process, while also strengthening broader community awareness of the CMP and its objectives.



Table 2-2 CFG Workshop Program

CFG Workshop	Date	Key Activities
 <b>Workshop #1: Introduction and Vision</b>	19/03/2025	<ul style="list-style-type: none"> <li>Introduction to the CMP and Stage 3 process</li> <li>Establishment of CFG roles and responsibilities</li> <li>Identification of community values, priorities and strategic direction</li> </ul>
 <b>Workshop #2: Option Identification</b>	03/04/2025	<ul style="list-style-type: none"> <li>Review of preliminary options long list</li> <li>Collaborative brainstorming and option generation</li> </ul>
 <b>Workshop #3: Option Detailing</b>	19/06/2025	<ul style="list-style-type: none"> <li>Detailing of option concepts using participatory mapping</li> <li>Exploration of future scenarios and management responses</li> </ul>
 <b>Workshop #4: Option Evaluation</b>	11/11/2025	<ul style="list-style-type: none"> <li>Evaluation and prioritisation of options using traffic-light assessment</li> <li>Group discussion of emerging themes and findings</li> </ul>
 <b>Workshop #5: Closing the Loop</b>	25/02/2026	<ul style="list-style-type: none"> <li>Review of option assessment outcomes</li> <li>Revisit CMP vision and objectives</li> <li>Overview of Stage 4 planning and certification process</li> </ul>

## 2.4 CFG Workshop Summary

### 2.4.1 Workshop 1 – Introduction and Vision

#### Purpose of the Workshop

The first CFG workshop introduced participants to the CMP process and established the foundations for the co-design program. The session aimed to build a shared understanding of the project, confirm the role of the CFG, and begin identifying the key issues, values and priorities that should inform the strategic direction of the CMP.



#### Workshop Activities

The workshop commenced with introductions from Council and the project team, followed by an overview of the CMP framework, project scope and Stage 3 process. An interactive session was then undertaken to familiarise participants with the role and expectations of the CFG.

Participants then took part in facilitated group discussions focused on identifying key issues affecting the lagoon systems and potential management responses. Participants were divided into lagoon-based groups to discuss:

- What participants value about the lagoons and how they use them
- Key issues and risks that should be addressed through the CMP
- Potential management responses and ideas for future actions
- Stakeholders and community groups that should be engaged during the CMP process

Groups recorded their discussions on butcher's paper before reporting back to the broader workshop.



### Key Outcomes

Key outcomes from the workshop included:

- Establishment of the CFG and confirmation of roles and expectations
- A shared understanding of the CMP process and project objectives
- Identification of community values associated with the lagoon systems
- Preliminary identification of key issues and potential management responses
- Initial input into the strategic direction of the CMP

### Contribution to the CMP

The issues, priorities and management ideas identified during Workshop 1 informed the development of the preliminary long list of management options considered during Stage 3 of the CMP.

## 2.4.2 Workshop 2 – Option Identification

### Purpose of the Workshop

The second workshop focused on identifying and refining potential management options for inclusion in the Stage 3 options long list. The session aimed to review preliminary actions developed by the project team and incorporate additional ideas and local knowledge from CFG members.



### Workshop Activities

The workshop commenced with a brief recap of the outcomes of Workshop 1 and an overview of how these inputs had informed the development of the preliminary options list.

Participants then undertook a series of facilitated activities in lagoon-based groups to review and refine the proposed actions.

Activities included:

- Reviewing the preliminary options long list
- Identifying actions that participants broadly supported
- Flagging actions that required further discussion or refinement
- Providing local knowledge and site-specific insights to improve proposed actions
- Identifying additional actions or issues not yet captured in the options list

Participants used coloured stickers and facilitated discussions to highlight actions requiring further review and to identify opportunities to improve the coverage of the long list.

### Key Outcomes

Key outcomes from the workshop included:

- Initial community review of the Stage 3 options long list
- Identification of actions requiring further refinement
- Incorporation of local knowledge to improve action descriptions and scope
- Identification of additional potential management actions and issues



### Contribution to the CMP

Feedback from Workshop 2 informed the refinement and expansion of the Stage 3 options long list prior to further development and assessment.

## 2.4.3 Workshop 3 – Option Detailing

### Purpose of the Workshop

The third workshop focused on further developing and refining the long list of management options, with particular emphasis on incorporating local knowledge and considering future environmental and community pressures.



### Workshop Activities

Two primary activities were undertaken during the workshop.

The first involved participatory mapping, where participants identified specific locations within the lagoon catchments where management actions or issues were relevant. Participants worked in small lagoon-based groups to place markers on maps and provide additional detail regarding local issues and potential management responses.

The second activity focused on future scenario planning, where participants considered how climate change, sea level rise and population growth may influence the lagoon systems over the coming decades. Participants discussed how these potential future changes could influence management priorities and whether additional actions may be required.

The workshop also included discussion regarding upcoming community engagement activities and opportunities to capture further community input.

### Key Outcomes

Key outcomes from the workshop included:

- Identification of site-specific locations relevant to potential management actions
- Incorporation of local knowledge into the refinement of proposed actions
- Consideration of long-term pressures such as climate change and population growth
- Further refinement of the options long list

### Contribution to the CMP

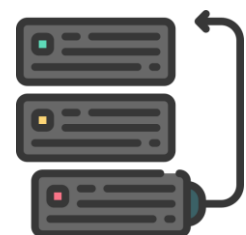
Outputs from Workshop 3 helped refine the scope and spatial relevance of several management actions and informed the preparation of the options assessment process undertaken later in Stage 3.

## 2.4.4 Workshop 4 – Option Evaluation

### Purpose of the Workshop

The fourth workshop focused on evaluating and prioritising the management options developed during the earlier stages of the co-design process.

### Workshop Activities





The workshop commenced with a recap of the project journey to date, including a summary of Stage 3 community consultation outcomes and an overview of the proposed options assessment process.

Participants then undertook a facilitated prioritisation exercise to assess the relative importance of the proposed management actions.

Participants worked in lagoon-based groups and were provided with a limited number of prioritisation tokens representing high, medium and low priority. Participants allocated these tokens across the list of actions to indicate their relative priorities. The activity was supported by facilitated discussion regarding potential trade-offs, implementation considerations and perceived benefits.

A reporting session followed where participants reflected on the prioritisation process and discussed the considerations influencing their decisions.

### Key Outcomes

Key outcomes from the workshop included:

- Community-informed prioritisation of the Stage 3 options long list
- Identification of actions considered to be high community priority
- Discussion of trade-offs and implementation considerations
- Confirmation of key themes emerging from the prioritisation exercise

### Contribution to the CMP

The prioritisation results from Workshop 4 informed the Stage 3 options assessment and contributed to the identification of preferred management actions for inclusion in the CMP.

## 2.4.5 Workshop 5 – Closing the Loop

### Purpose of the Workshop

The final CFG workshop presented the outcomes of the Stage 3 assessment process and provided an opportunity for participants to review the proposed shortlist of management actions for the CMP.

### Workshop Activities

The workshop included a presentation outlining the current status of the CMP and the results of the Stage 3 options assessment, including the proposed shortlist of management actions.

Participants were then invited to participate in a facilitated discussion to reflect on the outcomes of the co-design process. This included revisiting the vision and objectives developed during Workshop 1 and discussing whether the proposed CMP actions addressed the key priorities identified by the CFG.

The workshop concluded with an overview of the next steps in the CMP process, including Stage 4 planning and the certification process.

### Key Outcomes

Key outcomes from the workshop included:

- Presentation and discussion of the Stage 3 outcomes
- Confirmation that the shortlisted actions addressed key community priorities
- Review and refinement of the CMP vision and objectives





- Discussion of the next steps in the CMP process

**Contribution to the CMP**

Workshop 5 provided the CFG with an opportunity to confirm that the outcomes of the Stage 3 process reflected the values, priorities and insights contributed during the co-design process.



### 3 COMMUNITY AND STAKEHOLDER ENGAGEMENT

#### 3.1 Overview of Community and Stakeholder Engagement

In addition to the Community Focus Group co-design process described in Chapter 2, a broader program of community and stakeholder engagement was undertaken during Stage 3 of the CMP. While the CFG provided a structured forum for detailed collaboration with a consistent group of community representatives, the engagement program described in this chapter was designed to provide opportunities for broader community and stakeholder participation in the identification and evaluation of potential management options.

The engagement program aimed to inform the wider community about the CMP, seek feedback on the Stage 3 long list of management options, and provide opportunities for community members and stakeholders to contribute additional ideas and local knowledge.

Consistent with the Community and Stakeholder Engagement Strategy developed during Stage 1 (Royal Haskoning, 2021), engagement activities were guided by the IAP2 Spectrum of Public Participation. The following levels of engagement were applied during Stage 3 (see Figure 3-1):

- **Inform:** Provide stakeholders and the community with clear, accessible information about the project, identified coastal hazards, and the range of potential management options.
- **Consult:** Seek feedback on the Stage 3 “long list” of potential management options, including levels of community and stakeholder support.
- **Involve:** Ensure that community values, concerns, and aspirations - identified through Stages 1 and 2 of the CMP engagement - are reflected in the development and evaluation of management options.
- **Collaborate:** Invite stakeholders and community members to contribute suggestions for additional management options, to be considered as part of the Stage 3 assessment process.

Increasing impact on the decision					
Public participation goal (what are we trying to achieve)	Inform	Consult	Involve	Collaborate	Empower
	To provide the public with balanced and objective information to help them understand the problem, alternatives and/or solutions	To obtain public feedback on alternatives and/or decisions	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered	To partner with the public in each aspect of the decision including the development of alternatives and identification of the preferred solution	To place the final decision-making in the hands of the public
Promise to the public	We will keep you informed	We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision	We will work with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible	We will implement what you decide

Figure 3-1 The IAP2 spectrum of engagement (source: IAP2)



The Stage 3 engagement program included two primary components:

- Community engagement - which provided opportunities for the broader community to learn about the project and provide feedback on the proposed management options. These activities are described in Section 3.2.
- Stakeholder engagement - which involved consultation with relevant State agencies and First Nations groups regarding issues and potential management responses relevant to the lagoon systems. These activities are described in Section 3.3.

## 3.2 Community Engagement

The Stage 3 community engagement period lasted for four weeks, from Wednesday 1 October to Wednesday 29 October 2025. The engagement program was designed to provide both online and in-person opportunities for community members to review the proposed management options and provide feedback.

The engagement process included three key elements:

- Your Voice, Our Coast webpage, provided background information about the CMP and hosted engagement materials.
- Online survey, which enabled community members to indicate their level of support for individual management actions.
- Community drop-in sessions, which provided opportunities for face-to-face discussion with project staff and Council representatives.

Each of these engagement elements is described below.

### 3.2.1 Your Voice, Our Coast Webpage

The primary online platform for Stage 3 community engagement was the project webpage hosted on Council's Your Voice, Our Coast engagement portal: <https://www.yourvoiceourcoast.com/our-coast-our-waterways/coastal-lagoons>.

The webpage served as a centralised and accessible hub for project information throughout the Stage 3 engagement period and played an important role in informing the community about the CMP and the opportunities to participate in the process. Key features of the webpage included:

- Background: A comprehensive overview of the CMP, including its purpose, who is involved, and how it is being developed under the NSW Coastal Management Framework.
- A document library: A central repository of project materials, including brochures, bulletins, the Stage 1 Scoping Study, selected Stage 2 Technical Studies, and fact sheets on major issues and coastal risks being addressed.
- Progress Updates: Regular updates on the progress of each stage of the CMP, including announcements and advertisements for community engagement opportunities.

During Stage 3, the webpage also hosted specific content designed to support community participation, including:

- Promotion of community engagement events, including details of community drop-in sessions.
- Stage 3 community survey, providing an online portal through which community members could review the proposed management options and provide feedback.



### 3.2.2 Online Survey

An online survey was developed to allow community members to provide feedback on the Stage 3 long list of management options.

The survey presented all 44 actions included in the long list and asked participants to indicate their level of support for each action using a scoring scale ranging from:

- -10 (strongly disagree with the action)
- 0 (neutral)
- +10 (strongly support the action)

This scoring approach enabled the responses to be analysed quantitatively, allowing both average and median scores to be calculated for each action. These results provided an indication of community acceptability and were used as an input to the acceptability assessment described in Section 6.

Given the relatively large number of proposed management actions, the survey included a logic pathway that asked participants a small number of introductory questions regarding their location and areas of interest. Based on these responses, participants were directed to the most relevant subset of management actions to review.

A total of 70 survey responses were received during the engagement period.

### 3.2.3 Community Drop-In Sessions

To complement the online engagement activities, a series of community drop-in sessions were held to provide opportunities for face-to-face discussion with Council and project staff.

Each session was open for a four-hour period, allowing community members to attend at a time convenient to them. This flexible format helped reduce overcrowding and enabled more relaxed and personalised discussions between attendees and project staff.

The drop-in sessions were designed to:

- Provide clear and accessible information about the CMP and the Stage 3 process.
- Explain the proposed management options included in the Stage 3 long list.
- Direct community members to the online engagement portal to provide feedback.
- Provide opportunities for community members to share local knowledge, raise issues, and suggest additional management options.

Participants were able to provide both verbal and written feedback on the proposed management actions and on broader issues affecting the lagoon systems. Many constructive and detailed discussions occurred between community members and Council representatives during these sessions.

In total, 4 drop-in sessions were held across the community engagement. Table 2-2 provides session details, including estimated attendance.



**Table 3-1 Community Drop-In Sessions**

Lagoon	Date	Location
Cockrone Lagoon	Sunday 12 October 08:00 am to 12:00 pm	Bonnie Lookout, 2358 Del Monte Pl, Copacabana
Terrigal Lagoon	Tuesday 14 October 08:00 am to 12:00 pm	Terrigal Rotary Park, 11 Terrigal Dr, Terrigal
Wamberal Lagoon	Sunday 19 October 08:00 am to 12:00 pm	Remembrance Drive, Wamberal NSW 2260
Avoca Lagoon	Tuesday 21 October 02:00 pm to 06:00 pm	Jack Muller Picnic Area, 1 Ficus Ave, Avoca Beach

### 3.3 Stakeholder Engagement

#### 3.3.1 Internal Council Engagement

A key component of Stage 3 was targeted engagement with internal Council departments. These sessions were designed to capture operational knowledge, existing initiatives and practical insights from across the teams responsible for managing infrastructure, environmental assets and public land within the lagoon catchments.

The purpose of this engagement was to help confirm that the management actions developed through the CMP were practical, coordinated and capable of being implemented through Council's existing operational frameworks. Council staff play a direct role in the day-to-day management of stormwater infrastructure, public reserves, environmental programs and development processes across the lagoon catchments. Their input was therefore critical in identifying feasible actions, refining proposed initiatives and highlighting opportunities to align CMP actions with existing Council programs and delivery mechanisms.

The internal engagement program involved a series of structured workshops held across two days (24 and 25 September), bringing together representatives from key Council teams, including:

- Water and Sewer
- Roads and Drainage
- Open Space and Recreation
- Environmental Management
- Environmental Compliance
- Strategic Planning

These sessions provided an opportunity to examine lagoon management issues from an operational and implementation-focused perspective, allowing Council staff to test and refine potential management actions identified through the CMP process.

Each session followed a consistent workshop format. Participants were provided with a short briefing on the CMP and the purpose of the engagement session, followed by an interactive discussion focused on the proposed management actions relevant to each department. Staff were invited to review the draft action list and provide feedback on:

- the practicality and feasibility of proposed actions
- opportunities to align actions with existing Council programs and projects



- additional actions or initiatives that should be considered
- operational constraints or considerations relevant to implementation.

To complement the group sessions, a broader “lunch and learn” briefing session was also held for Council staff. This session provided an overview of the Coastal Management Program framework, the status of Council’s estuary CMPs, and the strategic direction and objectives of the lagoons CMP. The briefing helped build organisational awareness of the program and clarify how different Council teams contribute to lagoon management.

Overall, the internal engagement program helped confirm that the management options developed through the CMP were informed by both strategic planning considerations and on-ground operational experience, strengthening the practicality and implementability of the final action list.

### 3.3.2 Agency Engagement

Several State agencies have statutory responsibilities or interests relevant to the management of coastal lagoons and their surrounding environments. Engagement with these agencies during Stage 3 helped confirm that the proposed management actions and strategic direction of the CMP are consistent with broader State Government policies and programs.

Agency discussions focused on reviewing the proposed management options, identifying actions relevant to specific agency responsibilities, and confirming alignment with regulatory requirements such as Coastal Management Area mapping, environmental protection objectives, and CMP certification requirements.

These discussions also provided an opportunity for agencies to highlight emerging issues, share relevant technical information, and identify potential partnership opportunities for future implementation of CMP actions.

Key agencies consulted during Stage 3 are summarised in Table 3-2.

Table 3-2 State Agency Engagement

Agency	Purpose
National Parks and Wildlife Service	Discussion of management actions relevant to Wamberal Lagoon, the catchment of which includes land within Wamberal Nature Reserve under NPWS management.
Department of Planning, Housing and Infrastructure – Planning and Assessment	Discussion regarding Coastal Management Area mapping for the lagoons and the strategic direction of the CMP in relation to potential CMA mapping amendments.
Department of Climate Change, Energy, the Environment and Water – Marine and Coastal Ecosystems Framework	Discussion regarding Coastal Management Area mapping, alignment with the NSW Coastal Management Framework, and CMP certification requirements.
Department of Primary Industries and Regional Development (DPIRD) – Fisheries	Discussion of management actions relevant to fisheries habitat, aquatic ecosystems, and estuarine health.

### 3.3.3 First Nations Engagement

Engagement with First Nations representatives formed an important component of the CMP process and builds upon several years of ongoing engagement undertaken by Council and the project team across multiple Coastal Management Programs on the Central Coast. Rather than being limited to a single consultation activity, engagement has been undertaken through a series of meetings, workshops, discussions and on-



Country interactions, providing opportunities to build relationships and develop a deeper understanding of Aboriginal perspectives on the management of coastal environments.

The engagement process recognised that Aboriginal people hold enduring cultural, spiritual and practical connections to the lagoon systems and surrounding landscapes. Discussions focused on understanding cultural values, heritage considerations, historical and contemporary connections to Country, and opportunities to better incorporate Aboriginal knowledge and perspectives into coastal management planning and implementation.

Importantly, the engagement process was not solely focused on seeking feedback on proposed management actions. It was also a listening and learning exercise for both Council and the project team, helping to build a greater understanding of Aboriginal values, aspirations and approaches to caring for Country. This approach helped foster respectful dialogue and strengthen relationships between Council, the project team and First Nations representatives.

Engagement was undertaken with representatives of the Central Coast First Nations community, with support from Wannangini Pty Ltd. Through these discussions, participants provided valuable insights that helped inform the development and refinement of management actions and identify opportunities for greater recognition of cultural values within lagoon management. The process also highlighted the importance of ongoing collaboration and relationship-building beyond the completion of the CMP.

By engaging respectfully with First Nations representatives and providing opportunities for meaningful dialogue, the CMP process has sought to recognise the cultural significance of the lagoon environments and support the inclusion of Aboriginal knowledge and values within the long-term management of the coastal zone.



## 4 STEP 1: STRATEGIC DIRECTION

### 4.1 Vision, Purpose, and Objectives

The Coastal Management Program establishes the strategic direction for the long-term management of the CCL. At the highest level of the CMP hierarchy, this direction is defined through a **Vision**, **Purpose** and set of **Management Objectives** that guide the development and evaluation of management actions.

The overall purpose of the CMP is to provide a coordinated framework for the future management of the lagoon systems and their surrounding coastal environments. In doing so, the program seeks to support the principles of ecologically sustainable development while promoting the environmental, social, cultural and economic well-being of the community (OEH, 2018d).

During Stage 1 of the CMP (Royal Haskoning, 2021), the Vision, Purpose and Management Objectives for the project were initially developed through community and stakeholder engagement. These elements establish the strategic foundation of the CMP and provide the framework against which potential management actions are identified and evaluated.

During Stage 3, the Vision and Purpose were reviewed and refined through the Community Focus Group co-design process to confirm that they remain aligned with community values and the strategic direction of the CMP (see Section 2.4).

Within the CMP hierarchy, the Vision sets the long-term aspiration for the lagoon systems, the Purpose describes the intended role of the CMP, and the Management Objectives provide a set of guiding outcomes that inform the development and assessment of management actions. The relationship between the Vision, Purpose, and Specific Objectives is illustrated in Figure 4-1.

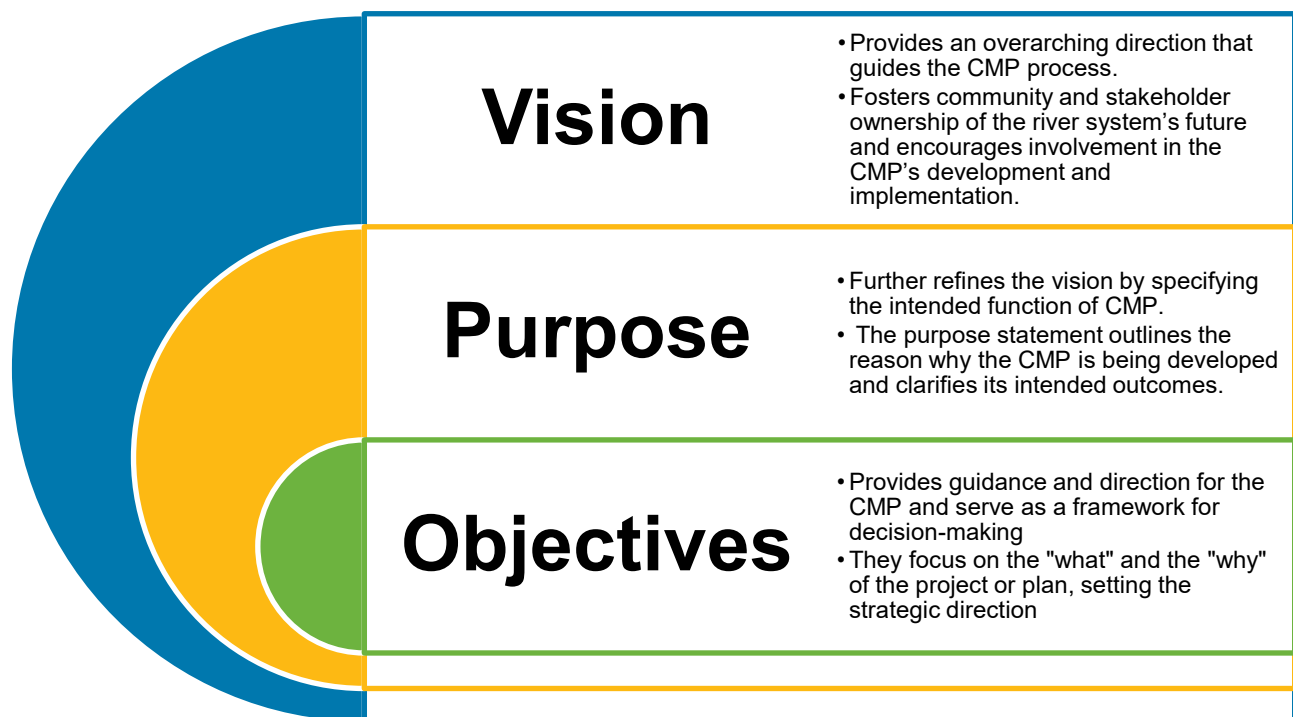


Figure 4-1 The Vision, Purpose, and Objectives of the CMP



#### 4.1.1 Vision

During the Community Focus Group workshops, participants were invited to develop their own vision statements describing their aspirations for the long-term future of the lagoon systems. These statements reflected a wide range of perspectives, including environmental stewardship, community wellbeing, cultural connections to Country, and the importance of maintaining healthy and accessible waterways.

Participants drafted individual vision statements which were then discussed collectively and refined through facilitated discussion. Common themes were identified across the responses, including the importance of healthy ecosystems, resilience to climate change, strong cultural and community connections, and maintaining the lagoons as valued places for recreation and everyday life.

These themes were subsequently consolidated into a single representative vision statement, which reflects the shared aspirations expressed by CFG members and provides the long-term guiding direction for the CMP:

■■■  
*Healthy, resilient and valued lagoon systems that support thriving ecosystems, strong cultural connections and vibrant communities for generations to come.*  
■■■

#### 4.1.2 Purpose

The following Purpose statement was developed through the Community Focus Group co-design process and describes the role of the CMP in guiding the long-term management of the lagoon systems:

■■■  
*To set a clear long-term direction for managing the Central Coast lagoons that protects ecosystems, supports community wellbeing and responds to changing coastal conditions.*  
■■■

The purpose of the CMP is to set the long-term strategy for the coordinated management of the CCL.

#### 4.1.3 Objectives

The strategic management objectives determined during Stage 1 of the CMP are summarised in Table 4-1

**Table 4-1 Strategic objectives of the CMP**

Objectives
a) to protect and enhance natural processes and environmental values of the Central Coast Lagoons.
b) to support the social and cultural values of the Central Coast Lagoons and maintain public access, amenity, use and safety.
c) to acknowledge Aboriginal peoples' spiritual, social, customary and economic use of the Central Coast Lagoons.



## Objectives

- d) to recognise the subject area as a vital economic zone and to support sustainable coastal economies.
- e) to facilitate ecologically sustainable development in the Central Coast Lagoon catchments and promote sustainable land use planning decision-making.
- f) to mitigate current and future risks from coastal hazards, taking into account the effects of climate change.
- g) to recognise that the local and regional scale effects of coastal processes, and the inherently ambulatory and dynamic nature of the shoreline, may result in the loss of coastal land to the sea (including estuaries and other arms of the sea), and to manage coastal use and development accordingly.
- h) to promote integrated and co-ordinated coastal planning, management and reporting.
- i) to encourage and promote plans and strategies to improve the resilience of coastal assets to the impacts of an uncertain climate future including impacts of extreme storm events.
- j) to ensure co-ordination of the policies and activities of government and public authorities relating to the coastal zone and to facilitate the proper integration of their management activities.
- k) to support public participation in coastal management and planning for the Central Coast Lagoons and greater public awareness, education and understanding of coastal processes and management actions.
- l) to facilitate the identification of land in the coastal zone for acquisition by public or local authorities in order to promote the protection, enhancement, maintenance and restoration of the environment of the coastal zone; and
- m) to support the objects of the *Marine Estate Management Act 2014*.

## 4.2 Approach to Managing Catchment-Based Stressors

### 4.2.1 Role of Catchment Processes in Lagoon Health

The ecological condition and functioning of the CCL are strongly influenced by processes occurring across their contributing catchments. As Intermittently Closed and Open Lake and Lagoon (ICOLL) systems, these lagoons have limited tidal flushing capacity and are therefore highly sensitive to changes in nutrient inputs, sediment loads and hydrologic modification.

The primary stressors impacting the health of these lagoons have been studied at length over the last 3 decades and are well understood, and have been recorded and assessed in:

- The Gosford Lagoons Process Study (Cardno, 2010)
- The NSW Estuary Health Risk Dataset (DPIE, 2019b)
- The CMP Stage 1 Scoping Study (RHDHV, 2021)
- The CMP Stage 2 Studies, including:
  - The Avoca Lagoon Processes Study (DCCEEW, 2024), and
  - The Open Coast and Coastal Lagoons Coastal Hazard Assessment (Bluecoast Consulting Engineers, 2024)



Across these studies, the key stressors affecting lagoon condition are consistently identified as urban stormwater inputs, sedimentation, vegetation clearing, habitat fragmentation and modifications to catchment hydrology.

The significance of these catchment-derived pressures is further reflected in the NSW Monitoring, Evaluation and Reporting (MER) Program, which identifies the Central Coast lagoons as among the most heavily impacted coastal lagoon systems in NSW. Decades of urban development and catchment modification have resulted in sustained pressures on water quality, ecological condition, hydrologic function and habitat values. Collectively, the available evidence demonstrates that many of the key challenges affecting lagoon health originate within the catchment rather than the lagoon waterbody itself.

Consistent with many ICOLL systems located within urbanised catchments, the majority of these pressures originate within the catchment rather than within the lagoon foreshore and waterbody itself. Land use activities occurring upstream can influence water quality, sediment transport and hydrologic processes that ultimately affect lagoon ecosystems, recreational values and entrance behaviour.

Effective management of lagoon health therefore requires consideration of both coastal processes and catchment-based drivers operating across the broader contributing catchment. Given the scale of catchment modification and the strong influence of upstream processes on lagoon condition, management responses focused solely on the immediate foreshore environment are unlikely to achieve meaningful long-term improvements in ecosystem health. Addressing the underlying drivers of degradation requires a planning and management framework capable of considering the full hydrologic catchment and the activities occurring within.

#### **4.2.2 Statutory Constraints of the CMP Framework**

While improving lagoon health requires a catchment-wide perspective, the statutory framework governing CMPs limits the spatial scope of actions that can be formally included within a certified CMP.

Under the CM Act, a CMP may only apply to land and waters within the legally defined coastal zone. Section 13(2) of the Act states that:

*"A Coastal Management Program may be made in relation to the whole, or any part of the area included within the coastal zone."*

The coastal zone is defined through the Coastal Management Areas mapped under the Resilience and Hazards State Environmental Planning Policy. These include:

- Coastal Use Area (CUA) – generally a 250 m buffer around the estuary foreshore
- Coastal Environment Area (CEA) – estuarine waterways plus a landward buffer typically between 100 and 500 m from the foreshore
- Coastal Wetlands and Littoral Rainforest Area (CWLR)
- Coastal Vulnerability Area (CVA) – areas subject to coastal hazards

As a result, large portions of the hydrologic catchment that influence lagoon condition fall outside the mapped coastal zone. This means that many catchment-based management actions cannot be directly included as certified actions within the CMP.

This creates an inherent challenge for lagoon management, as the dominant drivers of lagoon condition often originate beyond the spatial boundary recognised by the coastal planning framework.



### 4.2.3 Planning Response: Coastal Environment Area Mapping Amendment

The CEA identifies the environmental features of the coastal zone, such as state waters, estuaries, coastal lakes and coastal lagoons. It also includes land adjoining those features including beaches, dunes, coastal headlands and rock platforms.

The State Government *SEPP Fact sheet 2: Coastal management areas*<sup>1</sup> notes that:

*“An area of land adjacent to the open coast, estuary or coastal lake or lagoon is also included in the coastal environment area map. This is to ensure nearby development takes into account potential impacts on the coastal environment. This distance is a minimum of 100 metres but is more if the land is adjacent to an area that is more sensitive to development impacts, such as a coastal lake. The entire catchment of sensitive coastal lakes is mapped and for other coastal lakes there is a 500m buffer mapped around them.”*

For lagoon systems, the mapping typically includes the waterbody and a buffer of surrounding land. In the case of the CCL, the mapped CEA currently comprises a 500 m buffer from the lagoon foreshore. While this captures the immediate riparian environment, it does not fully reflect the broader catchment processes that influence lagoon health. In practice, the ecological, geomorphic, hydrological and water quality processes that drive lagoon condition operate across the entire hydrologic catchment.

To help address this limitation, the CMP includes Option 45, which includes undertaking a planning proposal to extend the mapped CEA to align with the full hydrologic catchment boundary for each lagoon.

Aligning the CEA with the functional catchment would provide a planning framework that better reflects the processes influencing lagoon condition. It would allow development assessment processes to more consistently consider impacts relating to water quality, sediment transport, vegetation disturbance and hydrologic modification across the catchment.

Importantly, the inclusion of this action within the CMP does not itself amend the CEA mapping. Rather, it commits Council to undertaking a future planning proposal to update the mapping in consultation with relevant State agencies.

Preliminary discussions with the DCCEEW and the Department of Planning, Housing and Infrastructure have indicated that this approach is consistent with the intent of the coastal planning framework.

### 4.2.4 Precedent for Catchment-Scale Coastal Environment Areas

There is clear precedent within NSW for applying a broader catchment-scale interpretation of the Coastal Environment Area for lagoon systems, particularly for wave-dominated barrier estuaries and ICOLLs.

Along the NSW South Coast, several lagoon systems have CEA mapping that aligns closely with their entire contributing catchments, recognising that the dominant environmental processes affecting lagoon health originate across the catchment rather than solely within a narrow foreshore buffer. Examples include: Termiel Lake, Meroo Lake, Durras Lake, and Nadgee Lake.

These systems share similar typology, hydrology and ecological function to the CCL. Their mapped CEAs acknowledge the importance of catchment-scale processes in shaping lagoon condition, including nutrient loading, sediment transport and hydrologic connectivity.

The application of catchment-scale CEA mapping in these systems demonstrates that this approach is compatible with the existing RH SEPP framework and has already been implemented elsewhere in NSW. It also reflects the intent described in the RH SEPP guidance note, which recognises that sensitive coastal lakes

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<sup>1</sup> <https://www.planning.nsw.gov.au/sites/default/files/2023-03/coastal-management-sepp-fact-sheet-2-coastal-management-areas.pdf>



and lagoons may require broader spatial mapping to ensure development considers impacts on coastal environmental values.

This precedent provides a strong basis for undertaking a similar catchment-scale approach for the CCL through the planning proposal process identified in Option 45.

### 4.3 Management Themes

To support the organisation and implementation of management actions in Stage 4, the actions developed through the CMP have been grouped into a set of strategic management themes. These themes provide a practical framework for organising the large number of potential actions identified through the Stage 3 process.

The use of strategic themes serves several purposes within the CMP. First, it helps structure the management actions in a way that reflects the key focus areas for lagoon management, making the program easier to understand and navigate for Council staff, partner agencies, and the community.

Grouping actions into themes also supports the transition from planning to implementation during Stage 4 of the CMP process. By organising actions under clear strategic areas, Council can more easily prioritise projects, allocate responsibilities across different departments, and align CMP implementation with existing Council programs and funding streams. The thematic framework also supports integration of CMP actions into Council's broader Integrated Planning and Reporting (IP&R) framework, including the Community Strategic Plan (CSP), Delivery Program and Operational Plan. Embedding CMP actions within these core corporate planning documents provides a practical pathway for implementation, funding allocation, performance monitoring and long-term organisational ownership of the program.

Finally, the use of themes helps communicate the CMP to the community in a more accessible way. Rather than presenting a long list of individual actions, the thematic structure highlights the key priorities for the CMP and the structured delivery pathways for CMP actions.

The management actions identified through the CMP have been grouped into the following six strategy themes:

- Strategy 1 – Monitoring, Evaluation and Reporting
- Strategy 2 – Community Engagement and Education
- Strategy 3 – Coastal Hazard Resilience
- Strategy 4 – Estuary Health
- Strategy 5 – Social and Cultural Values
- Strategy 6 – Research and Innovation

Together, these themes reflect the integrated nature of lagoon management, recognising that long-term outcomes depend on a combination of environmental protection, community stewardship, risk management and ongoing learning.



## 5 STEP 2: OPTION IDENTIFICATION

### 5.1 Strategic Approach

Coastal management is generally approached through the lens of five different strategic approaches as described in the NSW Coastal Management Manual (OEH, 2018d) and outlined in Figure 5-1.



Figure 5-1 The five strategic approaches to coastal management (adapted from the NSW Coastal Management Manual)

Different strategic approaches are relevant to different levels of risk and attitudes to risk. However, they are often combined, or the emphasis may change from one to another over time as circumstances change. Therefore, the derivation of management options for Stage 3 of the CMP has been undertaken with consideration of these five strategic approaches.

1. For coastal environments such as the study area, **Alert** responses may be implemented to monitor conditions and ensure communities are aware of emerging changes to the environment. *Low regrets* responses are generally cost-effective, low impact options that yield multiple net benefits now, and



help communities prepare for future changes to risk exposure. Often, low regrets options can be insufficient to manage medium to high risks on their own, but they do allow coastal managers to strengthen coastal resilience and build management capacity.

2. Reducing current and future pressures on ecosystem health may also be achieved through **Avoid** approaches, such as recommending appropriate land use planning and infrastructure planning decisions that support appropriate community uses of the coastal environment and avoid future irreversible impacts.
3. If coastal hazard risk is high, or coastal ecosystem health is poor, then management options may seek to improve the safety, resilience, health or function of coastal landforms and ecosystems through a range of **Active Intervention** approaches – such as remediation, rehabilitation, and implementation of environmental improvement programs and coastal protection works.
4. **Planning for change** and allowing coastal environments to adapt to climate change is often a more cost-effective approach that will lead to higher value environmental outcomes. Fostering strategic adaptation in coastal environments to address climate change is frequently a more economically efficient strategy that yields enhanced environmental benefits. Contemplating habitat migration becomes advisable when vigilant monitoring substantiates the impending or irreparable nature of such changes. This entails establishing a comprehensive set of protocols and tactics to be activated when inescapable transformations (like coastal erosion) render a region unsuitable for human occupancy or utilization.
5. **Emergency Response** is a strategic approach incorporating immediate actions designed to be implemented during extreme coastal hazards events, providing a set of actions to be followed during times of emergency.

## 5.2 Identification of Options

Once the strategic direction of the CMP had been confirmed, the next step was to develop a comprehensive suite of potential management options capable of addressing the risks identified during Stages 1 and 2 and achieving the objectives of the program. Consistent with the NSW Coastal Management Manual, this process began with the preparation of a “long list” of potential management options to be considered during the Stage 3 assessment process.

In total, 45 potential management options were identified through a multi-source process that combined technical analysis, previous studies, agency input and community knowledge. The intent of this step was to cast the net broadly and identify the full range of potential responses available to Council before progressing to the option assessment and prioritisation stages.

Developing a relatively broad long list at this stage is consistent with the NSW Coastal Management Manual, which encourages consideration of a wide range of potential responses before options are progressively refined and consolidated.

### Community Co-design (CFG)

A defining feature of the option identification process for this CMP was the community co-design process undertaken with the CFG. Through a structured program of facilitated workshops, CFG participants worked collaboratively with Council and the project team to explore lagoon management issues, develop potential responses and refine proposed actions.

This process enabled local knowledge, lived experience and community priorities to directly inform the development of the options long list. Participants were encouraged to challenge, expand and improve the initial



set of ideas presented by the project team, creating an environment where management actions could be tested and refined through open discussion.

The co-design workshops played an important role in:

- Identifying locally relevant issues and management opportunities that may not be apparent through technical studies alone
- Refining actions to reflect site-specific conditions and community use patterns across the lagoon systems
- Testing the practicality and acceptability of potential management approaches
- Identifying gaps in the initial list of actions and proposing additional options.

Through this process, the development of management options became a collaborative exercise between Council, technical specialists and the community. The resulting long list therefore reflects both the scientific evidence base and the lived experience of those who use and value the lagoons. This approach helped strengthen the relevance, legitimacy and community ownership of the options that were carried forward into the Stage 3 assessment process.

### **Community and Stakeholder Engagement**

The identification of management options was also informed by the broader program of community and stakeholder engagement undertaken during Stage 3. This included engagement with State agencies, First Nations representatives and the wider community, as described in Section 3.

In particular, a series of internal Council engagement workshops were undertaken with key operational departments to review the draft action list and provide input on feasibility, implementation pathways and alignment with existing Council programs. These sessions helped confirm that the proposed management options were practical, coordinated and capable of being delivered through Council's existing operational frameworks

### **Review of Historical Information**

In addition to the co-design process, the long list of options was informed by a wide range of technical studies, policy documents and previous investigations relevant to the lagoon systems, including

- Gosford Coastal Lagoons Estuary Processes Study (Cardno, 2010)
- Coastal Zone Management Study For Gosford Lagoons (BMT WBM, 2014)
- Gosford Beaches Coastal Zone Management Plan (WorleyParsons, 2017)
- Central Coast Recreational Use Study (Middle & Middle, 2022)
- Bareena Wetland Hydrological Study (Salients, 2022)
- Green and Golden Bell Frog Population Study (Callen, Maher, Tunstill, & Hayward, 2023)
- Avoca Lagoon Processes Study 2022 (DCCEEW, 2024)
- Annual Lagoon Estuary Report Cards

### **Risk-Based Technical Analysis**

The identification of potential management options was also informed by a technical, risk-based analysis that assessed threats to key environmental, social, cultural, and infrastructure values within the coastal zone. This process included a detailed geospatial assessment, supported by a broad range of datasets and technical guidelines. The analysis incorporated (but was not limited to) the following:

- **Environmental Assets and Estuary Health Datasets:**



- The NSW Estuary Health Risk Dataset (DPIE, 2019b)
- The NSW Estuary Water Quality Data Compilation: 2007 – 2020 (DCCEEW, 2025)
- Coastal Wetland and Littoral Rainforest Mapping provided in the State Environmental Planning Policy (Resilience and Hazards) 2021
- **Coastal and Estuarine Hazard Datasets:**
  - The NSW Estuary Tidal Inundation Exposure Assessment (OEH, 2018g)
- **Assets, Infrastructure, and Social Values:**
  - Geospatial data (GIS) utilised by Council to determine assets at risk or new asset requirements:
    - Coastal and estuary infrastructure (e.g. boat ramps, wharves, jetties, and seawalls)
    - Community and recreational infrastructure (e.g. access paths and public foreshore amenities)
    - Road networks and car parks
    - Stormwater infrastructure (e.g. outlets, pits, and drainage systems, where available)
    - Council-managed reserves and open spaces.

This multi-layered risk assessment allowed the project team to identify spatially explicit vulnerabilities and target areas where management actions would deliver the greatest benefit to the health, function, and resilience of the CCL.



## 6 STEP 3: OPTION ASSESSMENT

### 6.1 Overview

Once the long list of management options was developed in Step 2, the next step was to assess and prioritise these options. Decision making in coastal and estuary management can be complex and multifaceted due to the inherent trade-offs required between social, environmental, economic, and political factors. The identification of appropriate management options therefore requires the consideration of a range of criteria, many of which cannot be easily quantified into common units or monetary values. Traditionally, optioneering undertaken as part of coastal and estuary management plans has applied qualitative methods that aim to simplify this complexity. Whilst practical, this can sometimes lead to over-simplifications whereby important information may be lost, opposing points of view may be discarded, and elements of uncertainty may be ignored.

To ensure the program of management options are appropriate, are able to be implemented and meets the objectives the CM Act, Stage 3 of the CMP has employed a robust multi-criteria decision-making framework. The purpose of this approach is to evaluate and choose among alternatives based on a systematic analysis that uses stakeholder participation to inform economic, social, and environmental criteria. This provides a tool that enables different stakeholders' perspectives and values to be explicitly included in the analysis.

The options assessment has followed a 3-step process, as outlined in the NSW Coastal Management Manual (OEH, 2018d), and summarised in Figure 6-1 below.

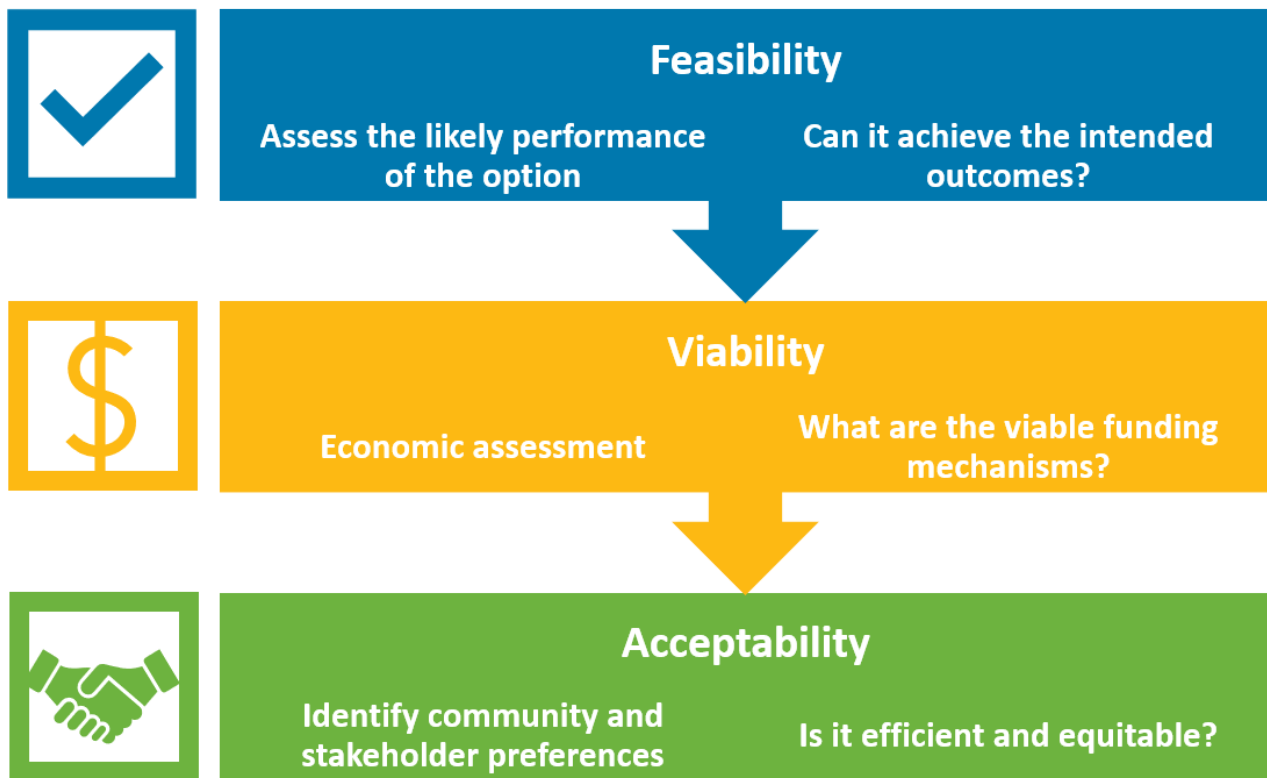


Figure 6-1 The Stage 3 options assessment process (adapted from the NSW Coastal Management Manual)

The overarching approach has been to undertake a discrete (but interrelated) assessment of each of these three components. The output of each assessment was a numerical score: a *Feasibility Score*, a *Viability Score*, and an *Acceptability Score*. These three scores are then subsequently combined in order to calculate a total *Options Ranking Score* that can be used to rank and compare the various options.



## 6.2 Options Long List

A full description of all options in the long list is provided in Table 6-2, which includes a comprehensive set of information for each option, as summarised in Table 6-1. The long list includes 45 options, each of which was assessed in detail using the methodology outlined in Figure 6-1 and described in Sections 6.3 to 6.5 below.

**Table 6-1 Snapshot of Long List Information**

<b>ID</b>	A unique action ID assigned to each option
<b>Locality</b>	Describes the specific location of the option.
<b>Action Name</b>	A short name or title for the option (typically fewer than 20 words).
<b>Action Description</b>	A more detailed explanation of the option.
<b>Lead</b>	Identifies the organisation with lead responsibility for implementation.
<b>Support</b>	Lists supporting agencies or stakeholders.
<b>CM Manual Approach</b>	Indicates the relevant strategic approach from the Coastal Management Manual (OEH, 2018d)
<b>Option Development Summary</b>	Summarises how the option was identified, developed or refined during Stage 3, including relevant inputs from historical studies, technical analysis, community co-design, stakeholder engagement and Council workshops.



Table 6-2 Long List of CMP Options

ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
1	Study Area Wide	Develop and implement a monitoring and reporting program for the Central Coast Lagoons.	<p>A comprehensive estuary health monitoring program should be implemented, grounded in the key ecological indicators already monitored at the State level through the NSW Monitoring, Evaluation and Reporting (MER) Program. To ensure consistency and data comparability, the program should focus on the following core indicators:</p> <ul style="list-style-type: none"> <li>• Turbidity - to assess water clarity and sediment load;</li> <li>• Physical and chemical water quality parameters - including salinity, dissolved oxygen, pH, and temperature;</li> <li>• Estuarine Macrophytes - such as seagrasses, saltmarsh, and mangroves, with a focus on tracking distribution and change over time;</li> <li>• Macroalgae blooms - as an indicator of nutrient enrichment and ecosystem imbalance;</li> <li>• Riparian vegetation distribution and condition - as a key contributor to bank stability and estuarine habitat health; and</li> <li>• Bacterial indicators - including E. coli and other relevant pathogens, to assess recreational and ecological health risks.</li> </ul> <p>To maximise efficiency and integration, the program should leverage and align with existing monitoring initiatives such as Beachwatch and Waterwatch, and actively explore opportunities to incorporate citizen science contributions and local volunteer groups into the sampling and data collection processes. This community-based approach not only expands monitoring capacity but also fosters local stewardship of the estuary.</p> <p>Monitoring results should be communicated regularly to the public through clear and accessible formats, such as annual water quality scorecards, interactive dashboards, and other online information platforms. Public reporting will support transparency, build community trust, and encourage ongoing community engagement in estuary health and management efforts.</p>	Council	DCCEEW	Alert	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous Coastal Zone Management Plan and reviewed during Stage 3 of the CMP.</li> <li>▪ The monitoring framework was refined through the CFG Workshops, where participants emphasised the importance of transparent reporting and community involvement in lagoon monitoring programs.</li> </ul>
2	Study Area Wide	Prepare an infrastructure vulnerability assessment for the Lagoons	<p>A comprehensive audit of publicly owned coastal assets and infrastructure will be undertaken to assess their current condition, vulnerability to coastal hazards, and future adaptation needs. This audit will inform a structured approach to managing coastal infrastructure over the next 50–100 years, ensuring resilience to sea level rise, erosion, and extreme weather events. Key components of this action include:</p> <ul style="list-style-type: none"> <li>• Auditing Coastal Assets: Conducting a detailed assessment of key (public) coastal infrastructure, including seawalls, stormwater outlets, walkways, wastewater infrastructure, and public amenities. This will document asset condition, maintenance requirements, and exposure to coastal hazards.</li> <li>• Determining Adaptation Triggers: Identifying environmental and structural thresholds (e.g., erosion rates, inundation levels, structural degradation) that will signal when adaptation or intervention is required. These triggers will be based on climate change projections, historical trends, and asset vulnerability.</li> <li>• Developing a Long-Term Response Framework: Establishing a strategic framework for asset adaptation, including short-, medium-, and long-term management options such as maintenance, reinforcement, managed retreat, or realignment.</li> <li>• Prioritising Works: Developing a prioritised list of coastal asset management and adaptation works based on risk, urgency, and cost-effectiveness. These works will be incorporated into future Coastal Management Programs (CMPs) to ensure funding and implementation align with broader coastal planning objectives.</li> </ul> <p>This plan would integrate with relevant flood risk management plans and infrastructure &amp; asset programs and consider all relevant planning horizons and climate change projections.</p>	Council	DCCEEW	Avoid Future Impact	<ul style="list-style-type: none"> <li>▪ Developed through Stage 3 technical review and discussions with Council asset management teams.</li> <li>▪ The scope of the infrastructure vulnerability assessment was further refined through feedback received during CFG Workshops and internal Council engagement sessions.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
			This plan will be aligned with existing Flood Risk Management Plans, Asset Management Plans, and relevant state and local planning frameworks. It will ensure coastal infrastructure investment is risk-informed, future-focused, and resilient to long-term climate change impacts.				
3	Study Area Wide	Develop and implement a Community Education Program	<p>The action includes the design and implementation of a Community Engagement and Education Program to inform key stakeholders (internal and external) and the community about lagoon dynamics, threats to lagoon health and behaviours that can help to improve lagoon health. Key objectives would be to:</p> <ul style="list-style-type: none"> <li>• Encourage a reduction in catchment pollution through stormwater runoff</li> <li>• Raise community awareness of natural lagoon processes, and the future impacts of climate change</li> <li>• Change behaviour of both people living within catchments, and visitors to the lagoons.</li> </ul> <p>It would include the following components, or themes:</p> <ul style="list-style-type: none"> <li>• Water quality and marine litter</li> <li>• Riparian zone and foreshore management (focusing on foreshore residents) – including the appropriate use of pesticides/herbicides/weed control/rubbish removal</li> <li>• Ecosystems of the estuary and biodiversity</li> <li>• Aboriginal and European cultural heritage values of the estuary</li> <li>• Coastal hazard risk (focusing on residents impacted by such hazards)</li> <li>• The impacts of climate change on the lagoon systems</li> </ul> <p>The program can leverage off the existing community education material developed by the state government (DPIRD-Fisheries, DCCEE, NPWS, TfNSW) and be implemented across the Lagoons by Council in a strategic and integrated manner.</p> <p>The program can also be extended to local schools, incorporating tailored educational resources that align with relevant stages of the NSW curriculum. This may include in-class workshops, field trips, and hands-on science activities linked to estuarine health, water quality, and cultural values. Partnering with local educators and schools will help embed lagoon knowledge early and foster the next generation of estuary stewards.</p> <p>In addition, the program will actively use social media platforms to share engaging, easy-to-understand content, such as short videos, infographics, interactive quizzes, and real-time updates on monitoring results or community events. Social media will serve as a key tool to boost visibility, increase community participation, and maintain momentum between on-ground engagement activities.</p> <p>This could also include broader education strategies such as painted signage on drains where rubbish directly travels into the lagoon as a community awareness reminder; and signs on Council bins (Take 3 for the Sea).</p>	Council	Education institutions DCCEE DPIRD-Fisheries NPWS	Alert	<ul style="list-style-type: none"> <li>▪ Developed through Council engagement and the CFG Workshops, where participants highlighted the need to improve community understanding of lagoon processes and catchment impacts.</li> <li>▪ The program scope was expanded following feedback from multiple CFG Workshops and written community submissions.</li> </ul>
4	Study Area Wide	Provide education and training opportunities for operational staff and other relevant council units in relation to lagoon management	<p>Undertake an intensive engagement program for Council works staff to raise the profile of best practice erosion and sediment control, vegetation management and assist staff with new policies and procedures. The initiative will support the consistent implementation of environmental procedures and improve on-ground outcomes in sensitive coastal and estuarine areas. The program will aim to:</p> <ul style="list-style-type: none"> <li>• Establish current levels of knowledge for Council and contractor staff undertaking infrastructure works within the catchment</li> <li>• Identify the areas where awareness can be improved. This includes a review how “Works” teams undertake their pre-start work checks to make sure appropriate pre-start processes are in place when working in vulnerable / sensitive coastal areas.</li> <li>• Follow up with regular (possibly annual) audits and knowledge assessments to monitor success and to ascertain when further training and awareness may be required.</li> </ul> <p>As part of this initiative, a Council Environmental Induction Manual could be developed and maintained, outlining essential environmental procedures, compliance obligations, and site management requirements for field staff. The manual will be supported by a formal environmental induction training module, delivered</p>	Council	N/A	Alert	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and reviewed during Stage 3.</li> <li>▪ Feedback from CFG Workshops and internal Council engagement helped refine the focus on improving operational awareness and environmental procedures for staff working in sensitive catchment areas.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
			to all relevant new and existing staff and contractors working in sensitive catchment areas. Consideration will be given to establishing internal environmental champions or peer trainers to support sustained knowledge transfer, mentoring, and cultural change at the team level.				
5	Study Area Wide	Continue to support volunteer based rehabilitation initiatives such as Landcare	<p>Continue to support volunteer based rehabilitation initiatives such as Landcare and Clean4shore. Support for such programs would be in the form of:</p> <ul style="list-style-type: none"> <li>• Financial and logistical support for on ground works and activities</li> <li>• Technical support and identification of priority sites and activities</li> <li>• Promotion of activities through Council communications channels</li> <li>• Utilising Council networks with existing businesses and chambers of commerce to actively promote corporate volunteering events and donations</li> <li>• Providing administration assistance to support the establishment of new bush regeneration programs across the catchment</li> </ul> <p>In addition, engagement with existing groups and local environmental advocates will be a core part of this action. Council will liaise directly with these groups to understand their priorities, barriers, and support needs — ensuring that assistance is targeted, responsive, and genuinely helpful. Strengthening these relationships will be critical to fostering long-term community ownership and delivering place-based outcomes that reflect local knowledge and values.</p>	Council	NPWS	Active Intervention	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and reaffirmed during Stage 3 engagement.</li> <li>▪ Discussions during the CFG Workshops highlighted the value of volunteer groups and the importance of continued Council support for community-led rehabilitation initiatives.</li> </ul>
6	Study Area Wide	Develop Lagoon Water Quality Improvement Plan	<p>The Water Quality Improvement Plan (WQIP) for the lagoons will aim to enhance and protect the water quality of the lagoons and their catchment areas. The plan will outline the actions, responsibilities, and timelines for achieving sustainable water quality improvements.</p> <p>To ensure transparency and accountability, the plan will include the development of quantitative targets for both estuary ecosystem health and human health (e.g. recreational water quality), drawing on relevant guidelines and site-specific data. Targets will align with ANZECC (2018) guideline values, NSW Water-Quality Objectives and NHMRC recreational water guidelines, providing a robust benchmark for ongoing monitoring and adaptive management.</p> <p>The WQIP will include:</p> <ul style="list-style-type: none"> <li>• Collation and review of existing water quality data, details on current point source loads to the estuaries, catchment land use data and existing environmental values/water quality objectives</li> <li>• Identify opportunities to collaborate with key stakeholders including commercial &amp; tourism operators</li> <li>• Catchment Audits: Undertake detailed audits of each sub-catchment across the Lagoons</li> <li>• Water Quality Assessment and Modelling: Comparisons to be made between actual water quality across the lagoons and the identified waterway objectives by way of an effects-based assessment. Where modelling tools are available, these tools will be applied at this stage to enhance the rigour of the assessments.</li> <li>• Management Options: Development of a suite of potential management responses, and evaluate the options based on cost effectiveness and risk treatment. This includes investigation of the use of constructed wetlands, sediment, and detention basins and other WSUD options to minimise the effect of freshwater and sediment inflows, with particular reference to areas of high biodiversity value around entrances to creeks. Consideration should be given to both current and future meteorological conditions.</li> <li>• Action Plan: Define the roles and responsibilities, costs, and timeframes for implementation of the action plan.</li> </ul> <p>The WQIP will support evidence-based decision-making and provide a performance framework to track progress toward improved water quality outcomes over time.</p>	Council	DCCEEW	Active Intervention	<ul style="list-style-type: none"> <li>▪ Consolidates several water quality improvement actions identified in earlier management plans and technical studies.</li> <li>▪ The scope of the Water Quality Improvement Plan was refined through Council engagement and discussions during the CFG Workshops.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
7	Study Area Wide	Reduce sewage contamination of lagoons	<p>Collaborate with Water &amp; Sewer (W&amp;S) authorities to identify and prioritise upgrades or maintenance of key sewerage infrastructure. The focus will be on reducing contamination risks to receiving waters and improving long-term water quality outcomes for the lagoon systems. This action includes:</p> <ul style="list-style-type: none"> <li>• Infrastructure Audits and Risk Assessment: Undertake comprehensive audits of critical sewerage infrastructure — including pump stations, sewer mains, and manholes — to assess their condition, identify high-risk failure points, and prioritise investment in upgrades or maintenance based on proximity to sensitive receiving waters and risk to human and ecosystem health</li> <li>• Targeted Investigations of Illegal Connections: In partnership with Council Water and Sewer department, conduct targeted investigations to identify illegal or non-compliant sewer connections discharging wastewater to stormwater infrastructure or directly into lagoons. Develop and implement rectification strategies, including compliance notices and education.</li> <li>• On-Site Sewage Management (OSSM) Risk Reduction: Assess and mitigate the impact of OSSM systems — particularly in western catchment areas where these systems are more prevalent — through water quality monitoring, targeted compliance audits, and property owner education programs. Consider incentives or support mechanisms for system upgrades where appropriate.</li> <li>• Data Integration and Asset Management Alignment: Ensure findings from audits and investigations are integrated into Council's asset management, renewal, and upgrade programs.</li> </ul>	Council	EPA	Active Intervention	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and reviewed during Stage 3.</li> <li>▪ Discussions during CFG Workshops highlighted community concern regarding sewerage infrastructure risks, which informed the proposed focus on audits and targeted investigations.</li> </ul>
8	Study Area Wide	Wetland Refugia and Migration Study	<p>This study will assess the future viability of coastal wetland habitats within the lagoon systems in response to projected sea level rise. The primary objective is to forecast shifts in the extent and distribution of intertidal vegetation - such as saltmarsh, mangroves, and other important vegetation communities such as Swamp Sclerophyll Forest - over coming decades.</p> <p>The study will make use of existing intertidal vegetation mapping, high quality topographic data, and long-term tidal water level data to develop existing and future (under sea level rise) mapping outputs. These inputs will inform the development of current and future spatial models of intertidal habitat extent under different sea level rise scenarios. The results will be used to:</p> <ul style="list-style-type: none"> <li>• Identify areas at risk of coastal squeeze, where intertidal habitats may be trapped between rising water levels and fixed landward boundaries</li> <li>• Highlight opportunities for wetland refugia, where landward migration of habitats is possible</li> <li>• Assess implications for ecosystem services, such as habitat provision, nutrient cycling, and shoreline protection.</li> </ul> <p>The outputs of the technical assessment should be used to help inform land use and conservation planning by overlaying results with zoning and land tenure, helping to identify strategic areas for restoration, buffering, or managed realignment.</p> <p>Where possible, the study will engage with First Nations groups and local community stakeholders to incorporate cultural values and traditional knowledge relating to wetland areas</p>	Council	DCCEEW	Avoid Future Impact	<ul style="list-style-type: none"> <li>▪ Consolidates several wetland and climate adaptation actions previously identified in earlier studies.</li> <li>▪ The option was refined through Council engagement and discussions during the CFG Workshops, with a stronger focus on planning for wetland migration under sea level rise.</li> </ul>
9	Study Area Wide	Implement a wetland & riparian monitoring, management and restoration program	<p>This would include the development of an LGA wide wetland management strategy for Central Coast Council. The strategy will provide a coordinated framework for the protection, enhancement, and long-term management of wetlands across the study area.</p> <p>Upon completion of the strategy, this action would include implementation of wetland restoration works in priority locations across the CMP study area. Restoration activities may include:</p> <ul style="list-style-type: none"> <li>• Reinstating natural hydrological regimes</li> <li>• Revegetation with native wetland species</li> <li>• Weed suppression through manual and mechanical techniques (with avoidance of herbicide spraying wherever possible)</li> <li>• Buffer planting and foreshore rehabilitation</li> </ul>	Council	DCCEEW	Active Intervention	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and expanded during Stage 3.</li> <li>▪ Feedback during CFG Workshops reinforced the importance of coordinated wetland monitoring and restoration across the lagoon systems.</li> <li>▪ Updated in Council's internal workshops</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
			<p>This initiative aims to enhance ecosystem health, improve biodiversity, and bolster the resilience of the region's wetlands in the face of climate change and urbanisation.</p> <p>An important component of the wetland management strategy is monitoring. The monitoring program would utilise both physical on-ground monitoring techniques such as floristic surveys as well as remote sensing techniques looking at changes in the wetlands over time in response to climate change.</p> <p>This should also include monitoring before, during, and after ICOLL entrance opening (artificial and natural), where practical – to help inform future updates to the Entrance Management Policy.</p>				
10	Study Area Wide	Sedimentation Process and Management Investigation	<p>This action will begin by developing a contemporary understanding of sedimentation patterns and rates within the lagoons, with a particular focus on major tributaries that contribute to sediment inflows. This will leverage off historical work undertaken for the 2008 Estuary Process Study, and will involve a detailed sediment transport study - incorporating historical data, hydrodynamic modelling, and field assessments to determine deposition hotspots and rates of accumulation over time. This may include strategic surveys of the lagoons in potential sedimentation hot spot areas, where considered appropriate.</p> <p>Understanding these patterns is critical to identifying long-term trends, potential impacts on water quality, and risks to lagoon health, including habitat degradation and reduced tidal exchange. The study should also consider historical dredging, and reclamation works across the study area and the local impacts that such works have had on sedimentation rates.</p> <p>In addition to quantifying sedimentation rates, the quality of accumulated sediment will be assessed to determine its composition and potential contaminants. This analysis will help identify any risks associated with nutrient loading, heavy metals, or other pollutants that may impact aquatic ecosystems. Based on these findings, management recommendations will be developed, outlining feasible strategies to mitigate excessive sedimentation, improve lagoon health, and enhance ecosystem resilience.</p> <p>One key outcome of this assessment will be determining whether dredging is a warranted and viable management option. Feasibility studies will consider environmental, economic, and logistical factors, ensuring that any intervention aligns with broader lagoon management objectives and minimizes ecological impacts.</p>	Council	DCCEEW	Alert	<ul style="list-style-type: none"> <li>Developed through Stage 3 technical review of sedimentation processes and historical studies of lagoon geomorphology.</li> <li>The option was further refined through feedback received during the CFG Workshops and community submissions.</li> </ul>
11	Study Area Wide	Introduction of "No Mow Zones" at targeted areas of public foreshore	<p>This includes the introduction of "No Mow Zones" at specific areas along the public foreshore. These zones are designated areas where mowing and other maintenance activities will be minimised or halted to promote natural vegetation growth and enhance the ecological health of the foreshore.</p> <p>This would be undertaken in combination with targeted planting of native riparian vegetation to accelerate vegetation recovery, improve habitat connectivity, and suppress invasive weeds.</p> <p>In addition, the program will include efforts to identify and address instances of encroachment by private landholders onto public foreshore land, ensuring public land boundaries are respected and the integrity of lagoon-edge habitats is maintained.</p>	Council	N/A	Active Intervention	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops in response to community observations regarding foreshore mowing practices and habitat disturbance.</li> <li>The concept was refined through subsequent CFG Workshop discussions to incorporate revegetation and foreshore restoration measures.</li> </ul>
12	Study Area Wide	Implement recommendations from the Gosford Creek and Lagoon Entrance Review (Salients 2019) where appropriate	<p>Implement recommendations from the Gosford Creek and Lagoon Entrance Review (Salients, 2019) where appropriate, including:</p> <ul style="list-style-type: none"> <li>Investigate possibility of incrementally raising the breakout levels, to enhance resilience to sea level rise and better protect threatened species and ecological communities</li> <li>Review of contemporary entrance management operations (triggers, methods, timing) to determine if any operational improvements are possible. Implementation should be flexible and adaptive, responding to ongoing monitoring, environmental conditions, and changing community flooding needs.</li> <li>Implement entrance clearance operations when appropriate with the view to redistribute sand within entrance compartments to improve access and mitigate coastal erosion risk.</li> </ul>	DCCEEW	DCCEEW DPIRD- Fisheries	Active Intervention	<ul style="list-style-type: none"> <li>Developed through Council engagement and informed by the Gosford Creek and Lagoon Entrance Review (Salients, 2019).</li> <li>The option was refined through discussions during CFG Workshops and community submissions regarding lagoon entrance management.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
			This approach recognises the dynamic nature of coastal lagoon systems and the need for responsive, evidence-based management that evolves over time.				
13	Study Area Wide	Council continue to support research which improves understanding of lagoon processes, threats and anthropogenic impacts in order to develop improved management practices	<p>Continue to contribute to research where it has the potential to increase the understanding of ICOLL function including entrance processes (hydrodynamic and morphological), ecology and nutrient dynamics. Where feasible, Council should:</p> <ul style="list-style-type: none"> <li>• Partner with universities and other research institutions to develop applied research projects that align with management priorities under the CMP</li> <li>• Provide in-kind support for high-priority research initiatives</li> <li>• Facilitate access to monitoring data and field sites</li> </ul> <p>Research supported under this initiative should prioritise:</p> <ul style="list-style-type: none"> <li>• Understanding the biological, chemical, and physical functioning of the lagoons</li> <li>• Investigating the impacts of urbanisation and development on biodiversity, water quality, and hydrological processes</li> <li>• Establishing clear cause-and-effect relationships to inform management responses</li> <li>• Addressing gaps in knowledge that directly relate to high-priority values and threats identified in the CMP</li> </ul> <p>Research outcomes will be integrated into CMP updates, monitoring frameworks, and on-ground actions, and shared with stakeholders through reports, forums, and other knowledge-sharing platforms.</p>	Council	Research Institutions	Alert	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and reviewed during Stage 3.</li> <li>▪ Discussions during CFG Workshops reinforced the importance of ongoing research partnerships to improve understanding of lagoon processes.</li> </ul>
14	Wamberal Lagoon	Develop and implement a holistic Foreshore Access Improvement Plan for the Southern Foreshore of Wamberal Lagoon	<p>The Foreshore Landscape Masterplan will guide the rehabilitation of key habitats and enhance recreational access across the lagoon and its foreshore while balancing environmental, social, and economic needs.</p> <p>Key Objectives:</p> <ul style="list-style-type: none"> <li>• Address uncontrolled access and encourage safe, sustainable recreation.</li> <li>• Improve public amenities to enhance visitor experience.</li> <li>• Protect and enhance wetland and lagoon vegetation for biodiversity.</li> <li>• Manage bank erosion and foreshore stability.</li> </ul> <p>Community ideas for the development of the FMP include:</p> <ul style="list-style-type: none"> <li>• Removal of frag rocks and old copper log car barriers along the full length of Remembrance Drive – replacement with better-suited car barriers that are in keeping with the natural environment, more aesthetically pleasing and take up less much-needed space for walkers</li> <li>• Concrete slabs (from old boat sheds) could be utilised to make way for comfortable seating (made from recycled plastics for durability).</li> <li>• Increased <i>Melaleuca quinquenervia</i> Paperbark trees, Casuarinas and <i>Juncus spp</i> (common rush) plantings along Remembrance Drive foreshore to assist erosion problems, foreshore protection and create more shade</li> <li>• Ensuring Remembrance Drive is placed on the CCC's Resealing Program – not the Pot Hole Repair Program – in line with keeping the surrounding environment as natural as possible by avoiding concrete kerbs, gutters and footpaths</li> <li>• Provision of a Shared Zone with reduced speed limits in Remembrance Drive to ensure safety</li> <li>• Removal of unsightly power poles and replacement with underground cables</li> <li>• Provision of a recycling bin near the picnic shed in Remembrance Drive</li> </ul>	Council	DCCEEW	Active Intervention	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and significantly refined through Stage 3 engagement.</li> <li>▪ Detailed input from Wamberal CFG members during the CFG Workshops and written submissions helped shape the scope of the master planning action.</li> </ul>
15	Terrigal Lagoon	Develop and implement a holistic Foreshore Access Improvement Plan for Terrigal Lagoon	<p>The Foreshore Landscape Masterplan will guide the rehabilitation of key habitats and enhance recreational access across the lagoon and its foreshore while balancing environmental, social, and economic needs.</p> <p>Key Objectives:</p> <ul style="list-style-type: none"> <li>• Address uncontrolled access and encourage safe, sustainable recreation.</li> <li>• Improve public amenities to enhance visitor experience – with a focus on local issues such as parking, access and amenities.</li> </ul>	Council	DCCEEW	Active Intervention	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and reviewed during Stage 3 engagement.</li> <li>▪ CFG Workshop discussions helped refine the scope of the master plan and identify local priorities for</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
			<ul style="list-style-type: none"> <li>• Protect and enhance wetland and lagoon vegetation for biodiversity – including the significance of wildlife corridors across the lagoon foreshore and catchment(s). This includes the use of bollards or <u>fencing</u> to protect sensitive vegetation areas along the northern and eastern foreshores.</li> <li>• Manage bank erosion and foreshore stability through vegetation planting and other nature based solutions.</li> </ul>				Terrigal Lagoon foreshore management.
16	Avoca Lagoon	Green and Golden Bell Frog research and habitat restoration.	<p>Opportunities to enhance breeding habitat sites for the Green and Golden Bell Frog (GGBF) adjacent to Avoca Lagoon and within the broader catchment will be investigated, including the outcomes and recommendations of - and building on - the extensive body of existing research and studies already undertaken in this area. Key activities will include:</p> <ul style="list-style-type: none"> <li>• Identifying suitable locations for the creation of dedicated breeding habitat, such as shallow freshwater ponds with appropriate water depth, hydroperiod, water quality, and shelter</li> <li>• Enhancing existing wetlands by improving hydrology, vegetation structure, and connectivity to support GGBF breeding and foraging</li> <li>• Establishing or strengthening buffer zones to minimise disturbance from urban development and reduce predation pressure</li> <li>• Assessing the feasibility of water level control structures to help maintain optimal conditions during critical breeding periods</li> <li>• Assess connectivity corridors to other nearby potential habitat,</li> </ul> <p>These efforts will be aligned with broader wetland restoration and conservation initiatives in the Avoca Lagoon catchment to maximise ecological outcomes and ensure integrated management. Ongoing population monitoring will continue in collaboration with researchers, Council staff, and local community groups. Citizen science initiatives will be actively encouraged, including training and support for volunteers to participate in frog call surveys, habitat assessments, and data collection. This community involvement will improve the spatial and temporal resolution of monitoring data, foster local stewardship, and build awareness of the GGBF’s conservation needs. An adaptive management approach will be adopted, using monitoring results to refine conservation strategies. Findings will contribute to long-term conservation planning and inform future management decisions for Avoca Lagoon and surrounding wetland ecosystems. This Action will link to a similar action in the Hawkesbury Nepean River System CMP – to ensure that GGBF management is focussed on the regional populations of the species.</p>	Council	DPIRD-Fisheries	Alert	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and informed by recent research on Green and Golden Bell Frog populations.</li> <li>▪ Discussions during CFG Workshops helped identify habitat restoration opportunities within the Avoca Lagoon catchment.</li> </ul>
17	Avoca Lagoon	Dredge hole rehabilitation feasibility investigation	<p>This would include a feasibility investigation into the rehabilitation of the Avoca Lagoon dredge hole, with the goal of restoring a more stable and ecologically functional lagoon bed. The primary objectives of this investigation include:</p> <ul style="list-style-type: none"> <li>• Undertaking a contemporary bathymetric survey, and assessing the current condition of the dredged hole and identifying areas that require rehabilitation.</li> <li>• Reviewing historical dredging records and sediment transport processes to understand the original dredging impacts and natural infill trends.</li> <li>• Evaluating the potential methods for re-filling dredge holes to ensure a stable and even lagoon bed (including required equipment and associated costs).</li> <li>• Investigating the environmental impact of bed modification works and re-filling activities on the lagoon's ecosystem - including hydrodynamics, benthic habitats, and water quality.</li> <li>• Identifying suitable sediment sources for re-filling, including potential reuse of dredged material from Avoca Beach or other external sources.</li> <li>• Developing a comprehensive plan for the rehabilitation process, including timelines, resource allocation, and potential challenges.</li> </ul> <p>This would also include engaging with stakeholders, including local communities and environmental</p>	Council	DCCEEW DPIRD-Fisheries	Alert	<ul style="list-style-type: none"> <li>▪ Generated through the CFG Workshops and refined through later CFG Workshop discussions and internal Council engagement.</li> <li>▪ The option reflects community interest in exploring rehabilitation opportunities for the Avoca Lagoon dredge hole.</li> </ul>



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			experts, to gather input and ensure the proposed actions align with broader environmental and recreational goals				
18	Avoca Lagoon	Develop and Implement an Algae Management Strategy for Avoca Lagoon	<p>This strategy should build on the findings of current Council-funded research into the drivers of algal growth in the lagoon and its role in the lake's nutrient budget. Algal harvesting is proposed to help manage the adverse effects of blooms, including reduced recreational amenity and post-bloom anoxic events that elevate biological oxygen demand. It is acknowledged that harvesting is a symptom management tool and will be complementary to long-term nutrient load reduction strategies identified in this CMP. However, any harvesting approach should also account for the ecological value of algal presence, which includes:</p> <ul style="list-style-type: none"> <li>• Providing structure for colonization and habitat provision.</li> <li>• Serving as a food source for water birds, particularly swans.</li> <li>• Offering spawning grounds, shelter, and refuge from predators for juvenile fish species and benthic invertebrates.</li> </ul> <p>Targeted algal removal has been successfully implemented in Tuggerah Lake and Lake Illawarra, particularly for <i>Chaetomorpha linum</i> blooms. Current harvesting techniques include the use of floating harvesters in water depths greater than 0.5 metres and front-end loaders in shallower areas. Lagoon entrance management may also influence algal dynamics and should be integrated into future planning. Removal efforts should prioritise public-use foreshore areas where algal mats extend more than 20 metres from the water's edge—especially ahead of peak holiday periods—to preserve visual and recreational amenity.</p> <p>Council should develop a clear, evidence based policy to guide algal removal and disposal that adheres to ecological best practice, ensuring it is both effective and sensitive to the ecological integrity of the lagoon bed. This includes minimising disturbance to lagoon bed habitats, using appropriate dewatering and composting or reuse methods, and monitoring ecological outcomes to support adaptive management. Key elements of the strategy should include:</p> <ul style="list-style-type: none"> <li>• Integration with catchment nutrient reduction efforts, recognising harvesting as a complementary symptom-management approach</li> <li>• Clear prioritisation of high-use foreshore areas, especially before peak holiday periods</li> <li>• Monitoring protocols to assess effectiveness (e.g. nutrient removal, community satisfaction) and detect unintended ecological impacts</li> <li>• Community engagement and communications, to build understanding and support for the approach</li> </ul>	Council	DPIRD-Fisheries	Alert	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and updated during Stage 3.</li> <li>▪ Discussions during the CFG Workshops helped refine the concept of a structured algae management strategy for Avoca Lagoon.</li> </ul>
19	Avoca Lagoon	Develop and implement a holistic Foreshore Access Improvement Plan for Avoca Lagoon	<p>The Foreshore Landscape Masterplan will guide the rehabilitation of key habitats and enhance recreational access across the lagoon and its foreshore while balancing environmental, social, and economic needs. Key objectives are:</p> <ul style="list-style-type: none"> <li>• Improve public amenities to enhance visitor experience - including the potential to install unpowered craft launch facilities (such as kayaks ramps) which can help mitigate bank erosion. This may include upgrade of safe waterway access at Heazlett Park.</li> <li>• Consideration of overland drainage from the carpark and commercial area to the east of Heazlett Park.</li> <li>• Improve public amenities to enhance visitor experience.</li> <li>• Landscaping and green space design</li> <li>• Protect and enhance wetland and lagoon vegetation for biodiversity. This may include succession planting to address die back of casuarinas, linking to the management of Coastal Open Space System (COSS) lands that are adjacent to lagoons</li> <li>• Manage bank erosion and foreshore stability - specifically of the downstream estuary foreshores impacted by entrance instability.</li> </ul>	Council	DCCEEW	Active Intervention	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and reviewed during Stage 3 engagement.</li> <li>▪ Feedback during CFG Workshops helped identify site-specific improvements for Avoca Lagoon foreshore management.</li> </ul>



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20	Cockrone Lagoon	Develop and implement a holistic Foreshore Access Improvement Plan for Cockrone Lagoon	<p>The Foreshore Landscape Masterplan will guide the rehabilitation of key habitats and enhance recreational access across the lagoon and its foreshore while balancing environmental, social, and economic needs. Key objectives are:</p> <ul style="list-style-type: none"> <li>• Improving safe access to (and along) the estuary foreshore. This includes upgrades of existing pedestrian accessways and walking tracks – and provisions to include all-abilities access to the foreshore where possible.</li> <li>• This could also include installation of unpowered craft launch facilities (such as kayak ramps) which can help mitigate bank erosion, as well as storage facilities such as racks for kayaks and other watercraft.</li> <li>• Improve public amenities to enhance visitor experience – which may include restroom facilities at key locations, and the provision of bins and dog waste bags</li> <li>• Landscaping and green space design</li> <li>• Protect and enhance wetland and lagoon vegetation for biodiversity – this could include measures to help keep dogs out of protected wetland areas where appropriate.</li> <li>• Maintenance of the southern foreshore rock revetment - in order to prolong its useful life. This would also include a small (20m) eastwards extension of the existing rock revetment – in order to prevent entrance instability impacting upon the public reserve at 1 Tudibaring Parade.</li> </ul>	Council	DCCEEW	Active Intervention	<ul style="list-style-type: none"> <li>▪ Carried forward from the previous CZMP and reviewed during Stage 3 engagement. Input from CFG</li> <li>▪ Workshops and internal Council engagement helped refine access improvements and foreshore stabilisation measures.</li> </ul>
21	Study Area Wide	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	<p>Enhance the involvement of First Nations peoples in the stewardship and management of the estuary systems and their catchment by building strong, collaborative partnerships with First Nations Ranger Groups and Bush Regeneration Teams. This approach aims to integrate traditional knowledge and contemporary conservation practices for sustainable environmental management. This would include:</p> <ul style="list-style-type: none"> <li>• Identify key First Nations Ranger Groups and Bush Regeneration Teams that are active in the region. Initiate dialogues to understand their perspectives, goals, and areas of expertise.</li> <li>• Engage teams where appropriate to undertake bush regeneration works including weeding and revegetation</li> <li>• Provide training and capacity-building opportunities to First Nations Rangers and community members. This can include workshops on estuary management, ecological monitoring, and restoration techniques. Note that this action would not exclude non-First Nations bush regeneration companies from Council procurement processes</li> </ul>	Council	First Nations Groups NPWS	Active Intervention	<ul style="list-style-type: none"> <li>▪ Developed through engagement with First Nations representatives during Stage 3. The action reflects opportunities identified through consultation to involve First Nations groups in on-ground rehabilitation works.</li> </ul>
22	Study Area Wide	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	<p>Develop and implement a program of Indigenous cultural education activities within the study area. The objective is to increase community awareness and appreciation of the Indigenous cultural heritage values of the estuary and Indigenous management practices around our coastal lagoons.</p>	Council	First Nations Groups NPWS	Alert	<ul style="list-style-type: none"> <li>▪ Developed through engagement with First Nations representatives during Stage 3. The action supports increased community awareness of Indigenous cultural heritage associated with the lagoon systems.</li> </ul>
23	Study Area Wide	Support cultural education and awareness of estuary health issues for First Nations Groups	<p>Provide funding and technical support for the development of a coordinated program of cultural education activities that are designed to enable local First Nations groups to further their understanding and awareness of key estuary health issues and associated management approaches. The objective of these activities are to increase First Nations participation in catchment and estuary management.</p>	Council	First Nations Groups NPWS	Alert	<ul style="list-style-type: none"> <li>▪ Developed through engagement with First Nations representatives during Stage 3 to support increased participation of Aboriginal communities in lagoon management and environmental education programs.</li> </ul>



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24	Study Area Wide	Identify opportunities for, and undertake cultural land management practices, including cultural burning	Council should engage with local First Nations groups to identify opportunities for and undertake cultural practices (including cultural burning) across the lagoon catchments. This would involve the Council working closely with NPWS and local First Nations Groups to develop and implement appropriately.	Council	First Nations Groups NPWS	Active Intervention	<ul style="list-style-type: none"> <li>Developed through engagement with First Nations representatives during Stage 3 and informed by discussions regarding cultural land management practices within coastal catchments.</li> </ul>
25	Study Area Wide	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	<p>This action involves engaging with the relevant First Nations Groups to protect and preserve Aboriginal Cultural Heritage (ACH) items within the lagoon catchments. It is anticipated that there would be four main tasks for this action:</p> <ul style="list-style-type: none"> <li>• Consultation with the relevant First Nations Groups.</li> <li>• A literature review of existing ACH databases (such as AHIMS) and existing cultural heritage plans</li> <li>• An Aboriginal cultural heritage survey, which should include field work, and recording of cultural heritage sites (such as middens sites) and detailed documentation of findings.</li> <li>• The development and prioritisation of local, site specific management plans for protection and preservation of sites exposed to coastal hazard risk.</li> </ul>	Council	First Nations Groups NPWS	Active Intervention	<ul style="list-style-type: none"> <li>Developed through engagement with First Nations representatives and informed by existing cultural heritage studies. The action responds to the need to better document and protect Aboriginal cultural heritage sites within lagoon catchments.</li> </ul>
26	Study Area Wide	Undertake a habitat assessment and develop a targeted management plan for flying-fox populations, with a focus on the Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> ).	<p>This action involves a detailed habitat assessment and the development of a targeted management plan for flying-fox populations, with a focus on the Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>). The goal is to improve ecological understanding, support species conservation, and guide land use and environmental planning in areas where flying-fox populations are known to occur or may be affected by future development or climate pressures.</p> <p>This action should include mapping of current roosting and foraging sites, assessment of habitat condition, and identification of potential areas for long-term habitat protection or enhancement—particularly where <i>Corymbia glauca</i> (<i>C. glauca</i>) forms a key part of the canopy.</p> <p>Ongoing monitoring of population trends and habitat use is essential to inform adaptive management responses, ensure protection of this threatened species, and guide planning for future urban and environmental pressures.</p> <p>The development of the plan should actively involve local residents and wildlife carers to understand local issues and values, and ensure the management approach balances conservation, amenity, and public expectations.</p>	Council	NPWS	Active Intervention	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops in response to community observations regarding flying-fox habitat and population changes.</li> <li>Internal Council discussions helped refine the scope of the proposed habitat assessment.</li> </ul>
27	Study Area Wide	Introduce area-specific Development Control Plan (DCP) provisions for lakefront properties to strengthen foreshore protection through the development assessment (DA) process.	<p>Introduce tailored Development Control Plan (DCP) provisions for lakefront properties to strengthen foreshore protection through the development assessment (DA) process. These provisions would help manage cumulative impacts on lagoon-edge environments while increasing resilience to climate change and long-term shoreline change.</p> <p>Key considerations should include:</p> <ul style="list-style-type: none"> <li>• The establishment and maintenance of riparian vegetation buffers along private foreshore boundaries.</li> <li>• Providing guidance for landholders on the selection and maintenance of native vegetation — with emphasis on species that are resilient to drought, inundation, and saltwater exposure.</li> <li>• Consideration of future climate change impacts on foreshore vegetation.</li> <li>• Include appropriate sediment and erosion controls in accordance with the State Governments “Blue Book” – to protect the sediment load in the lakes.</li> </ul> <p>These controls would support improved water quality, bank stability, and habitat connectivity, and could be directly linked to broader riparian restoration efforts outlined in Actions 11 and 15. Guidance should also be</p>	Council	N/A	Avoid Future Impact	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops and refined through later CFG Workshop discussions and internal Council engagement.</li> <li>The option reflects community interest in strengthening planning controls for lagoon-edge development.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
			developed to assist landholders in selecting appropriate native species and maintaining vegetated buffers over time.				
28	Study Area Wide	Install historic flood markers at key locations around the lagoons to indicate past flood heights.	Install historic flood markers at key locations around the lagoons to indicate past flood heights. These markers will serve as a visual and educational tool to raise community awareness about flood risk and lagoon behaviour during extreme weather events. Locations should be selected for high visibility and accessibility - such as public reserves, walking paths, and accessways - and include interpretive signage to explain the date and cause of the recorded flood, its impacts, and how it relates to projected future risks under climate change.	Council	DCCEEW	Alert	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops as a community awareness initiative aimed at improving understanding of flood behaviour and lagoon dynamics during extreme coastal and catchment inundation events.</li> </ul>
29	Terrigal and Wamberal Lagoons	Consider potential impacts of the Wamberal Seawall on the coastal processes at Wamberal and Terrigal Lagoons	Assess the potential impacts of any coastal protection works which may affect the entrance dynamics, hydrodynamics and ecosystems of the coastal lagoons. This should consider the whole suite of options available to address coastal erosion hazards on the open coast along the Terrigal-Wamberal, Avoca-North Avoca and Macmasters-Copacabana beaches. This study should consider current and future risks at appropriate planning horizons including but not limited to the impacts of climate change. Outputs of this study should be used to inform future iterations of Coastal Management Programs and projects or programs seeking to implement coastal protection works.	Council	DCCEEW	Alert	<ul style="list-style-type: none"> <li>Developed through the CFG Workshops and informed by written submissions from Wamberal and Terrigal CFG representatives.</li> <li>The option reflects community concerns regarding potential interactions between open coast management and lagoon processes.</li> </ul>
30	Study Area Wide	Support Regional Invasive Fauna Management with LLS	This option would involve Council liaising with NSW Local Land Services (LLS) to support coordinated management of invasive predators -particularly foxes, deer, and domestic and feral cats - across the catchments of the study area lagoons. This will include identifying priority areas for control, sharing data and observations, and aligning timing of on-ground efforts with broader catchment-wide programs. The aim is to reduce predation pressure on native fauna, particularly ground-nesting birds, frogs and other vulnerable lagoon-dependent species. This Action should be undertaken in alignment with the Regional Strategic Pest Animal Management Plan 2024-2028 (NSW LLS), which states Councils responsibilities in this area include: <ul style="list-style-type: none"> <li>Administer and enforce the Companion Animals Act 1998, including microchipping and registration</li> <li>Ensure all domestic cats are treated humanely and their welfare needs are met</li> <li>Promote responsible cat ownership, including desexing</li> <li>Respond to complaints about stray and nuisance domestic cats</li> <li>Impound and euthanise domestic cats that pose a threat to the public</li> </ul> Encourage the local community and relevant land managers to report invasive fauna sightings using FeralScan, to improve regional data and inform more effective, targeted control efforts.	Council	LLS	Active Intervention	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops and refined through later discussions regarding invasive fauna management within lagoon catchments.</li> </ul>
31	Study Area Wide	Develop a Community Monitoring Program for Lagoon Birdlife	This option would involve Council developing a citizen science program to engage the community in monitoring important wetland bird species, including threatened and migratory shorebirds that rely on the lagoons for habitat. This program will aim to increase public awareness of the ecological significance of the lagoons, build local capacity to contribute to long-term data collection, and strengthen conservation outcomes through improved understanding of bird presence, habitat use, and seasonal patterns. Activities may include volunteer bird surveys, photo monitoring, training workshops, and partnerships with local birding groups, schools, and conservation organisations. Data collected will be shared with relevant agencies and used to inform ongoing lagoon management and habitat protection initiatives. The action would include engagement with relevant community groups, such as the Central Coast Birders, and well as Non-Government Organisations, such as Birding NSW.	Council	DCCEEW	Alert	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops, where participants highlighted opportunities for citizen science programs to support bird monitoring and habitat protection.</li> </ul>
32	Study Area Wide	Develop and execute a communications	Develop a communications plan for the 10-year implementation phase of the CMP. This will include maintenance of the Council's web page for the CMP, to provide the community with the following	Council	DCCEEW	Alert	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops and refined through internal Council engagement.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
		plan for Stage 5 of the CMP	information: <ul style="list-style-type: none"> <li>The CMP background, and an overview of the NSW Coastal Management Framework.</li> <li>Key CMP information, including reports available for public consumption.</li> <li>The Status of CMP actions, with details of the actions and recent updates/progress.</li> <li>Outputs of the various monitoring programs undertaken as part of the CMP (including water quality monitoring)</li> <li>Links to relevant materials such as The NSW Coastal Management Framework, and the Marine Estate Management Strategy.</li> </ul> This may also include the ongoing social media presence, mailing lists and newsletters publishing.				<ul style="list-style-type: none"> <li>The action supports communication and transparency during the implementation phase of the CMP.</li> </ul>
33	Avoca Lagoon	Trial Installation of Water Quality Autosampler in Avoca Lagoon Catchment	<p>Council will install and operate an automated water quality sampler in the Avoca Lagoon catchment for a 12-month trial period. The device will be programmed to collect water samples when it is not possible to collect them manually - such as during significant rainfall and stormwater runoff events. This allows for the capture of important data regarding the behaviour of the catchment (and nutrient concentrations including TN, TKN, NH<sub>3</sub>, NOx, TP and SRP) in response to rainfall events.</p> <p>The autosampler will be strategically located to align with existing research by the NSW Government and the University of Newcastle. This will ensure that the collected data complements broader scientific efforts to understand nutrient dynamics and sources within the catchment.</p> <p>The data collected will improve the evidence base for managing nutrient inputs into the lagoon, support modelling of catchment nutrient loads, and help identify key pollutant pathways. These insights will inform future management actions to improve water quality and reduce the risk of algal blooms and other ecological impacts. If the trial proves to be effective and value for money, the program may be extended to support long-term monitoring and adaptive management.</p>	Council	DCCEEW	Alert	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops and informed by ongoing research into nutrient dynamics within the Avoca Lagoon catchment.</li> </ul>
34	Wamberal Lagoon	Develop a Memorandum of Understanding (MoU) Between Central Coast Council and NPWS for Wamberal Lagoon Management	<p>Council would work with NSW National Parks and Wildlife Service (NPWS) to establish a Memorandum of Understanding (MoU) to clarify roles and responsibilities for managing Wamberal Lagoon. The MoU would promote coordinated implementation of best-practice actions under the Lagoon's Plan of Management, including ecological management, entrance works, pest control, and community engagement.</p> <p>The MoU will also formalise information and data sharing protocols, enabling more effective decision-making, aligned monitoring efforts, and improved responsiveness to emerging environmental and operational issues.</p>	Council NPWS	DCCEEW	Alert	<ul style="list-style-type: none"> <li>Developed in response to written submissions from Wamberal CFG members and refined through discussions during the CFG Workshops.</li> </ul>
35	Wamberal Lagoon	Fishing closure of Wamberal Lagoon	<p>This option would involve NSW DPIRD-Fisheries declaring a fishing closure for Wamberal Lagoon under Section 8 of the Fisheries Management Act 1994. This provision enables the prohibition or restriction of taking or possessing fish in a specified area to protect fish stocks, aquatic ecosystems, and sensitive habitats. A closure of this kind would support the ecological values of the lagoon - particularly its role as a bird sanctuary and nature reserve - by reducing disturbance, improving water quality, and enhancing habitat protection for vulnerable and migratory species.</p>	DPIRD-Fisheries	Council	Avoid Future Impact	<ul style="list-style-type: none"> <li>Developed in response to written submissions from Wamberal community representatives during Stage 3 engagement.</li> </ul>
36	Study Area Wide	Undertake Ecosystem Services Valuation for the Central Coast Lagoons	<p>The CMP recognises biodiversity and recreational values - but quantifying the economic benefits of lagoon ecosystem services (e.g. flood mitigation, carbon storage, water filtration, mental health, tourism) can build a stronger case for funding, policy alignment, and community buy-in.</p> <p>Engage with environmental economists and universities to quantify the value of ecosystem services provided by the lagoons. This includes tangible (e.g. flood buffering, avoided infrastructure damage) and intangible services (e.g. cultural and mental health benefits). Outputs could include spatial valuation maps and communication tools to support future investment decisions, grant applications, and planning</p>	Council	DCCEEW	Alert	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops and refined through discussions regarding the value of ecosystem services in supporting future funding and policy decisions.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
			instruments. The Action could also be rolled into Option 13, as a focus for academic research				
37	Study Area Wide	Assess and Manage Light and Noise Pollution Impacts on Lagoon Ecology	Artificial light and noise from urban areas, roads, and recreational use can disturb wildlife, especially nocturnal and sensitive lagoon species like frogs, waterbirds, and bats. Light spill near roosting or breeding areas can alter behaviour, suppress breeding, and disrupt natural rhythms. This option would involve undertaking an audit of artificial lighting and noise sources across all lagoon foreshores and adjacent land uses. Identify high-sensitivity areas (e.g. frog breeding ponds, bird roosts, flying-fox camps), and develop guidelines or design interventions to minimise ecological impacts — such as low-glare, directional lighting, curfews, or vegetative buffers. Include a community education component to reduce light pollution on private land adjacent to ecologically sensitive zones. The outcomes of this work could be included into an existing, or new Development Control Plan to help embed the outcomes of the assessment into regulated conditions of development consent (for certain kinds of development). The Action could also be rolled into Option 13, as a focus for academic research.	Council	DCCEEW DPIRD- Fisheries	Alert	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops and further refined through internal Council engagement to identify potential planning and design responses.</li> </ul>
38	Study Area Wide	Assess and Address the Impact of Private Structures on Lagoon Foreshores	In many of the lagoons, informal or legacy private jetties, boat ramps, paths or drains exist on public or riparian land, often contributing to bank erosion or weed spread. This is a common community concern. Undertake an audit of existing private and semi-private structures on or adjacent to lagoon foreshores. Identify unauthorised structures, assess impacts, and prioritise actions for removal, regularisation, or retrofitting with low-impact alternatives. Support with an education campaign on property boundaries, erosion, and bank stabilisation.	Council	DCCEEW DPIRD- Fisheries	Active Intervention	<ul style="list-style-type: none"> <li>Generated through the CFG Workshops in response to recurring community concerns regarding private structures and their impacts on lagoon foreshores.</li> </ul>
39	Avoca Lagoon	Investigate the Feasibility of Constructing a Water Treatment Wetland in the Southern Arm of Avoca Lagoon	This action proposes to investigate the potential for constructing an in-lagoon water treatment wetland within the southern arm of Avoca Lagoon, particularly near the outfall of Bowtells Drain. Due to limited space within the upstream catchment for land-based water quality treatment, this action would assess the viability of using floating treatment wetlands, targeted sediment reworking, and nearshore reclamation to establish wetland areas within the lagoon itself. The feasibility study will assess the ecological, hydraulic, engineering, social, and economic considerations associated with establishing constructed wetland features within the lagoon. This may include the use of wetland “fingers” or extensions projecting perpendicular from the southern shoreline to: <ul style="list-style-type: none"> <li>Enhance hydraulic complexity</li> <li>Promote sediment deposition</li> <li>Reduce wind-induced shear stress, a known driver of elevated turbidity in this are</li> </ul> By altering local hydrodynamics and encouraging natural treatment processes, the intervention has potential to improve water clarity, reduce nutrient loads, and enhance the ecological function of the southern lagoon. Any future design and implementation would be subject to detailed environmental assessment, community consultation, and regulatory approvals	Council	DCCEEW DPIRD- Fisheries	Active Intervention	<ul style="list-style-type: none"> <li>Developed through Council engagement and Stage 3 technical analysis of water quality issues within the Avoca Lagoon catchment.</li> <li>The concept was refined through discussions during the CFG Workshops and internal Council engagement.</li> </ul>
40	Study Area Wide	European and Archaeological Heritage Management	There appears to be a gap in the consideration of European and archaeological heritage across the coastal lagoons. This Option would therefore include the protection, maintenance, and management of identified heritage items and sites. Where this cannot be achieved, a hierarchy or set of criteria should be developed to guide alternative approaches (e.g. salvage, heritage interpretation). In addition, review approval processes to identify how they could be streamlined or better aligned with existing conservation management planning frameworks.	Council	Heritage NSW	Active Intervention	<ul style="list-style-type: none"> <li>Identified during internal Council engagement sessions as a gap in the consideration of European and archaeological heritage values across the lagoon systems.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
41	Study Area Wide	Environmental Protection Works	<p>This action is intended to enable Environmental Protection Works (EPW) to be undertaken in Coastal Wetland and Littoral Rainforest Areas (as defined by clause 10 of the RH SEPP) within the Study Area by Public Authorities under Part 5, of the Environmental Planning and Assessment Act 1979 (EP&amp;A Act). The following notes apply to this action (Cardno, 2019a):</p> <ul style="list-style-type: none"> <li>• EPW include those works that would meet the definition in the LEP, that is: “environmental protection works means works associated with the rehabilitation of land towards its natural state or any work to protect land from environmental degradation, and includes bush regeneration works, wetland protection works, erosion protection works, dune restoration works and the like, but does not include coastal protection works”;</li> <li>• EPW can also include minor ground cultivation (where there is no risk of disturbing Acid Sulfate Soils) to support tree planting/regeneration.</li> <li>• EPW are typical activities undertaken by public authorities on an as needs basis as part of their general environmental management works;</li> <li>• An important consideration for any vegetation removal in the Coastal Wetland and Littoral Rainforest Area (which may form part of EPW), is that it may trigger a Biodiversity Development Assessment Report (BDAR) under the BC Act (this does not include marine vegetation protected under the Fisheries Management Act 1994).</li> <li>• Other works not including EPW in the Coastal Wetland and Littoral Rainforest Area would be deemed Designated Development under the EP&amp;A Act.</li> </ul> <p>The primary intent of the works must be other than for coastal protection. For example, the works may be intended to protect the health of a waterway by preventing erosion and sedimentation, to re-establish riparian vegetation and/or improve its growth and retention, to provide fish habitat, etc.</p>	Council	DCCEEW DPIRD- Fisheries NPWS DPHI-Crown Lands	Active Intervention	<ul style="list-style-type: none"> <li>▪ Developed through internal Council engagement to clarify opportunities for environmental protection works within Coastal Wetland and Littoral Rainforest areas.</li> </ul>
42	Terrigal Lagoon	Road Raising at Lakeview Drive	<p>Inspection of topographic road survey data and tidal inundation mapping has identified that approximately 250 m of Lakeview Drive (along the eastern foreshore of the Lake) is currently subject to sunny-day tidal inundation. The magnitude and frequency of inundation are projected to increase over coming decades with future sea level rise. Therefore, road raising will be required in order to maintain safe all-tide vehicle access in the future. Works would include:</p> <ul style="list-style-type: none"> <li>• Raising the existing road crest above the current and projected tidal inundation levels (from +1.2 m AHD to +1.5 m AHD – a crest level increase of around +0.3 m). This should incorporate design allowances for future adaptation to additional sea level rise over the asset’s design life.</li> <li>• Upgrading subgrade and pavement materials to suit higher moisture and salinity exposure.</li> <li>• Installing improved surface and subsurface drainage to manage local ponding and runoff.</li> </ul> <p>These works will improve public safety, maintain access for residents and service vehicles, and enhance the long-term resilience of local infrastructure to coastal hazards.</p>	Council	DCCEEW	Active Intervention	<ul style="list-style-type: none"> <li>▪ Identified through internal Council engagement based on infrastructure vulnerability mapping and known tidal inundation risks along Lakeview Drive.</li> </ul>
43	Study Area Wide	Develop and Implement a Program to Incentivise Environmentally Responsible Development Practices	<p>There is an opportunity to encourage improved environmental performance by developers and the construction industry through a structured incentive and compliance program. This initiative would seek to embed environmental best practice within Development Control Plan (DCP) construction requirements and broader development processes. The program could include the following components:</p> <ul style="list-style-type: none"> <li>• Induction and Education – Deliver targeted induction sessions for developers, planners, and contractors to improve understanding of local environmental objectives, DCP requirements, and construction controls.</li> <li>• Compliance Resourcing – Strengthen compliance capacity within Council to monitor and support environmentally responsible site practices, supported by mechanisms such as discounted developer contributions or refundable deposits for compliance.</li> <li>• Incentivisation Framework – Introduce financial or procedural incentives (e.g. reduced contributions,</li> </ul>	Council	DCCEEW DPIRD- Fisheries NPWS	Active Intervention	<ul style="list-style-type: none"> <li>▪ Developed through internal Council engagement to encourage improved environmental performance in development and construction practices across lagoon catchments.</li> </ul>



ID	Locality	Action Name	Action Description	Lead	Support	CM Manual Approach	Option Development Summary
			<p>refundable levies) for developers who demonstrate compliance or exceed environmental standards.</p> <ul style="list-style-type: none"> <li>• Recognition and Awards – Establish non-financial recognition, such as annual developer awards or public acknowledgment, for projects that achieve high environmental performance against agreed criteria.</li> </ul> <p>This action aims to improve environmental outcomes through collaboration with the development sector, while reinforcing compliance and rewarding best practice in sustainable construction and site management.</p>				
44	Study Area Wide	Retrofit Stormwater Outlets with One-Way Valves to Prevent Tidal Backflow	<p>Several low-lying stormwater outlets within the estuary are subject to tidal backflow during high tides, leading to localised flooding, ponding, and saltwater intrusion into the drainage network. The frequency and extent of these issues are expected to increase under future sea level rise conditions.</p> <p>This action involves identifying priority stormwater outlets for retrofitting with one-way tide-flex or flap valves to prevent saltwater ingress during elevated tidal events while maintaining normal drainage capacity during low tides.</p> <p>Implementation steps may include:</p> <ul style="list-style-type: none"> <li>• Mapping and inspection of existing stormwater outlets to identify locations at risk of tidal backflow.</li> <li>• Hydraulic assessment to confirm design levels, valve suitability, and maintenance requirements.</li> <li>• Staged retrofit program focusing on high-risk areas (e.g. low-lying roads, drainage pits near foreshore reserves, and known nuisance flooding locations).</li> <li>• Integration of the retrofit program with Council’s broader asset maintenance and capital works schedules.</li> </ul> <p>The works will reduce nuisance flooding, limit saline intrusion into the drainage network, and improve infrastructure resilience to sea level rise and tidal inundation.</p>	Council	N/A	Active Intervention	<ul style="list-style-type: none"> <li>▪ Identified through internal Council engagement in response to known stormwater infrastructure issues related to tidal backflow and nuisance flooding.</li> </ul>
45	Study Area Wide	Undertake a Planning Proposal to Amend the RH SEPP Coastal Environment Area Mapping	<p>This action involves preparing and progressing a planning proposal to amend the Coastal Environment Area mapping under the Resilience and Hazards State Environmental Planning Policy so that, for each of the CCL, the mapped Coastal Environment Area aligns more closely with the full hydrologic catchment boundary rather than the current foreshore-based buffer. The purpose of this action is to better align the coastal planning framework with the catchment-scale processes that influence lagoon health, including water quality, sediment transport, vegetation disturbance and hydrologic modification. By extending the mapped Coastal Environment Area, future development assessment within the catchment would be better able to consider impacts on lagoon condition and long-term estuary health.</p> <p>This action would include:</p> <ul style="list-style-type: none"> <li>▪ Review and confirmation of existing Coastal Environment Area mapping and catchment boundaries for each lagoon</li> <li>▪ Preparation of technical justification for the proposed amendment, including environmental, hydrologic and planning rationale</li> <li>▪ Consultation with relevant State agencies regarding process, requirements and implementation considerations</li> <li>▪ Preparation and progression of a formal planning proposal in accordance with statutory requirements.</li> </ul> <p>Importantly, this action does not itself amend the mapping. Rather, it commits Council to investigating and progressing the planning pathway required to achieve this change.</p>	Council	DCCEEW, DPHI – Planning and Assessment	Avoid Future Impact	<ul style="list-style-type: none"> <li>▪ Developed in response to the recognised role of catchment-based stressors in lagoon health and the limitations of the current coastal zone boundary under the CMP framework.</li> <li>▪ Informed by technical review undertaken during Stage 3 and discussions with DCCEEW and DPHI.</li> <li>▪ Supported by precedent for catchment-scale Coastal Environment Area mapping for lagoon systems elsewhere in NSW.</li> </ul>



## 6.3 Feasibility Assessment

### 6.3.1 Overview

As per the NSW Coastal Management Manual (OEH, 2018d), feasible coastal management options are those which are:

- Consistent with the objects of the relevant legislation (including the *Coastal Management Act 2016*, the *Marine Estate Management Act 2014*).
- Consistent with statutory and policy requirements at local, state and Commonwealth levels.
- Environmentally acceptable and consistent with Ecologically Sustainable Development (ESD) principles.
- Feasible in engineering / management terms, i.e., can the option(s) be realistically implemented, given the local social and environmental context.
- Able to address the identified issues, mitigating risks or enhancing opportunities, based on previous experience.
- Adaptive and can transition to alternative approaches when circumstances change.
- Broadly able to be implemented, in terms of available capacity and capability.
- Able to contribute new knowledge about effective management; for instance, a response that is structured as a carefully controlled trial of new technology.

The development of the long list of options was thereby undertaken with regards to the above. The feasibility assessment investigated how each option met the above requirements, and the ability for each option to address the various risks and opportunities across the study area.

Importantly, the feasibility assessment framework applied in this CMP has been intentionally designed to align with the methodology adopted for the Hawkesbury-Nepean River System CMP. Applying a consistent approach across Council's estuarine CMPs provides a common evaluation framework for comparing, prioritising and implementing management actions across multiple estuary systems. This consistency supports clearer decision-making, improves transparency for stakeholders, and allows Council to apply a more coordinated and strategic approach to coastal and estuary management across the LGA.

### 6.3.2 Multi Criteria Analysis Methodology

The feasibility assessment was designed to provide an indicative measure of each potential management option's ability to address the identified risks and capitalise on opportunities across the study area (as outlined in Stage 2 of the CMP). This included both direct and indirect contributions to risk reduction and broader management objectives. To ensure a consistent, transparent, and easily understood approach for comparing diverse options, a high-level, semi-quantitative multi-criteria analysis (MCA) framework was applied.

Under this framework, each option was assessed against a defined set of criteria and assigned a numerical score, allowing for a semi-quantified comparison across all options. The outcome of this process was the calculation of a Total Feasibility Score (TFS), which enabled a ranking of options based on their overall merit and feasibility for implementation.

A summary of this methodology is provided in Figure 6-2. Each option was evaluated against the following key criteria:

- **The Degree of Risk Mitigation:** This criterion assessed how effectively each option reduces risks identified in Stages 1 and 2 of the CMP. It considered:



- The level of risk being addressed – for example, does the option mitigate an extreme risk to public safety or a moderate risk to estuary health?
- The effectiveness of the option – assessing whether the option provides a long-term or short-term solution, and the degree to which it mitigates the target risk.
- ***Potential Impacts on Environmental, Social, and Cultural Values:*** This considered the broader implications of each option, recognising that effective coastal management must balance risk reduction with the protection and enhancement of key community values. Options were scored based on potential positive or negative impacts in the following areas (which were adopted to broadly align with the “Key Estuary Threats” identified in the Stage 1 Scoping Study (Royal Haskoning, 2021):
  - Water Quality – including stormwater runoff, estuarine water quality, and potential for pollution reduction.
  - Biodiversity – including habitat protection and enhancement for native species and ecological communities.
  - Physical coastal & estuary processes – including impacts on sediment transport, erosion, and natural geomorphic function
  - Social & recreational amenity – including accessibility, usability, and enhancement of public open space and foreshore areas.
  - Public safety – including reduction in exposure to coastal hazards such as erosion, inundation, or shoreline instability.
  - Cultural heritage values – considering both tangible heritage (e.g. sites or artefacts) and intangible cultural connections, including those identified through consultation with First Nations Groups stakeholders.

Each criterion was scored on a scale from **+4 (strongly positive)** to **0 (neutral or no impact)** to **-4 (strongly negative)**. A strongly negative score (e.g. -3 or lower) in any criterion may render an option unfeasible for inclusion due to significant adverse impacts.

Using the formula provided in Figure 6-2 below, a ***Feasibility Impact Score*** was calculated for each option. To further refine the assessment, a geographic scale factor - ranging from 1 to 1.5 - was applied to each option to reflect the spatial extent of its potential benefits and impacts. This approach acknowledges that options with broader application across the study area may deliver more widespread value and efficiency. The scale factor was applied to the Feasibility Score to determine the ***Total Feasibility Score***.

The Feasibility Assessment scores for each option are provided in Appendix D.

**Table 6-3 Scale factor criteria**

Option range of application	Scale Factor
Option generates benefit/impacts to a localised area or single estuary	1
Benefit/impacts realised across the entire CCL study area	1.5

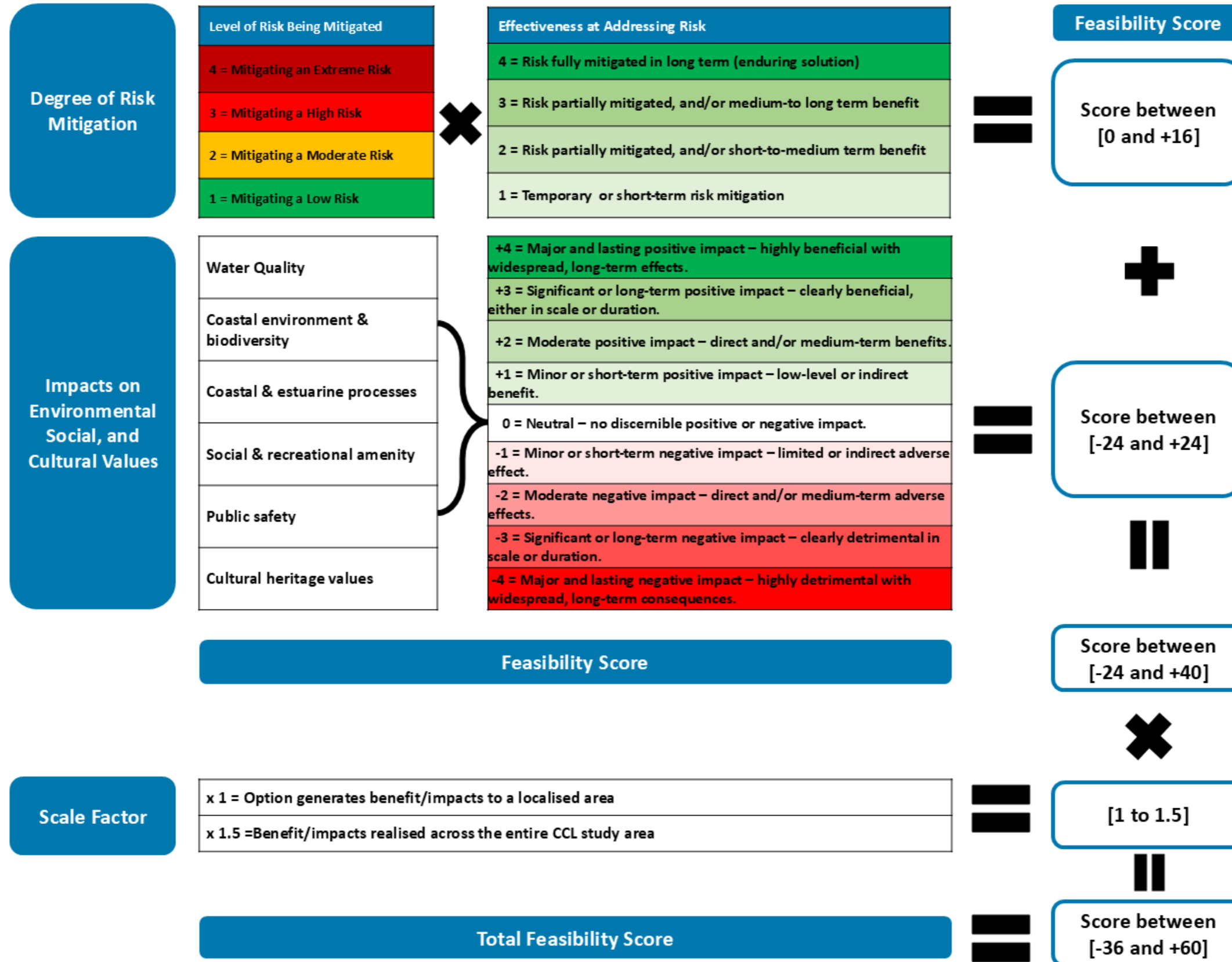


Figure 6-2 Calculation of feasibility score



## 6.4 Acceptability Assessment

A key factor in the evaluation of options involved determining the acceptability of those options to four distinct stakeholder groups:

- The Community Focus Group (CFG)
- The local communities across the CCL study area
- Local First Nations stakeholders, including those identified in the Community & Stakeholder Engagement Plan
- Relevant public authorities, including State Government agencies

To inform this assessment, a robust community and stakeholder engagement process was carried out during Stage 3. The engagement methods and outcomes are detailed in Section 2 and 3. This process provided an opportunity for stakeholders to offer feedback on the potential management options and propose additional actions for consideration.

Feedback from this engagement was used to calculate an Acceptability Score for each option, using the method outlined in Table 6-4. Equal weighting was applied across the four stakeholder groups to generate a normalised score between 0 and 1 for each option. Where options were developed after the primary engagement period, a default score of 1 was applied to reflect the absence of recorded opposition at the time of assessment. This conservative assumption reflects the absence of recorded opposition rather than confirmed endorsement, and will be revisited during Stage 4 exhibition.

It is important to note that the Acceptability Score is not intended to represent a definitive measure of consensus or support within any particular stakeholder group. Each of the stakeholder groups considered in the assessment represents a diverse set of perspectives, and it is not expected that all individuals or organisations will hold a single unified view on every management option. Rather, the Acceptability Score provides a broad, indicative index derived from available engagement data. The purpose of this index is to assist the option evaluation process by identifying options that are broadly supported, those that may require modification, and those that may warrant further discussion during later stages of the CMP.

The Acceptability Assessment scores for each option are provided in Appendix B.

**Table 6-4 Calculation of acceptability score**

Component	Description	Acceptability Score
Community Support	Based on the percentage of community support recorded through the Stage 3 online community survey. Support was converted into a decimal value (e.g. 75% = 0.75).	0 - 1
Community Focus Group	The Community Focus Group undertook a prioritisation activity, where members were asked to rank their priority actions. These were converted to an overall support score per action.	0 - 1
First Nations Stakeholder Support	Support from local First Nations interest groups was obtained through both face to face and online engagement methods. Stakeholder support was provided as a number between 0 and 1: <ul style="list-style-type: none"> <li>▪ If a First Nations interest group indicated that it did not support a particular option, then a score of 0 was given.</li> <li>▪ If partial or conditional support was offered from any group, then a score of 0.5 was applied and conditions of support were noted to modify the option accordingly.</li> </ul>	0 - 1



Component	Description	Acceptability Score
	<ul style="list-style-type: none"> <li>If all groups indicated support of the option, then a score of 1 was applied.</li> </ul>	
Stakeholder Support	Based on feedback from State Government agencies. Scored identically to the approach for First Nations stakeholders. A score of 0 received from any State Agency automatically excludes the option.	0 - 1
<b>Total Acceptability Score</b>	<b>Calculated as the product of the four component scores</b>	<b>0 - 1</b>

## 6.5 Viability Assessment

### 6.5.1 Overview

The purpose of the viability assessment was to evaluate the financial practicality and affordability of each potential management option identified in the long list. In particular, the assessment sought to determine:

- The estimated cost of implementation
- The distribution of costs and benefits among stakeholders
- Proposed cost-sharing arrangements and funding mechanisms
- Whether the option is considered affordable and, therefore, viable for progression to Stage 4 of the CMP.

As part of Stage 3, a preliminary economic assessment was undertaken for each option. The objective of economic assessment within a Coastal Management Program is to support informed decision-making by helping decision-makers understand the socioeconomic implications of alternative management responses and identify options that are likely to deliver net community benefit (OEH, 2018d).

The NSW Coastal Management Manual (OEH, 2018d) recognises that the depth and level of economic assessment should be proportionate to the scale and complexity of the option being considered. In particular, the appropriate level of economic analysis depends on:

- Nature and scale of the option – including its cost, complexity, and the number of affected stakeholders
- Risk level and significance of the issue being addressed

Accordingly, different options may warrant different levels of economic assessment. This is illustrated in Figure 6-3, which presents guidance from the NSW Coastal Management Manual for aligning the level of economic analysis with the risk and complexity of a project.

As shown in this guidance, undertaking detailed cost-benefit analysis for relatively small-scale actions with limited cost and impact is often not a proportionate use of resources. Instead, the level of analysis should scale with the potential consequences and investment associated with each option. Consistent with this approach, Stage 3 of the CMP adopted an intermediate level of economic assessment, whereby each option was assigned a Viability Score based primarily on its estimated 10-year lifecycle cost. This approach provides a practical and transparent method for incorporating economic considerations into the broader multi-criteria analysis used to compare management options.



		Complexity	
		Low	High
Risks and impacts	Low	<ul style="list-style-type: none"> <li>Limited number of stakeholders</li> <li>Little or no quantitative data</li> </ul>	<ul style="list-style-type: none"> <li>Disagreement or conflicting views among stakeholders</li> <li>Difficulty defining beneficiaries or apportioning costs</li> <li>Good quantitative data</li> </ul>
	High	<p><b>Simple economic assessment</b></p> <p>These assessments ask similar questions as the more complex analysis, but use qualitative analysis and expert opinion rather than quantitative data.</p>	<p><b>Intermediate level assessment</b></p> <p>These assessments ask the same questions as the more complex analysis, but may use detailed costings.</p>
		<ul style="list-style-type: none"> <li>Limited spatial scale</li> <li>Low risk and low impact</li> </ul>	
		<ul style="list-style-type: none"> <li>Addressing high or extreme risks</li> <li>An option involves major investment (see <a href="#">Treasury Guideline 2017</a>)</li> </ul>	
		<p><b>Intermediate level assessment</b></p> <p>Monte Carlo modelling or significant social analysis may not be necessary, but some detailed costing, e.g. for maintenance, is required.</p>	<p><b>Detailed cost-benefit analysis</b></p> <p>This may involve a systematic comparison of all foreseeable costs and benefits and the probability that they will arise over the planning period.</p>

Figure 6-3 Matrix of risk and complexity for selecting the level of economic assessment (source: OEH, 2018d)

### 6.5.2 Calculation of Forward Lifecycle Costings

A key component of the economic assessment process was the estimation of the forward lifecycle costs associated with each potential management option. This included the preparation of indicative forward estimates for the capital, operational and ongoing maintenance costs required to implement each option.

Cost estimates were informed by a range of sources, including:

- Engagement with relevant stakeholders.
- Historical costs of capital works and environmental management programs, as recorded by Council.
- Industry standard guidelines, such as the *Rawlinsons Australian Construction Handbook 2026* (Rawlinsons, 2026), and the *Transport for NSW Economic Parameter Values* (Transport for NSW, 2020).
- Coastal engineering and coastal management experience of the project team.

For a number of options, cost estimates were derived using standard unit rates for common works, including road raising, drainage upgrades and environmental management activities.

Forward costs were projected over a 10-year planning period, which aligns with the intended implementation timeframe of the CMP.

It should be noted that the cost estimates developed at this stage are high-level, order-of-magnitude estimates only. They are intended to support the comparative evaluation of options during the Stage 3 optioneering process and are not suitable for detailed budgeting, funding allocation, procurement or tendering. This level of detail is appropriate at this stage of the CMP because many options remain conceptual in nature and would require further investigation, design development and environmental assessment prior to implementation. More detailed costing would therefore be expected during Stage 4 for any options that progress to the shortlist and move toward implementation planning.



As part of the economic assessment, the net present value (NPV) of the forward cost stream associated with each option was also considered. NPV is a standard approach used in economic analysis to compare options where costs occur at different points in time. The method discounts future costs to express them in present-day dollar terms, allowing direct comparison between options with different expenditure profiles.

This approach reflects the time value of money - the principle that a dollar today is worth more than a dollar in the future, as it can be invested to yield a return. Accordingly, future expenses are, in effect, less costly than those incurred immediately. By adjusting all costs and benefits to present-day values, NPV enables a direct financial comparison between options. From this perspective, options with a lower NPV cost are considered more favourable from a financial standpoint.

The choice of discount rate is a critical factor in NPV-based economic assessments. The most contemporary NSW Government Guide to Cost-Benefit Analysis (NSW Treasury, 2023) at the time of this assessment recommends that economic appraisals should adopt a discount rate of 5% p.a., with sensitivity testing to be undertaken using a lower bound of 3% p.a., and an upper bound of 7% p.a. These values have been adopted for the economic assessment described herein.

It should be noted that the NSW Government *Guidelines for using cost-benefit analysis to assess coastal management options* (DPE, 2020), makes reference to now superseded treasury advice which previously recommended the use of a 7% p.a. discount rate, with sensitivity testing undertaken using a lower bound of 4% p.a., and an upper bound of 10% p.a. However, this assessment has been undertaken in accordance with the most up-to-date guidance available from NSW Treasury (2023), to ensure consistency with current best practice.

### **6.5.3 Viability Score**

Following the estimation of the 10-year lifecycle cost for each option, a Viability Score was calculated based on the base-10 logarithm of the estimated Net Present Value (NPV) cost. This approach provides a practical way of representing the relative financial scale of each option within the overall multi-criteria assessment (MCA).

The purpose of the Viability Score is to incorporate relative cost magnitude into the option evaluation process. Options included in the long list vary substantially in cost, ranging from actions that primarily involve in-kind Council staff time to major infrastructure works requiring significant capital investment. Applying a logarithmic scale allows these differences to be represented transparently without implying a level of precision that would be inappropriate or impractical at this stage of planning.

Importantly, the Viability Score reflects the relative scale of cost, rather than the economic benefit or desirability of an option. Higher scores correspond to options with higher estimated lifecycle costs. This does not imply that higher-cost options are preferred; rather, the score allows cost considerations to be incorporated alongside feasibility and acceptability when comparing options within the broader evaluation framework.

The scoring approach therefore produces a continuous value, reflecting the logarithmic relationship between cost and score. Table 6-5 provides several illustrative examples of how different orders of magnitude of NPV cost translate to the corresponding Viability Score.

For some options, the primary resource requirement relates to in-kind Council staff time, rather than direct capital expenditure. These options are identified in the economic assessment summary in Appendix C using the designation CST (Council Staff Time). For these options, a Viability Score of 3 was applied to reflect their relatively low direct financial cost.

The Viability Assessment scores for each option are provided in Appendix C.



Table 6-5 Viability score weighting for options

10-Year NPV cost of options	Viability Score
< \$1,000 (or In-Kind Council Staff Time resourcing)	3
\$10,000	4
\$100,000	5
\$1,000,000	6
\$10,000,000	7

## 6.6 Options Ranking Score

The output of the three-phase assessment described was the calculation of an *Options Ranking Score*, which was the arithmetic combination of the *Feasibility Score*, the *Viability Score*, and the *Acceptability Score*, as demonstrated in Figure 6-4.



Figure 6-4 Calculation of the options ranking score

Each component of the Options Ranking Score provided a distinct perspective on the performance of an option:

- The **Total Feasibility Score** assessed the extent to which an option addressed the various risks across the study area - either directly or indirectly - and considered its social and environmental impacts.
- The **Acceptability Score** reflected the level of support for each option among local community members and key project stakeholders.
- The **Viability Score** captured the full life-cycle cost of each option and provided an indication of economic viability and value for money.

It is recognised that the Options Ranking Score inherently contains elements of subjectivity and uncertainty, reflecting both the qualitative nature of some assessment criteria and the high-level nature of cost estimates at this stage of the CMP. Accordingly, the Options Ranking Score should not be interpreted as a definitive or prescriptive ranking of options.

Rather, the score is intended to provide a structured guide to assist decision-making, helping to identify options that perform well across multiple criteria and warrant further consideration during Stage 4 of the CMP. In practice, some options may deliver additional strategic, environmental, cultural or community benefits that are not fully captured within the quantitative assessment framework. Broader organisational, policy or social considerations may therefore also influence the final selection and prioritisation of management actions.



## 6.7 Options Assessment Outcomes

The summary of the outcomes of the assessment is provided in Table 6-6, which presents the Acceptability Score, Feasibility Score, Viability Score and resulting Options Ranking Score for each action in the long list.

The options have been ordered by their overall Options Ranking Score to assist with comparison between actions. This ranking provides an indication of which options perform most strongly when considered across the three assessment criteria.

It should be noted that the ranking presented in Table 6-6 is intended to support the optioneering process rather than determine a fixed shortlist of actions. The results provide a useful overview of relative performance across the assessment criteria and help identify options that merit further investigation, refinement or integration into implementation strategies during the next stage of the CMP.

In addition, several options address different management objectives, locations or timeframes, and therefore may not be directly comparable in practice. As such, the assessment outcomes should be interpreted as part of a broader strategic evaluation process that also considers policy alignment, implementation feasibility, and opportunities for integrated management across the lagoon catchments.

**Table 6-6 Options Assessment Outcomes**

ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score
45	Undertake a Planning Proposal to Amend the RH SEPP Coastal Environment Area Mapping	1.00	42	3.0	14.0
6	Develop Lagoon Water Quality Improvement Plan	0.78	48	5.4	7.0
7	Reduce sewage contamination of lagoons	0.93	21	3.0	6.5
1	Develop and implement a monitoring and reporting program for the Central Coast Lagoons.	0.82	47	6.1	6.3
3	Develop and implement a Community Education Program	0.68	42	5.2	5.5
41	Environmental Protection Works	0.83	20	3.0	5.4
9	Implement a wetland & riparian monitoring, management and restoration program	0.66	44	5.4	5.3
29	Consider potential impacts of the Wamberal Seawall on the coastal processes at Wamberal and Terrigal Lagoons	0.77	27	4.9	4.3
12	Implement recommendations from the Gosford Creek and Lagoon Entrance Review (Salients 2019) where appropriate	0.50	26	3.0	4.2
4	Provide education and training opportunities for operational staff and other relevant council units in relation to lagoon management	0.53	23	3.0	4.0
34	Develop a Memorandums of Understanding (MoU) Between Central Coast Council and NPWS for Wamberal Lagoon Management	0.63	19	3.0	4.0
13	Council continue to support research which improves understanding of lagoon processes, threats and anthropogenic impacts in order to develop improved management practices	0.77	15	3.0	3.9
2	Prepare an infrastructure vulnerability assessment for the Lagoons	0.62	29	4.9	3.6



ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score
24	Identify opportunities for, and undertake cultural land management practices, including cultural burning	0.55	29	4.5	3.5
10	Sedimentation Process and Management Investigation	0.61	26	4.7	3.3
27	Introduce area-specific Development Control Plan (DCP) provisions for lakefront properties to strengthen foreshore protection through the development assessment (DA) process.	0.70	14	3.0	3.1
44	Retrofit Stormwater Outlets with One-Way Valves to Prevent Tidal Backflow	0.70	21	4.8	3.1
25	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	0.49	33	5.3	3.0
15	Develop and implement a holistic Foreshore Access Improvement Plan for Terrigal Lagoon	0.84	19	5.4	2.9
17	Dredge hole rehabilitation feasibility investigation	0.50	28	4.8	2.9
21	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	0.48	30	4.9	2.9
43	Develop and Implement a Program to Incentivise Environmentally Responsible Development Practices	0.63	24	5.2	2.9
5	Continue to support volunteer based rehabilitation initiatives such as Landcare	0.68	21	5.2	2.7
32	Develop and execute a communications plan for Stage 5 of the CMP	0.54	15	3.0	2.7
8	Wetland Refugia and Migration Study	0.35	35	4.6	2.6
31	Develop a Community Monitoring Program for Lagoon Birdlife	0.65	12	3.0	2.6
14	Develop and implement a holistic Foreshore Access Improvement Plan for the Southern Foreshore of Wamberal Lagoon	0.68	19	5.4	2.4
39	Investigate the Feasibility of Constructing a Water Treatment Wetland in the Southern Arm of Avoca Lagoon	0.46	21	4.3	2.3
19	Develop and implement a holistic Foreshore Access Improvement Plan for Avoca Lagoon	0.64	19	5.4	2.3
38	Assess and Address the Impact of Private Structures on Lagoon Foreshores	0.41	17	3.0	2.2
18	Develop and Implement an Algae Management Strategy for Avoca Lagoon	0.55	18	4.6	2.2
22	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	0.47	21	4.9	2.0
33	Trial Installation of Water Quality Autosampler in Avoca Lagoon Catchment	0.59	17	4.9	2.0
30	Support Regional Invasive Fauna Management with LLS	0.66	9	3.0	2.0
20	Develop and implement a holistic Foreshore Access Improvement Plan for Cockrone Lagoon	0.47	22	5.4	1.9



ID	Action Name	Accept. Score	Feasibility Score	Viability Score	Option Ranking Score
11	Introduction of "No Mow Zones" at targeted areas of public foreshore	0.42	14	3.0	1.9
42	Road Raising at Lakeview Drive	0.60	14	5.9	1.4
16	Green and Golden Bell Frog research and habitat restoration.	0.41	10	3.0	1.4
23	Support cultural education and awareness of estuary health issues for First Nations Groups	0.30	23	4.9	1.4
26	Undertake a habitat assessment and develop a targeted management plan for flying-fox populations, with a focus on the Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> ).	0.50	12	4.5	1.3
28	Install historic flood markers at key locations around the lagoons to indicate past flood heights.	0.46	12	4.3	1.3
36	Undertake Ecosystem Services Valuation for the Central Coast Lagoons	0.56	11	4.7	1.3
40	European and Archaeological Heritage Management	0.43	9	4.4	0.9
35	Fishing closure of Wamberal Lagoon	0.21	12	3.0	0.8
37	Assess and Manage Light and Noise Pollution Impacts on Lagoon Ecology	0.36	8	4.7	0.6

## 6.8 Option Consolidation and Stage 4 Progression

### 6.8.1 Option Consolidation

Following completion of the feasibility, acceptability and viability assessments, the long list of options was reviewed in detail to determine how the options should be structured for progression into Stage 4 of the CMP.

During this review it became clear that many of the identified options were closely related in theme, intent or delivery pathway. In several cases, multiple options represented different elements of what was effectively the same broader management initiative. While this level of detail was useful during the option identification phase to capture the full range of ideas raised through engagement, maintaining these as separate standalone actions would lead to a fragmented and inefficient implementation program.

Accordingly, a process of option consolidation was undertaken. This process focused on identifying actions that were:

- Strongly overlapping in theme or intent
- Complementary in nature, representing different components of the same broader initiative
- Linked in delivery, meaning they would logically be implemented together.

Where these relationships were identified, the options were combined into broader integrated Actions that bring together related activities under a single implementation framework.

This approach represents a deliberate transition from the *idea-generation* stage of the CMP (where it is important to capture a wide range of potential options) to a *delivery-focused* structure suitable for implementation planning.



Consolidating related options into integrated Actions provides several practical benefits for Council, including:

- Improved ability to stage and sequence delivery of related activities over the life of the CMP.
- More efficient use of staff and financial resources, reducing duplication of effort across multiple small projects.
- Improved funding opportunities, allowing related activities to be packaged together for grant applications and external funding programs.
- Reduced administrative burden, avoiding the need to manage numerous small projects competing for the same resources.
- More consistent implementation across the lagoon systems, particularly where similar issues occur at multiple locations.

These benefits were also recognised through the Community Focus Group (CFG) engagement process. Participants in workshops #3 and #4 noted that several options overlapped in intent and suggested that the final action set should be streamlined where appropriate to improve clarity and deliverability.

Importantly, the consolidation process was undertaken in a manner that retains the substance and intent of the original options identified through engagement and technical analysis. The aim was not to remove ideas, but to organise them into a structure that is clearer, more practical to implement and better aligned with Council's operational capacity.

Only four options were not progressed beyond the long list stage, while the remaining 40 options have been incorporated into 20 integrated Actions that retain the core intent of the ideas raised by the CFG, the broader community and Council staff.

### **6.8.2 Thematic Grouping**

To further improve clarity and usability, the refined Actions have been grouped into a series of thematic Strategies, each with a defined objective. These Strategies group Actions that collectively contribute to key outcomes such as monitoring and reporting, estuary health improvement, coastal hazard resilience, and protection of social and cultural values.

This structure is illustrated in Figure 6-5, which shows how related Actions interact and collectively contribute toward achieving the long-term vision for the CCL. Organising the CMP in this way provides a clearer framework for implementation planning, funding applications and future reporting.

Each refined Action has been assigned a new Action ID. Rather than retaining sequential numbering from Option 1 to Option 45, the revised identification system is structured by Strategy (1–7) followed by a letter identifying the Action within that Strategy. This framework improves tracking, reporting and alignment between the CMP strategic framework and implementation planning.

The consolidated Action set is presented in Table 6-7, which includes a description of each Action, identified responsibilities, indicative priority and an explanation of how related options have been consolidated. For transparency, the table also identifies the options that were not carried forward into the Draft CMP, together with the rationale for their exclusion. This provides a clear audit trail linking the original long list of options to the refined set of Actions proposed for implementation.

Table 6-7 also identifies the three options that were not carried forward from the long list, together with a brief explanation of the rationale for their exclusion. It should be noted that the exclusion of these options does not imply that they lack merit; rather, given the practical constraints of available funding and staff resources, a degree of prioritisation was required. In many cases, the excluded options may still be progressed outside the CMP framework through other Council and/or State Government programs or initiatives.

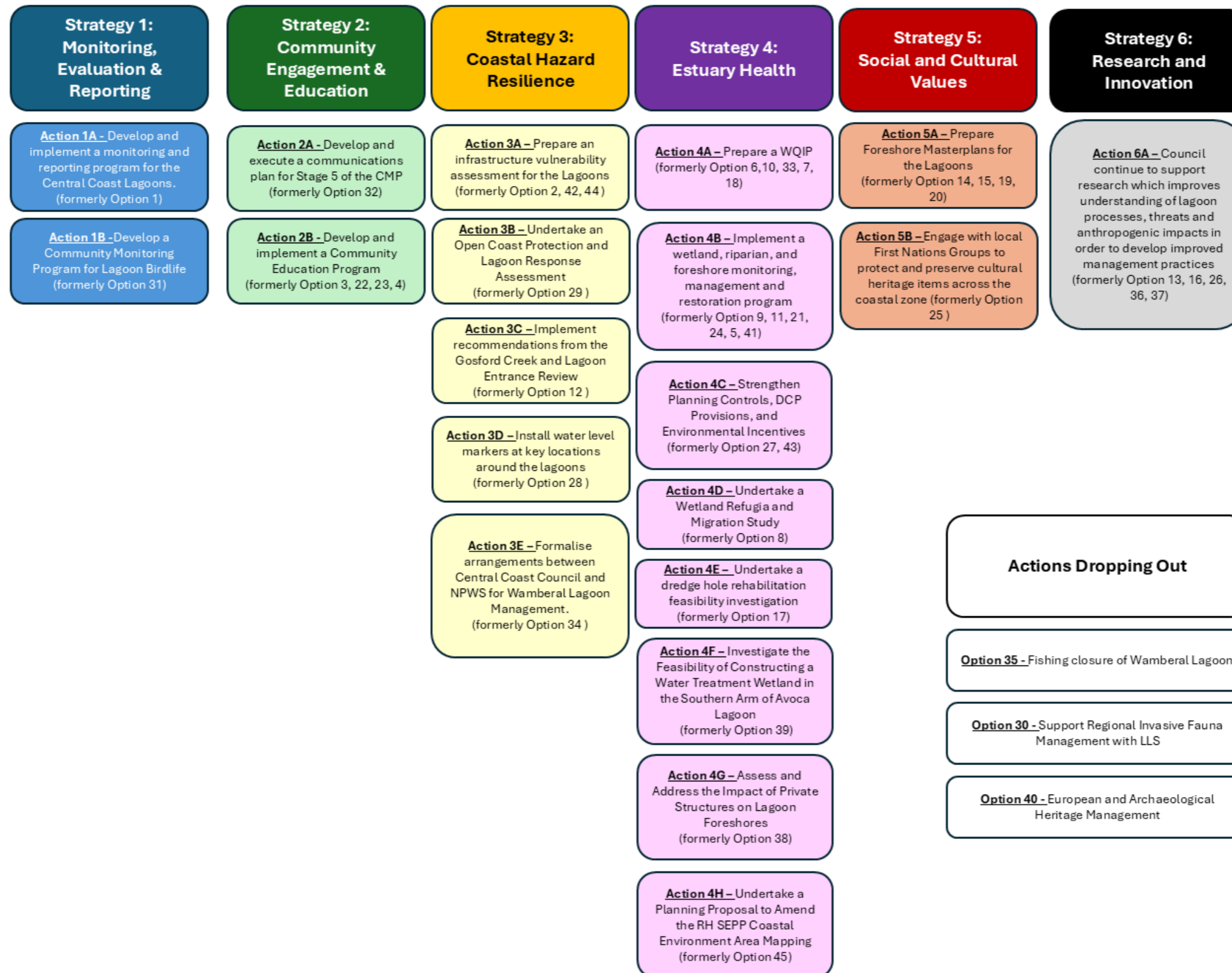


Figure 6-5 Actions for Stage 4 Progression



Table 6-7 Actions for Stage 4 Progression

ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
<b>Strategy 1: Monitoring, Evaluation &amp; Reporting</b>						
<b>Action 1A</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Develop and implement a monitoring and reporting program for the Central Coast Lagoons.	<p>A comprehensive estuary health monitoring program will be implemented, grounded in the key ecological indicators already monitored at the State level through the NSW Monitoring, Evaluation and Reporting (MER) Program. To ensure consistency and data comparability, the program will report on the following core indicators:</p> <ul style="list-style-type: none"> <li>▪ Turbidity - to assess water clarity and sediment load;</li> <li>▪ Physical and chemical water quality parameters - including salinity, dissolved oxygen, pH, and temperature;</li> <li>▪ Bioindicators of relevance - which may include wetland vegetation condition, fish assemblages, benthic invertebrates;</li> <li>▪ Macroalgae blooms - as an indicator of nutrient enrichment and ecosystem imbalance;</li> <li>▪ Riparian vegetation distribution and condition - as a key contributor to bank stability and estuarine habitat health; and</li> <li>▪ Bacterial indicators - including E. coli and other relevant pathogens, to assess recreational and ecological health risks</li> </ul> <p>To maximise efficiency and integration, the program will leverage and align with existing monitoring initiatives such as Beachwatch and Waterwatch, and actively explore opportunities to incorporate citizen science contributions and local volunteer groups into the sampling and data collection processes. This community-based approach not only expands monitoring capacity but also fosters local stewardship of the estuary.</p> <p>Monitoring results will be communicated regularly to the public through clear and accessible formats, such as annual water quality scorecards, interactive dashboards, and other online information platforms. Public reporting will support transparency, build community trust, and encourage ongoing community engagement in estuary health and management efforts.</p>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> DCCEEW</p>	<b>High</b>	<p>Formerly referred to as Option 1.</p> <p>This option was refined and improved throughout CFG Workshops #1 to #3 – with improvement focussed on including appropriate monitoring parameters, facilitating community monitoring initiatives, and public reporting/communication of results. It was then updated again in Council’s internal workshop to make it align with State Government Requirements for CMPs.</p> <p>This Action possessed very high levels of CFG and community support:</p> <ul style="list-style-type: none"> <li>▪ Community Support Score = Very High Support</li> <li>▪ CFG Priority Ranking = Very High Priority</li> </ul> <p>This Action has progressed into the CMP – and will form a major component of the CMP’s Monitoring, Evaluation, and Reporting (MER) Program.</p>
<b>Action 1B</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Develop and Implement a Community Monitoring Program for Lagoon Birdlife	<p>Developing a citizen science program to engage the community in monitoring important wetland bird species, including threatened and migratory shorebirds that rely on the lagoons for habitat.</p> <p>This program will aim to increase public awareness of the ecological significance of the lagoons, build local capacity to contribute to long-term data collection, and strengthen conservation outcomes through improved understanding of bird presence, habitat use, and seasonal patterns.</p> <p>Activities may include volunteer bird surveys, photo monitoring, training workshops, and partnerships with local birding groups, schools, and conservation organisations. Data collected will be shared with relevant agencies and used to inform ongoing lagoon management and habitat protection initiatives.</p> <p>The action would include engagement with relevant community groups, such as the Central Coast Birders, and well as Non-Government Organisations, such as Birding NSW.</p>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> DCCEEW</p>	<b>Medium</b>	<p>Formerly referred to as Option 31.</p> <p>This option was co-designed by the CFG at Workshop #2, who indicated that this monitoring and managing local lagoon birdlife was a high priority. The option was then refined at Workshop #3 to provide more detail regarding what it would include and how the data would be shared.</p> <p>This Action possessed very high levels of CFG and community support:</p> <ul style="list-style-type: none"> <li>▪ Community Support Score = Very High Support</li> <li>▪ CFG Priority Ranking = Medium Priority</li> </ul> <p>This Action has progressed into the CMP – and will support the CMP’s MER.</p>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
<b>Strategy 2: Community Engagement &amp; Education</b>						
<b>Action 2A</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Develop and execute a communications plan for Stage 5 of the CMP	<p>Develop a communications plan for the 10 year implementation phase of the CMP. This will include maintenance of the Council's web page for the CMP, to provide the community with the following information:</p> <ul style="list-style-type: none"> <li>The CMP background, and an overview of the NSW Coastal Management Framework.</li> <li>Key CMP information, including reports available for public consumption.</li> <li>The Status of CMP actions, with details of the actions and recent updates/progress.</li> <li>Outputs of the various monitoring programs undertaken as part of the CMP (including water quality monitoring)</li> <li>Links to relevant materials such as The NSW Coastal Management Framework, and the Marine Estate Management Strategy.</li> </ul> <p>This may also include the ongoing social media presence, mailing lists and newsletters publishing.</p>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> DCCEEW</p>	<b>Medium</b>	<p>Formerly referred to as Option 32.</p> <p>This Action was originally identified by Council – and was then improved and updated in CFG Workshops #2 and #3 so that it reported on the information that is important to the community. It was then updated again in Council's internal workshop to make it align with State Government Requirements for CMPs.</p> <p>This Option was well supported by the community:</p> <ul style="list-style-type: none"> <li>Community Support Score = Very High Support</li> <li>CFG Priority Ranking = Medium Priority</li> </ul> <p>This Action has progressed into the CMP – and will be a key means of communicating CMP progress and outcomes to the community.</p>
<b>Action 2B</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Develop and implement a Coastal Lagoons Education and Engagement Program	<p>This action establishes a coordinated education and engagement program focused on lagoon health, cultural values, and best practice environmental management. The program targets the broader community, Council works staff, local schools, and First Nations partners. Its purpose is to build shared knowledge, shift behaviours that influence lagoon condition, increase cultural understanding, and support more informed participation in estuary and catchment management.</p> <p>The program will include the following components, or themes:</p> <ul style="list-style-type: none"> <li>Lagoon dynamics and natural processes</li> <li>Biodiversity and ecosystem health</li> <li>Water quality, marine litter, and stormwater pollution sources</li> <li>Riparian zone and foreshore management (focusing on foreshore residents) – including the appropriate use of pesticides/herbicides/weed control/rubbish removal</li> <li>Coastal hazard risk (focusing on residents impacted by such hazards)</li> <li>The impacts of climate change on the lagoon systems</li> <li>Indigenous cultural heritage values, traditional management practices and cultural connections to the lagoons</li> </ul> <p>Key components include:</p> <ul style="list-style-type: none"> <li>Community education and engagement activities (public events, interpretive content, signage, talks and guided activities) aimed at increasing awareness of threats, processes, stewardship behaviours and future climate impacts.</li> <li>The program will actively use social media platforms to share engaging, easy-to-understand content, such as short videos, infographics, interactive quizzes, and real-time updates on monitoring results or community events. Social media will serve as a key tool to boost visibility, increase community participation, and maintain momentum between on-ground engagement activities</li> <li>An intensive engagement program for Council works staff to build capability in erosion and sediment control, vegetation and foreshore management, and the integration of environmental procedures into routine works</li> <li>Partnerships with local schools, incorporating tailored educational resources that align with relevant stages of the NSW curriculum. This may include in-class workshops, field</li> </ul>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> DCCEEW, First Nations Groups, NPWS</p>	<b>High</b>	<p>This Action is the result of consolidating:</p> <ul style="list-style-type: none"> <li>Option 3: Develop and implement a Community Education Program</li> <li>Option 4: Provide education and training opportunities for operational staff and other relevant council units in relation to lagoon management.</li> <li>Option 22: Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage</li> <li>Option 23: Support cultural education and awareness of estuary health issues for First Nations Groups</li> </ul> <p>These options were co-designed through engagement with the CFG, local First Nations groups, and Council staff – across workshops #2 and #3. All four options received either Very High or High levels of community support.</p> <p>Bringing these ideas together has clear benefits. It avoids multiple separate programs doing similar things, meaning the program can be developed and implement more quickly - and at lower cost. It also creates a single, integrated program that speaks to everyone involved with the lagoons, from residents and visitors to schools, Council staff, and First Nations groups. This makes it easier for all stakeholders to learn about lagoon health, cultural values and practical ways to look after the lagoons.</p>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
			<p>trips, and hands-on science activities linked to estuarine health, water quality, and cultural values. Partnering with local educators and schools will help embed lagoon knowledge early and foster the next generation of estuary stewards.</p> <ul style="list-style-type: none"> <li>▪ A coordinated cultural education program to increase community understanding of Indigenous cultural values, histories and management practices related to lagoons and catchments</li> <li>▪ Funding and technical support for First Nations community groups to design and deliver their own cultural education activities and to participate in discussions about lagoon health, management priorities and future on-ground initiatives.</li> </ul> <p>This program would be integrated with the corresponding community education programs nominated in the full suite of CMPs. Together those actions will form an overarching education program for the entire coastal zone of the LGA.</p> <p>The program can leverage off the existing community education material developed by the state government (DPIRD-Fisheries, DCCEEW, NPWS, TfNSW) and will be delivered across all lagoons in a cohesive and strategic manner. It is intended to build mutual understanding among residents, visitors, Council staff and First Nations groups, support more consistent on-ground management outcomes, and strengthen participation in CMP implementation over time.</p>			
<b>Strategy 3: Coastal Hazard Resilience</b>						
<b>Action 3A</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Prepare an infrastructure vulnerability assessment for the Lagoons	<p>A comprehensive audit of publicly owned coastal assets and infrastructure will be undertaken to assess their current condition, vulnerability to coastal hazards, and future adaptation needs. This audit will inform a structured approach to managing coastal infrastructure over the next 50–100 years, ensuring resilience to sea level rise, erosion, and extreme weather events. Key components of this action include:</p> <ul style="list-style-type: none"> <li>▪ Auditing Coastal Assets: Conducting a detailed assessment of key (public) infrastructure fringing the lagoons - including public roads, stormwater outlets, seawalls, walkways, wastewater infrastructure, and public amenities. This will document asset condition, maintenance requirements, and exposure to coastal hazards such as erosion and inundation.</li> <li>▪ Determining Adaptation Triggers: Identifying environmental and structural thresholds (e.g., erosion rates, inundation levels, structural degradation) that will signal when adaptation or intervention is required. These triggers will be based on climate change projections (future sea level rise), historical trends, and asset vulnerability.</li> <li>▪ Developing a Long-Term Response Framework: Establishing a strategic framework for asset adaptation, including short-, medium-, and long-term management options such as maintenance, reinforcement, managed retreat, or realignment.</li> <li>▪ Prioritising Works: Developing a prioritised list of coastal asset management and adaptation works based on risk, urgency, and cost-effectiveness. These works will be incorporated into future Coastal Management Programs (CMPs) to ensure funding and implementation align with broader coastal planning objectives.</li> </ul> <p>This plan would integrate with relevant flood risk management plans and infrastructure &amp; asset programs and consider all relevant planning horizons and climate change projections.</p> <p>This plan will be aligned with existing Flood Risk Management Plans, Asset Management Plans, and relevant state and local planning frameworks. It will ensure coastal infrastructure investment is risk-informed, future-focused, and resilient to long-term climate change impacts.</p>	<p><u>Lead:</u> Council <u>Support:</u> DCCEEW</p>	<b>Medium</b>	<p>This Action is the result of consolidating:</p> <ul style="list-style-type: none"> <li>▪ Option 2: Prepare an infrastructure vulnerability assessment for the Lagoons</li> <li>▪ Option 42: Road Raising at Lakeview Drive, Terrigal Lagoon</li> <li>▪ Option 44: Retrofit Stormwater Outlets with One-Way Valves to Prevent Tidal Backflow,</li> </ul> <p>This action was identified through Council engagement, and refined by the CFG during Workshops #2 and #3 so that it encompasses relevant at-risk infrastructure.</p> <p>The consolidated action mainly follows the intent of Option 2, while adding future opportunities for road raising and stormwater backflow prevention in a more coordinated and efficient way.</p> <p>Option 2 was well supported by the community:</p> <ul style="list-style-type: none"> <li>▪ Community Support Score = Very High Support</li> <li>▪ CFG Priority Ranking = Medium Priority</li> </ul> <p>By combining these ideas, Council can look at vulnerable roads, stormwater outlets and other assets as a connected system rather than as isolated fixes. This makes it easier to identify the best places to invest and to time upgrades in a practical way. It also avoids repeating similar assessments, reduces overall cost and lets improvements roll out sooner.</p>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
<b>Action 3B</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Undertake an Open Coast Protection and Lagoon Response Assessment	<p>Conduct a detailed study of the potential impacts of open coast CMP management actions on the lagoon entrance dynamics, hydrodynamics, hazard vulnerability (including storm surge and catchment flooding), and ecosystem health. This study should consider the whole suite of options available to manage the open coast along the Terrigal-Wamberal, Avoca-North Avoca and Macmasters-Copacabana beaches. The study should also consider current and future risks at appropriate planning horizons including but not limited to the impacts of climate change.</p> <p>Outputs of this study should be used to inform future iterations of CMPs and projects or programs seeking to implement adjacent beach management works</p>	<p><u>Lead:</u> Council <u>Support:</u> DCCEEW</p>	<b>High</b>	<p>Formerly referred to as Option 29.</p> <p>This Action was identified by the CFG through both Workshop #3, and through subsequent engagement and written submissions.</p> <p>This action was identified by the CFG during Workshop 3 and was reinforced through subsequent engagement and written submissions. It did not receive a community support score because it was still being drafted during the engagement period. The CFG initially gave it a Medium priority rating at Workshop 4, which has since been raised to High in recognition of its value and the strong interest shown during follow up discussions</p> <p>This action has been included in the CMP because it fills an important gap between the Lagoons and Open Coast CMPs. It will help clarify how actions on the open coast may influence lagoon dynamics, and vice versa. This provides a practical link between the two CMPs, supports better planning across both environments, and helps the community and Council make more joined up decisions about future works along the coast and lagoons.</p>
<b>Action 3C</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Implement recommendations from the Gosford Creek and Lagoon Entrance Review	<p>Implement recommendations from the Gosford Creek and Lagoon Entrance Review (Salients 2019) where appropriate, including:</p> <ul style="list-style-type: none"> <li>Investigate possibility of incrementally raising the breakout levels, to enhance resilience to sea level rise and better protect threatened species and ecological communities</li> <li>Review of contemporary entrance management operations (triggers, methods, timing) to determine if any operational improvements are possible. Implementation should be flexible and adaptive, responding to ongoing monitoring, environmental conditions, and changing community flooding needs.</li> <li>Implement entrance clearance operations when appropriate with the view to redistribute sand within entrance compartments to improve access and mitigate coastal erosion risk.</li> </ul> <p>This approach recognises the dynamic nature of coastal lagoon systems and the need for responsive, evidence-based management that evolves over time.</p> <p>As per element #3 above, this action would also include the redistribution of sand within entrance compartments to be placed at areas of known coastal erosion risk. This sand placement would be a form of beach nourishment, and would therefore meet the definition of Coastal Protection Works, as defined in the Coastal Management Act.</p>	<p><u>Lead:</u> Council <u>Support:</u> DCCEEW, DPIRD-Fisheries, DPHI-Crown Lands</p>	<b>Medium</b>	<p>Formerly referred to as Option 12.</p> <p>This option was first identified through the 2019 Gosford Creek and Lagoon Entrance Review. Through Council engagement, it was noted that including the recommendations of the 2019 Review as a CMP action would create a clearer pathway for Council to seek State Government support and funding for implementation.</p> <p>This Action was subsequently updated with CFG feedback during Workshop #2, as well as feedback received from the <i>Future Protection of Terrigal Lagoon</i> CFG written submission.</p> <p>This option was well supported by the community:</p> <ul style="list-style-type: none"> <li>Community Support Score = High Support</li> <li>CFG Priority Ranking = Medium Priority</li> </ul> <p>Including this action in the CMP provides a practical way to progress the 2019 Review outcomes across all lagoons. It also supports more adaptive and evidence-based entrance management, helps reduce duplication between Council projects, and positions Council to access external funding. For the community, this creates opportunities to improve lagoon entrance function, reduce erosion and flooding issues, and enhance ecological resilience as conditions change over time.</p>
<b>Action 3D</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Install water level markers key locations around the waterway	<p>Lagoon water level markers will be installed at selected public locations to provide clear reference points on how lagoon water levels behave over time. The markers will display a range of relevant levels including typical lagoon water levels, historical breakout and flood levels, and the highest recorded water levels.</p> <p>These installations will act as both an educational resource and a practical decision making tool. During periods when gauges are offline or not reporting, the markers can assist on-</p>	<p><u>Lead:</u> Council <u>Support:</u> N/A</p>	<b>Low</b>	<p>Formerly referred to as Option 28.</p> <p>This option was identified by the community during CFG Workshop #2, and was supported by Council staff during internal Council workshops.</p> <p>This option was well supported by the community:</p>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
			<p>site staff, residents, and recreational users in making informed assessments of lagoon conditions and potential breakout or flooding risk.</p> <p>Locations should be selected for high visibility and accessibility such as foreshore reserves, walking paths, and public access points. Accompanying interpretive signage will describe the meaning of the reference levels, their historical context, and their relevance to lagoon management, catchment inflows, entrance condition, and future climate related risk.</p>			<ul style="list-style-type: none"> <li>Community Support Score = Very High Support</li> <li>CFG Priority Ranking = Medium Priority</li> </ul> <p>While the action is valued for its educational and awareness benefits, its priority has been set as to Low. This reflects that, compared with other actions in the CMP, it is less time-critical and does not directly influence lagoon health or flooding outcomes. It remains important as a longer term communication and awareness initiative, and can be delivered opportunistically as resources, funding and complementary on-ground works arise.</p>
<b>Action 3E</b>	Wamberal Lagoon	Formalise arrangements between Central Coast Council and NPWS for Wamberal Lagoon Management	<p>Council would work with NSW National Parks and Wildlife Service (NPWS) to formalise management arrangements (including roles, responsibilities and licencing/approvals requirements) for the management of the Wamberal Lagoon.</p> <p>The formalised arrangement would promote coordinated implementation of best-practice actions under the Lagoon's Plan of Management, including ecological management, entrance works, pest control, and community engagement.</p> <p>The arrangement could take the form of a Memorandum of Understanding (MoU), or could alternatively formal agreement or licence condition. This will also formalise information and data sharing protocols, enabling more effective decision-making, aligned monitoring efforts, and improved responsiveness to emerging environmental and operational issues.</p>	<p><u>Lead:</u> Council, NPWS</p> <p><u>Support:</u> N/A</p>	<b>Medium</b>	<p>Formerly referred to as Option 34.</p> <p>This option was first identified during Workshop #1, as well as through a written submission from the CFG Wamberal Lagoon residents. It was subsequently updated in Workshop #3 to help define the scope of the MoU.</p> <p>This option was well supported by the community:</p> <ul style="list-style-type: none"> <li>Community Support Score = Very High Support</li> <li>CFG Priority Ranking = Medium Priority</li> </ul> <p>The Action still requires commitment from both agencies and time to negotiate responsibilities. Implementation depends on executive-level support and alignment of priorities. Council is actively engaging with NPWS, and it may be that this agreement will ultimately take a different form to an MoU for practical reasons.</p>
<b>Strategy 4: Estuary Health</b>						
<b>Action 4A</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Develop a Holistic Lagoon Water Quality Improvement Plan for the Lagoons and their Catchments	<p>The Water Quality Improvement Plan (WQIP) for the lagoons will aim to enhance and protect the water quality of the lagoons and their catchment areas. The plan will outline the actions, responsibilities, and timelines for achieving sustainable water quality improvements.</p> <p>To ensure transparency and accountability, the plan will include the development of quantitative targets for both estuary ecosystem health and human health (e.g. recreational water quality), drawing on relevant guidelines and site-specific data. Targets will align with ANZECC (2018) guideline values, NSW Water-Quality Objectives and NHMRC recreational water guidelines, providing a robust benchmark for ongoing monitoring and adaptive management.</p> <p>The WQIP will include the following Key Tasks:</p> <p><u>Task 4A-1: Detailed Water Quality Assessment and Management Study</u></p> <ul style="list-style-type: none"> <li><u>Data Review:</u> Collation and review of existing water quality data, details on current point source loads to the estuaries, catchment land use data and existing environmental values/water quality objectives.</li> <li><u>Data Collection:</u> Existing water quality datasets will be supplemented by the temporary addition of automated water quality sampling devices in each Lagoon. The devices will be programmed to collect water samples when it is not possible to collect them manually - such as during significant rainfall and stormwater runoff events. This allows for the capture of important data regarding the behaviour of the catchment (and nutrient</li> </ul>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> DCCEE</p>	<b>High</b>	<p>This Action is the result of consolidating five closely related options:</p> <ul style="list-style-type: none"> <li>Option 6: Develop a Holistic Lagoon Water Quality Improvement Plan for the Lagoons and their Catchments</li> <li>Option 7: Reduce sewage contamination of lagoons</li> <li>Option 10: Sedimentation Process and Management Investigation</li> <li>Option 18: Develop and Implement an Algae Management Strategy for Avoca Lagoon</li> <li>Option 33: Trial Installation of Water Quality Autosampler in Avoca Lagoon Catchment</li> </ul> <p>These options were co-designed through engagement with the CFG, and Council staff – across CFG Workshops #1, #2, and #3. All five options received either Very High or High levels of community support.</p> <p>Combining these ideas provides a coordinated, catchment-wide approach to improving lagoon water quality. It avoids multiple separate investigations, reduces duplication and allows monitoring, modelling and management actions to work together rather than in isolation. This is particularly important because the</p>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
			<p>concentrations including TN, TKN, NH<sub>3</sub>, NO<sub>x</sub>, TP and SRP) in response to rainfall events. The autosamplers will be strategically located to align with existing research by the NSW Government and the University of Newcastle. This will ensure that the collected data complements broader scientific efforts to understand nutrient dynamics and sources within the catchment</p> <ul style="list-style-type: none"> <li>▪ <b>Groundwater Inputs and Nutrient Dynamics:</b> Further investigation of groundwater connectivity and potential nutrient contributions to the lagoons, including assessment of subsurface inflows, seepage dynamics, and nutrient flux pathways. Where necessary, this may include targeted monitoring or modelling investigations to differentiate surface stormwater inputs from groundwater derived nutrient loads.</li> <li>▪ <b>Water Quality Assessment and Modelling:</b> Using existing datasets, and the data collected by the autosamplers, a water quality modelling assessment will be undertaken in order to assess water quality in each lagoon against the desired targets, and identify priority subcatchments and tributaries where intervention can provide significant water quality improvements. This will also identify key locations where high sediment loads from the catchment contribute to lagoon turbidity and sedimentation.</li> <li>▪ <b>Management Options:</b> Development of a suite of potential management responses to improve water quality and sedimentation, and evaluate the options based on cost effectiveness and risk treatment. This includes investigation of the use of constructed wetlands, sediment, and detention basins and other WSUD options to minimise the effect of freshwater and sediment inflows, with particular reference to areas of high biodiversity value around entrances to creeks. Consideration should be given to both current and future meteorological conditions.</li> <li>▪ <b>Action Plan:</b> Define the roles and responsibilities, costs, and timeframes for implementation of the action plan.</li> </ul> <p>The WQIP will support evidence-based decision-making and provide a performance framework to track progress toward improved water quality outcomes over time.</p> <p><u>Task 4A-2: Reduce sewage contamination of lagoons</u></p> <p>Collaborate with Water &amp; Sewer (W&amp;S) authorities to identify and prioritise upgrades or maintenance of key sewerage infrastructure. The focus will be on reducing contamination risks to receiving waters and improving long-term water quality outcomes for the lagoon systems. This action includes:</p> <ul style="list-style-type: none"> <li>▪ <b>Infrastructure Audits and Risk Assessment:</b> Undertake comprehensive audits of critical sewerage infrastructure - including pump stations, sewer mains, and manholes - to assess their condition, identify high-risk failure points, and prioritise investment in upgrades or maintenance based on proximity to sensitive receiving waters and risk to human and ecosystem health. This will be informed by the desktop modelling in Task 4A-1 that identifies high risk sub-catchments of bacterial contamination.</li> <li>▪ <b>Targeted Investigations of Illegal Connections:</b> In partnership with Council Water and Sewer department, conduct targeted investigations to identify illegal or non-compliant sewer connections discharging wastewater to stormwater infrastructure or directly into lagoons. Develop and implement rectification strategies, including compliance notices and education.</li> <li>▪ <b>On-Site Sewage Management (OSSM) Risk Reduction:</b> Assess and mitigate the impact of OSSM systems — particularly in western catchment areas where these systems are more prevalent — through water quality monitoring, targeted compliance audits, and property owner education programs. Consider incentives or support mechanisms for system upgrades where appropriate.</li> </ul>			<p>management of water quality, algae and sedimentation are closely linked and are best addressed holistically.</p> <p>This speeds up delivery, makes better use of resources, and strengthens the scientific foundation needed to target upgrades and interventions. For the community, this means a clearer plan to improve lagoon health, tackle sediment and nutrient loads, reduce sewage contamination risks, and manage algal blooms in a more informed and balanced way.</p>



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			<ul style="list-style-type: none"> <li>Data Integration and Asset Management Alignment: Ensure findings from audits and investigations are integrated into Council’s asset management, renewal, and upgrade programs.</li> </ul> <p><u>Task 4A-3: Develop and Implement an Algae Management Policy for the Lagoons</u></p> <p>Based on the nutrient water quality modelling undertaken in the Task 4A-1, develop an Algae Management Policy for the Lagoons. This strategy should build on the findings of current Council-funded research into the drivers of algal growth in the lagoon and its role in the lake’s nutrient budget.</p> <p>Algal harvesting is proposed to help manage the adverse effects of blooms, including reduced recreational amenity and post-bloom anoxic events that elevate biological oxygen demand. It is acknowledged that harvesting is a symptom management tool and will be complementary to long-term nutrient load reduction strategies identified in this CMP. However, any harvesting approach should also account for the ecological value of algal presence, which includes:</p> <ul style="list-style-type: none"> <li>Providing structure for colonization and habitat provision.</li> <li>Serving as a food source for water birds, particularly swans.</li> <li>Offering spawning grounds, shelter, and refuge from predators for juvenile fish species and benthic invertebrates.</li> </ul> <p>Council should develop a clear, evidence-based policy to guide algal removal and disposal that adheres to ecological best practice, ensuring it is both effective and sensitive to the ecological integrity of the lagoon bed.</p>			
<b>Action 4B</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Implement a wetland, riparian & foreshore monitoring, management and restoration program	<p>This would include the development of a study area wide wetland management strategy for the Lagoons. The strategy will provide a coordinated framework for the protection, enhancement, and long-term management of riparian zones and wetland areas across the study area. This initiative aims to enhance ecosystem health, improve biodiversity, and bolster the resilience of the region’s wetlands in the face of climate change and urbanisation.</p> <p><u>Description of Program Works:</u></p> <p>This action would include implementation of wetland restoration works in priority locations across the CMP study area. Restoration activities may include:</p> <ul style="list-style-type: none"> <li>Removal and suppression of invasive weed species across foreshore and wetland areas. This would be undertaken through manual and mechanical techniques, with preference given to avoiding herbicide spraying where possible. Priority sites would be high-value riparian areas where weed infestations overlap with Threatened Ecological Communities (TECs).</li> <li>Revegetation of riparian and wetland areas through targeted planting of native species, focusing on restoring habitat structure, improving shading of waterways, stabilising banks and supporting native fauna, including waterbirds, amphibians and fish.</li> <li>Reinstating natural hydrological regimes, including re-establishing flow paths, removing or modifying small barriers and improving connectivity between wetlands and their floodplains to promote nutrient processing and sediment trapping.</li> <li>Introduction of “No Mow Zones” at specific areas along the public foreshore. These zones are designated areas where mowing and other maintenance activities will be minimized or halted to promote natural vegetation growth and enhance the ecological health of the foreshore.</li> </ul>	<u>Lead:</u> Council <u>Support:</u> DCCEEW	<b>High</b>	<p>This Action is the result of consolidating six closely related options:</p> <ul style="list-style-type: none"> <li>Option 5: Continue to support volunteer-based rehabilitation initiatives such as Landcare</li> <li>Option 9: Implement a wetland &amp; riparian monitoring, management and restoration program</li> <li>Option 11: Introduction of "No Mow Zones" at targeted areas of public foreshore</li> <li>Option 21: Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation</li> <li>Option 24: Identify opportunities for, and undertake cultural land management practices, including cultural burning</li> <li>Option 41: Environmental Protection Works</li> </ul> <p>These options were co-designed through engagement with the CFG, and Council staff – across CFG Workshops #1, #2, and #3. The six options received varying levels of community support, ranging from Medium to Very High.</p> <p>Combining the six ideas provides a single, coordinated approach to wetland and riparian restoration, cultural land management and long-term stewardship. It avoids multiple standalone initiatives, reduces duplication and gives Council a clearer framework for planning, procurement and funding. The consolidated action also brings together community-based rehabilitation, First Nations-led land management and technical</p>



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			<ul style="list-style-type: none"> <li>The identification of encroachment by private landholders onto public foreshore land, ensuring public land boundaries are respected and the integrity of lagoon-edge habitats is maintained.</li> <li>Engagement with local First Nations groups to identify opportunities for cultural practices within the lagoon catchments, including cultural burning. This would involve the Council working closely with NPWS and local First Nations Groups to develop and implement practices in an appropriate and safe manner.</li> <li>Continued financial and logistical support for volunteer-based rehabilitation initiatives such as Landcare and Clean4shore. Engagement with existing groups and local environmental advocates would be central to this action, with Council working directly with these groups to understand their priorities, challenges and support needs so that assistance is genuinely useful.</li> </ul> <p>These works would be considered 'Environmental protection works' (EPW) for mapped coastal wetlands and littoral rainforest in accordance with the R&amp;H SEPP, and the Standard Instrument - Principal Local Environmental Plan (2006 EPI 155a).</p> <p><u>Implementation:</u></p> <p>Works would typically be undertaken by approved contractors with appropriate technical expertise. Opportunities would also be sought to increase the involvement of First Nations peoples in the stewardship and management of lagoon catchments by building strong and collaborative partnerships with First Nations Ranger Groups and Bush Regeneration Teams. This approach supports the integration of traditional knowledge with contemporary conservation practices and builds local capacity. This action does not exclude non-First Nations regeneration companies from Council procurement processes.</p> <p><u>Monitoring:</u></p> <p>Monitoring is a key component of the Wetland Management Strategy. The monitoring program would combine on-ground assessment such as floristic surveys with remote sensing to assess changes in wetland condition over time in response to climate change and other pressures. Monitoring should also occur before, during and after ICOLL entrance opening events (artificial or natural), where practical, to help inform future updates to the Entrance Management Policy and to improve understanding of lagoon behaviour.</p>			<p>ecological works in a way that strengthens partnerships and builds capacity across the catchment.</p> <p>For the community, this means restoration works can be delivered faster and more cost-effectively and in the places that matter most for lagoon health and biodiversity. It also helps protect public access, improve foreshore amenity and support healthier wetlands over time as climate and land use pressures increase.</p>
<b>Action 4C</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Strengthen Planning Controls, DCP Provisions, and Environmental Incentives	<p>This action seeks to improve environmental performance within the development and construction sector and to better protect lagoon foreshores through updates to planning controls, Development Control Plan (DCP) provisions, and associated compliance and incentive mechanisms. The action focuses on reducing cumulative impacts on lagoon-edge environments, improving water quality and sediment control during construction, and supporting long-term foreshore resilience under climate change.</p> <p>Key components would include:</p> <ul style="list-style-type: none"> <li><u>Foreshore and Riparian DCP Provisions:</u> Introduce tailored DCP provisions for lakefront properties to strengthen foreshore protection through the development assessment (DA) process. These provisions would help manage cumulative impacts on lagoon-edge environments while increasing resilience to climate change and long-term shoreline change.</li> <li><u>Incentivise Environmentally Responsible Development Practices:</u> <ul style="list-style-type: none"> <li>Induction and Education – Deliver targeted induction sessions for developers, planners, and contractors to improve understanding of local environmental objectives, DCP requirements, and construction controls.</li> </ul> </li> </ul>	<u>Lead:</u> Council <u>Support:</u> DPHI-Planning and Assessment	<b>Medium</b>	<p>This Action is the result of consolidating six closely related options:</p> <ul style="list-style-type: none"> <li>Option 27: Introduce area-specific Development Control Plan (DCP) provisions for lakefront properties to strengthen foreshore protection through the development assessment (DA) process.</li> <li>Option 43: Develop and Implement a Program to Incentivise Environmentally Responsible Development Practices</li> </ul> <p>These options were developed through engagement with the CFG and Council staff and reflect a shared objective to lift environmental performance within the development and construction sector and to better protect lagoon foreshores and riparian areas over time.</p> <p>Combining the two options creates a more complete and practical approach by pairing regulatory guidance (through tailored DCP provisions) with education, compliance support and incentives for best practice. This avoids duplicating efforts, provides a clearer pathway for implementation and gives both</p>



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			<ul style="list-style-type: none"> <li>– Compliance Resourcing – Strengthen compliance capacity within Council to monitor and support environmentally responsible site practices, supported by mechanisms such as discounted developer contributions or refundable deposits for compliance.</li> <li>– Incentivisation Framework – Introduce financial or procedural incentives (e.g. reduced contributions, refundable levies) for developers who demonstrate compliance or exceed environmental standards.</li> <li>– Recognition and Awards – Establish non-financial recognition, such as annual developer awards or public acknowledgment, for projects that achieve high environmental performance against agreed criteria.</li> </ul> <p>Together, these measures provide a balanced approach that combines regulatory guidance, education, compliance and incentives. For the community and environment, this supports healthier lagoon foreshores, improved water quality, stronger riparian buffers and more climate-resilient shorelines. For the development sector, it provides clearer rules, more consistent expectations and opportunities to be recognised for environmental leadership.</p>			Council and developers a single framework to work within. The combined action more readily supports more sustainable construction practices across the catchment.
<b>Action 4D</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Undertake a Wetland Refugia and Migration Study	<p>This study will assess the future viability of coastal wetland habitats within the lagoon systems in response to projected sea level rise. The primary objective is to forecast shifts in the extent and distribution of intertidal vegetation - such as saltmarsh, mangroves, and other important vegetation communities such as Swamp Sclerophyll Forest - over coming decades.</p> <p>The study will make use of existing wetland vegetation mapping, high quality topographic data, and long-term tidal water level data to develop existing and future (under sea level rise) mapping outputs.</p> <p>These inputs will inform the development of current and future spatial models of intertidal habitat extent under different sea level rise scenarios. The results will be used to:</p> <ul style="list-style-type: none"> <li>▪ Identify areas at risk of coastal squeeze, where intertidal habitats may be trapped between rising water levels and fixed landward boundaries</li> <li>▪ Investigating the role of groundwater in wetland distribution and resilience. This will include consideration of freshwater recharge processes, the influence of groundwater on wetland persistence, and potential impacts of saltwater intrusion on freshwater aquifers.</li> <li>▪ Highlight opportunities for wetland refugia, where landward migration of habitats is possible</li> <li>▪ Assess implications for ecosystem services, such as habitat provision, nutrient cycling, and shoreline protection.</li> </ul> <p>The outputs of the technical assessment should be used to help inform land use and conservation planning by overlaying results with zoning and land tenure, helping to identify strategic areas for restoration, buffering, or managed realignment.</p> <p>Where possible, the study will engage with First Nations groups and local community stakeholders to incorporate cultural values and traditional knowledge relating to wetland areas</p>	<u>Lead:</u> Council <u>Support:</u> DCCEEW	<b>Low</b>	<p>Formerly referred to as Option 8.</p> <p>This option was rolled over as an outstanding action from the previous CZMP. This was first identified during CFG Workshop #1, updated in Workshops #2 and #3 to help define its scope and areas of focus.</p> <p>This option was well supported by the community:</p> <ul style="list-style-type: none"> <li>▪ Community Support Score = High Support</li> <li>▪ CFG Priority Ranking = Medium Priority</li> </ul> <p>While the CFG ranked this action as a Medium priority, it has been assigned a Low priority within the CMP. This reflects that the study focuses on long-term climate change impacts and future planning for wetland migration, rather than on immediate works or actions that directly affect current lagoon health or flooding outcomes. The action remains important for forward planning, conservation and adaptation, but can reasonably follow after more time-critical implementation actions are underway.</p>
<b>Action 4E</b>	Avoca Lagoon	Undertake a dredge hole rehabilitation feasibility investigation	<p>This would include a feasibility investigation into the rehabilitation of the Avoca lagoon dredge hole, with the goal of restoring a more stable and ecologically functional lagoon bed. The primary objectives of this investigation include:</p> <ul style="list-style-type: none"> <li>▪ Undertaking a contemporary bathymetric survey to enable an assessment of the current condition of the dredged hole and identify areas that require rehabilitation.</li> <li>▪ Reviewing historical dredging records and sediment transport processes to understand the original dredging impacts and natural infill trends.</li> </ul>	<u>Lead:</u> Council <u>Support:</u> DCCEEW, DPIRD-Fisheries	<b>High</b>	<p>Formerly referred to as Option 17.</p> <p>This option was identified in the Stage 2 Avoca Lagoon Process Study (DCCEEW, 2024). This option was updated and revised during CFG Workshops #2 and #3, to ensure that it includes adequate engagement with relevant stakeholders and the community.</p>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
			<ul style="list-style-type: none"> <li>Evaluating the potential methods for re-filling dredge holes to ensure a stable and even lagoon bed (including required equipment and associated costs).</li> <li>Investigating the environmental impact of bed modification works and re-filling activities on the lagoon's ecosystem - including hydrodynamics, benthic habitats, and water quality.</li> <li>Identifying suitable sediment sources for re-filling, including potential reuse of dredged material from Avoca Beach or other external sources.</li> <li>Developing a comprehensive plan for the rehabilitation process, including timelines, resource allocation, and potential challenges.</li> </ul> <p>This would also include engaging with stakeholders, including local communities and environmental experts, to gather input and ensure the proposed actions align with broader environmental and recreational goals</p>			<p>This option possessed high levels of CFG and community support:</p> <ul style="list-style-type: none"> <li>Community Support Score = High Support</li> <li>CFG Priority Ranking = Medium Priority</li> </ul>
<b>Action 4F</b>	Avoca Lagoon	Investigate the Feasibility of Constructing a Water Treatment Wetland in the Southern Arm of Avoca Lagoon	<p>This action proposes to investigate the potential for constructing an in-lagoon water treatment wetland within the southern arm of Avoca Lagoon, particularly near the outfall of Bowtells Drain. Due to limited space within the upstream catchment for land-based water quality treatment, this action would assess the viability of using floating treatment wetlands, targeted sediment reworking, and nearshore reclamation to establish wetland areas within the lagoon itself.</p> <p>The feasibility study will assess the ecological, hydraulic, engineering, social, and economic considerations associated with establishing constructed wetland features within the lagoon. This may include the use of wetland "fingers" or extensions projecting perpendicular from the southern shoreline to:</p> <ul style="list-style-type: none"> <li>Enhance hydraulic complexity</li> <li>Promote sediment deposition</li> <li>Reduce wind-induced shear stress, a known driver of elevated turbidity in this area</li> </ul> <p>By altering local hydrodynamics and encouraging natural treatment processes, the intervention has potential to improve water clarity, reduce nutrient loads, and enhance the ecological function of the southern arm of the lagoon.</p> <p>Any future design and implementation would be subject to detailed environmental assessment, community consultation, and regulatory approvals.</p>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> DCCEEW, DPIRD-Fisheries</p>	<b>Medium</b>	<p>Formerly referred to as Option 39.</p> <p>This option was identified during internal Council workshops, based on the outcomes of the Stage 2 Avoca Lagoon Process Study (DCCEEW, 2024). It was then reviewed by the CFG during Workshop #3 to incorporate local knowledge and confirm the need for the action.</p> <p>This option possessed high levels of CFG and community support:</p> <ul style="list-style-type: none"> <li>Community Support Score = High Support</li> <li>CFG Priority Ranking = Medium Priority</li> </ul> <p>To maximise benefits, this investigation should follow completion of the WQIP (Action 4A). This allows it to build on the water quality modelling and desktop assessments already completed, including information on pollutant loads, sedimentation and tributary flows. This sequencing creates efficiencies, avoids duplication and supports a more informed and cost-effective study.</p>
<b>Action 4G</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Assess and Address the Impact of Private Structures & encroachment on Lagoon Foreshores	<p>In many of the lagoons, informal or legacy private jetties, boat ramps, paths or drains exist on public or riparian land, often contributing to bank erosion or weed spread. These structures can contribute to bank erosion, weed spread and foreshore degradation and have been raised as a common concern during community engagement.</p> <p>This action involves undertaking an audit of existing private and semi-private structures &amp; encroachments located on or adjacent to lagoon foreshores. The audit would identify unauthorised structures &amp; encroachments, assess their physical and environmental impacts and prioritise actions for removal/rehabilitation, regularisation or retrofitting with lower-impact alternatives. The audit should also consider access, safety and public land values, and recognise that some structures may have historic or ongoing community uses that require balanced management.</p>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> DCCEEW, DPIRD-Fisheries</p>	<b>Low</b>	<p>Formerly referred to as Option 38.</p> <p>This option was identified by the CFG during Workshop #2 to incorporate local knowledge and confirm the need for the action.</p> <p>This option possessed high levels of CFG and community support:</p> <ul style="list-style-type: none"> <li>Community Support Score = High Support</li> <li>CFG Priority Ranking = Medium-Low Priority</li> </ul> <p>Including this action in the CMP helps address an identified information gap and supports more informed planning for future lagoon management. This will assist Council and the community to make clearer decisions about works and priorities that benefit lagoon health and public amenity over time.</p>



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<b>Action 4H</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Undertake a Planning Proposal to Amend the RH SEPP Coastal Environment Area Mapping	<p>This action involves preparing and progressing a planning proposal to amend the Coastal Environment Area mapping under the Resilience and Hazards State Environmental Planning Policy so that, for each of the Central Coast lagoons, the mapped Coastal Environment Area aligns more closely with the full hydrologic catchment boundary rather than the current foreshore-based buffer. The purpose of this action is to better align the coastal planning framework with the catchment-scale processes that influence lagoon health, including water quality, sediment transport, vegetation disturbance and hydrologic modification. By extending the mapped Coastal Environment Area, future development assessment within the catchment would be better able to consider impacts on lagoon condition and long-term estuary health.</p> <p>This action would include:</p> <ul style="list-style-type: none"> <li>Review and confirmation of existing Coastal Environment Area mapping and catchment boundaries for each lagoon</li> <li>Preparation of technical justification for the proposed amendment, including environmental, hydrologic and planning rationale</li> <li>Consultation with relevant State agencies regarding process, requirements and implementation considerations</li> <li>Preparation and progression of a formal planning proposal in accordance with statutory requirements.</li> </ul> <p>Importantly, this action does not itself amend the mapping. Rather, it commits Council to investigating and progressing the planning pathway required to achieve this change.</p>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> DCCEEW, DPPI – Planning and Assessment</p>	<b>High</b>	<p>This action was initiated by council in order to improve consistency of planning controls across the catchment – in consultation with DCCEEW and DPPI-Planning and Assessment, in order to improve consistency of planning controls across the catchment.</p>
<b>Strategy 5: Social and Cultural Values</b>						
<b>Action 5A</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Prepare Foreshore Masterplans for Each Lagoon	<p>Prepare and implement an integrated Foreshore Landscape Master Plan for the four coastal lagoons that prioritises environmental function, recreational use, public amenity and landscape character. The master plan will guide the rehabilitation of sensitive habitats, improve lagoon-side access and facilities, and support safe and sustainable recreation. The focus is on delivering coordinated outcomes across multiple lagoons, while recognising the unique opportunities and constraints of each site.</p> <p><u>Core Objectives</u></p> <ul style="list-style-type: none"> <li>Address informal access and promote safe, low-impact recreation</li> <li>Protect and improve wetland, riparian and lagoon vegetation for biodiversity</li> <li>Manage foreshore erosion and bank stability using nature-based approaches</li> <li>Upgrade public amenities to improve visitor experience</li> <li>Improve lagoon-side connectivity and pedestrian access</li> <li>Enhance landscape character and green space</li> <li>Consider universal access, watercraft launching and low-impact foreshore uses</li> <li>Integrate catchment and stormwater considerations where relevant</li> </ul> <p><u>Lagoon-Specific Considerations</u></p> <ul style="list-style-type: none"> <li>Wamberal: Local priorities include addressing uncontrolled access along Remembrance Drive and encouraging safe, sustainable recreation, improving public amenities, habitat improvements (plantings of Casuarina, Melaleuca and rushes), shared, and replacement of informal barriers and structures that currently impact movement, safety and bank condition.</li> </ul>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> N/A</p>	<b>Medium</b>	<p>This Action is the result of consolidating four closely related options:</p> <ul style="list-style-type: none"> <li>Option 14: Develop and implement a holistic Foreshore Access Improvement Plan for the Southern Foreshore of Wamberal Lagoon</li> <li>Option 15: Develop and implement a holistic Foreshore Access Improvement Plan for Terrigal Lagoon</li> <li>Option 19: Develop and implement a holistic Foreshore Access Improvement Plan for Avoca Lagoon</li> <li>Option 20: Develop and implement a holistic Foreshore Access Improvement Plan for Cockrone Lagoon</li> </ul> <p>The 4 master plan options were carried over as actions from the previous CZMP – and were optimised during CFG Workshops 2 and #3 to capture local priorities and opportunities for upgrades.</p> <p>Community Support was strong for all four options – which ranged from High to Very High.</p> <p>Combining the four foreshore master planning options into a single coordinated action will create efficiencies in design and construction, streamline engagement with the community and stakeholders, and support a shared vision for how the lagoons should function into the future. A combined approach allows the plans to speak to each other, avoids duplicated effort, and provides a platform to package works for funding and delivery. It also helps with sequencing and prioritising improvements across</p>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
			<ul style="list-style-type: none"> <li>Terrigal: Local priorities include resolving parking and access pressures, protecting wildlife corridors across the foreshore, using bollards or low fencing to protect sensitive vegetation, managing vegetation and bank erosion along northern and eastern foreshores.</li> <li>Avoca: Local priorities include opportunities for unpowered craft launching at Heazlett Park, addressing stormwater and overland drainage from adjacent commercial areas, succession planting to address Casuarina dieback, linkages to COSS lands, and managing downstream vegetation and bank erosion associated with entrance dynamics.</li> <li>Cockrone: Local priorities include improved all-abilities pedestrian access, unpowered craft launching and storage, provision of amenities (toilets, bins, dog waste bags), measures to limit dog movement into sensitive wetland areas.</li> </ul> <p>The development of the master plans should also align with the erosion mitigation and sand distribution works described in Action 3C.</p>			the lagoon network, so that recreational access, habitat outcomes and amenity upgrades are delivered in a way that is consistent and mutually reinforcing.
<b>Action 5B</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	<p>This action involves engaging with the relevant First Nations Groups to protect and preserve Aboriginal Cultural Heritage (ACH) items within the lagoon catchments. It is anticipated that there would be four main tasks for this action:</p> <ul style="list-style-type: none"> <li>Consultation with the relevant First Nations Groups.</li> <li>A literature review of existing ACH databases (such as AHIMS) and existing cultural heritage plans</li> <li>An Aboriginal cultural heritage survey, which should include field work, and recording of cultural heritage sites (such as middens sites) and detailed documentation of findings.</li> </ul> <p>The development and prioritisation of local, site-specific management plans for protection and preservation of sites exposed to coastal hazard risk.</p>	<u>Lead:</u> Council <u>Support:</u> First Nations Groups, NPWS	<b>High</b>	<p>Formerly referred to as Option 25.</p> <p>This option was identified through engagement with local First Nations Groups.</p> <p>This option possessed high levels of CFG and community support:</p> <ul style="list-style-type: none"> <li>Community Support Score = High Support</li> <li>CFG Priority Ranking = Medium-Low Priority</li> </ul> <p>Including this action in the CMP helps address an identified information gap and supports more informed planning for future lagoon management. This will assist Council and the community to make clearer decisions about works and priorities that benefit lagoon health and public amenity over time.</p> <p>While the CFG priority given to this Action was Medium-Low, this action has been assigned a High priority in consultation with the first nations Group with whom this action was co-designed.</p>
<b>Strategy 6: Research and Innovation</b>						
<b>Action 6A</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Council continue to support research which improves understanding of lagoon processes, threats and anthropogenic impacts in order to develop improved management practices	<p>Continue to contribute to research where it has the potential to increase the understanding of ICOLL function including entrance processes (hydrodynamic and morphological), ecology and nutrient dynamics.</p> <p>Where feasible, Council should:</p> <ul style="list-style-type: none"> <li>Partner with universities and other research institutions to develop applied research projects that align with management priorities under the CMP</li> <li>Provide in-kind support for high-priority research initiatives</li> <li>Facilitate access to monitoring data and field sites</li> </ul> <p>Research supported under this initiative should prioritise:</p> <ul style="list-style-type: none"> <li>Understanding the biological, chemical, and physical functioning of the lagoons</li> <li>Investigating the impacts of urbanisation and development on biodiversity, water quality, and hydrological processes</li> </ul>	<u>Lead:</u> Council <u>Support:</u> Research Institutions	<b>Low</b>	<p>This Action is the result of consolidating four closely related options:</p> <ul style="list-style-type: none"> <li>Option 13: Council continue to support research which improves understanding of lagoon processes, threats and anthropogenic impacts in order to develop improved management practices</li> <li>Option 16: Green and Golden Bell Frog research and habitat restoration</li> <li>Option 26: Undertake a habitat assessment and develop a targeted management plan for flying-fox populations, with a focus on the Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>).</li> <li>Option 36: Undertake Ecosystem Services Valuation for the Central Coast Lagoons</li> </ul>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
			<ul style="list-style-type: none"> <li>Establishing clear cause-and-effect relationships to inform management responses</li> <li>Addressing gaps in knowledge that directly relate to high-priority values and threats identified in the CMP</li> </ul> <p>Research outcomes will be integrated into CMP updates, monitoring frameworks, and on-ground actions, and shared with stakeholders through reports, forums, and other knowledge-sharing platforms.</p> <p>Key Research Priorities identified in the CMP:</p> <ul style="list-style-type: none"> <li>Habitat restoration and management for key species such as the Green and Golden Bell Frog and the Grey-headed Flying-fox)</li> <li>Impacts of artificial light and noise on lagoon fauna and ecological processes</li> <li>The economic value of the ecosystem services of the lagoon network</li> </ul> <p>Research outcomes will be reflected in CMP updates, monitoring frameworks, adaptive management responses and Stage 5 implementation.</p>			<ul style="list-style-type: none"> <li>Option 37: Assess and Manage Light and Noise Pollution Impacts on Lagoon Ecology</li> </ul> <p>Many of these priorities for research topics were identified through CGF engagement, during workshops #2, and #3.</p> <p>The consolidation of these options into a single action reflects that the research themes are closely related and do not require separate implementation pathways. Combining them allows for more efficient coordination of priorities, creates opportunities for joint funding applications, and supports clearer arrangements around data sharing, collaboration and dissemination.</p>
<b>Actions Dropping out of the CMP, and rationale for their exclusion</b>						
<b>Option 30</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	Support Regional Invasive Fauna Management with LLS	<p>This option would involve Council liaising with NSW Local Land Services (LLS) to support coordinated management of invasive predators -particularly foxes, deer, and domestic and feral cats - across the catchments of the study area lagoons. This will include identifying priority areas for control, sharing data and observations, and aligning timing of on-ground efforts with broader catchment-wide programs. The aim is to reduce predation pressure on native fauna, particularly ground-nesting birds, frogs and other vulnerable lagoon-dependent species.</p> <p>This Action should be undertaken in alignment with the Regional Strategic Pest Animal Management Plan 2024-2028 (NSW LLS), which states Councils responsibilities in this area include:</p> <ul style="list-style-type: none"> <li>Administer and enforce the <i>Companion Animals Act 1998</i>, including microchipping and registration</li> <li>Ensure all domestic cats are treated humanely and their welfare needs are met</li> <li>Promote responsible cat ownership, including desexing</li> <li>Respond to complaints about stray and nuisance domestic cats</li> <li>Impound and euthanise domestic cats that pose a threat to the public</li> </ul> <p>Encourage the local community and relevant land managers to report invasive fauna sightings using FeralScan , to improve regional data and inform more effective, targeted control efforts.</p>	<p><u>Lead:</u> Council</p> <p><u>Support:</u> LLS</p>	N/A	<p>This option did not progress from the long list of Options because its most effective delivery pathway lies outside the CMP framework.</p> <p>Invasive fauna management is LGA-wide and extends beyond the waterways and catchments of the 4 lagoons of the CMP. An LGA-wide approach that covers the full terrestrial landscape is more appropriate, as pest control cannot realistically be limited to a small geographic pocket without compromising effectiveness.</p> <p>A non-CMP pathway also allows alignment with existing regional pest programs led by LLS, supports multi-tenure coordination, and avoids unnecessary duplication of council's Companion Animals responsibilities.</p>
<b>Option 35</b>	Wamberal Lagoon	Fishing closure of Wamberal Lagoon	<p>This option would involve NSW DPIRD Fisheries declaring a fishing closure for Wamberal Lagoon under Section 8 of the <i>Fisheries Management Act 1994</i>. This provision enables the prohibition or restriction of taking or possessing fish in a specified area to protect fish stocks, aquatic ecosystems, and sensitive habitats. A closure of this kind would support the ecological values of the lagoon - particularly its role as a bird sanctuary and nature reserve - by reducing disturbance, improving water quality, and enhancing habitat protection for vulnerable and migratory species.</p>	<p><u>Lead:</u> DPIRD Fisheries</p> <p><u>Support:</u> Council, NPWS</p>	N/A	<p>Removed from the CMP long list because it received:</p> <ul style="list-style-type: none"> <li>The lowest community support score of any option, and</li> <li>The second lowest priority score from the CFG in Workshop #4.</li> </ul> <p>In addition, a fishing closure would require substantial engagement with NSW DPIRD-Fisheries and other stakeholders and involves statutory processes that extend beyond the scope and intent of the CMP. For these reasons it was not advanced further.</p>



ID	Locality	Action Name	Action Description	Responsibility	Priority	Action Development History
<b>Option 40</b>	All Lagoons: Cockrone, Avoca, Terrigal, Wamberal	European and Archaeological Heritage Management	<p>There appears to be a gap in the consideration of European and archaeological heritage across the coastal lagoons. This Option would therefore include the protection, maintenance, and management of identified heritage items and sites. Where this cannot be achieved, a hierarchy or set of criteria should be developed to guide alternative approaches (e.g. salvage, heritage interpretation).</p> <p>In addition, review approval processes to identify how they could be streamlined or better aligned with existing conservation management planning frameworks.</p>	<u>Lead:</u> Council <u>Support:</u> Heritage NSW	N/A	<p>Removed from the CMP long list following internal council discussions, which concluded that European and archaeological heritage management is better addressed outside the CMP in the same manner as Option 30. Heritage matters extend across the full LGA and are guided by separate statutory and policy frameworks, meaning a CMP action would add limited value relative to other options in the long list.</p> <p>This option was also rated as the lowest priority by the CFG in Workshop #4, and therefore did not progress to the refined action set.</p>



## 7 STEP 4: BUSINESS PLAN

### 7.1 The Benefits of Implementing the CMP

The Central Coast lagoons support high environmental, social and cultural values and play an important role in the identity, lifestyle and wellbeing of surrounding communities. These lagoon systems provide valuable ecological habitat, support recreational and tourism activities, contribute to local amenity, and hold cultural significance for First Nations communities.

However, the assessments undertaken as part of this CMP have identified a range of existing and emerging threats to these values. These include declining water quality, habitat degradation, sedimentation, coastal hazards, and increasing pressures associated with urban development within the lagoon catchments. Many of these pressures are expected to intensify over coming decades as a result of population growth, climate change and ongoing catchment development.

The purpose of this CMP is to establish a long-term, coordinated framework for managing these risks and protecting the environmental, social and economic values of the lagoon systems. The CMP sets out a structured program of management actions designed to address identified threats both now and into the future. These actions include a combination of on-ground works, monitoring and research programs, planning initiatives, and community engagement activities.

Implementing the CMP will deliver a range of benefits, including improved water quality, enhanced ecosystem health, increased resilience to coastal hazards, protection of cultural values, and improved recreational opportunities for the community. Collectively, these outcomes contribute to the long-term sustainability and liveability of the Central Coast region.

The Business Plan focuses on delivering these outcomes in the public interest, recognising that the lagoon systems provide broad community benefits and that many of the pressures affecting lagoon health arise from complex catchment-wide processes. As such, the plan focuses on funding and delivering actions that generate public good outcomes across the lagoon catchments, rather than allocating costs to individual private beneficiaries.

### 7.2 Costs of CMP Implementation

The estimated delivery costs for all proposed CMP Actions progressing to Stage 4 of the CMP is approximately \$4.9 million (NPV) over the 10-year implementation period.

This equates to an indicative average investment of approximately \$500,000 per year across the four lagoon systems. Given the eligibility of many actions under the NSW Coast and Estuary Grant Program, which typically provides up to two-thirds funding support, the net financial contribution required from Council may be significantly lower.

Based on current funding arrangements, Council's average annual contribution toward CMP implementation could be in the order of \$160,000 per year, with the balance expected to be supported through State Government funding and other external sources.

These figures represent indicative planning-level estimates intended to support strategic implementation planning. More detailed costing and funding arrangements will be confirmed during Stage 4 of the CMP as individual actions progress toward implementation.



## 7.3 Potential Funding Mechanisms

A detailed Business Plan will be prepared as part of the Stage 4 CMP document, building on the information developed during Stage 3 and incorporating refined action costs, priorities and delivery pathways.

This preliminary business planning section outlines the key components of the funding strategy for the CMP, including indicative implementation costs, potential cost-sharing arrangements and possible funding sources.

Establishing sustainable funding arrangements will require ongoing collaboration between Council and relevant stakeholders. Funding for CMP actions may be sourced from a combination of Council operational budgets, State and Commonwealth grant programs, and partnerships with external organisations or community groups where appropriate.

Given the scale and diversity of actions identified in this CMP, external funding will play a critical role in enabling implementation, particularly for larger infrastructure projects, environmental restoration works and technical investigations.

### 7.3.1 Council Funding

Funding for Council-led actions is allocated through Council's Resource Strategies and Long Term Financial Plan, which underpin the Delivery Program (four-yearly) and Operational Plan (annual) prepared under the NSW Integrated Planning and Reporting (IP&R) Framework.

Council's primary revenue sources include statutory rates and charges, such as water, sewer and waste service charges, which are applied to landowners and businesses across the Local Government Area. Under the Local Government Act 1993, ordinary rates may be levied on all rateable land within the LGA.

Revenue from ordinary rates supports a broad range of Council services, infrastructure programs and environmental management initiatives, and therefore represents an important funding source for implementing actions identified in this CMP.

According to publicly available financial statements, Council's annual revenue from rates and annual charges was approximately \$459 million in the 2024/25 financial year. While only a small proportion of this revenue would typically be allocated to coastal and estuary management activities, this revenue base provides the financial capacity for Council to contribute to the delivery of CMP actions, particularly when leveraged alongside external grant funding.

### 7.3.2 External Sources of Funding

It will not be possible for Council to implement all actions identified in this CMP without additional sources of funding. As such, the identification of grants and the submission of successful funding applications is an important component of this CMP.

There are a range of other funding mechanisms available for financing the implementation of the CMP. For example, Council can take advantage of various state grant programs, as listed in Table 7-1. The value of this funding cannot be accurately quantified until such time as it is awarded. It should be noted that this is not an exhaustive list of all funding opportunities, and that over the ten-year lifecycle of the CMP additional or new funding sources may become available.

Agencies responsible for the delivery of actions in this CMP have been consulted during its development and have indicated their support. However, delivery of the actions will depend on the availability of funding which is yet to be confirmed. Despite the priority of each action listed in the CMP, the timeframe of implementation will be influenced by the availability of resources and funding.



Table 7-1 Summary of potential funding sources of the CMP

Funding Source	Details / Description
<b>State Government</b>	
<b>NSW Coastal and Estuary Grants Program</b>	<p>The costs associated with delivery of the CMP can be partly funded by the NSW Coastal and Estuary Grants Program administered by DCCEEW. The program supports coastal and estuary planning projects and the implementation of works identified in certified CMPs. Funding is available under 5 funding streams:</p> <ul style="list-style-type: none"> <li>▪ A planning stream: for planning and studies including investigation, design and cost-benefit analyses for infrastructure works recommended in a certified CMP.</li> <li>▪ Four implementation streams – one for each of the coastal management areas. The focus of these streams are projects that manage risks from coastal hazards, and improve the health of estuaries, wetlands and littoral rainforests across NSW.</li> </ul> <p>For projects that address a documented action in a certified CMP funding is \$2 from the State Government for every \$1 provided by a Council. Certification of this CMP will facilitate eligibility for funding of many of the actions proposed in this CMP under the program.</p> <p>This grant funding program is contestable, and prioritised to Council applications with certified CMPs and subject to State Government funding priorities and allocations.</p>
<b>Marine Estate Management Strategy</b>	<p>A number of management actions in the CMP may be eligible for funding under the NSW Marine Estate Management Strategy (MEMS). The MEMS provides an overarching, strategic approach to the coordination and management of the marine estate through to 2028.</p> <p>The management of priority threats is grouped into 9 management initiatives that summarise the objectives, benefits, threats, stressors and proposed management actions. An implementation plan (developed by the Authority’s member agencies in consultation with key stakeholders) articulates the management actions in more detail. CMPs are key delivery mechanisms for the MEMS.</p>
<b>NSW Disaster Risk Reduction stream grants</b>	<p>Under two funding pathways, Discovery and Scale, the State Risk Reduction stream aims to reduce or enable the reduction of state-level risks, risks of state significance and systemic risks potentially impacting NSW (NSW Government, 2023).</p> <p>The Discovery Projects pathway offers funding of up to \$500,000, for projects that will test and pilot new approaches to achieve breakthrough disaster risk reduction outcomes. The projects must have potential for state-wide significance or impact.</p> <p>The Scale Projects pathway offers funding of up to \$2.5 million, for projects that aim to generate a new product, technology, platform, or approach that will have state-wide impact at a scale beyond piloting or testing.</p>
<b>Saving our Species Program</b>	<p>Administered by DCCEEW, the Saving our Species (SoS) sets out the NSW Government’s threatened species management plan. The main objectives of SoS are to increase the number of threatened species that are secure in the wild in NSW for 1 year and control the key threats facing the states threatened plants and animals.</p>
<b>NSW Heritage Grants</b>	<p>This program is administered by DCCEEW and aims to fund projects that provide sustainable, long-term heritage benefits and provide public benefit and enjoyment from heritage. Funding may be available for the management of heritage items in the coastal environment. Areas of interest include:</p> <ul style="list-style-type: none"> <li>▪ Aboriginal Cultural Heritage grants</li> <li>▪ Caring for State Heritage grants</li> <li>▪ Community Heritage grants</li> <li>▪ Grants for local government.</li> </ul>



Funding Source	Details / Description
<b>NSW Environment Trust Grants</b>	<p>Funding is available under the NSW Environment Trust to a broad range of organisations for projects that enhance the environment of NSW. Grants may be awarded for on ground rehabilitation and improvement works, research applications, land acquisition, waste reduction and promotion of environmental education.</p> <p>The NSW Environment Trust is an independent statutory body established by the NSW Government to make and supervise the environment grants. The Trust is administered by DCCEE. Suitable coastal management grant applications may relate to dune care, for example.</p>
<b>Crown Reserves Improvement Fund Program</b>	<p>Administered by Crown Lands, the Crown Reserves Improvement Fund Program provides financial support for the development, maintenance, and improvement of Crown reserves. Funding under this program is subject to a competitive grant application process and eligibility requirements which may change from year to year and in accordance with departmental priorities.</p>
<b>Federal Government</b>	
<b>Disaster Ready Fund</b>	<p>The Disaster Ready Fund (DRF) is the Australian Government's flagship disaster resilience and risk reduction initiative which will deliver projects that support Australians to manage the physical, social and economic impacts of disasters caused by climate change and natural hazards (NEMA, 2013). The DRF was established through the <i>Disaster Ready Fund Act 2019</i>. The DRF is intended to be an enduring fund, to provide all levels of government and affected stakeholders the certainty they need to plan for robust investments in resilience projects to reduce the impacts of disasters.</p>
<b>Urban Rivers and Catchments Program</b>	<p>The \$200 million Urban Rivers and Catchments Program was established by the Federal Government to assist in restoring the health of urban waterways for native plants, animals, and local communities. The program is funding projects including, but not limited to (Australian Government, 2025):</p> <ul style="list-style-type: none"> <li>▪ Creation of wildlife habitats and ecological corridors to support native species</li> <li>▪ Replacement of concrete channels and drains with restored, vegetated stream environments</li> <li>▪ Development of wetlands and interconnected ponds to slow and filter stormwater, enhance aquatic habitats, and improve water quality for native wildlife</li> <li>▪ Removal of in-stream barriers (e.g., weirs) to facilitate fish passage</li> <li>▪ Installation of litter and pollutant traps to prevent stormwater-borne plastics from entering aquatic and marine ecosystems.</li> </ul>
<b>Other funding opportunities</b>	
<b>Landcare Grants</b>	<p>Landcare Australia works with governments, corporate and philanthropic organisations, and donors to facilitate funding for good quality, hands on projects and programs that will improve environmental outcomes for the Landcare community (Landcare Australia, 2023).</p>
<b>Coastcare Grants</b>	<p>Coastcare grants support community groups working on projects across Australia. Grants support Landcare and Coastcare groups with projects like dune protection, revegetation of native coastal environments, protection of endangered coastal species habitats, collection and prevention of stormwater pollution, weed and non-native plant removal, and control of human access to sensitive and vulnerable areas (Landcare Australia, 2023).</p>



## 7.4 Cost-Benefit Distribution

The NSW Coastal Management Manual (OEH, 2018d) recommends consideration of the distribution of costs and benefits among Council, public authorities, stakeholders and the environment when preparing a CMP.

The actions proposed in this CMP are intended to deliver broad public benefits, including improved environmental health, enhanced coastal hazard resilience, and improved recreational and cultural values across the lagoon systems.

None of the actions have been designed to directly benefit specific private interests, although some indirect benefits may arise. For example, improvements in lagoon health, amenity and resilience may support nearby businesses such as tourism operators, hospitality venues and recreational service providers.

As the CMP actions primarily deliver public good outcomes, the implementation framework does not require formal public-private cost-sharing arrangements. Instead, funding is expected to be delivered primarily through Council investment, supplemented by State and Commonwealth grant programs and other public funding sources where available.

## 7.5 Progression through to the Stage 4 CMP Business Plan

The Business Plan developed herein has been undertaken to assist in the evaluation of options. The Stage 4 CMP document will include a detailed Implementation Program and Business Plan that will include the following information:

- Action ID and Name.
- Responsibilities – including the lead agency for implementation and any supporting agencies.
- Priority and timeframe for delivery.
- Forward cost estimates – including capital costs, and ongoing implementation and maintenance costs. These costs will be discretised into the forthcoming Delivery Program (DP) periods of Council's IP&R framework. Costs will be discretised into their respective capital, operational, and ongoing maintenance costs.
- Potential funding mechanisms.

Despite the nominated priority and expected timeframe of each action, the implementation of actions will be largely controlled by the availability of resources and the prioritisation across all of Council's respective functions via the Operational and Delivery Plans.



## 8 THE WAY FORWARD

The next stage of the CMP process, Stage 4, involves the preparation, public exhibition (and updating if required), and submission of a draft CMP to the Minister for certification (OEH, 2018e). The draft CMP should include the various components laid out in the NSW Coastal Management Manual (OEH, 2018e), including:

- Snapshot of issues (coastal processes, coastal hazards, threats to biodiversity, resilience and integrity of coastal ecosystems and ecological values etc)
- Actions to be implemented by Council and other public authorities.
- A business plan identifying the full capital, operational and maintenance costs, and timings of management actions.
- Mapping of coastal management areas (including any proposed changes to current coastal management areas, or mapping of new coastal vulnerability areas).

The Draft CMP document should, in essence, provide a clear and succinct *statement of proposed coastal management actions* undertaken to meet State, Regional and Local coastal management objectives. It will outline how actions will be implemented through Council's Integrated Planning and Reporting (IP&R) framework and the land-use planning systems. Following the completion of a draft CMP, DCCEEW will review the draft CMP prior to public exhibition to ensure it meets all mandatory requirements for ministerial certification by the Minister for Climate Change, Energy, the Environment and Heritage.

Council will then place the CMP on *public exhibition* to seek feedback from all stakeholders in the form of written submissions. It is a mandatory requirement of the NSW Coastal Management Manual that the draft CMP be exhibited for a period of not less than 28 calendar days (OEH, 2018e).

All submissions will be reviewed, considered, and if applicable, incorporated into the finalised version of the CMP.



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# APPENDIX A CFG TERMS OF REFERENCE AND WORKSHOP SUMMARY





## Terms of Reference

# Community Focus Group (CFG) 2024

### Central Coast Lagoons Coastal Management Program Stage 3 & 4

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**W** [www.centralcoast.nsw.gov.au](http://www.centralcoast.nsw.gov.au)

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**Acknowledgement  
of Country**

We acknowledge the  
traditional owners of the land  
on which we live, and pay  
our respects to elders past,  
present and emerging



## A. PURPOSE

The purpose of the Community Focus Group (CFG) is to bring together intelligent, interested and inquisitive minds to be involved in the project and ensure that engagement is undertaken in a highly collaborative manner and that community attitudes and values are listened to, represented accurately and considered.

This process aligns with Council's Engagement Framework and Community Participation Plan.

## B. BACKGROUND

### Coastal Management Programs

Coastal Management Programs (CMPs) are a legislative requirement of the *Coastal Management Act (2016)* (CM Act) which local councils are required to prepare in accordance with the Coastal Management Manual. They:

- set the long-term strategy for the coordinated management of the coastal zone, with a focus on achieving the objects and objectives of the *Coastal Management Act 2016* (CM Act).
- identify coastal management issues and the actions required to address these issues in a strategic and integrated way.
- detail how and when those actions are to be implemented, their costs and proposed cost-sharing arrangements and other viable funding mechanisms.

The CM Act (and other relevant legislation) establishes specific roles and responsibilities for relevant Ministers, the NSW Coastal Council, public authorities and local councils, as well as providing opportunities for communities to participate when preparing and implementing a CMP.

<https://www.environment.nsw.gov.au/topics/water/coasts/coastal-management/programs>

Acknowledging the size and diversity of the coastal zone of the Central Coast, Council is preparing four CMPs, focusing on **Coastal Lagoons**, Tuggerah Lakes, the Open Coast, and the Hawkesbury-Nepean River System (including Brisbane Water). We are also working with Lake Macquarie City Council to implement a CMP for Lake Macquarie.

<https://www.yourvoiceourcoast.com/project-stage/coastal-management-programs>

### Coastal Lagoons Coastal Management Program

The Central Coast's Coastal Lagoons have been managed over the past 10 years in accordance with the Gosford Lagoons Coastal Zone Management Plan adopted by the former Gosford City Council in 2015. Key achievements include a detailed review of the entrance management strategy conducted between 2016 and 2017, delivery of some significant wetland improvement works around Terrigal and Avoca Lagoons and detailed research into the population dynamics of the Green and Golden Bell Frog at North Avoca. Council is also implementing ongoing, significant sewerage infrastructure improvement works within the



Terrigal and Avoca Catchments and while this doesn't directly relate to the implementation of the CZMP it will assist with the objective of improving recreational and environmental water quality within the lagoons.

While the CZMP has provided council with an effective plan for the management of the lagoons and still contains some useful and relevant actions & information, it is dated and does not meet current legislative and policy requirements set by the state government in the NSW Coastal Management Framework. Further to this, our understanding of the ecosystem condition and processes have improved over this time and it is important that this information is properly considered in the ongoing management of these systems through a new CMP.

Council completed the first stage of the CMP with a scoping study that covered the open coast and the coastal lagoons:

[https://www.yourvoiceourcoast.com/sites/default/files/2021-10/stage\\_1\\_scoping\\_study\\_report\\_-\\_central\\_coast\\_cmp\\_for\\_open\\_coast\\_and\\_coastal\\_lagoons.pdf](https://www.yourvoiceourcoast.com/sites/default/files/2021-10/stage_1_scoping_study_report_-_central_coast_cmp_for_open_coast_and_coastal_lagoons.pdf)

Stage 2 was completed in 2024 with studies focused on addressing key knowledge gaps to support decision-making in the subsequent stages of the CMP planning process.

#### Avoca Lagoon Process Study:

The ecological health of our 4 coastal lagoons is monitored in collaboration with the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) as part of the [Monitoring, Evaluation and Reporting \(MER\) program for assessing estuary ecosystem health](#). This state wide program facilitates standardised monitoring of estuaries in NSW providing a basis upon which to determine appropriate management actions, monitoring the effectiveness of management and contributing to the ongoing adaptive management of estuaries and their catchments.

The MER revealed a trend in declining ecological health at Avoca Lagoon which warranted further investigation. The Avoca Lagoon Process Study was designed to gain insight into the likely drivers of this decline seeking to understand the nutrient dynamics in the lagoon and develop a nutrient balance model to inform management priorities for the life of the CMP and beyond.

Outputs of this project are available via the [Our Coast Our Waterways website](#) under the coastal lagoons menu.



## **C. ROLE**

The role of the CFG is to:

- C1 Be involved in the project to ensure that the community's values and attitudes are listened to, represented and considered.
- C2 The CFG has no authority to make decisions on behalf of the Council.
- C3 The CFG has no authority to direct Council staff or external consultants engaged for the project.

## **D. MEMBERSHIP**

The CSRG will comprise of:

- D1 25 community members (maximum).
- D2 Representatives will be selected by Council staff, on a merit basis, as a result of an Expression of Interest process. Council staff will seek to ensure a broad cross section of the community is represented through the selection process.
- D3 The CFG will be chaired by a member of Council staff and/or assigned representative on their behalf. Other staff members may participate in the discussion for the purposes of guidance but will not be members of the CFG.
- D4 Former Councillors or people intending to nominate for Council election shall not be members of the CFG, as it is intended to be a community focus group, not a political group. Members of state or federal government shall also not be members of the CFG.
- D5 The CFG is not a political group and solely to be used for community feedback and contributions towards the Central Coast Lagoons Coastal Management Program.

## **E. RESPONSIBILITY OF MEMBERS**

- E1 Review and provide timely feedback on aspects of the project or draft documents, as and when required.
- E2 Participate in workshops in a cooperative mutually respectful manner.
- E3 Contribute personal and the community's perspective to discussions.
- E4 Read pre-meeting materials, if applicable, to enable full participation in the meetings.

## **F. MEETING FORMATS**

- F1 The meeting schedule will be developed in consultation with the successful applicants as the first order of business for the CFG. Meetings will be face to face at a Council facility (TBD). There will be NO online option for meetings unless a Public Health Order is issued requiring this to change.



## **G. ATTENDANCE**

- G1 The CFG meetings are not open to the public. Addressing or attending meetings by interested persons is at the discretion of the CFG Facilitator.
- G2 CFG members are expected to attend all meetings where possible.
- G3 Where a Member fails to attend two successive meetings without submitting a reasonable explanation, the Chairperson may replace or dismiss the member at their discretion.

## **H. FOCUS GROUP FACILITATOR**

- H1 The CFG Facilitator shall be a staff member of Council, or a consultant directly engaged by council, and is responsible for co-ordinating the preparation of agendas, invitations, and minutes of the CFG.
- H2 The Facilitator shall also be responsible for co-ordinating the consultants and/or their representatives.

## **I. CHAIRPERSON**

- I1 The Chairperson of the CFG will be a Council Officer, or in their absence, a delegated representative on their behalf.
- I2 The Chairperson shall determine the order of proceedings generally as set by the agenda.
- I3 In the absence of the Chairperson, the CFG Facilitator shall Chair the meeting.

## **J. VOTING**

- J1 The CFG has a participatory role, its recommendations and suggestions will be taken into consideration during the course and in the context of the project but are not deemed to be a decision of Council.

## **K. QUORUM**

- K1 The CFG does not require a quorum to hold a meeting.
- K2 The Chairperson shall use their discretion to determine if any item on the agenda should be deferred to a future meeting if it is considered there are insufficient members at the meeting.

## **L. MEETING SCHEDULE**

- L1 The CFG shall meet on a minimum of four occasions.
- L2 The CFG shall meet at times and dates determined by Council in consultation with CFG members.
- L3 The CFG shall meet at a Council facility, location(s) to be advised.



## **M. AGENDA**

- M1 The Agenda shall be set by the CFG Facilitator.
- M2 The Agenda shall be distributed at least 5 days prior to the meeting.

## **N. COLLABORATION TOOLS**

- N1 NSW Public Health Orders may require the need for meeting to be conducted remotely, using Microsoft Teams (MS Teams) or similar.
- N2 The CFG may use tools such as Mentimeter, Kahoot and MIRO to communicate, prompt discussion, explore ideas, brainstorm and capture ideas and feedback.

## **O. MINUTES AND REPORTING**

- O1 Minutes will be taken for all meetings of the CFG.
- O2 Minutes of the meeting shall be recorded in Central Coast Council information management database.

## **P. SECRETARY**

- P1 The administration of the CFG shall be undertaken by a Council staff member, or delegated representative, reporting to the CFG Facilitator.

## **Q. CODE OF CONDUCT**

- Q1 All CFG Members are required to comply with Central Coast Council policies including the Code of Conduct. This includes compliance with confidentiality and appropriate behaviour. CFG members may be exposed to information which is confidential and/or privileged and proprietary in nature. Where this is the case, such information must be kept confidential both during and after volunteer service as a CFG member.

CFG members should also be aware that they are participating in a workplace environment and all other policies of Central Coast Council, such as workplace health and safety, and appropriate behaviour in the workplace, apply. Where staff direct members to follow policy requirements that direction shall be followed.

- Q2 CFG members are expected to return materials containing privileged or confidential information at the time of cessation of the CFG.

Source document: **Code of conduct**

[https://cdn.centralcoast.nsw.gov.au/sites/default/files/codeofconduct0\\_0.pdf](https://cdn.centralcoast.nsw.gov.au/sites/default/files/codeofconduct0_0.pdf)

## **R. CESSATION OF ADVISORY GROUP**

- R1 The CFG shall cease to operate at the completion of the project.





**Table A-1 CFG Workshop #1 – Runsheet and Activities**









Time	Component	Activities
5:40-6:00	Arrival	<ul style="list-style-type: none"> <li>Sign in and name tags</li> </ul>
6:00-6:10	Welcome	<ul style="list-style-type: none"> <li>Acknowledgement to Country</li> <li>Welcome from Council</li> </ul>
6:10-6:25	Tonight's Workshop	<ul style="list-style-type: none"> <li>Why are we here?</li> <li>Outline of the session</li> <li>Housekeeping and expectations of behaviour</li> <li>Introductions of key staff and consultants.</li> <li>Introduction of technical advisors</li> </ul>
6:25-6:35	Introduction of CFG Members	<ul style="list-style-type: none"> <li>Ice breaker activity for the CFG members</li> <li>Lagoon-based groups: What we love about the lagoons. How we use them.</li> </ul>
6:35-6:40	Role of the CFG	<ul style="list-style-type: none"> <li>The role of the CFG:               <ul style="list-style-type: none"> <li>The importance of this CFG.</li> <li>The codesign process: The role of CFG in this project.</li> <li>CFG commitments and optional other opportunities.</li> </ul> </li> </ul>
6:40-6:45	What's your CMP knowledge	<ul style="list-style-type: none"> <li>How much do you know about the CMP?               <ul style="list-style-type: none"> <li>Who read the Stage 11 Scoping Study?</li> <li>How much background do you want us to cover tonight?</li> <li>A 10 minutes or 20 minute version of project background?</li> </ul> </li> </ul>
6:45-7:00	Overview of the Project	<ul style="list-style-type: none"> <li>What is a CMP?</li> <li>What does this CMP cover? (and relationship to Council's other CMPs)</li> <li>CMP Goals and Objectives</li> <li>How is a CMP delivered?</li> <li>Timeframes and key milestones for this project.</li> <li>State Government requirements and certification</li> </ul>
7:00-7:30	DINNER BREAK	<ul style="list-style-type: none"> <li>Catered dinner break</li> <li>Mingling of WT and CCC staff amongst community members</li> <li>Spread out and facilitate conversations</li> </ul>
7:30-8:00	The Strategic Direction of the CMP	<p><b>Brainstorming:</b> A series of interactive activities to inform the Strategic Direction, aimed and answering <b>three key questions</b>.</p> <p>Split into 4 x Groups (2 x AC &amp; 2 x WT) of each ~7 people.</p> <p>Each group can be facilitated by someone from WT/CCC, and potentially have a roaming specialist.</p> <p>With each facilitator, we can have a sheet of butchers paper, split into two: (1) Issues and (2) solutions.</p> <ul style="list-style-type: none"> <li><b>(1) What are our key issues to address?</b> The priorities for the CMP – big and small.</li> <li><b>(2) Solutions and Potential Management Actions:</b> What can we be doing to address those risks</li> </ul> <p>As a prompt along the way?</p> <ul style="list-style-type: none"> <li><b>(3) Who should we talk to along the way, or how can we learn more about this?</b> Stakeholder identification.</li> </ul>



Time	Component	Activities
8:00-8:20	Reporting Back	Each group reports back on the Group activities: <ul style="list-style-type: none"><li>▪ Post the butchers paper up for others to see.</li><li>▪ Get people to think “cross-lagoon” outside of their own backyard</li><li>▪ 3 key takeaways from each group</li></ul>
8:20-8:30	Debrief	<ul style="list-style-type: none"><li>▪ Where to from here?</li><li>▪ If you have Qs after tonight (waterways email address)</li></ul>
8:30-9:00	Afterparty	<ul style="list-style-type: none"><li>▪ Tea &amp; coffee</li><li>▪ Dessert</li><li>▪ Networking</li></ul>



**Table A-2 CFG Workshop #2 – Runsheet and Activities**

Time	Component	Activities
5:40-6:00	Arrival	<ul style="list-style-type: none"> <li>Sign in and name tags</li> </ul>
6:00-6:10	Welcome	<ul style="list-style-type: none"> <li>Acknowledgement of Country</li> <li>Welcome from Council</li> <li>Other workshops and info sessions</li> </ul>
6:10-6:15	Next Stop on the Journey	<ul style="list-style-type: none"> <li>Quick recap of CFG Workshop #1 outcomes (all going to be used later)</li> <li>Where we are in the Stage 3 CMP process right now?</li> <li>Where are we going?</li> <li>Outline of Workshop 2</li> </ul>
6:15-6:25	Council Approach	<ul style="list-style-type: none"> <li>What is Council already doing to manage ICOLLs?</li> </ul>
6:25-6:40	Overview of Actions	<ul style="list-style-type: none"> <li>CMP Objectives: Based on Workshop 1 (issues and values) - codesign</li> <li>Quick snapshot of Actions (study area wide only)</li> </ul>
6:40-7:00	Activity 1: Long List First Impressions (Lagoons Groups)	<p>Break into Lagoon Based Groups – that will each look at (a) study area wide actions and (b) local actions frothier lagoon.</p> <p>A quick first pass of the long list... <b>Name of the game: “Tick it  or flag it  for a “dive in” next session”</b></p> <p>This will be facilitated by 1 x workshop staff facilitator per group (assumes pre-reading has occurred) .</p> <p>For each Action:</p> <ul style="list-style-type: none"> <li><b>Tick it </b>: Are you generally comfortable with the intent?</li> <li><b>Flag it </b>: Which actions do you want to really dive into in the next session? i.e., Is there anything you are not totally comfortable with, or think could be improved? <ul style="list-style-type: none"> <li>Use coloured stickers to flag Actions</li> </ul> </li> </ul>
7:00-7:30	<b>DINNER BREAK</b>	<ul style="list-style-type: none"> <li>Catered dinner break</li> <li>Mingling of WT and CCC staff amongst community members</li> <li>Spread out and facilitate conversations</li> </ul>
7:30-8:00	Activity 2: Detailed Action Refinement (Lagoons Groups)	<p>Break into Lagoon Based Groups – that will then dive into more detail about those actions flagged from Activity 1 (likely to be about ~5-10 actions).</p> <p>For each of those actions flagged in Activity 1 – a short facilitated group discussion about:</p> <ul style="list-style-type: none"> <li>Is there any local knowledge to improve or refine the Action?</li> <li>Specific and local details</li> </ul> <p><b>Name of the game: “Deeper Dive : Improve it  - add some local flavour  + address local issues  <p>Central Coast Council   14 April 2026 Central Coast Lagoons Coastal Management Program</p> </b></p>



Time	Component	Activities
8:45-9:00	Afterparty	<ul style="list-style-type: none"><li>▪ Tea &amp; coffee</li><li>▪ Dessert</li><li>▪ Networking</li></ul>



**Table A-3 CFG Workshop #3 – Runsheet and Activities**

Time	Component	Activities
5:40-6:00	Arrival	Sign in and name tags
6:00-6:10	Welcome	<ul style="list-style-type: none"> <li>Acknowledgement of Country</li> <li>Welcome from Council</li> </ul>
6:10-6:20	Where are we right now with the CMP?	<u>Status Update</u> <ul style="list-style-type: none"> <li>To date: How we have used your input to date</li> <li>Up next: What up next?</li> <li>Therefore, right now: Overview &amp; purpose of tonight’s workshop</li> </ul>
6:20-7:00	Activity 1: Participatory Mapping	<u>Participatory Mapping</u> <ul style="list-style-type: none"> <li>Building on Workshop 2 (without repeating it) &gt; a check prior to community engagement and MCA               <ul style="list-style-type: none"> <li>Continue &amp; extend with updated action list (refinement)</li> <li>Put dots on the Map, and tell us which Action this dot aligns to, along with a sticky note on map to describe issues in local detail</li> <li>Lagoon “Sub Groups” of 2-3 people, each with a copy of the Map</li> <li>Reporting back to the broader lagoon group</li> </ul> </li> </ul>
7:00-7:30	<b>DINNER BREAK</b>	<ul style="list-style-type: none"> <li>Catered dinner break</li> <li>Dinner Presentation (provided availability - potentially)</li> </ul>
7:30-8:15	Activity 2: Future Scenario Planning	<u>Future Scenario Planning: Climate Change and Population Growth</u> <ul style="list-style-type: none"> <li>15 minute intro:               <ul style="list-style-type: none"> <li>SLR Projections (IPCC)</li> <li>Climatic Patterns (rainfall and drought etc)</li> <li>CommunityID Population Forecasts (consider Greater Sydney)</li> </ul> </li> <li>Group Work:               <ul style="list-style-type: none"> <li>What does our lagoon look like in 100 years time?</li> <li>What do the issues look like?</li> <li>What do we need to start planning for now?</li> <li>Changes in management options as a result of this thinking (updates and/or additions)?</li> </ul> </li> </ul>
8:15-8:30	Presentation	Presentation on Open Coast CMP Management - with a focus on relevant to the Lagoons CMP
8:30-8:35	Community Engagement	<u>Harnessing CFG Suggestions for Community Engagement</u> <ul style="list-style-type: none"> <li><b>How:</b> <ul style="list-style-type: none"> <li>In Person Engagement</li> <li>Online Engagement (where)</li> </ul> </li> <li><b>When/Timing?</b></li> <li><b>Who:</b> People and/or groups we should talk to?</li> </ul>
8:35-8:40	Debrief and Close Out	Where to from here?



**Table A-4 CFG Workshop #4 – Runsheet and Activities**

Time	Component	Activities
5:40-6:00	Arrival	Sign in and name tags
6:00-6:15	Welcome	<ul style="list-style-type: none"> <li>Acknowledgement of Country</li> <li>Welcome from Council</li> <li>Table Trivia (5 mins)</li> </ul>
6:15-6:35	Introduction and Project Refresher	<ul style="list-style-type: none"> <li>Recap: The Journey to date</li> <li>Project Status Update</li> <li>Stage 3 Community Consultation Results</li> <li>The Stage 3 Options Assessment Process (High Level)               <ul style="list-style-type: none"> <li>Review of key goals of the CMP</li> <li>Logistical Constraints &amp; Considerations</li> </ul> </li> <li>Expectation Setting / Limitation of the CFG prioritization process</li> <li>Purpose / Outline of the Day</li> <li>A quick note on Option 29</li> <li>Questions of Clarification</li> </ul>
6:35-7:35	CFG Facilitated Activity: Prioritisation of Actions	<p><u>Activity Process:</u></p> <ul style="list-style-type: none"> <li>Explain the activity</li> <li>Split into Lagoons based groups</li> <li>Each person is assigned a set of tokens / stickers that they can use to help prioritise the action list.</li> <li>3 kinds of token / sticker will be provided (H,M,L) – but a limited number of each.</li> <li>CCC and WT and DCCEEW to help facilitate conversations at each table</li> <li>While discussion is group based – people will fill in individual responses.</li> <li>Responses will be provided by paper-based sheets</li> </ul>
7:35-8:00	<b>DINNER BREAK</b>	<ul style="list-style-type: none"> <li>Catered dinner break</li> <li>Dinner Presentation (provided availability - potentially)</li> </ul>
8:00-8:30	Continue Activity 1	<ul style="list-style-type: none"> <li>As above.</li> </ul>
8:30-8:50	CFG Facilitated Activity: Reporting Back	<p><u>Facilitated Discussion / Reporting Back</u></p> <ul style="list-style-type: none"> <li>Probing Questions for Each Group top include:           <ul style="list-style-type: none"> <li>How did you feel about it?</li> <li>What trade-offs did you have to consider?</li> <li>Where did you have difficulty?</li> <li>What did you consider?</li> </ul> </li> </ul>
8:50-9:00	Where to from here?	<ul style="list-style-type: none"> <li>How this feedback will be incorporated?</li> <li>How to keep responding after tonight</li> <li>Where to from here for the CMP?: Option Assessment and Report</li> <li>Where to from here for the CFG?: Presentation</li> </ul>



**Table A-5 CFG Workshop #5 – Runsheet and Activities**

<b>Time</b>	<b>Component</b>	<b>Activities</b>
<b>5:40-6:00</b>	Arrival	Sign in and name tags
<b>6:00-6:15</b>	Welcome	<ul style="list-style-type: none"> <li>▪ Acknowledgement of Country</li> <li>▪ Welcome from Council</li> <li>▪ Dinner Provided</li> </ul>
<b>6:15-7:15</b>	Presentation of Final Outcomes	<ul style="list-style-type: none"> <li>▪ CMP Status update</li> <li>▪ Overview of the Stage 3 Outcomes, and the Shortlist of Actions for the CMP</li> </ul>
<b>7:15-7:30</b>	Q&A	<ul style="list-style-type: none"> <li>▪ Facilitated Q&amp;A session</li> </ul>
<b>8:00-8:30</b>	Activity	<ul style="list-style-type: none"> <li>▪ CMP Vision and Objectives               <ul style="list-style-type: none"> <li>– Review of CMP Vision and Objectives from Workshop #1</li> <li>– Have we met out brief</li> <li>– Refining and Optimising the Vision Statement and CMP Purpose</li> </ul> </li> </ul>
<b>8:30-8:45</b>	Workshop Close	<ul style="list-style-type: none"> <li>▪ Overview of CMP Stage 4 and Certification Process</li> <li>▪ Workshop wrap up and Mingling</li> </ul>



# APPENDIX B

## ACCEPTABILITY ASSESSMENT OUTCOMES





**Table B-1 Acceptability Assessment Outcomes**

Action ID	Name	Community Support Score	CFG Priority	State Agencies	First Nations Groups	Total
1	Develop and implement a monitoring and reporting program for the Central Coast Lagoons.	0.88	0.93	1.00	1.00	<b>0.82</b>
2	Prepare an infrastructure vulnerability assessment for the Lagoons	0.80	0.77	1.00	1.00	<b>0.61</b>
3	Develop and implement a Community Education Program	0.85	0.80	1.00	1.00	<b>0.68</b>
4	Provide education and training opportunities for operational staff and other relevant council units in relation to lagoon management	0.73	0.73	1.00	1.00	<b>0.54</b>
5	Continue to support volunteer based rehabilitation initiatives such as Landcare	0.82	0.83	1.00	1.00	<b>0.68</b>
6	Develop Lagoon Water Quality Improvement Plan	0.87	0.90	1.00	1.00	<b>0.78</b>
7	Reduce sewage contamination of lagoons	0.93	1.00	1.00	1.00	<b>0.93</b>
8	Wetland Refugia and Migration Study	0.62	0.57	1.00	1.00	<b>0.35</b>
9	Implement a wetland & riparian monitoring, management and restoration program	0.82	0.80	1.00	1.00	<b>0.66</b>
10	Sedimentation Process and Management Investigation	0.79	0.77	1.00	1.00	<b>0.61</b>
11	Introduction of "No Mow Zones" at targeted areas of public foreshore	0.63	0.67	1.00	1.00	<b>0.42</b>
12	Implement recommendations from the Gosford Creek and Lagoon Entrance Review (Salients 2019) where appropriate	0.71	0.70	1.00	1.00	<b>0.50</b>
13	Council continue to support research which improves understanding of lagoon processes, threats and anthropogenic impacts in order to develop improved management practices	0.86	0.90	1.00	1.00	<b>0.77</b>
14	Develop and implement a holistic Foreshore Access Improvement Plan for the Southern Foreshore of Wamberal Lagoon	0.82	0.83	1.00	1.00	<b>0.68</b>
15	Develop and implement a holistic Foreshore Access Improvement Plan for Terrigal Lagoon	0.90	0.93	1.00	1.00	<b>0.84</b>
16	Green and Golden Bell Frog research and habitat restoration.	0.69	0.60	1.00	1.00	<b>0.41</b>
17	Dredge hole rehabilitation feasibility investigation	0.79	0.63	1.00	1.00	<b>0.50</b>



Action ID	Name	Community Support Score	CFG Priority	State Agencies	First Nations Groups	Total
18	Develop and Implement an Algae Management Strategy for Avoca Lagoon	0.79	0.70	1.00	1.00	<b>0.55</b>
19	Develop and implement a holistic Foreshore Access Improvement Plan for Avoca Lagoon	0.80	0.80	1.00	1.00	<b>0.64</b>
20	Develop and implement a holistic Foreshore Access Improvement Plan for Cockrone Lagoon	0.61	0.77	1.00	1.00	<b>0.47</b>
21	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	0.71	0.67	1.00	1.00	<b>0.47</b>
22	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	0.70	0.67	1.00	1.00	<b>0.47</b>
23	Support cultural education and awareness of estuary health issues for First Nations Groups	0.63	0.47	1.00	1.00	<b>0.29</b>
24	Identify opportunities for, and undertake cultural land management practices, including cultural burning	0.88	0.63	1.00	1.00	<b>0.56</b>
25	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	0.77	0.63	1.00	1.00	<b>0.49</b>
26	Undertake a habitat assessment and develop a targeted management plan for flying-fox populations, with a focus on the Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> ).	0.79	0.63	1.00	1.00	<b>0.50</b>
27	Introduce area-specific Development Control Plan (DCP) provisions for lakefront properties to strengthen foreshore protection through the development assessment (DA) process.	0.80	0.87	1.00	1.00	<b>0.69</b>
28	Install historic flood markers at key locations around the lagoons to indicate past flood heights.	0.80	0.57	1.00	1.00	<b>0.45</b>
29	Consider potential impacts of the Wamberal Seawall on the coastal processes at Wamberal and Terrigal Lagoons	#N/A	0.77	1.00	1.00	<b>0.77</b>
30	Support Regional Invasive Fauna Management with LLS	0.86	0.77	1.00	1.00	<b>0.66</b>
31	Develop a Community Monitoring Program for Lagoon Birdlife	0.85	0.77	1.00	1.00	<b>0.65</b>
32	Develop and execute a communications plan for Stage 5 of the CMP	0.86	0.63	1.00	1.00	<b>0.54</b>



Action ID	Name	Community Support Score	CFG Priority	State Agencies	First Nations Groups	Total
33	Trial Installation of Water Quality Autosampler in Avoca Lagoon Catchment	0.77	0.77	1.00	1.00	<b>0.59</b>
34	Develop a Memorandums of Understanding (MoU) Between Central Coast Council and NPWS for Wamberal Lagoon Management	0.86	0.73	1.00	1.00	<b>0.63</b>
35	Fishing closure of Wamberal Lagoon	0.42	0.50	1.00	1.00	<b>0.21</b>
36	Undertake Ecosystem Services Valuation for the Central Coast Lagoons	0.77	0.73	1.00	1.00	<b>0.56</b>
37	Assess and Manage Light and Noise Pollution Impacts on Lagoon Ecology	0.71	0.50	1.00	1.00	<b>0.36</b>
38	Assess and Address the Impact of Private Structures on Lagoon Foreshores	0.68	0.60	1.00	1.00	<b>0.41</b>
39	Investigate the Feasibility of Constructing a Water Treatment Wetland in the Southern Arm of Avoca Lagoon	0.58	0.80	1.00	1.00	<b>0.46</b>
40	European and Archaeological Heritage Management	#N/A	0.43	1.00	1.00	<b>0.43</b>
41	Environmental Protection Works	#N/A	0.83	1.00	1.00	<b>0.83</b>
42	Road Raising at Lakeview Drive	#N/A	0.60	1.00	1.00	<b>0.60</b>
43	Develop and Implement a Program to Incentivise Environmentally Responsible Development Practices	#N/A	0.63	1.00	1.00	<b>0.63</b>
44	Retrofit Stormwater Outlets with One-Way Valves to Prevent Tidal Backflow	#N/A	0.70	1.00	1.00	<b>0.70</b>
45	Undertake a Planning Proposal to Amend the RH SEPP Coastal Environment Area Mapping	#N/A	#N/A	1.00	#N/A	<b>1.00</b>

\*\* #N/A = Options were still under development at the time of this data capture.



# APPENDIX C

## VIABILITY ASSESSMENT OUTCOMES





**Table C-1 Viability Assessment Outcomes**

Action ID	Name	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
1	Develop and implement a monitoring and reporting program for the Central Coast Lagoons.	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$1,216,173	6.1
2	Prepare an infrastructure vulnerability assessment for the Lagoons	\$80,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$80,000	4.9
3	Develop and implement a Community Education Program	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$162,156	5.2
4	Provide education and training opportunities for operational staff and other relevant council units in relation to lagoon management	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
5	Continue to support volunteer based rehabilitation initiatives such as Landcare	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$162,156	5.2
6	Develop Lagoon Water Quality Improvement Plan	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$250,000	5.4
7	Reduce sewage contamination of lagoons	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
8	Wetland Refugia and Migration Study	\$40,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$40,000	4.6
9	Implement a wetland & riparian monitoring, management and restoration program	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$243,235	5.4
10	Sedimentation Process and Management Investigation	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$50,000	4.7
11	Introduction of "No Mow Zones" at targeted areas of public foreshore	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
12	Implement recommendations from the Gosford Creek and Lagoon Entrance Review (Salients 2019) where appropriate	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
13	Council continue to support research which improves understanding of lagoon processes, threats and anthropogenic impacts in order to develop improved management practices	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
14	Develop and implement a holistic Foreshore Access Improvement Plan for the Southern Foreshore of Wamberal Lagoon	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$250,000	5.4
15	Develop and implement a holistic Foreshore Access Improvement Plan for Terrigal Lagoon	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$250,000	5.4
16	Green and Golden Bell Frog research and habitat restoration.	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
17	Dredge hole rehabilitation feasibility investigation	\$60,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$60,000	4.8
18	Develop and Implement an Algae Management Strategy for Avoca Lagoon	\$40,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$40,000	4.6
19	Develop and implement a holistic Foreshore Access Improvement Plan for Avoca Lagoon	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$250,000	5.4
20	Develop and implement a holistic Foreshore Access Improvement Plan for Cockrone Lagoon	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$250,000	5.4
21	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$81,078	4.9
22	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$81,078	4.9
23	Support cultural education and awareness of estuary health issues for First Nations Groups	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$81,078	4.9
24	Identify opportunities for, and undertake cultural land management practices, including cultural burning	\$30,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$30,000	4.5
25	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$202,696	5.3
26	Undertake a habitat assessment and develop a targeted management plan for flying-fox populations, with a focus on the Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> ).	\$30,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$30,000	4.5
27	Introduce area-specific Development Control Plan (DCP) provisions for lakefront properties to strengthen foreshore protection through the development assessment (DA) process.	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
28	Install historic flood markers at key locations around the lagoons to indicate past flood heights.	\$20,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$20,000	4.3



Action ID	Name	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Total 10 Yr NPV Cost (5% discount rate)	Viability Score
29	Consider potential impacts of the Wamberal Seawall on the coastal processes at Wamberal and Terrigal Lagoons	\$75,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$75,000	4.9
30	Support Regional Invasive Fauna Management with LLS	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
31	Develop a Community Monitoring Program for Lagoon Birdlife	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
32	Develop and execute a communications plan for Stage 5 of the CMP	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
33	Trial Installation of Water Quality Autosampler in Avoca Lagoon Catchment	\$80,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$80,000	4.9
34	Develop a Memorandum of Understanding (MoU) Between Central Coast Council and NPWS for Wamberal Lagoon Management	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
35	Fishing closure of Wamberal Lagoon	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
36	Undertake Ecosystem Services Valuation for the Central Coast Lagoons	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$50,000	4.7
37	Assess and Manage Light and Noise Pollution Impacts on Lagoon Ecology	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$50,000	4.7
38	Assess and Address the Impact of Private Structures on Lagoon Foreshores	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
39	Investigate the Feasibility of Constructing a Water Treatment Wetland in the Southern Arm of Avoca Lagoon	\$20,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$20,000	4.3
40	European and Archaeological Heritage Management	\$25,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$25,000	4.4
41	Environmental Protection Works	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0
42	Road Raising at Lakeview Drive	\$750,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$750,000	5.9
43	Develop and Implement a Program to Incentivise Environmentally Responsible Development Practices	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$162,156	5.2
44	Retrofit Stormwater Outlets with One-Way Valves to Prevent Tidal Backflow	\$60,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$60,000	4.8
45	Undertake a Planning Proposal to Amend the RH SEPP Coastal Environment Area Mapping	CST	CST	CST	CST	CST	CST	CST	CST	CST	CST	\$0	3.0

\* CST refers to actions that are delivered through in kind staff time for Central Coast Council (Council Staff Time).



# APPENDIX D FEASIBILITY ASSESSMENT OUTCOMES





Table D-1 Feasibility Assessment Outcomes

Action ID	Name	Level of Risk being Mitigated				Associated Environmental, Social and Cultural Impacts							Total Score		
		Level of Risk Being Mitigated	Risk Rating Score	Effectiveness at Risk Mitigation	Risk Mitigation Score	Water Quality	Biodiversity	Physical Proc. & Hazards	Social/ Recr. Amenity	Public Safety	Cultural Heritage Values	Impact Score	Total Benefit Score	Scale Factor	Total Feasibility Score
1	Develop and implement a monitoring and reporting program for the Central Coast Lagoons.	Extreme	+4	+4	+16	+4	+2	+1	+3	+3	+2	+15	+31	1.5	46.5
2	Prepare an infrastructure vulnerability assessment for the Lagoons	High	+2	+4	+8	0	0	+4	+3	+4	0	+11	+19	1.5	28.5
3	Develop and implement a Community Education Program	Extreme	+4	+4	+16	+2	+2	+2	+2	+2	+2	+12	+28	1.5	42
4	Provide education and training opportunities for operational staff and other relevant council units in relation to lagoon management	High	+3	+1	+3	+2	+2	+2	+2	+2	+2	+12	+15	1.5	22.5
5	Continue to support volunteer based rehabilitation initiatives such as Landcare	Moderate	+2	+3	+6	0	+3	0	+2	+2	+1	+8	+14	1.5	21
6	Develop Lagoon Water Quality Improvement Plan	Extreme	+4	+4	+16	+4	+3	0	+3	+3	+3	+16	+32	1.5	48
7	Reduce sewage contamination of lagoons	Extreme	+4	+2	+8	+3	+1	0	0	+1	+1	+6	+14	1.5	21
8	Wetland Refugia and Migration Study	Extreme	+4	+4	+16	+1	+4	+1	0	0	+1	+7	+23	1.5	34.5
9	Implement a wetland & riparian monitoring, management and restoration program	Extreme	+4	+4	+16	+2	+4	+2	+1	+1	+3	+13	+29	1.5	43.5
10	Sedimentation Process and Management Investigation	High	+3	+2	+6	+2	+2	+3	+2	+1	+1	+11	+17	1.5	25.5
11	Introduction of "No Mow Zones" at targeted areas of public foreshore	Moderate	+2	+2	+4	0	+4	0	0	0	+1	+5	+9	1.5	13.5
12	Implement recommendations from the Gosford Creek and Lagoon Entrance Review (Salients 2019) where appropriate	High	+3	+3	+9	+1	0	+3	+1	+3	0	+8	+17	1.5	25.5
13	Council continue to support research which improves understanding of lagoon processes, threats and anthropogenic impacts in order to develop improved management practices	Extreme	+4	+1	+4	+1	+1	+1	+1	+1	+1	+6	+10	1.5	15
14	Develop and implement a holistic Foreshore Access Improvement Plan for the Southern Foreshore of Wamberal Lagoon	Moderate	+2	+4	+8	0	+1	+1	+4	+4	+1	+11	+19	1	19
15	Develop and implement a holistic Foreshore Access Improvement Plan for Terrigal Lagoon	Moderate	+2	+4	+8	0	+1	+1	+4	+4	+1	+11	+19	1	19
16	Green and Golden Bell Frog research and habitat restoration.	High	+3	+2	+6	+1	+3	0	0	0	0	+4	+10	1	10
17	Dredge hole rehabilitation feasibility investigation	Extreme	+4	+4	+16	+4	+1	+1	+3	+2	+1	+12	+28	1	28
18	Develop and Implement an Algae Management Strategy for Avoca Lagoon	High	+3	+2	+6	+3	+3	0	+3	+2	+1	+12	+18	1	18
19	Develop and implement a holistic Foreshore Access Improvement Plan for Avoca Lagoon	Moderate	+2	+4	+8	0	+1	+1	+4	+4	+1	+11	+19	1	19
20	Develop and implement a holistic Foreshore Access Improvement Plan for Cockrone Lagoon	Moderate	+2	+4	+8	0	+3	+1	+4	+4	+2	+14	+22	1	22



		Level of Risk being Mitigated				Associated Environmental, Social and Cultural Impacts							Total Score			
21	Engage First Nations teams where appropriate to undertake bush regeneration works including weeding and revegetation	Moderate	+2	+4	+8	+1	+4	+1	+1	+1	+1	+4	+12	+20	1.5	30
22	Further develop and implement community education programs for awareness and appreciation of Indigenous cultural heritage	High	+3	+2	+6	+1	+1	+1	+1	+1	+1	+3	+8	+14	1.5	21
23	Support cultural education and awareness of estuary health issues for First Nations Groups	High	+3	+2	+6	+1	+1	+1	+1	+1	+1	+4	+9	+15	1.5	22.5
24	Identify opportunities for, and undertake cultural land management practices, including cultural burning	High	+3	+3	+9	+2	+2	+1	+1	+1	+1	+3	+10	+19	1.5	28.5
25	Engage with local First Nations Groups to protect and preserve cultural heritage items across the coastal zone	Extreme	+4	+3	+12	+1	+1	+2	+1	+1	+1	+4	+10	+22	1.5	33
26	Undertake a habitat assessment and develop a targeted management plan for flying-fox populations, with a focus on the Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> ).	Moderate	+2	+2	+4	0	+2	0	+1	0	0	+1	+4	+8	1.5	12
27	Introduce area-specific Development Control Plan (DCP) provisions for lakefront properties to strengthen foreshore protection through the development assessment (DA) process.	Moderate	+2	+2	+4	0	+3	+2	0	0	0	0	+5	+9	1.5	13.5
28	Install historic flood markers at key locations around the lagoons to indicate past flood heights.	Low	+1	+2	+2	0	0	+1	+1	+1	+3	+1	+6	+8	1.5	12
29	Consider potential impacts of the Wamberal Seawall on the coastal processes at Wamberal and Terrigal Lagoons	Extreme	+4	+3	+12	0	0	+3	0	+3	0	0	+6	+18	1.5	27
30	Support Regional Invasive Fauna Management with LLS	Moderate	+2	+2	+4	0	+2	0	0	0	0	0	+2	+6	1.5	9
31	Develop a Community Monitoring Program for Lagoon Birdlife	Moderate	+2	+2	+4	0	+2	0	+1	0	+1	0	+4	+8	1.5	12
32	Develop and execute a communications plan for Stage 5 of the CMP	Extreme	+4	+1	+4	+1	+1	+1	+1	+1	+1	+1	+6	+10	1.5	15
33	Trial Installation of Water Quality Autosampler in Avoca Lagoon Catchment	High	+3	+2	+6	+3	+1	0	0	0	0	+1	+5	+11	1.5	16.5
34	Develop a Memorandum of Understanding (MoU) Between Central Coast Council and NPWS for Wamberal Lagoon Management	High	+3	+3	+9	+1	+1	+3	+1	+1	+3	+1	+10	+19	1	19
35	Fishing closure of Wamberal Lagoon	Moderate	+2	+4	+8	0	+4	0	0	0	0	0	+4	+12	1	12
36	Undertake Ecosystem Services Valuation for the Central Coast Lagoons	Low	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+6	+7	1.5	10.5
37	Assess and Manage Light and Noise Pollution Impacts on Lagoon Ecology	Low	+1	+2	+2	0	+3	0	0	0	0	0	+3	+5	1.5	7.5
38	Assess and Address the Impact of Private Structures on Lagoon Foreshores	Moderate	+2	+3	+6	0	+2	0	0	0	+3	0	+5	+11	1.5	16.5
39	Investigate the Feasibility of Constructing a Water Treatment Wetland in the Southern Arm of Avoca Lagoon	Extreme	+4	+4	+16	+2	+2	0	0	0	0	+1	+5	+21	1	21
40	European and Archaeological Heritage Management	Low	+1	+3	+3	0	0	0	0	0	0	+3	+3	+6	1.5	9



		Level of Risk being Mitigated			Associated Environmental, Social and Cultural Impacts								Total Score			
41	Environmental Protection Works	High	+3	+3	+9	0	+4	0	0	0	0	0	+4	+13	1.5	19.5
42	Road Raising at Lakeview Drive	Moderate	+2	+4	+8	0	0	+3	0	+3	0	0	+6	+14	1	14
43	Develop and Implement a Program to Incentivise Environmentally Responsible Development Practices	High	+3	+3	+9	+3	+3	+1	0	0	0	0	+7	+16	1.5	24
44	Retrofit Stormwater Outlets with One-Way Valves to Prevent Tidal Backflow	Moderate	+2	+4	+8	0	0	+2	+2	+2	0	0	+6	+14	1.5	21
45	Undertake a Planning Proposal to Amend the RH SEPP Coastal Environment Area Mapping	Extreme	+4	+4	+16	+4	+4	0	0	0	+4	0	+12	+28	1.5	42



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