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Greater Sydney Harbour Estuary Coastal Management Program Scoping Study

Final Report

June 2018

NSW GOVERNMENT

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Document Control Sheet

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Document:	R.N20888.001.02.docx
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Synopsis: **This Greater Sydney Harbour Coastal Management Plan (CMP) Stage 1 Scoping Study outlines a range of coastal zone management issues and priorities in relation to the Greater Sydney Harbour Estuary, and provides a forward plan for preparing Stage 2 to Stage 5 of a Greater Sydney Harbour CMP.**

This report has been prepared in consultation with local council and state agency stakeholders, and in line with the draft NSW Coastal Management Manual (OEH, 2015).

REVISION/CHECKING HISTORY

Revision Number	Date	Checked by		Issued by	
0	11 April 2018	DR		DR	
1	18 May 2018	PD		PD	
2	27 June 2018	AD		PD	

DISTRIBUTION

Destination	Revision										
	0	1	2	3	4	5	6	7	8	9	10
Local Land Services	PDF	PDF	PDF								
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Acknowledgment
This report has prepared with financial assistance from the NSW Government through its Estuary Management Program. This document does not necessarily represent the opinions of the NSW Government or the Office of Environment and Heritage.

EXECUTIVE SUMMARY

Introduction

Stretching from its upper tidal limits on the Parramatta River downstream to the ocean entrance between North and South Head, Sydney Harbour is a natural wonder on which the commercial and social foundations of the Greater Sydney region are built. At the centre of Australia's largest city, the harbour is subject to intense human activity which presents coastal managers with many challenges.

Through the NSW Coastal Management Framework, the State Government aims to foster thriving and resilient coastal communities, and supports preparation of Coastal Management Programs (CMP) to set the long-term strategy for coordinated management.

This Scoping Study represents the first (of five) stages for preparing a Greater Sydney Harbour CMP, that encompasses the tidal waterways of Port Jackson, Parramatta River, Lane Cove River, Middle Harbour and their catchments. This study was prepared in consultation with stakeholders from local council and state government, and in line with the NSW Coastal Management Manual.

Vision

The long-term vision for Sydney Harbour's coastal zone is to:

Support the coordinated management and ecologically sustainable development of Greater Sydney Harbour to maintain its exceptional social, cultural, economic and environmental values, and symbolic status as Australia's most globally iconic waterway.

Objectives

Eleven (11) objectives are proposed for a Greater Sydney Harbour CMP that are consistent with the objects of the *Coastal Management Act 2016*. In addition to these, a Greater Sydney Harbour CMP shall give effect to the management objectives of the four management areas that comprise the NSW coastal zone.

Context and Scope

The coastal management context for Sydney Harbour has been characterised, based on a literature review, in terms of its:

- physical, environmental and climate context
- legislative, planning, governance and management context
- social, cultural context
- economic and development context

In summary, Sydney Harbour's coastal zone is rich in natural attractions and environmental assets, including dramatic sandstone cliffs, estuary and harbour bathymetry, catchment and estuary hydrological processes and diverse coastal ecosystems. Greater Sydney is an economic powerhouse that is home to diverse people and cultures and rich in Indigenous heritage. The value of Sydney Harbour has been estimated at $43 billion, which is founded on its geography, water quality and healthy marine ecosystem.

The globally iconic harbour is the maritime gateway to the largest city in Australia. As such, all levels of government have a presence and responsibilities across the range of maritime, economic, social, political and environmental issues and concerns within the harbour.

Past and present human activities within the waterway and its catchment threaten many of the harbours values. Climate change and an increasing population in Greater Sydney will place additional pressures on the harbour's coastal zone in coming decades, and in the long term.

Unclear governance is an issue. No single body or framework oversees the management and planning of Sydney Harbour and considerable jurisdictional ambiguity exists. Management actions are typically undertaken in response to localised plans and initiatives, as opposed to a system-wide strategy. A single, whole-of-system CMP is needed to facilitate coordinated and integrated management of Australia's most iconic and important waterway.

Values, Threats and Management Issues

Eight common **values** and benefits were identified for Sydney Harbour' coastal zone, through stakeholder workshops and a literature review:

- clean waters
- biodiversity: ecosystem value
- geodiversity: form and process value
- cultural value
- amenity / recreation / participation value
- education / scientific value
- economic value
- symbolic value

A review of various coastal/estuary plans and risk assessments identified a long list of **threats** to the environmental, social and economic values of the Greater Sydney Harbour coastal zone. These were distilled down to 23 threats, which relate to one of the following key issues:

- land use intensification
- resource use and conflict
- natural hazards
- public safety

A first pass risk screening was conducted at a system-wide scale, with expert input, which gave consideration to several factors (current management, its effectiveness, future risk trajectory). The risk assessment found:

- risk management actions are in place for many of the threats, and many are already not achieving the intended outcomes. Residual risk remains (e.g. urban stormwater, foreshore development, conflict over resource use).
- over time, with increasing population, climate change and the combination of a range of these and other threats, there is likely to be increasing risk on many areas of the harbour (e.g. urban stormwater; coastal inundation, shipping, boating and boating infrastructure).
- risk associated with some threats has and will continue to be reduced (e.g. industrial discharges).

At a system-wide scale, several areas were identified where additional knowledge or a more detailed risk assessment is needed:

- present risk – damaging riparian vegetation and wetlands, degraded seawalls and coastal protection and disturbance of contaminated sediment.

- future risk – loss of terrestrial vegetation, introduction of invasive species, shipping, boating and associated infrastructure, coastal and tidal inundation from sea-level rise, overland flooding and effects of drought including on groundwater.

Following on from the risk screening, and drawing on the existing literature and workshop outcomes, a series of knowledge gaps were identified under the following categories:

- governance
- natural, social, cultural and economic values/assets
- coastal hazard and threats
- socioeconomic information

Benefits and Scope

The potential benefits from preparing a Greater Sydney Harbour CMP are huge and include in summary the:

- **potential to establish a clear governance framework for managing Greater Sydney Harbour.**
- **potential to secure significant funding to undertake planning and implement action** (e.g. State and Federal Government, business) if the benefits of a coordinated and strategic plan are well articulated.
- **opportunity to develop a strategic and integrated long-term plan** that can address the system-wide opportunities and threats, while also addressing local issues.
- **opportunity to dovetail with parallel planning process and management strategies underway** (e.g. Greater Sydney Region Plan and District Plans; draft NSW Marine Estate Management Strategy).

Key local government and state agency stakeholders consulted through this study demonstrated in principle support for a whole-of-catchment strategic plan. Considering the above:

It is strongly recommended that a Greater Sydney Harbour CMP be prepared in partnership between all tiers of government. The system-wide CMP should extend across all tidal waterways and catchment lands for Sydney Harbour, and address issues relating to all four coastal management areas that comprise the NSW coastal zone.

There are several matters that will require consideration and negotiation. A partnership arrangement to progress the Greater Sydney Harbour CMP is recommended for the immediate term, which includes a: (i) Project Coordinator; (ii) Steering Committee and; (iii) Technical Working Group – although this may change as project partners progress through CMP Stages 2 to Stage 5. **There is the need for strong and senior leadership to drive the CMP partnership from the outset.**

Outcomes and Forward Plan

This scoping study establishes the foundation for a Greater Sydney Harbour CMP, by:

- synthesising relevant literature (Appendix B), establishing the context for management (Chapter 2), outlining the scope and issues (Section 4), and reviewing current governance arrangements (Section 5 and Appendix D);
- initiating engagement through stakeholder workshops (Appendix C) and preparing a CMP engagement strategy (Appendix A);

- distilling the important coastal zone values and threats and identifying key risks through a preliminary risk assessment (Section 6); and completing a detailed gap analysis and identifying information needs to progress a CMP (Chapter 7);
- outlining a preliminary business case (Chapter 8) that highlights the value in preparing a catchment wide CMP and provides a hypothetical cost breakdown (Section 8.5); and
- setting out a CMP forward plan (Chapter 9) for the next steps of preparing a Greater Sydney Harbour CMP.

The following key recommendations are provided:

- **progress with the preparing a Greater Sydney Harbour CMP** that encompasses Sydney Harbour tidal waterways and its catchment lands.
- **establish a whole-of-government partnership for the CMP planning and implementation process**. Buy-in and participation by all government tiers is needed to achieve a truly strategic and coordinated management framework for Sydney Harbour.
- **establish a collaborative project governance arrangement to drive the CMP forward**.

The below summarises the forward plan to progress the Greater Harbour CMP.

Table 1 Greater Sydney Harbour CMP Forward Plan Summary

CMP Stage	Indicative Timing	Overview	Indicative Resourcing Estimates*
Stages 2 to 4 **Project coordination Engagement**	3 - 4 years	Establish CMP project coordinator Implement engagement strategy	Moderate (up to $400K) Moderate (~$250K)
Stage 2 **Risks, vulnerabilities & opportunities**	~2 years	Governance study Technical studies: hazards/threats and values/assets	Low (~$100K) High (~$1M)
Stage 3 **Identify and evaluate options**	~2 years	Options assessment Cost benefit assessment (CBA) Business plans	High (~$1M)
Stage 4 **Finalise, certify and adopt CMP**	~6 months	Prepare and exhibit draft CMP Review, finalise and certify CMP	Moderate (~$250K)
Stage 5 **Implement, monitor, evaluate and report**	>5 years	Council implement through IP&R Other organisations implement through relevant work programs	*Unknown*
		TOTAL CMP PLANNING COSTS	**Approx. $3M**

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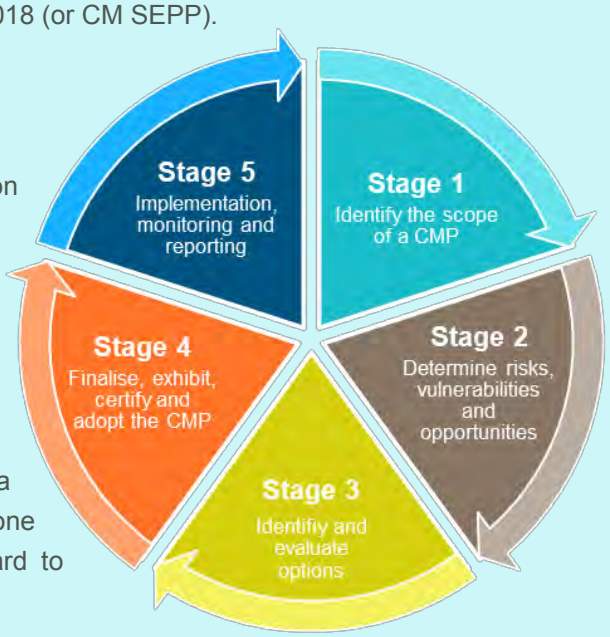
CHAPTER 1 SUMMARY: INTRODUCTION

NSW Coastal Management Program

A range of legislation is applicable to the NSW coastal zone, however there are four key items central to the NSW coastal management framework and they include the:

- *Coastal Management Act 2016* (or CM Act)
- Coastal Management State Environment Planning Policy 2018 (or CM SEPP).
- Coastal Management Manual (or the 'Manual')
- *Marine Estate Management Act 2014* (or MEM Act).

Whilst each of these are important, the Manual provides direction and guidance to coastal councils preparing, implementing and reviewing a Coastal Management Plan (CMP) to meet the requirements of the CM Act. Part B of the Manual addresses the five key stages of preparing a CMP (shown in the flow diagram) and describes each stage in detail.



The Greater Sydney Harbour Coastal Management Plan Stage 1 Scoping Study (this report) has been prepared to develop a shared understanding of the Greater Sydney Harbour coastal zone management issues and priorities and provide a way forward to undertake Stage 2 to Stage 5 of the CMP.

Sydney Harbour Study Area

The Greater Sydney Harbour stretches from the upper tidal limits on the Parramatta River downstream to the ocean entrance between North and South Head. Sydney Harbour and its tidal waterways are diverse, and encompasses a wide range of natural processes and values, cultures and communities, uses, pressures and threats.

The harbour foreshore is fringed by twelve local government areas, with a total of twenty-one LGAs dispersed across the greater catchment area. Four sub-catchments drain into the harbour estuary, these include the Port Jackson, Parramatta River, Lane Cove River and Middle Harbour sub-catchments (SIMS, 2014).

Greater Sydney Harbour CMP Stage 1 Scoping Study Objectives

This report is intended to satisfy the requirements for completing Stage 1 of a CMP, including: engaging with stakeholders and the community, determining the strategic context, vision and scope of a CMP, establishing roles and responsibilities, identifying key management issues and knowledge gaps, and developing a forward plan and preliminary business case for subsequent stages of a CMP. This report does this and importantly outlines the pathway for undertaking technical studies (as per Stage 2 and 3 of a CMP) and developing the management program (Stage 4 of a CMP) for Sydney Harbour and its tidal waterways.

This study was undertaken on behalf of Local Land Services (LLS), with guidance by the NSW Office of Environment and Heritage (OEH) and in consultation with various State Agencies and local Councils.

1 Introduction

1.1 Purpose of this Report

This Greater Sydney Harbour Coastal Management Plan (CMP) Stage 1 Scoping Study has been prepared to develop a shared understanding of the Greater Sydney Harbour coastal zone management issues and priorities, and provide a forward plan for undertaking Stage 2 to Stage 5 of a CMP, consistent with the NSW Coastal Management Framework. This study has been prepared on behalf of Local Land Services (LLS) and the NSW Office of Environment and Heritage (OEH), and in consultation with the State Agencies and local Councils. This report is consistent with the requirement outlined in the draft Coastal Management Manual (OEH, 2015).

1.2 NSW Coastal Management Framework

A range of legislation and polices are relevant to managing the coastal zone in NSW, which is typically under the care and control of local Councils or public authorities (including the Roads and Maritime Service, Department of Industry – Crown Lands and Water, and National Parks and Wildlife Service). Central to the NSW coastal management framework is the:

- *Coastal Management Act 2016* (or CM Act)
- Coastal Management State Environment Planning Policy 2018 (or CM SEPP).
- Coastal Management Manual (or the 'Manual')
- *Marine Estate Management Act 2014* (or MEM Act).

The **CM Act** provides for the integrated management of the NSW coastal environment consistent with the principles of ecological sustainable development for the social, cultural and economic well-being of the NSW people. The CM Act establishes 13 high-level statutory objects for management of the NSW coastal zone, including to support the objectives of the **MEM Act**. Under the CM Act, the NSW coastal zone is defined as comprising four distinct 'coastal management areas'. These four areas include the:

- Coastal Wetland and Littoral Rainforest Area;
- Coastal Vulnerability Area;
- Coastal Environment Area; and
- Coastal Use Area.

Management objectives specific to each coastal management area are outlined in the CM Act. The CM Act also outlines the purpose of and requirements for a CMP, which may be prepared by a local council or councils. Local councils are required under the CM Act to embed coastal management within the Integrated Planning and Reporting (IP&R) Framework, established in the *Local Government Act 1993*. Public authorities must also take into consideration the objectives and processes to achieve integrated management of the NSW coast (NSW Govt, 2015a).

The **CM SEPP** is now one of the key environmental planning instruments for land-use planning in the coastal zone, and will deliver the statutory management objectives for each of the four coastal management areas (as set out in the CM Act). The four coastal management areas are mapped under the CM SEPP. The CM SEPP outlines development controls for each coastal management area (NSW Govt, 2015b).

The **Manual** provides guidance to coastal councils on all stages of preparing, implementing and reviewing a CMP. The important aspects of the draft Manual and CMPs are summarised below.

1.3 What is a Coastal Management Program?

A CMP sets out the long-term strategy for co-ordinated management of land within the coastal zone, that addresses local circumstances while also meeting the state objectives. The Manual provides councils with guidance to meet the requirements of the CM Act and outlines the process for undertaking and assessing coastal issues, and preparing CMPs. The Manual is comprised of three parts:

- Part A: Outlines the mandatory requirements in the CM Act, and the essential elements that councils are required to follow.
- Part B: Describes in detail the process for preparing a CMP.
- Part C: Provides a technical toolkit with advice on a range of topics.

Part B of the Manual is structured to address the five key stages of a CMP, which are illustrated in Figure 1-1. This report is the key output from Stage 1.

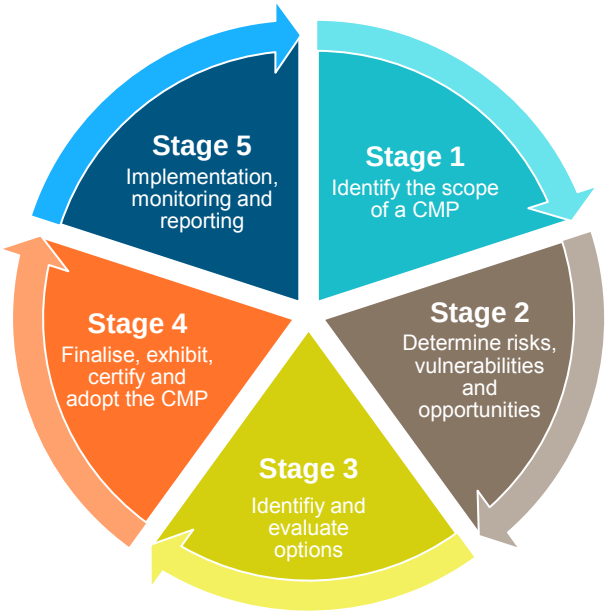


Figure 1-1 Five Stage Process for Developing a Coastal Management Program (Draft Manual; NSW Govt, 2015a)

1.3.1 What is Expected from Stage 1 of the CMP?

Stage 1 of a CMP involves the development of a 'Scoping Study' to help Councils 'get ready' and understand where their organisations are now, where they need to be to prepare a CMP, and how to make informed and confident decisions during the project and through implementation. It is therefore about establishing a plan to complete the rest of the CMP stages (Stages 2 to 5).

Stage 1 includes a Preliminary Risk Assessment that identifies the priority issues (see Section 6); a Gap Analysis of work to undertake in Stage 2 (see Section 7), a Preliminary Business Case to identify the value of investing in the CMP process (see Section 8), and a Forward Plan to outline the subsequent stages of work needed (see Section 9). A Community and Stakeholder Engagement Plan forms another key component of this study (see Appendix A). This Strategy provides guidance to Councils/CMP project partners on how to seek internal and external buy-in to the CMP process, and also the who, how and when of engagement for each subsequent CMP stage.

Under certain circumstances, the opportunity exists to fast-track from Stage 1 to Stage 4 of the planning process.

1.4 Study Area Context

1.4.1 Sydney Harbour Overview

Stretching from its upper tidal limits on the Parramatta River downstream to the ocean entrance between North and South Head, the Greater Sydney Harbour is a natural wonder on which the commercial and social foundations of the greater Sydney region are built (see Figure 1-2 for locality map).

Sydney Harbour and its tidal waterways are diverse, and encompasses a wide range of:

- natural features, processes and values;
- cultures and communities;
- human uses and infrastructure;
- pressures and threats; and
- agencies / organisations with management roles and responsibilities.

The Harbour foreshore is fringed by twelve (12) local government areas, with a total of twenty-one (21) LGAs dispersed across the greater catchment area. The LGA's adjoining Sydney Harbour's estuary foreshore are listed below (anticlockwise from South Head):

- Woollahra Municipal Council
- City of Sydney
- Inner West Council
- City of Canada Bay
- City of Parramatta
- Ryde City Council
- Municipality of Hunters Hill
- Lane Cove Municipal Council
- North Sydney Council
- Mosman Municipal Council
- Willoughby City Council
- Northern Beaches Council

LEGEND

— Catchment Boundary

Title:

Greater Sydney Harbour Estuary Locality Map

Figure: **1-2**

Rev: **A**

BMT endeavours to ensure that the information provided in this map is correct at the time of publication. BMT does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

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Approx. Scale

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Geographically, four (4) sub-catchments drain into the harbour estuary, they are the sub-catchments of Port Jackson, Parramatta River, Lane Cove River and Middle Harbour (SIMS, 2014). The distribution of the Greater Sydney Harbour Catchment councils across the four (4) sub-catchments, that drain into estuary waterway system is demonstrated in the Table 1-1 and Figure 1-3.

Table 1-1 Local government areas within Greater Sydney Harbour Estuary Catchment

Greater Sydney Harbour Catchment Local Government Area	Foreshore Frontage?	Port Jackson Sub-Catchment	Parramatta River Sub-Catchment	Lane Cove River Sub-Catchment	Middle Harbour Sub-Catchment
Woollahra	Yes				
Waverly	-				
Sydney	Yes				
Inner West	Yes				
Canada Bay	Yes				
Burwood	-				
Strathfield	-				
Canterbury-Bankstown	-				
Cumberland	-				
Parramatta	Yes				
Blacktown	-				
The Hills Shire	-				
Hornsby	-				
Ryde	Yes				
Hunters Hill	Yes				
Ku-ring-gai	-				
Lane Cove	Yes				
Willoughby	Yes				
North Sydney	Yes				
Mosman	Yes				
Northern Beaches	Yes				

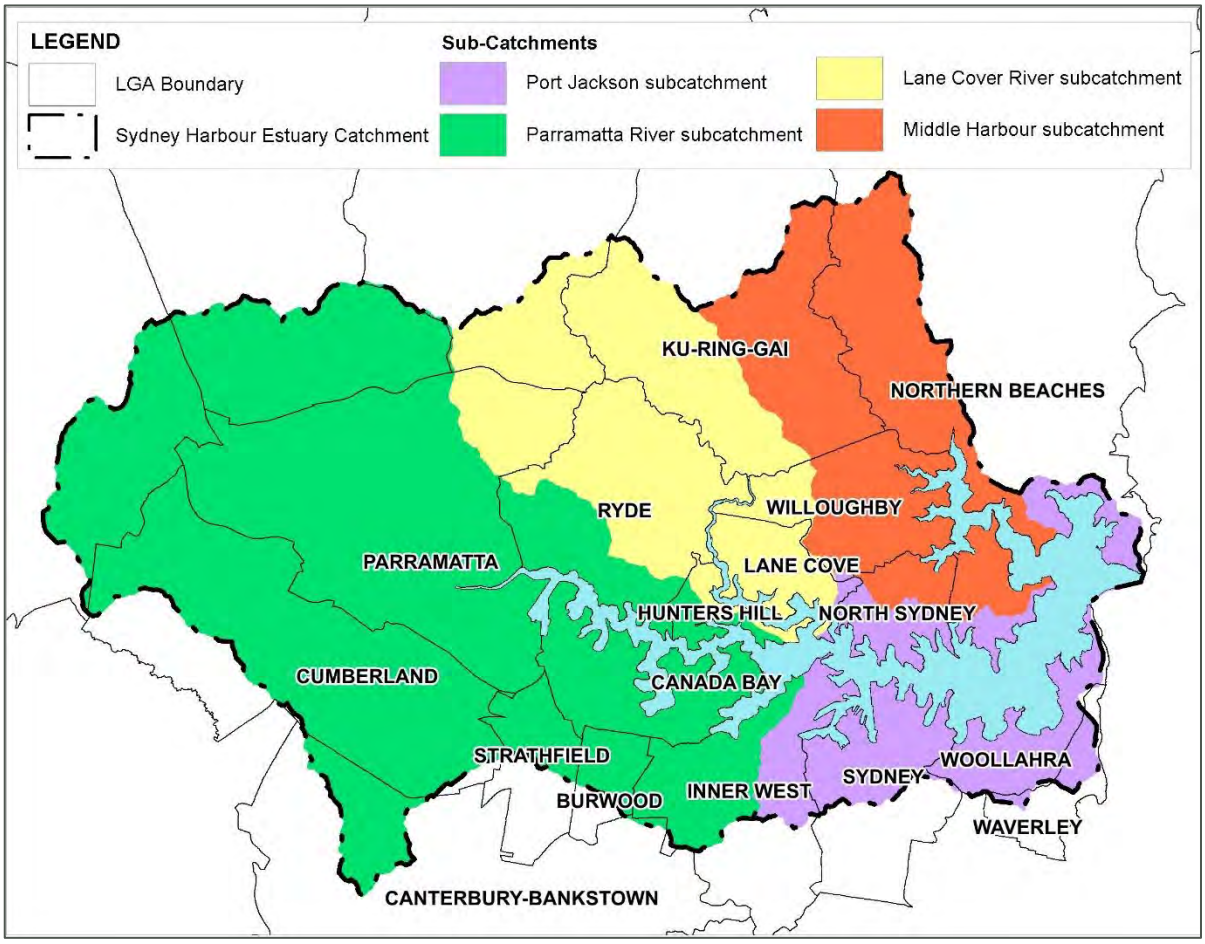


Figure 1-3 Distribution of local government areas and estuary sub-catchments across Sydney Harbour and its tidal waterways.

The Greater Sydney Harbour is a connected system from a physical, biological, social and economic stand point. The harbour is a drowned river valley hydrologically connected through the action of waves, tidal current and freshwater flows. The waterway houses a complex and interconnected ecosystem, with marine fauna inhabiting the diverse array of natural habitats, including rock reefs, soft sediment areas and wetland areas. Riparian habitat and remnant littoral rainforest and bushland extend into the catchment area.

The Sydney Harbour region is an iconic site, recognised globally because of its diverse waterways and the number of infrastructural assets such as the Harbour Bridge, the Sydney Opera House and the Olympic complex. Sydney Harbour is home to many important cultural assets (both Indigenous and settler). Sydney is the economic powerhouse of Australia, being home to a multitude of businesses and a range of important economic centres such as Parramatta, North Sydney and the Sydney CBD. A large and expanding population lives in the catchment of Sydney Harbour and along the foreshore which places significant pressure on the system. Much of the foreshore has been hardened through construction of seawalls and in many places public foreshore access has been blocked.

Sydney Harbour provides an important link for much of the city, providing a means for public and private transport and for a host of recreational activities. The water quality of Sydney Harbour reflects pressures from the catchment and from past and present uses. It has improved substantially in recent years but remains under pressure. For example, recent water quality modelling for the Parramatta River indicates that, due largely to increasing population density, water quality in the River will decrease over the next decade. Many of the buildings and properties along the harbour are at risk from rising sea levels associated with climate change.

1.4.2 Sydney Harbour Coastal Zone

The CM Act provides for the integrated management of the coastal environment of New South Wales consistent with the principles of ecologically sustainable development, for the social, cultural and economic wellbeing of the people of the state.

The CM Act also defines the NSW coastal zone as being made up of four distinct coastal management areas and sets out specific management objectives for each of the areas. Example characteristics of each area for Sydney Harbour's coastal zone is shown in Figure 1-4. A hierarchy of management objectives exist for the management areas where there is overlap.

Sydney Harbour and its tidal estuaries includes (and is mapped as having) the:

- Coastal Wetland and Littoral Rainforest Area;
- Coastal Environment Area; and
- Coastal Use Area.

Coastal Wetland areas are mostly absent from the Port Jackson Estuary, but occur more commonly around the fringes of the upper reaches of the Parramatta River, Duck River, Lane Cover and Middle Harbour. *Littoral Rainforest* remnants occur within pockets and along gully lines within the Northern Beaches, Mosman and Lane Cove Councils.

The *Coastal Environment* area spans the Greater Sydney Harbour waterway, plus foreshore areas in close proximity to the shoreline. The environmental characteristics and values of this broad area are diverse, and encompass natural processes and features, biodiversity, the marine estate, water quality and estuary health.

Coastal Use areas within the Sydney Harbour coastal zone comprises the land fringing its tidal waterways, which has important human use values and characteristics, including cultural heritage, public open space, appropriate development and infrastructure to support the coastal economy of Sydney Harbour.

The *Coastal Vulnerability Area* is not yet mapped under the CM SEPP. The coastal management planning process presents the opportunity for councils within Sydney Harbour to ensure that coastal hazards identified in existing studies or plans are further considered, and where appropriate, reflected in land use planning instruments.

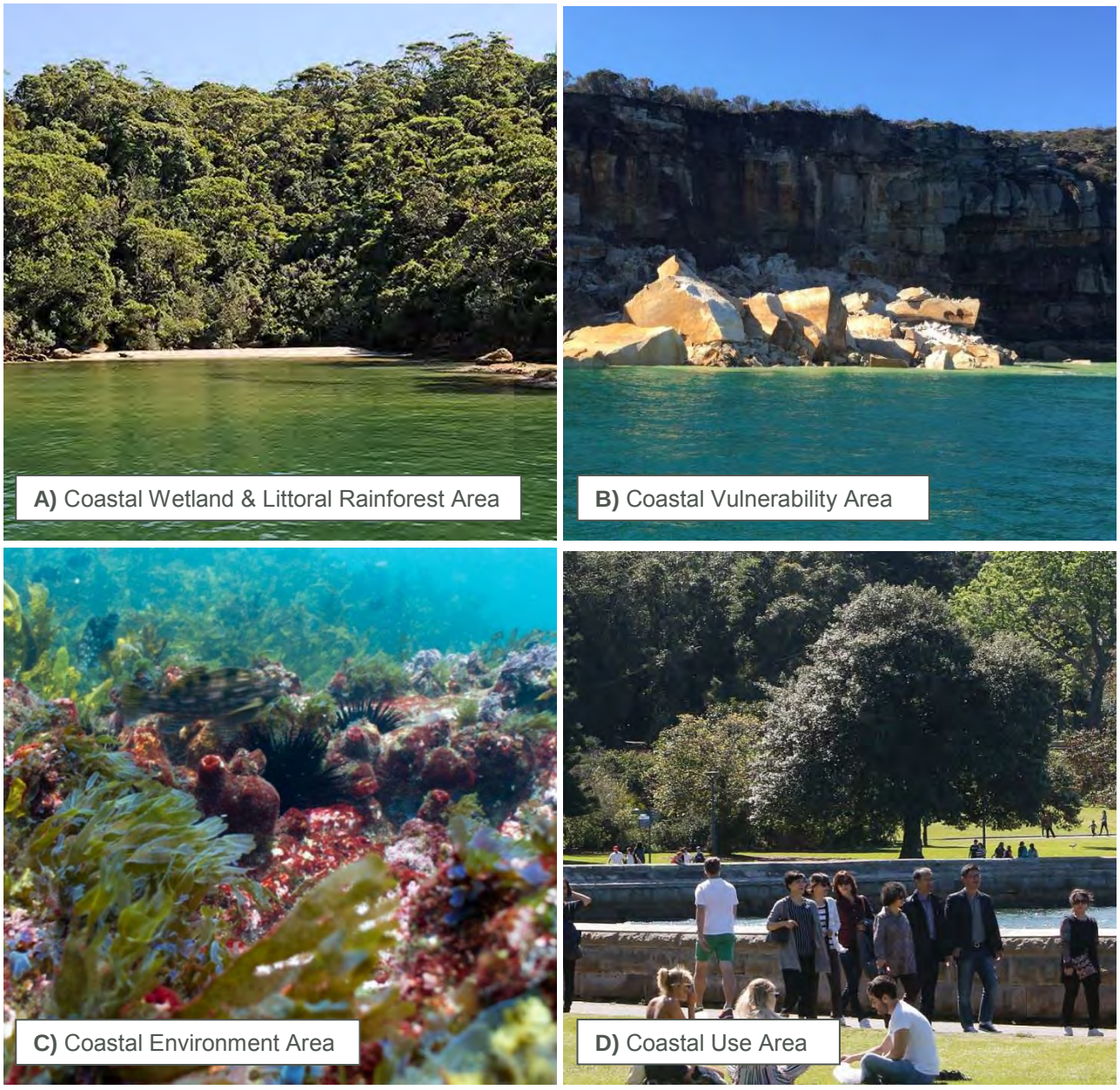


Figure 1-4 Sydney Harbour's Coastal Zone

A) Littoral Rainforest at Taylors Bay, Mosman (Source: NSW Govt.); B) Cliff collapse, North Head (Source: Sydney Morning Herald); C) Marine Habitat, Sydney Harbour (Source: SIMS); and Community foreshore infrastructure (Source: NSW Govt.).

Under the CM Act, Councils are required to take a systems approach to coastal management, that looks at coastline issues in the broader context. For large estuary systems like Sydney Harbour, councils must consider management within a coastal catchment context and liaise closely with all Council, State and Commonwealth agencies, non-government organisations and with the wider community that have a role and interest in the management of Sydney Harbour.

1.5 CMP Vision Statement and Objectives

1.5.1 Vision Statement

Support the coordinated management and ecologically sustainable development of Greater Sydney Harbour to maintain its exceptional social, cultural, economic and environmental values and symbolic status as Australia's most globally iconic waterway.

1.5.2 Greater Sydney Harbour CMP Objectives

Consistent with the CM Act, the objectives for the Greater Sydney Harbour CMP are:

- to protect and enhance natural processes and environmental values of the Greater Sydney Harbour coastal zone;
- to support the social and cultural values of the Greater Sydney Harbour and maintain public access, amenity, use and safety;
- to acknowledge Aboriginal peoples' spiritual, social, customary and economic connection with and use of the Greater Sydney Harbour coastal zone;
- to recognise the Greater Sydney Harbour coastal environment is a vital economic zone, the maritime gateway to Australia's largest city;
- to facilitate ecologically sustainable development in the Greater Sydney Harbour coastal zone and promote strategic, coordinated and sustainable land use planning decision-making;
- to mitigate current and future risks from coastal hazards, taking into account the effects of climate change, including impacts from extreme storm events;
- to recognise that the local and regional scale coastal processes and shoreline dynamics effect on Sydney Harbours beaches and estuary foreshores;
- to promote integrated and co-ordinated coastal planning, management and reporting that benefits from, and guides implementation of, the Greater Sydney Region Plan and coastal zone District Plans;
- to facilitate co-ordination of the policies and activities of government and public authorities relating to the Greater Sydney Harbour coastal zone and to facilitate the proper integration of their management activities across all tiers of government;
- to support public participation in coastal management and planning in Greater Sydney Harbour and greater public awareness, education and understanding of coastal processes and management actions;
- to support the objects of the *Marine Estate Management Act*.

In addition, a Greater Sydney Harbour CMP shall give effect to the management objectives for the following four coastal management areas that comprise the NSW coastal zone:

- Coastal wetlands and littoral rainforest area
- Coastal vulnerability area

- Coastal environment area
- Coastal use area

1.6 Report Objectives, Scope and Structure

This report is intended to satisfy the requirements for completing Stage 1 of a CMP, which provides for:

- engaging with stakeholders and the community;
- determining the strategic context, vision and scope of a CMP;
- establishing roles and responsibilities;
- identifying key management issues and knowledge gaps; and
- developing a forward plan and preliminary business case for subsequent stages of a CMP.

This report meets Stage 1 CMP requirements outlined in the draft Manual (OEH, 2015) and importantly outlines the pathways for undertaking technical studies (as per Stage 2 and 3 of a CMP) and developing the management program (Stage 4 of a CMP) for Sydney Harbour and its tidal waterways.

The structure of the report is as follows:

- **Chapter 1** introduces the Study.
- **Chapter 2** sets the strategic context for coastal management in Sydney Harbour, based on a review of existing information.
- **Chapter 3** provides a summary of engagement (Council and Agency Workshops) undertaken and workshop outcomes.
- **Chapter 4** provides details of the four coastal management areas that comprise the Greater Sydney Harbour coastal zone.
- **Chapter 5** provides an overview of the complex governance arrangement of Sydney Harbour, and provides some discussion on governance needs and options for a Greater Sydney Harbour CMP.
- **Chapter 6** documents the values, threats and preliminary risk assessment process and results undertaken for this study.
- **Chapter 7** documents the knowledge gaps identified as part of this study and provides guidance on further studies needed to support a Greater Sydney Harbour CMP.
- **Chapter 8** presents a preliminary business case, that identifies the value and benefits of investing in the CMP process.
- **Chapter 9** documents the Sydney Harbour CMP forward plan that outlines the subsequent CMP stages.
- **Appendix A** provides community and stakeholder engagement strategy for a CMP.

- **Appendix B** provides a summary of the key background documents and information sources reviewed for this project.
- **Appendix C** documents the detailed council and agency workshop outputs.
- **Appendix D** documents the government organisations and legislation that govern the management of Sydney Harbour.

CHAPTER 2 SUMMARY: STRATEGIC CONTEXT

Information Review

There is a wealth of information from a variety of sources relating to the functioning and management of Sydney Harbour's coastal zone (including its tidal waterways and fringing coastal margin). An information review was undertaken to gain an understanding of the strategic context of Sydney Harbour's coastal zone, identify the values and threats as well as identify any critical information gaps that would impede the CMP progression.

Physical and Environmental Context

The Sydney estuary is classified as a tide-dominated estuary, more specifically a drowned river valley. The East Australian Current provides nutrient depleted subtropical water to the Harbour's entrance, with salinity concentrations varying dependent on freshwater inflows, precipitation and evaporation. Circulation is tidally dominated, with some influence from prevailing winds and tidal velocities are periodic, reversing every 6 hours and varying in magnitude both spatially and over a tidal period.

Sydney Harbours coastal zone is rich in natural attractions and environmental assets, including dramatic sandstone cliffs, estuary and harbour bathymetry, catchment and estuary hydrological processes and diverse coastal ecosystems (Hoisington, 2015). The harbour waterway is a hotspot for marine diversity with varied habitats including seagrass communities, mangroves, subtidal rock reefs, rocky intertidal shores, macroalgal communities, open water/semi-pelagic and soft-sediment benthic environments (Hedge et al., 2014).

Environmental values within the Sydney Harbour are primarily driven by a concern for the longer-term preservation for future generations, the conservation of natural resources and protection of habitats (Hedge et al., 2014). Past and present human activities within the waterway and its catchment threaten many of the harbours environmental values. For example, the release of untreated storm water and urban runoff into the harbour results in nutrient and contaminant enrichment. The continuing growth of Greater Sydney region along with climate change will place a range of pressures on the harbour. Sea level variation, atmospheric, hydrologic and hydrodynamic processes are all predicted to shift under climate change, each of which influence coastal landforms and ecosystems (Roy et al., 2001).

Legislative, Planning, Governance and Management Context

The legislation and policies governing the management of Sydney Harbour and its catchment are complex. The *Coastal Management Act 2016* underpins management of the NSW coastal zone. Management of Sydney Harbour is also supported by the *Marine Estate Management Act 2014*, *Environmental Planning & Assessment Act 1979*. *National Parks and Wildlife Act 1974*, *Fisheries Management Act 1994*, *Local Government Act 1993*, *Crown Lands Act 1989*, *Water Management Act 2000*, *Protection of the Environment Operations Act 1997*, *Catchment Management Act, 2003*, *Natural Resource Management Act, 2003*, and *Environment Protection and Biodiversity Conservation Act 1999*.

Numerous planning instruments are also relevant to the governance of Sydney Harbour. The *Coastal Management SEPP* maps the coastal zone, identified development controls and outlined approvals pathways. The *Sydney Harbour Catchment Regional Environmental Plan 2005* (SREP) is the primary State Planning Policy relating specifically to the Harbour waterway, foreshore and its catchment, which is supported by the Sydney Harbour Foreshore Area Development Control Plan (DCP). The SREP will soon fall under the new

Environment SEPP proposed by NSW Government. There are a several other SEPPs that guide management of Sydney Harbour, including SEPP Infrastructure and the Three Ports SEPP (for example).

At a regional level, the Greater Sydney Regional Plan and District Plans prepared by the Greater Sydney Commission encompass the Sydney Harbour. The Greater Sydney Region Plan (GSC, 2018) sets out an overarching vision and strategy for the Greater Sydney Region. Five District Plans sit below the Region Plan, which provide the framework to implement the overarching vision and strategy for Greater Sydney. The Central City, Eastern City and Northern City District Plans cover the Greater Sydney Harbour Estuary and catchment.

Twelve LGA's occur along the fringes of Sydney Harbours tidal waterways, with 21 councils occurring within the Greater Sydney Harbour Estuary catchment. Each of these Councils have a Local Environment Plan (LEP), that outlines particular aims for the use and development of land within their LGA. These along with Council DCPs, Strategic Community Plans, Delivery Plans and Operations Plans regulate development and set the direction for each Council, outlining their priorities and how they will achieve them. Council's will be required to implement CMPs through their Integrated Planning and Reporting (IP&R) Framework.

Numerous management plans relating to the management of the Sydney Harbour coastal zone have been prepared to date. Coastal plans have been prepared in various forms, including Coastal Zone Management Plans (CZMPs), Coastline Management Plans and Estuary Management Plans. Under the State Governments' former coastal management framework, councils were provided technical guidance and financial assistance to prepare CZMPs, for the primary purpose of outlining proposed actions to be implemented by a council or public authority to address priority issues. The new State Government coastal management framework requires councils to transition from CZMPs to CMPs by 2021.

As a range of state and commonwealth agencies and local governments are involved, the governance of Sydney Harbour is complex. In addition, there are many authorities, businesses and industries which have influence over decisions relating to Sydney Harbour. Additionally, groups such as Sydney Coastal Councils Group and the Parramatta River Catchment Group are involved in regional projects aimed at supporting their members or constituents to achieve relevant outcomes. ***Currently, no single governance body oversees Sydney Harbour and thus the many management actions are typically undertaken in response to localised plans and initiatives, as opposed to a coordinated system-wide strategy.***

Social, Cultural and Economic Context

From coast to catchment, the Sydney Harbour houses a diverse range of communities, cultures, uses and has a rich Indigenous heritage. Sydney Harbour has extensive social and cultural values to the community and is home to a thriving port and ferry terminal. Tourism is a significant contributor to Sydney's economy, which is founded on the natural heritage of the Marine Estate, demonstrating it also has key economic values. Greater Sydney has approximately 9% of the national Aboriginal population (~57,000 in 2016) and there are numerous known registered Aboriginal sites, middens, shelters, deposits, engravings and burials within the estuary catchment area, and many more site which remain unregistered (Metro LALC, 2018). The Aboriginal community will be an important stakeholder in the development of a Greater Sydney Harbour CMP.

Increasing population and development intensity is common across the study area. Sydney's population is forecast to increase by 80% by 2054, which indicates that an additional three million people will live and work in metropolitan Sydney by that time (Tyrrell Studio, 2017). This will require significant changes to the built environment and development intensification that will place additional pressure on the Sydney Harbour coastal zone.

2 Strategic Context for Coastal Management

2.1 Previous Work and Information Review

There is a wealth of information from a variety of sources relating to the functioning and management of Sydney Harbour's coastal zone (including its tidal waterways and fringing coastal margin). This includes the following information sources:

- technical studies and academic literature;
- planning documents (e.g. strategic, operational and natural resource/coastal zone management plans); and
- spatial mapping and data.

A review of information was undertaken to gain an understanding of the strategic context for Sydney Harbour's coastal zone, identify the values/benefits and issues/threats, in addition to identifying critical information gaps for progressing with a CMP. A summary of the following key documents and information sources are provided in Appendix B:

- coastal zone management plans (CZMP), their background studies and the Sydney Coastal Council CZMP Sydney Harbour Scoping Study.
- Harbour-wide information sources, including the Sydney Institute of Marine Science (SIMS) reports, the Sydney Harbour Catchment Water Quality Improvement Plan, NSW Marine Estate Threat and Risk Assessment and the Sydney Harbour Estuary Processes Study.
- Greater Sydney Commission plans, including the Regional Plan and relevant District Plans.

2.2 Physical Context

Geology

The Sydney estuary is classified as a tide-dominated estuary, more specifically a drowned river valley (SIMS, 2014). Taking formation between 15 and 29 million years ago as a result of erosion from the Parramatta River, periods of uplift saw the formation of the steep-sided banks where the river eroded to bedrock.

The rapid sea level rise following the last glacial period 17,000 years ago saw levels increase from ~100m below current levels to 25m below current levels during the following 7,000 years. This saw the water's edge move from between 25 and 30 km to between 3 and 5 km east of its current coastline. The seas moved into the Sydney river valley forming a flood-tide delta whilst sediments were deposited by rivers in the upper part of the estuary as fluvial deltas.

Hydrology

The East Australian Current (EAC) provides nutrient depleted subtropical water to the Harbour's entrance. Salinity concentrations in the estuary vary dependent on freshwater inflows, precipitation and evaporation, and range from 30 to 35 psu (SIMS, 2014). The Sydney Harbour catchment is generally subjected to dry conditions with periods of infrequent, high-precipitation events. During

these events, the extensive impervious surfaces result in rapid runoff which forms a buoyant layer upon reaching the estuary.

Exchange

Circulation within the Sydney Harbour is tidally dominated, with some influence from prevailing winds. Tidal velocities are periodic, reversing every 6 hours, varying in magnitude both spatially and over a tidal period. Circulation patterns are variable dependant on the wind direction, contributing to a difference in harbour retention and flushing. The age of water in the main Harbour body varies from 0 to 20 days, and up to 130 days in the upper Parramatta River. Flushing is at a maximum under a southerly wind forcing at the harbour mouth with easterly and north-easterly winds resulting in greater retention (Roughan et al., *unpublished,* in Hedge et al., 2014).

Catchment

The Sydney Harbour catchment covers approximately 484 km^2 with 86% of it classified as highly urbanised. There are significant areas of bushland, particularly within the Lane Cove, Garigal and Sydney Harbour national parks. Natural waterways within the catchment have been modified, with systems being channelised with concrete. More than 50% of the Sydney Harbour shoreline has been replaced by artificial structures, with 77km of the original 322 km of original shoreline having been removed as a result of reclamation and infilling (SIMS, 2014).

2.3 Environmental Context

Sydney Harbours coastal zone is rich in natural attractions and environmental assets; ranging from dramatic sandstone cliffs, estuary and harbour bathymetry, to varied catchment and estuary hydrological processes and diverse coastal ecosystems (Hoisington, 2015). The harbour waterway is a hotspot for marine diversity with a range habitats including, seagrass communities, mangroves, subtidal rock reefs, rocky intertidal shores, macroalgal communities, open water/semi-pelagic and soft-sediment benthic environments (Hedge et al., 2014). These habitats support marine flora and fauna including, plankton, infaunal and epifaunal invertebrates, birds, marine reptiles, marine mammals, fish, sharks and marine plants. The environmental values of Sydney Harbour and threatening processes to these values, are detailed Chapter 6 and briefly summarised below.

Values

Environmental values within the Sydney Harbour are primarily driven by a concern for the longer-term perspective for future generations and the conservation of natural resources and protection of habitats (Hedge et al., 2014). Environmental values relating to the Sydney Harbour for residents include, protection of natural assets and against environmental threats, the islands and foreshores, geodiversity, biodiversity, addressing issues such as invasive species and erosion and whale sightings and marine life.

There are 49 threatened species that may inhabit Sydney Harbour on a temporary or regular basis (GHD, 2015). Marine life in the waterways is aided by two protected marine areas, the Sydney Harbour National Park and the North Harbour Aquatic Reserve.

Pressures

Past and present human activities within the waterway and its catchment threaten many of the harbours environmental values. These threats include urban pollution, physical disturbances and habitat loss. For example, the release of stormwater and urban runoff into the harbour continues with little treatment, resulting in nutrient and contaminant enrichment in both sediments and the water column. Marine life is under threat from a range of processes, including contaminated sediments on the sea floor and the addition of seawalls, pontoons and wharves impacting foreshore habitats. More recently, the connectedness of the harbour and the rest of the world has given rise to the number of non-indigenous species arriving on the hulls of ships.

Sydney Harbour has established itself as a leading destination for cruise ships, which are centred around cruise terminals at Circular Quay and White Bay (Freewater, 2018). The use of the harbour by both cruise ships and recreational boats continues to grow (Hedges *et al.*, 2014) and whilst there are still some commercial shipping operations, the volume has decreased.

Population growth and land use intensification has produced multiple threatening processes which has led to the degradation of the coastal zone environment and has placed significance pressure on environmental values of Sydney Harbour. In the future, project population growth will drive further land use intensification of the catchment, which will compound many of the threatening processes. Climate change will become a key threatening process to the environment in the medium to long term, driving changes to the physical processes and associated ecological health and functioning.

2.4 Climate Context

Sea level variation, atmospheric, hydrologic and hydrodynamic processes are all predicted to shift under climate change, all of which influence coastal landforms and ecosystems (Roy et al., 2001). Current sea level rise is occurring at a rate of 3mm/year with projected sea levels expected to increase dependant on emissions between 0.22m and 0.88m (RCP2.6 and RCP8.5) by 2090 (CoastAdapt, 2018).

Sydney Harbour is known to be in a region warming faster than the global average (SIMS, 2014). The historic mean annual number of days with a temperature greater than 30°C is 27 days for the Sydney area. This is predicted to increase to between 51 and 85 days (RCP2.6 and RCP8.5) for Sydney by 2090. For Parramatta, which has a current mean annual number of 40, this is predicted to increase between 71 and 109 days by 2090.

In recent years, storm events generated by East Cost Lows (ECLs) have had a detrimental effect on estuaries such as Sydney Harbour which contain significant coastal infrastructure. It is likely that mangrove and seagrass habitats will become more important to maintain as they act as a natural buffer form erosion for coastal settlements, although the ability of coastal wetlands to adapt to sea level rise will depend on local factors (e.g. migration potential/barriers, sediment supply).

2.5 Governance Context

The governance of Sydney Harbour is multi-layered and includes all levels of government which are responsible for overseeing or delivering, legislation, policy and plans (see Section 5.1 and Appendix D). The catchment land and waterways of Sydney Harbour are owned and managed by a wide variety

of stakeholders. There are 21 local council areas wholly or partly within the Sydney Harbour catchment, 14 state government agencies and several Commonwealth government agencies that have a management and/or land ownership role (Freewater, 2018). Considerable jurisdictional ambiguity exists across the Sydney Harbour and its coastal fringes.

There are also a range of industries and organisations which have influence over decisions relating to Sydney Harbour. For example, Sydney Coastal Councils Group and the Parramatta River Catchment Group, who undertake and drive integrated regional activities and projects aimed at supporting their members or constituents to achieve relevant outcomes.

In the Federal context, the Commonwealth Department of Defence owns land and operates a range of defence facilities throughout Sydney Harbour (e.g. Royal Australian Navy bases). The Sydney Harbour Federation Trust is also responsible for Commonwealth land in and around Sydney Harbour (e.g. Cockatoo Island). The *Environmental Protection and Biodiversity Conservation Act 1999* protects national significant heritage within Sydney Harbour, including threatened species and communities (e.g. *Posidonia australis* seagrass beds) and built heritage items (e.g. Opera House).

State and local government share strategic and statutory planning responsibilities for land in the Sydney Harbour foreshore and catchment. Both the Department of Planning and Environment and local councils administer the NSW *Environmental Planning and Assessment Act 1979*, which is the key legislation for land use planning and development assessment in NSW. Local Environmental Plans are made under the NSW *Environmental Planning and Assessment Act 1979* (Part 3), and specify land zoning and permissible development for each local council area. The CM Act provides the legislative framework for managing the coastal zone in a strategic and coordinated manner, including Sydney Harbour. The CM Act is administered by the Office of Environment Heritage. Under the CM Act, CMPs are developed and certified to specify actions to be implemented by local councils (generally through councils Integrated Planning and Reporting Framework, which is established in the *Local Government Act 1993*) and state agencies (through written agreement).

The NSW Maritime Division of Roads and Maritime Services (RMS) are responsible for property administration and infrastructure management related to commercial and recreational boating. Sydney Ports Corporation manages cruise terminal assets at Circular Quay (Overseas Passenger Terminal) and White Bay and dry bulk facilities at Glebe Island (Freewater, 2018).

There are many other legislation, plans and policies relating to the management of Sydney Harbour, which are reviewed in the following sections of this report. Section 5.1 provides a detailed overview of the various federal, state and local government organisations with direct management responsibilities in Sydney Harbour.

At this point in time there is no single body or framework to oversee the management of Sydney Harbour and its tidal waterways. As a result, management initiatives undertaken to date are in response to localised plans and initiatives (as opposed whole-of-system strategy). A single, whole-of-system CMP that encompasses the Greater Sydney Harbour coastal zone provides the ideal opportunity to (a) clarify the jurisdictional ambiguity that exists and (b) develop a truly strategic and integrated plan for Australia most iconic and important waterway.

2.6 Legislative Context

The legislation and policy governing the management of Greater Sydney Harbour estuary and its catchment is complex and includes:

- 4 Commonwealth Acts
- 27 State Government Acts
- 21 Local Environment Plans
- 18 State Environmental Planning Policies
- A Sydney Harbour Regional Environmental Plan (soon to be replaced with a new Environment SEPP, currently in draft form)

As outlined previously, the CM Act establishes the framework and overarching objectives for coastal management in NSW which focus on strategic, integrated and ecologically sustainable management of the NSW's coastal zone.

Table 2-1 provides a snap shot of the legislation and policy that have a major influence in the management of Greater Sydney Harbour coastal zone, which is further expanded in Appendix D.

Table 2-1 Key Legislation and Policy Governing Sydney Harbour

NSW Coastal Zone Legislation and Policy	Additional Key Legislation Supporting Coastal Management in Sydney Harbour
Coastal Management Act 2016 Coastal Management SEPP 2018 NSW Coastal Policy (1997) Marine Estate Management Act 2014	**Commonwealth** Environment Protection and Biodiversity Conservation Act 1999 **NSW** Environmental Planning & Assessment Act 1979 Protection of the Environment Operations Act 1997 Local Government Act 1993 Crown Lands Act 1989 Fisheries Management Act 1994 Threatened Species Conservation Act 1995 National Parks and Wildlife Act 1974 Water Management Act 2000 Catchment Management Act, 2003; Natural Resource Management Act, 2003 Greater Sydney Commission Act 2015

2.7 Regional and Local Planning Context

A number of planning instruments are relevant to the governance of Sydney Harbour. The key State, Regional and Local Level Planning instruments that guide management of the Harbour's coastal zone are reviewed below.

State Level Plans

The *Sydney Harbour Catchment Regional Environmental Plan 2005* (SREP) is the primary State Planning Policy relating specifically to the Harbour waterway, foreshore and its catchment. The SREP aims to create a balance between promoting a working harbour, maintaining a sustainable and healthy waterway and promoting community and recreational access to the foreshore and its waterways. It also outlines planning principles for Sydney Harbour's foreshore councils to guide preparation of planning instruments, and zones the waterway into nine different zones to suit the differing environmental characteristics and land uses of the harbour and its tributaries.

The SREP is supported by the Sydney Harbour Foreshore Area Development Control Plan (DCP), with the NSW Department of Planning and Environment currently responsible for both the SREP and the DCP.

The NSW Government is working towards developing a new State Environment Planning Policy (SEPP) – the Environment SEPP is proposed to repeal and replace a number of SEPPs and REPs including the SREP.

The proposed new Environment SEPP aims to consolidate seven existing state level planning provisions into a single instrument, that will set out provision under four parts, being: catchments, waterways, bushland and protected areas. The SREP will fall under the managing catchments and protecting waterways part of the new Environment SEPP.

There are a several other SEPPs that guide management of Sydney Harbour, including the Coastal Management SEPP, SEPP Infrastructure and the Three Ports SEPP (for example).

Regional Level Plans

At a regional level, the *Greater Sydney Regional Plan* and associated *District Plans* have been prepared by the Greater Sydney Commission - an independent organisation established under the *Greater Sydney Commission Act 2015* and tasked with preparing a Plan for Greater Sydney over the next 40 years.

The *Greater Sydney Region Plan* (GSC, 2018) sets out an overarching vision and strategy for the Greater Sydney Region, which comprises a future as a metropolis of three unique but connected cities. The Regional Plan identifies infrastructure and collaboration, liveability, productivity and sustainability as four key themes that underpin the plan. Ten directions are outlined to guide delivery of the key themes. It is noted that, **a Greater Sydney Harbour CMP would support several of the key directions of the Greater Sydney Region Plan**. The key themes, directions, objectives and strategies of the Greater Sydney Region Plan and how a Greater Sydney Harbour CMP would support the delivery of the Regional Plan are discussed in Appendix B (Section B.2.1.1).

Five District Plans sit below the Regional Plan, which provide the framework to implement the overarching vision and strategy for Greater Sydney. The Central City, Eastern City and Northern City District Plans cover the Greater Sydney Harbour Estuary and its catchment (see Table 2-2). Planning priorities within each District Plan include: 'Protecting and improving the health and enjoyment of Sydney Harbour, and the District's waterways'. Appendix B (Section B.2.1.2) provides additional information on the District Plans and highlights how a Greater Sydney Harbour CMP would support the delivery of the District Plans.

Table 2-2 Sydney Harbour Fringing Councils in the Greater Sydney District Areas

Eastern City District Plan	Central City District	Northern District Plan
• Woollahra • City of Sydney • Inner West • City of Canada Bay	• City of Parramatta	• Lane Cove • Mosman Municipal • Hunter's Hill • City of Ryde • North Sydney • Willoughby City • Northern Beaches

Local Level Plans

Twelve (12) LGA's occur along the fringes of Sydney Harbours tidal waterways, with 21 councils occurring within the Greater Sydney Harbour Estuary catchment. Under the direction of the State Government, all NSW local governments are required to prepare a Local Environment Plan (LEP), that outlines particular aims for the use and development of land within their LGA. LEPs must be prepared in accordance with the relevant standard environmental planning instrument outlined under Section 33A of the *Environment Protection and Assessment Act 1979.*

A Development Controls Plan (DCP) provides detailed planning and design guidelines to support the planning controls in each LEP.

All Councils in NSW are tasked to produce the following documents as part of the State Government's Integrated Planning and Reporting (IP&R) Framework (as set out in the *Local Government Act 1993*).

- Community Strategic Plan (10+ years), which identifies the community's main priorities and aspirations for the future. A Resources Strategy describes how a council will achieve the objectives and strategies outlined the Community Strategic Plan.
- Delivery Program (4 years), that outlines to the community how council intends to achieve the community priorities and goals.
- Operational Plan (1 year), which outlines the details of the Delivery Program on an annual basis.

Under the CM Act, councils are required to establish links and alignment between management strategies in their CMPs and objectives and strategies in their Community Strategic Plan – with the aim to mainstream coastal management into councils' overall service delivery and asset management responsibilities. Appendix B.4 provides a summary of strategic directions established for the coastal zone of individual foreshore councils, as outlined in their respective Community Strategic Plans.

In addition to the above, many foreshore councils have developed Coastal Zone Management Plans (CZMPs) under the former State Government coastal management framework for part or all of their harbour coastline (see Section 2.8.1 for further details). The Parramatta River Estuary CZMP and Lane Cove River CZMP have now been certified by the Minister and are now gazetted (or in the process of becoming gazetted).

Other Coastal Zone Planning Projects

There are several other planning project and processes underway that will facilitate management of Greater Sydney Harbour's coastal environment. These include for example:

- Making Parramatta River Swimmable Again by 2025 project;
- Parramatta River Masterplan; and
- WaterSmart Cities program.

The Greater Sydney Harbour CMP planning process presents an opportunity to further support (and be supported by) the above plans and projects.

2.8 Management Context

Management plans in various forms relating to the management of Sydney Harbour coastal zone have been prepared to date. These include the following:

- Coastal and estuary management plans, in various forms;
- Sydney Harbour Catchment Water Quality Improvement Plan; and
- Other management plans, including park plans for management.

A summary of the coastal specific management plans is provided below.

2.8.1 Coastal Management Plans

Coastal plans have been prepared in various forms across Sydney Harbour waterway, including Coastal Zone Management Plans (CZMPs), Coastline Management Plans and Estuary Management Plans. Under the State Governments' former coastal management framework, councils were provided technical guidance and financial assistance to prepare CZMPs, for the primary purpose of outlining proposed actions to be implemented by a council or public authority to address priority issues.

Table 2-3 lists the CZMP in preparation or completed across Sydney Harbour, which are mapped spatially in Figure 2-1. A number of CZMP have been certified by the Minister and are now gazetted (or in the process of becoming gazetted). The new State Government coastal management framework requires councils to transition from CZMPs to Coastal Management Programs (CMPs) by 2021.

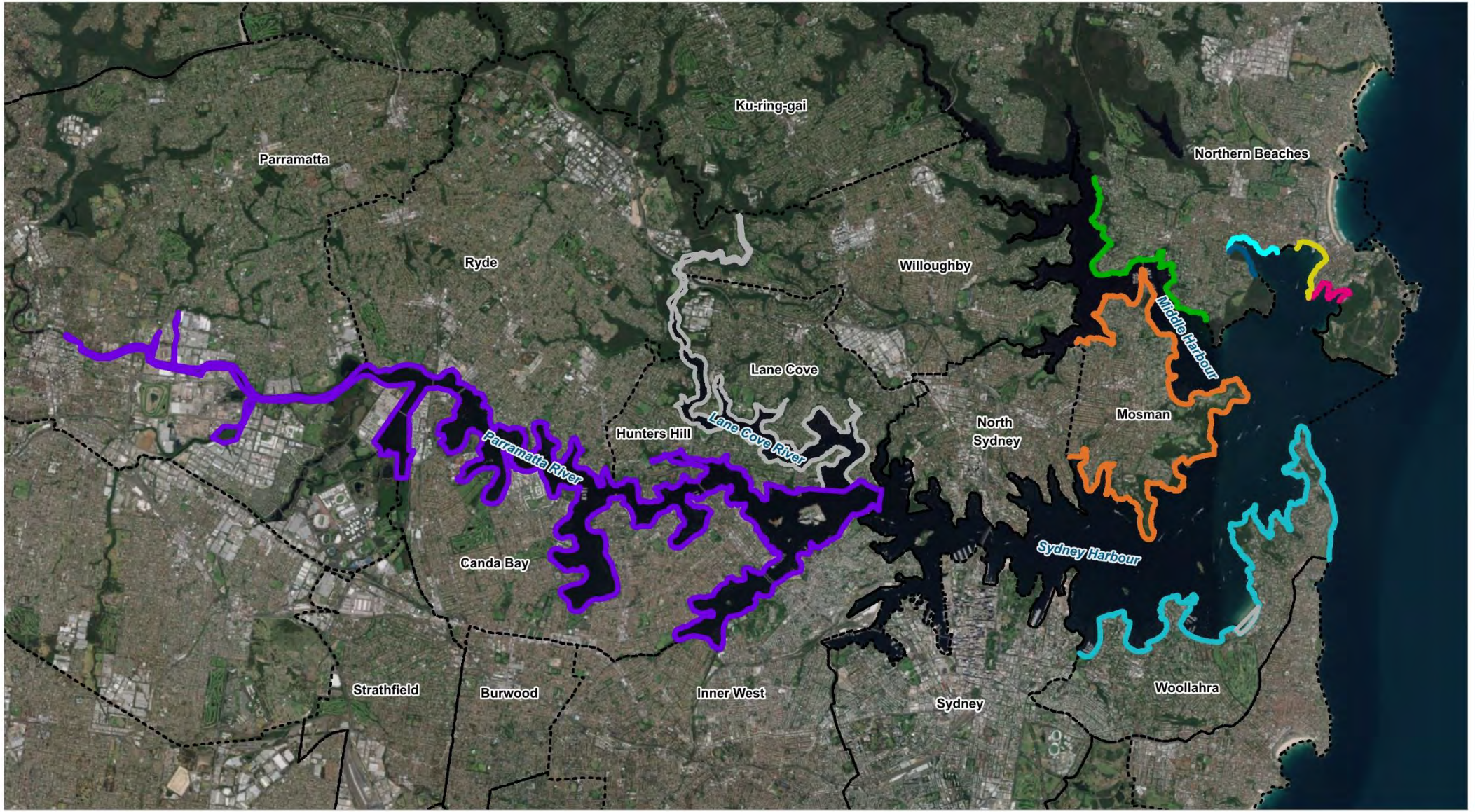
The former Manly Council (amalgamated into the Northern Beaches Council) has prepared five separate coastal management plans that span the North Harbour area of Port Jackson, with each being supported by technical studies that provide context and identify and quantify coastal processes and hazards. These plans are now somewhat dated and none have been certified by the Minister.

The Lane Cove CZMP encompasses the Lane Cove sub-catchment and has been prepared in partnership between four councils. The Lane Cove CZMP has several objectives with actions targeted primarily at water quality and estuary health. This CZMP has received certification by the Minister.

The Parramatta River CZMP has been prepared by the Parramatta River Catchment Group (PRCG), which is a proactive alliance of local and State government organisations and the community. A key objective is to make the Parramatta River swimmable, which has huge support from government, stakeholders and the community. Central to this is the management of water quality and sediment contamination. A Master Planning project is also underway to address the increasing density and foreshore use of the river.

Table 2-3 Coastal Zone Management Plan completed within Sydney Harbour and its Tidal Waterways

Coastal Zone/Coastline/Estuary Management Plan	Author / Year	Status	Local Government Area
Port Jackson Sub-catchment			
Woollahra Coastal Zone Management Plan	Cardno, 2015	Draft	Woollahra
Forty Baskets Coastline Management Plan	Manly Council, 2004	Completed	Manly (former)
Little Manly Coastline Management Plan	Manly Council, 2004	Completed	Manly (former)
Manly Cove Coastal Zone Management Plan	Manly Council, 2011	Completed	Manly (former)
North Harbour Coastline Management Plan	Manly Council, 2010	Completed	Manly (former)
Mosman Coastal Zone Management Plan	*Author unknown*	*Status unknown*	Mosman
Lane Cove River Sub-catchment			
Lane Cove Coastal Zone Management Plan	BMT WBM, 2013	Completed, Certified	Hunters Hill, Lane Cove, Ryde, Willoughby.
Parramatta River Sub-catchment			
Parramatta River Estuary Coastal Zone Management Plan	Cardno, 2013	Completed, Certified	Leichhardt (former), Ashfield (former), Auburn (former), Canada Bay, Strathfield, Parramatta, Ryde, Hunters Hill
Middle Harbour Sub-catchment			
Clontarf / Bantry Bay Estuary Management Plan	Manly Council, 2008	Completed	Manly (former)
Mosman Coastal Zone Management Plan	*Author unknown*	*Status unknown*	Mosman



LEGEND

Management Plan Area

- Woollahra
- Forty Baskets
- Little Manly Cove
- Manly Cove
- North Harbour
- Mosman
- Parramatta River Estuary
- Clontarf/Banty Bay Estuary
- Lane Cove
- LGA Boundary

Title:

Coastal Zone/Coastline/Estuary Management Plan Extents

Figure: **2-1**

Rev: **A**

N

0 2 4km

Approx. Scale

BMT

www.bmt.org

Filepath: K:\N20888_Sydney Harbour CMP Scoping Study\GIS\MI\Workspace\DRG_002_CMP_Extents.wor

2.9 Social and Cultural Context

The Greater Sydney Harbour encompasses a globally recognised city that is the economic powerhouse of Australia. From coast to catchment, the Sydney Harbour houses a diverse range of communities, cultures and uses, and has a rich Indigenous heritage. Increasing population and development intensity is common across the study area. The below section summarises some key facts relating to cultural heritage, population, demographic and community values and issues.

2.9.1 Indigenous Heritage

Sydney Harbour and its surrounds have a rich Indigenous history that extends from past to present. The land and waterway was traditionally owned and occupied by Aborigines and is of spiritual, social, cultural and economic importance to the Aboriginal people of Greater Sydney.

Prior to European settlement and the subsequent widespread development of the Sydney Harbour region, the harbour's coastal zone provided a rich source of food, medicine and shelter to Aboriginal people. Hunting and gathering of fish, shellfish and other marine animals was common, as was hunting land animals, birds, reptiles and collecting plants (GHD, 2015). Communities closest to the waterway consumed more fish and shellfish, relative to those in the hinterland. There are numerous registered Aboriginal sites, middens, shelters, deposits, engravings and burials within the Sydney harbour estuary catchment area, and many more sites which remain unregistered (Metro LALC, 2018).

Greater Sydney has approximately 9% of the national Aboriginal population (~57,000 in 2016), which represents the largest gathering of Indigenous people in Australia (GSC, 2018). The Aboriginal community will be an important stakeholder in the development of a Greater Sydney Harbour CMP.

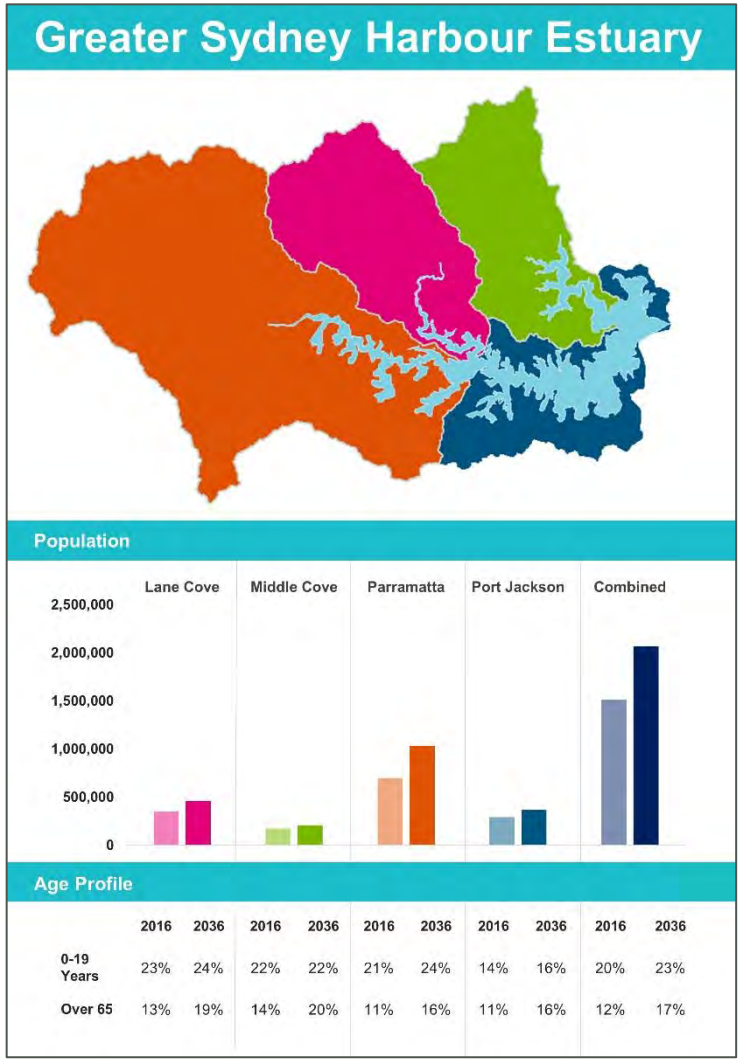
2.9.2 Population and Demographic

Greater Sydney is home to diverse people and cultures, with more than 250 different languages spoken across the region and up to 77% of people born outside of Australia from some areas adjacent to the harbour (e.g. Homebush, the Rocks, Parramatta, West Ryde; GSC, 2018). The population of the Greater Sydney region has grown significantly in the past 25 years, increasing by 1.3 million to reach a total of 4.7 million. Sydney's population is forecast to increase by 80% by 2054, which indicates that an additional three million people will live and work in metropolitan Sydney by that time (Tyrrell Studio (2017). This will require significant changes to the built environment that will place additional pressure on the Sydney Harbour coastal zone.

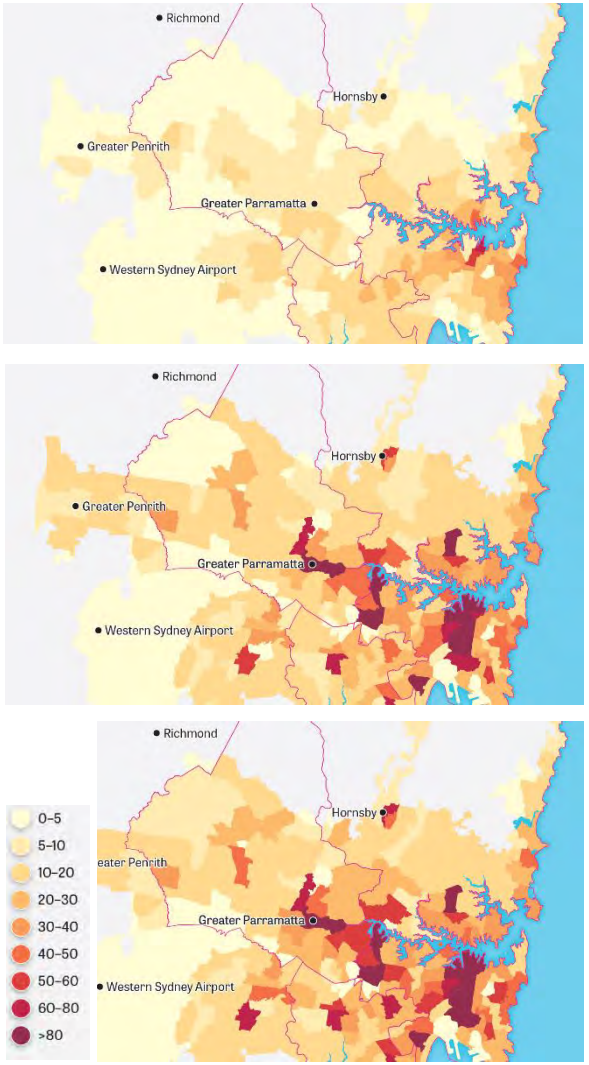
As of 2016 there were roughly 1.5 million residents living within Sydney Harbour's contributing catchment. Of these 20% are under the age of 19 and 12% over the age of 65. Projections indicate that by 2036, 23% of the population will be under the age of 19 and 23% over the age of 65 (DPE, 2016).

Figure 2-2 below provides a summary of population and demographic statistics and projections for the 21 LGAs (wholly or partly) within the Greater Sydney Harbour catchment. This provides a snap shot of population growth and demographic challenges that must be considered as part of a CMP.

Population and Demographic Snap Shot for Greater Sydney Harbour (source data/projections: DPE, 2016)



Greater Sydneys Changing Urban Dwelling Density: 1996 - 2016 - 2036 (modified form GSC online resources)



1996 Data

Detached low density housing on suburban blocks common in urban areas; some medium density and semi-detached housing in the inner suburbs; higher density dwelling limited to the city, eastern beaches and inner west.

2016 Data

Density increases across urban areas, traditional block sizes diminished in central and eastern areas, more intense development evident in serval LGAs, including a number of foreshore councils.

2036 Projection

Little change in outward spread; increased intensity of development within the existing centres and the exsisting urban areas.

Dwelling density per hectare

Figure 2-2 Greater Sydney Harbour Population, Demographics and Housing Infographics

2.9.3 Community Values and Issues

The key values associated with the Sydney Harbour were identified in the Sydney Harbour CZMP Scoping Study (GHD, 2015) following an extensive literature review and stakeholder engagement activities. Values identified during this process were:

- Safe and healthy access to the harbour
- Maintenance or enhancement of Harbour views
- High quality outdoor experience
- Maintenance and improvement of high water quality
- Appreciation of low key/natural public areas
- Preservation of natural areas and threatened species
- Sustainable use and management of the harbour
- Preservation and appreciation of cultural heritage

Key management issues for the Sydney harbour were identified as being:

- Protection and Maintenance/Improvement of Estuarine and Riparian Terrestrial Habitats
- Maintenance/ Improvement of Water/Sediment Quality
- Foreshore Access
- Coastal Inundation
- Shoreline Stability
- Cultural and Heritage Protection
- Recreation Use and Amenity

2.10 Economic Context

Source: NSW Govt

Greater Sydney is the economic powerhouse of Australia and a globally recognised city, located adjacent to the Sydney Harbour waterway. The Greater Sydney Harbour estuary is one of the world's

largest natural harbours and is home to a thriving port and ferry terminal. Tourism is a significant contributor to Sydney's economy, which is founded on the natural heritage of the Marine Estate.

To date the precise economic value of having a functioning Sydney Harbour ecosystem has not been quantified although several relevant studies have been undertaken to investigate the economic benefits. The Sydney Harbour Background Report (SIMS, 2014) categorised economic values into eight groups including:

- Harbour functions: ports, maritime activates, transport, Royal Australian Navy
- Tourism and the cruising industry
- Harbour foreshore attractions and events
- Incremental land values close to the harbour
- Harbour-related businesses selling retain and offering services
- Outdoor leisure's and sporting activities
- Ecosystem service values and indicators of valuing environmental quality
- Cultural heritage and the arts, icons and civic pride, landscape and spiritual values.

Hoisington (2015) collated information on the economic value of Sydney Harbour which encompassed the eight groups listed above. It was found to be an extremely difficult task with many of the Harbour's important values having no existing economic estimates. The monetary total for certain values reported by Hoisington (2015) were significant and include the following annual values:

- Harbour port revenues - $430 million
- Maritime revenues for services - $35 million
- Sydney ferries revenue - $175 million
- Cruise ships expenditure - $1,025 million
- Sydney Opera House - $254 million
- Taronga Zoo - $42 million
- Major events on and around Sydney Harbour - $400 million
- Domestic real estate - $3,775 million
- Recreational fishing - $71 million
- Ecosystem services - $160 million
- Valuing cleaner water - $75 million
- Sydney Harbour Federation Trust - $33 million

2.11 Development Context

Source: Six Maps

Greater Sydney Harbour Estuary comprises the most densely developed catchment of any estuary system in NSW, with the catchment land heavily urbanised. Government plans for population growth in Greater Sydney. This will result in the intensification of existing developed areas.

Freewater and Kelly (2015) reports that 80% of the catchment is covered by urban land uses, with the majority being residential, with roads and parklands the next largest land uses (Table 2-4). No rural land occurs within the catchment (Freewater and Kelly, 2015). Industrial land occurs in isolated areas throughout the catchment and typically next to the waterway, with the greatest being in Port Jackson and Parramatta River sub-catchments. Some former industrial areas have been redeveloped, however historic contamination remains an issue.

Table 2-4 Land Use Areas of the Sydney Harbour Sub-catchments (source: Freewater and Kelly, 2015)

Sub-catchment	Bushland	Commercial	Indus-trial	Parkland	Rail	Residential	Roads	Rural
Parramatta	3%	8%	6%	12%	1%	49%	20%	<1%
Lane Cove	7%	9%	1%	17%	0%	49%	17%	0%
Middle Harbour	16%	3%	1%	20%	1%	44%	15%	0%
Port Jackson	6%	17%	3%	11%	1%	40%	22%	0%
Total	**6%**	**9%**	**4%**	**14%**	**1%**	**47%**	**19%**	**0%**

The Greater Sydney Commission outline the future plans for development in and around Sydney Harbour, as documented in Greater Sydney Region Plan and subordinate District Plans (GSC, 2018). While little change is expected in the outward spread of development over the next 20 years, increased intensity of development is planned within the existing urban areas (see Figure 2-2).

CHAPTER 3 SUMMARY: ENGAGEMENT

The Engagement Process

Stakeholder workshops were held over two consecutive days to inform this study and initiate engagement in the CMP preparation process. The workshops were highly interactive and participatory and included a series of open forum discussion sessions and group activities. Representatives from ten state agencies and organisations participated in the Day 1 Agency Workshop, and representatives from nine of the twelve local government areas that fringe Sydney Harbour participated in the Day 2 Council Workshop.

The broad objectives of the engagement included: (1) communicate the context and drivers for the CMP Scoping Study (2) identify key stakeholders and confirm the legislation, policy and plans that govern Sydney Harbour (3) confirm a relevant list of background information and stakeholders and (4) seek high level feedback on the asset/value and threat categories, to help guide the preliminary risk assessment undertaken for this study. An additional aim was to investigate the potential benefits, challenges, and barriers for preparing a harbour-wide CMP.

State Agency Workshop Outcomes

Key issues identified include urban stormwater and foreshore development along with natural coastal hazards, sewerage assets, inadequate foreshore access / infrastructure and lack of connectivity. Other important issues raised include: current management initiatives *ad hoc* in nature, lack of interaction between existing studies, lack of effective and measurable monitoring/evaluation and accountability and jurisdictional ambiguity.

There was unanimous in principal support by the state agency representatives for a Greater Sydney Harbour CMP. The Western Sydney Infrastructure Plan was highlighted as a possible parallel funding model, recognising the importance of Sydney Harbour on a national scale. A harbour-wide CMP should link with the Greater Sydney Commission (e.g. to ensure coastal zone values and coastal hazard risks are recognised).

Council Workshop Outcomes

There was general census that a Greater Sydney Harbour CMP would improve management outcomes for the Greater Sydney Harbour coastal zone, however there are details around project governance and roles/responsibility need to be worked through. Learnings from the Parramatta Coastal Zone Management Plan were discussed, noting that time-commitment, organisation and governance becomes more complex with an increasing number of parties and partners.

Clearly defined governance structures and processes will be required to be able to develop a CMP for Sydney Harbour and its tidal catchments. There is the need for strong and senior leadership to drive a CMP partnership, plus in-kind time and resourcing contributions and financial support from State (and Federal) Government agencies (in addition to the 50:50 coastal management planning funding currently available).

Priority Values and Threats

Important values and priority threats were identified in both workshops. Most potential values for Sydney Harbour were considered to be ‘important’ to ‘very important’ with only ‘Sydney Harbour fishery’ (recreational) being identified as ‘less important’ (no existing commercial fishing in Sydney Harbour). Land use intensification and coastal hazards were identified as priority environmental threats.

3 Engagement: State Agency and Council Workshops

3.1 Stakeholder Engagement Process

Stakeholder workshops were held over two consecutive days to inform this study and initiate engagement in the CMP preparation process. Representatives from ten state agencies and organisations participated in the Day 1 Agency Workshop and representatives from nine of the 12 local government areas that fringe Sydney Harbour participated in the Day 2 Council Workshop (see Table 3-1). Appendix B provides a detailed overview of the workshops content and synthesis of the discussion and activity outcomes. A brief summary of the workshops is also provided below.

Table 3-1 Participation Record from Stakeholder Workshops

Agency / Organisation Representation: ***Day 1 Workshop***	**Council Representation:** ***Day 2 Workshop***
• NSW Office of Environment and Heritage • Planning NSW • Place Management, Property NSW (former Sydney Harbour Foreshore Authority) • Fisheries NSW • Local Land Services, Greater Sydney • RMS, Centre for Urban Design • Environment Protection Authority NSW • NSW Health • Sydney Water • Sydney Coastal Council Group	• Woollahra Municipal Council • City of Sydney • Inner West Council • City of Canada Bay • City of Parramatta • Municipality of Hunters Hill • Lane Cove Municipal Council • Mosman Municipal Council • Northern Beaches Council • NSW Office of Environment and Heritage • Sydney Coastal Council Group

Broad outcomes sought from both the workshops were as follows:

- Communicate the context and drivers for the CMP Scoping Study
- Identify key stakeholders and confirm the legislation, policy and plans that govern Sydney Harbour
- Confirm a relevant list of background information and stakeholders
- Seek high level feedback on the asset/value and threat categories, to help guide the preliminary risk assessment undertaken for this study

An additional aim was to investigate the potential benefits, challenges, and barriers for preparing a harbour-wide CMP.

The workshops were highly interactive and participatory, and included a series of open forum discussion sessions and group activities. Table 3-2 lists the worksheet group activities completed during the workshops.

Table 3-2 Stakeholder Workshop Worksheet Activities

Agency workshop	Council workshop
• *Background Study List*: review and update • *Sydney Harbour Governance*: review and update • *Assets and Values*: review, updated and prioritise • *Threats*: review, updated and prioritise	• *Background Study List*: review and update • *Assets and Values*: review, updated and prioritise • *Threats*: review, updated and prioritise • *Stakeholder List*: review and update

The background studies, governance and stakeholder worksheets comprised a list of relevant information obtained from the Sydney Harbour CZMP Scoping Study (SCCG, 2015), which was reviewed and updated for the workshops. Values and threats previously documented for Sydney Harbour were synthesised into a comprehensive list from the following key documents:

- Sydney Harbour CZMP Scoping Study (SCCG, 2015),
- Parramatta River Estuary CZMP (Cardno, 2013),
- Lane Cove River CZMP (BMT WBM, 2013), and
- NSW Marine Estate Threat and Risk Assessment Report (BMT WBM, 2017).

3.2 Agency Workshop Outcomes

3.2.1 Key Issues

Urban stormwater and foreshore development were identified as the highest priority issues in the Agency open forum discussion session. Natural coastal hazards, sewerage assets and inadequate foreshore access/infrastructure, plus lack of connectivity were also highlighted as high priority issues.

Current management initiatives were highlighted as being *ad hoc* in nature. The lack of interaction between existing studies; the lack of effective and measurable monitoring/evaluation and accountability, plus the jurisdictional ambiguity across the Greater Sydney Harbour were also noted as important issues. The new CMP framework provides an opportunity to clarify management roles and responsibilities from all tiers of government, and improve collaboration and integration of management in the harbour and its catchment.

3.2.2 Opportunities, Ideas and Support for a Harbour-Wide CMP

There was unanimous in principal support by the state agency representatives for a Greater Sydney Harbour CMP. The importance and opportunities of a harbour-wide CMP emphasised in the Agency workshop, included to: address catchment scale issues/opportunities; ensure sustainable and strategic management of a globally-iconic waterway; and develop a framework for interagency co-

ordination. Cost advantages to Council for undertaking a harbour-wide CMP were also highlighted, i.e. economies of scale, platform for attracting government and/or private funds, and it was noted that the vision and scope of a CMP should not be limited by Council budget constraints. The Western Sydney Infrastructure Plan was highlighted as a possible parallel funding model, recognising the importance of Sydney Harbour on a national scale.

A harbour-wide CMP should link with the Greater Sydney Commission (e.g. to ensure the GSC growth and infrastructure plans recognise the coastal zone values and accommodate coastal hazard risks). Several Greater Sydney Regional Plan and District Plan objectives would be supported by, and best achieved through, a harbour-wide CMP.

3.3 Council Workshops Outcomes

3.3.1 Barriers, Drivers and Structure of a Harbour-Wide CMP

There was general census that a Greater Sydney Harbour CMP would improve management outcomes for the Greater Sydney Harbour coastal zone, however there are details around project governance and roles/responsibility need to be worked through. Council representatives developed a series of key words and messages to highlight the advantages and opportunities for completing a harbour-wide CMP (see Table 3-3). Learnings from the Parramatta Coastal Zone Management Plan were discussed, noting that time-commitment, organisation and governance becomes more complex with an increasing number of parties and partners. A Greater Sydney Harbour CMP would need to recognise that considerable work has been achieved in preparing for a large-scale CMP. This includes efforts of Sydney's Coastal Councils Group, The Sydney Institute of Marine Science, along with the Parramatta River Catchment Group and other councils in coastal planning (see Section 2.8.1). It was also noted that convincing Council executives and elected members to be involved in a CMP process will be important. Key messages that Council officers can use internally to promote the benefits of a coordinated harbour-wide approach to the CMP are needed.

Table 3-3 Advantages and Opportunities for Developing a Greater Sydney Harbour CMP

Advantages and Opportunities: Key Words	
• 'one harbour' • 'improved environmental outcomes' • 'integrated and holistic' • 'coordinate and collaborate' • 'benefit of economies of scale (in the planning process)'	• 'clarity and transparency' • 'consistent approach' • 'power in numbers' • 'shared ownership, shared success' • ''financial leverage in implementing a large scale/high profile plan'

Drivers and governance models for a Greater Sydney Harbour CMP were discussed. As a potential model, an agreement between Council and State Government has been developed for the Healthy Waterways Partnership in Moreton Bay dealing with similar issues to Sydney Harbour. Clearly defined governance structures and processes will be required to be able to develop a CMP for Sydney Harbour and its tidal catchments. There is the need for strong and senior leadership to drive a CMP partnership, plus in-kind time and resourcing contributions and financial support, from State

(and Federal) Government agencies (in addition to the 50:50 coastal management planning funding available through the OEH coastal and estuary grants program).

3.4 Priority Values and Threats

Group worksheet activities were undertaken to identify important values and priority threats. These were incorporated into the preliminary risk assessment, completed during this CMP Scoping Study. A long list of values and threats relating to environmental, social/community use, and economic aspects of Sydney Harbour were assessed.

The majority of the 21 potential values for Sydney Harbour were considered to be 'important' to 'very important' by both the Agency and Council workshop attendees. 'Sydney Harbour fishery' (recreational) was the only value identified by both an Agency and Council group as being 'less important' (noting that no commercial fishing is currently permitted in Sydney Harbour).

Land use intensification and coastal hazards were identified as priority environmental threats. A wide range of priority socio-economic threats were highlighted under the themes of 'environment', 'governance', 'public safety', 'critical knowledge gaps', 'lack of access availability' and 'coastal hazards.'

The outputs from the values and threats worksheet activities are provided in the workshop synthesis and outputs document in Appendix B.

CHAPTER 4 SUMMARY: CMP SCOPE

CMP Scope and Area

Councils are required under the CM Act to take a systems approach to coastal management. **The study recommends the spatial extent of the Greater Sydney Harbour CMP should encompass all tidal waterways within Sydney Harbour and extend landward across its entire catchment.** The extent of the CMP will include the upper catchment areas and extend outside of the coastal zone.

Coastal Management Areas and Scope

Coastal wetlands and littoral rainforest support high value biodiversity that are particularly sensitive to development. CM SEPP mapping identifies coastal wetlands to extend across scattered sections of the Harbour, fringing contributing creeks and covering more large sections of Middle Harbour, Lane Cove and Parramatta Rivers. This area focusses on protecting well established and more extensive communities.

The CM Act recognises seven coastal hazards within the NSW coastal zone. The **coastal vulnerability area** focusses on identifying land subject to current and future coastal hazards, and ensure land use management recognises coastal risk. The Greater Sydney Harbour Estuary coastal zone is subject to a range of hazards, although these are not currently mapped within the CM SEPP.

The coastal environment management area is land containing features such as the coastal waters of the State, estuaries, coastal lakes and lagoons, and land adjoining those features such as headlands and rock platforms. CM SEPP mapping identifies the **coastal environment area** to encompass Sydney Harbour and its tidal waterways.

The **coastal use area** encompasses land adjacent to coastal waterways (ocean, estuaries, lakes etc.) where impacts of development on the use and enjoyment of the beaches, dunes, estuaries and lakes need to be considered. Most of Sydney Harbour and its tributaries waterfront land is classed as coastal use area.

Key Management Issues

A number of key management issues for the Greater Sydney Harbour region exist given the complexity of the catchment in terms of environmental value, increasing population numbers and development and industrial pressures. As such, management of the harbour is multifaceted and requires consideration of a wide range of factors to address immediate and priority threats whilst planning for the region's future.

Key management issues for the Greater Sydney Harbour Region, the Harbours coastal zone and surrounding Marine Estate have been explored in several previous studies. Common coastal management issues relevant to the Greater Sydney Harbour region include land use intensification (and population growth), resource conflict, natural hazards, public safety and governance. Each of these issues can result in threats, for example:

- Land use intensification resulting in stormwater runoff, vegetation clearing and sediment contamination
- Resource conflict resulting in introduction of invasive species and recreational pressures
- Natural hazards resulting in climate change, erosion, cliff instability or drought and bushfires
- Public safety resulting in degraded and failing coastal protection structures (seawalls)
- Governance resulting in unclear or inadequate regulation and lack of compliance and lack of funding.

4 Coastal Management Program Scope – Issues and Areas

4.1 CMP Scope and Area

Councils are now required under the CM Act to take a systems approach to coastal management, which looks at coastal zone issues in a broader and strategic context. There are a range of system-wide attributes for the Greater Sydney Harbour estuary that will benefit from undertaking a systems approach to management. The symbolic value of Sydney Harbour (and its associated economic benefits) is one such example that cannot be managed in a strategic manner through an *ad hoc* approach. Similarly, water quality is an issue that requires co-ordinated catchment scale action. The need and support for a system wide, catchment scale, approach to management was clearly demonstrated at the stakeholder workshops series undertaken for this study (see Chapter 3).

The study recommends the spatial extent of the Greater Sydney Harbour CMP should encompass all tidal waterways within Sydney Harbour and extend landward across its entire catchment (see Figure 1-2). The extent of the CMP will therefore include the upper catchment areas and extend outside of the coastal zone (as defined by the CM SEPP mapping).

This study has identified a wide range of priority values and key threats to the coastal environment and marine estate of the Sydney Harbour Estuary (these are detailed in Chapter 6). These values and threats align with characteristics of the four coastal management areas outlined the CM Act, being:

- Coastal wetland and littoral rainforest (Section 4.2.1)
- Coastal vulnerability (Section 4.2.2)
- Coastal environment (Section 4.2.3)
- Coastal use (Section 4.2.4)

This study therefore recommends that all four coastal management areas are applicable to the issues that will be the focus of the Greater Sydney Harbour CMP.

4.2 Coastal Management Areas

4.2.1 Coastal Wetlands and Littoral Rainforest Area

Coastal wetlands and littoral rainforest support high value biodiversity that are particularly sensitive to development. This management area is defined in the CM Act as land which displays 'the hydrological and floristic characteristics of coastal wetlands or littoral rainforests and land adjoining those features' (DPE, 2016). This area focusses on protecting well established and more extensive vegetation communities (as opposed to single trees or isolated stands). The maps include a 100-metre proximity area, applying to all land use zones, around coastal wetlands and littoral rainforests.

The objectives of the coastal wetland and littoral rainforest management area within the CM Act are to:

- protect coastal wetlands and littoral rainforests in their natural state, including their biological diversity and ecosystem integrity,
- promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests,
- improve the resilience of coastal wetlands and littoral rainforests to the impacts of climate change, including opportunities for migration,
- support the social and cultural values of coastal wetland and littoral rainforest communities,
- promote the objectives of State policies and programs for wetlands or littoral rainforest management.

CM SEPP mapping identifies coastal wetlands to extend across scattered sections of the Harbour, fringing contributing creeks and covering more large sections of Middle Harbour, Lane Cove and Parramatta Rivers (see Figure 4-1), more specifically:

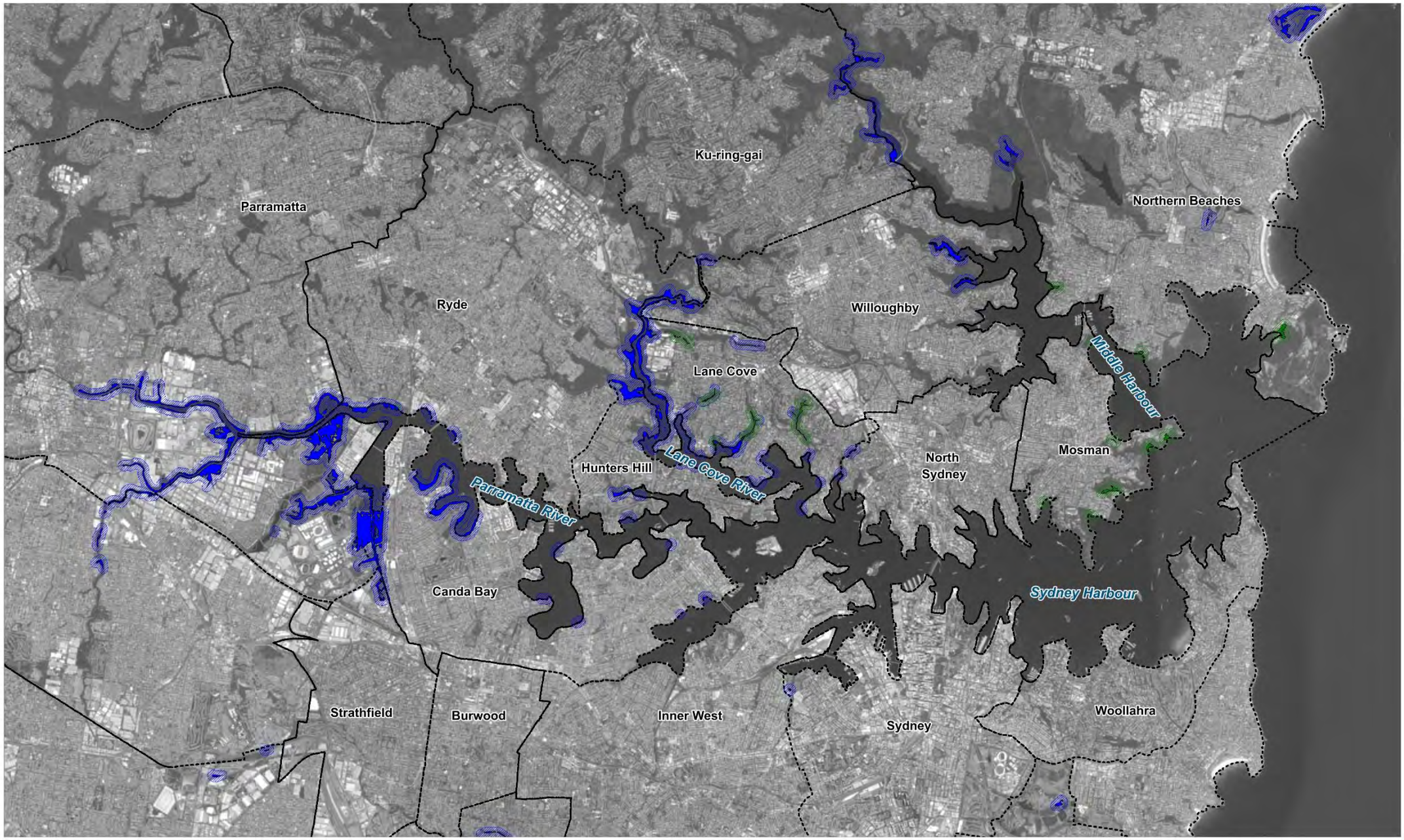
- *Middle Harbour* - Middle Harbour, Gordon, Moores, Scotts, Sugarloaf and Carroll Creeks, Fig Tree Cove, Bantry Bay and Echo Point
- *Lane Cove* - Blue Gum, Pages, Buffalo, Tannery, Brickmakers and Tambourine Creeks
- *Parramatta River* – Powells and Haslams Creeks, Yaralla and Brays Bays, Newington Nature Reserve and Duck River

CM SEPP mapping identifies Littoral Rainforest extending predominantly on the fringes of North Harbour, Middle Harbour and Lane Cove (see Figure 4-1). More specifically, areas surrounding:

- *Sydney Harbour* - Obelisk Beach, Middle Head, Clifton Gardens and Sirius Cove Reserves and Taylors Gully
- *North Harbour* - Colins Flat Beach
- *Middle Harbour* - Sangardo Park, Koosha's Beach Rock and Castle Rock Beach
- *Lane Cove* - Gore, Tamborine, Tannery and Stringybark Creeks

4.2.2 Coastal Vulnerability Area

The CM Act recognises seven coastal hazards within the NSW coastal zone. The coastal vulnerability area focusses on identifying land subject to current and future coastal hazards, and ensure land use management undertaken in these areas recognise coastal risk.



LEGEND

Coastal Management SEPP Area

- Coastal Wetlands
- Coastal Wetland Proximity Area
- Littoral Rainforests
- Littoral Rainforest Proximity Area

----- LGA Boundary

Title:

Coastal Management SEPP Mapping
Coastal Wetlands and Littoral Rainforests Area

N

0 1.25 2.5km

Approx. Scale

Figure: 4-1

Rev: A

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The summarised objectives of the coastal vulnerability management area within the CM Act are to:

- ensure public safety and prevent risks to human life;
- mitigate current and future coastal hazards;
- maintain the presence of beaches, dunes and other natural features;
- maintain public access, amenity and use of the coast;
- encourage land use that reduces exposure to hazards, including through siting, design, construction and operational decisions;
- adopt coastal management strategies that reduce exposure to hazards, in the first instance by restoring or enhancing natural defences such as dunes, and thereafter by taking other action and
- if taking other action, to
  - avoid significant degradation or disruption of biological diversity, ecosystem integrity, coastal processes (ecological, biophysical, geological, geomorphological), beach and foreshore amenity, and social and cultural values,
  - avoid adverse offsite impacts, or otherwise restore the land if any impacts are caused by the action to reduce exposure to hazards,
- maintain essential infrastructure; and
- improve community resilience and reduce reliance on emergency responses.

Sydney Harbour and its tidal waterways are subject to a range of coastal hazards. While there is no CM SEPP mapping of hazard areas for the Greater Sydney Harbour Estuary, its coastal zone is known to be subject to a range of hazards, including:

- beach erosion and shoreline recession,
- coastal and tidal inundation,
- coastal cliff or slope instability, and
- erosion and inundation of foreshores caused by tidal waters and the action of waves

Coastal hazards have been assessed across the harbour through various coastal hazard studies and modelling investigations. Table 4-1 provides a snap shot of the existing hazard investigations available for the study region. Some of these studies are now becoming dated and the methods and assumptions underpinning the associated hazard mapping may not be consistent with current best-practice.

Figure 4-2 shows the coastal inundation mapping completed for Greater Sydney Harbour Estuary on behalf of the Sydney Coastal Council Group for the immediate, 2050 and 2100 timeframes (CSIRO, 2012).

Table 4-1 Summary of Hazard Mapping for the Greater Sydney Harbour Estuary

Hazard Type	Woollahra	Sydney	Inner West	Canada Bay	Parramatta	Ryde	Hunters Hill	Lane Cove	Willoughby	North Sydney	Mosman	Northern Beaches
Beach erosion	✓											✓
Shoreline recession	✓											✓
Cliff/Slope instability	✓											✓
Coastal inundation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tidal inundation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Foreshores erosion & inundation												
Seawall Stability	✓		✓	✓	✓	✓	✓					

Coastal Erosion and Recession Hazards

Beach erosion and shoreline recession hazards are limited to wave exposed sandy beaches in the Port Jackson reach of Greater Sydney Harbour. Hazard investigations for the Woollahra LGA looked at immediate, 2050 and 2100 timeframes. Only two beaches were found to be subject to future erosion related hazards, as many beaches are protected by seawalls. Erosion mapping has been completed for North Harbour, under several studies. This mapping shows the sandy estuary beach embayment to be at risk from erosion hazards.

Coastal and Tidal Inundation Hazards

Coastal inundation mapping completed by CSIRO (2012) for the Greater Sydney Harbour Estuary indicates that all 12 coastal fringe council LGAs currently have areas affected by coastal inundation hazard (under 100 year ARI conditions).

Most of the harbourfront and beach areas of all LGAs are mapped as being inundated. There are however certain areas more notably affected under the existing 100-year ARI inundation extent. These include:

- Northern Beaches LGA: areas in the upper sections of Bantry Bay near Bates Creek (Killarney Heights) and Carroll Creek (Forestville) and sections of the harbourfront from Clontarf around to North Head.

- Willoughby LGA: areas in the upper section of Fig Tree Cover around Scotts Creek (Castle Cove) and Sugarloaf Creek (Castlecrag).
- Mosman LGA: large sections of the harbourfront from Chinamans Beach (Mosman) around to Taronga Zoo (Mosman).
- North Sydney LGA: sections of harbourfront in Cremorne Point and Kurraba Point as well as Balls Head (Waverton) and Berry Island (Wollstonecraft).
- Lane Cove LGA: areas in the upper reaches of the Lane Cove River between Blackman Park (Lane Cove West) and Mowbray Park (Lane Cove North).
- Hunters Hill LGA: numerous areas along the length of both the Lane Cove River and the Parramatta River.
- Ryde LGA: scattered areas along the Parramatta River including near Banjo Paterson Park (Gladesville, Raven Point (Tennyson Point), Putney Park (Putney), Kissing Point Park (Putney) and the area between Meadowbank Park (Meadowbank) and the Ermington Boat Ramp (Melrose Park).
- Parramatta LGA: areas around Subiaco Creek (Rydalmere), Vineyard Creek (Parramatta), Duck River (Silverwater), and riverfront areas between the James Ruse Drive and Harris St bridges (Parramatta). Extensive inundation is mapped as occurring at the Millennium Parklands (Wentworth Point) and in Homebush Bay / The Flats (as well as in upstream areas such as Powells Creek).
- Canada Bay and Inner West LGA: relatively consistent inundation hazard along harbourfront land.
- Sydney LGA: areas along Johnstons Creek (Glebe), around Mrs Macquarie's Chair and the Royal Botanic Gardens and the east facing section of Garden Island.
- Woollahra LGA: most harbourfront reaches in particular sections from Rose Bay to South Head.

Areas in some of the upper catchment councils are also impacted by coastal inundation hazard, for examples areas in the upper section of Bantry Bay near Gordon Creek (East Killara / East Lindfield) and Moore Creek (Roseville Chase).

The majority of the above areas and harbourfront land is shown to have increased inundation hazard with the 0.4m and 0.9m sea level rise.

Specific areas with a notable increase in inundation hazard are shown in Table 4-2.

Table 4-2 Areas with a Notable Increase in Inundation Hazard with 0.4m and 0.9m Sea Level Rise

Council LGA	Areas Notably Affected by 0.4m and 0.9m Sea Level Rise
Woollahra	• Parsley Bay • Rose Bay / Lyne Park area • Double Bay / Steyne Park • Keltie Bay and Rushcutters Bay Park area
City of Sydney	• Elizabeth Bay • Woolloomooloo and Garden Island • Royal Botanic Gardens • Blackwattle and Rozelle harbourfront areas • Birchgrove Park
Inner West	• Rozelle and White Bay harbourfront areas • Birchgrove Park (Birchgrove) • Callan Park (Lilyfield) • Hawthorne Canal and Timbrell Park areas (Haberfield / Five Dock)
Canada Bay	• Sections of Drummoyne, Canada Bay, Concord harbourfront areas • Yaralla Bay and Concord West riverfront areas
Parramatta	• Wentworth Point • Rosehill riverfront areas
Ryde	• Meadowbank Park (Meadowbank) • Morrisons Bay (Putney) and Glades Bay (Tennyson Point) riverfront areas
Hunters Hill	• Riverglade Reserve (Huntleys Cove) • Hunters Hill Ferry Wharf area • Hunters Hill High School area
Lane Cove	• Upper reaches of Lane Cove River • Gore Creek Reserve (Greenwich)
North Sydney	• Harbourfront sections of McMahons Point • Milson Park (Kirribilli) • Tunks Park area (Cammeray)
Mosman	• Areas around Mosman Bay and Reid Park (Mosman) • Clifton Gardens Reserve (Mosman) / Chowder Bay • Areas around Spit Bridge
Northern Beaches	• Clontarf Reserve area (Clontarf) • North Harbour Reserve (Balgowlah)

4.2.3 Coastal Environment Area

The NSW coastal environment is diverse and encompasses a range of different landforms, processes and environments. The coastal environment management area is land containing features such as the coastal waters of the State, estuaries, coastal lakes and lagoons, and land adjoining those features such as headlands and rock platforms.

The objectives of the coastal environment areas within the CM Act are to:

- protect and enhance coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes, coastal lagoons, and enhance natural character, scenic value, biological diversity and ecosystem integrity;
- reduce threats to and improve resilience of these coastal environments, including in response to climate change;
- maintain and improve water quality and estuary health;
- support social and cultural values of the coastal environments;
- maintain the presence of beaches, dunes and natural features of the foreshore; and
- maintain and improve public access, amenity and use of the coast.

CM SEPP mapping identifies the coastal environment area to encompass Sydney Harbour and its tidal waterways (see Figure 4-3). Within Sydney harbour the coastal environment area is defined by the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 Foreshore and Waterways Area mapping. This mapping is proposed for the State Environmental Planning Policy (Environment), for which an Explanation of Intended Effect was exhibited in 2017.

Parramatta
Ku-ring-gai
Northern Beaches
Ryde
Willoughby
Middle Harbour
Lane Cove
Lane Cove River
Parramatta River
Hunters Hill
North Sydney
Mosman
Canda Bay
Sydney Harbour
Strathfield
Burwood
Inner West
Sydney
Woollahra

LEGEND

Inundation Extents

- 100 Year ARI Inundation Extent
- 100 Year ARI Inundation Extent (0.4 m SLR)
- 100 Year ARI Inundation Extent (0.9 m SLR)

Source: CSIRO (2012) mapping for Sydney Coastal Councils Group

----- LGA Boundary

Title:

Coastal Inundation Hazard Extents

Figure: **4-2**

Rev: **A**

N

0 1.25 2.5km

Approx. Scale

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Parramatta
Ku-ring-gai
Northern Beaches
Ryde
Willoughby
Lane Cove
Middle Harbour
Hunters Hill
Lane Cove River
North Sydney
Mosman
Parramatta River
Canda Bay
Sydney Harbour
Strathfield
Burwood
Inner West
Sydney
Woollahra

LEGEND

Coastal Management SEPP Area

Coastal Environment Area

----- LGA Boundary

Title:

Coastal Management SEPP Mapping
Coastal Environment Area

Figure: 4-3

Rev: A

N

0 2 4km

Approx. Scale

BMT
www.bmt.org

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4.2.4 Coastal Use Area

The coastal zone comprises land that is extremely valuable to the economy and society. Indeed, the coast supports a range of human uses and development types that enable the wider coastal community to live, work and play on the coast. The coastal use management area encompasses land adjacent to coastal waterways (ocean, estuaries, lakes etc.) where impacts of development on the use and enjoyment of the beaches, dunes, estuaries and lakes need to be considered. Figure 4-4 shows the coastal use management areas across the Greater Sydney Harbour region.

The objectives of the coastal use area within the CM Act are to:

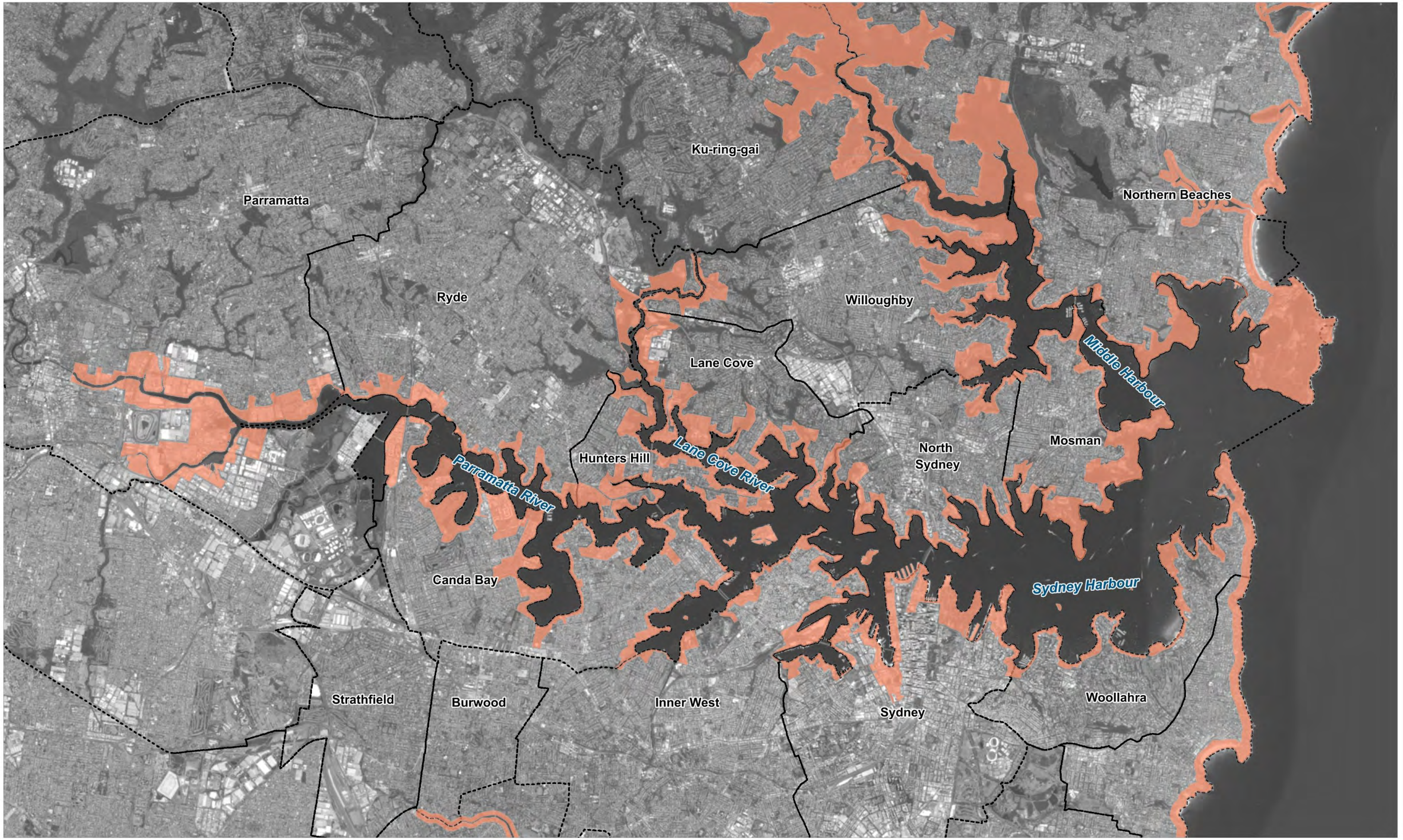
- protect and enhance the scenic, social and cultural values of the coast by ensuring that:
  - the type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast,
  - adverse impacts of development on cultural and built environmental heritage are avoided or mitigated,
  - urban design, including water sensitive urban design, is supported and incorporated into development activities,
  - adequate public open space is provided, including for recreational activities and associated infrastructure, and
  - the use of the surf zone is considered;
- accommodate both urbanised and natural stretches of coastline.

4.3 Key Management Issues

A number of key management issues for the Greater Sydney Harbour region exist given the complexity of the catchment in terms of environmental value, increasing population numbers and development and industrial pressures. As such, management of the harbour is multifaceted and requires consideration of a wide range of factors to address immediate and priority threats whilst planning for the region's future.

Key management issues for the Greater Sydney Harbour Region, the Harbours coastal zone and surrounding Marine Estate have been explored in several previous studies and documents, namely:

- Sydney Coastal Council's Sydney Harbour CZMP Scoping Study (GHD, 2016)
- NSW Marine Estate Threat and Risk Assessment Report (BMT, 2017)
- Environment Panel Advisory Paper for the Greater Sydney Commission (Total Environment Centre and Greater Sydney Commission, 2016).
- Sydney Harbour Catchment Water Quality Improvement Plan (Freewater and Kelly, 2015)
- Sydney Harbour Estuary Processes Study (Freewater, 2018)



LEGEND

Coastal Management SEPP Area

Coastal Use Area

LGA Boundary

Title:

Coastal Management SEPP Mapping
Coastal Use Area

Figure: **4-4**

Rev: **A**

N

0 1.25 2.5km

Approx. Scale

BMT

www.bmt.org

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The independent Environment Panel Advisory Paper (2016) explores the position of the Environmental Panel established by the Greater Sydney Commission and Total Environment Centre in regard to sustainable development and the environmental management of Sydney. Key environmental issues are explored in relation to associated social and economic values and provides strategies for their assessment and review in the future.

The Sydney Harbour Catchment Water Quality Improvement Plan (Freewater and Kelly, 2015) was the first environmental management plan targeted at the whole of Sydney Harbour's catchment as well as the waterways. This provided the first coordinated management framework for all levels of government who are involved in improving the health of the harbour and its catchments. The Plan documented numerous key issues and threats facing Sydney Harbour (most of which are outlined below) and identified stormwater pollution as the current major threat to the ecological integrity of the harbour.

Common coastal management issues relevant to the Greater Sydney Harbour region include:

- **Land use intensification**, resulting in threats including for example stormwater runoff and discharge, sewerage overflows, domestic and commercial toxic chemical pollution, litter, clearing of terrestrial and wetland vegetation, and land/sediment contamination. Land use intensification will increase with population growth.
- **Resource use and conflict**, resulting in threats including for example, the introduction of invasive species, extraction and introduction of artificial barriers to reduce flow, restricted, disconnected and inadequate boating and shipping infrastructure, vessel waste discharge, conflicting resource use of foreshore/waterway areas and facilities, and recreational pressures.
- **Natural hazards,** resulting in threats including for example, climate change, erosion, cliff instability, drought and bushfires.
- **Public safety,** resulting in threats including for example, degraded and failing coastal protection structures (seawalls).
- **Governance,** resulting in threats including for example, governance ambiguity, community/stakeholder engagement and awareness, lack of knowledge and cohesion in water quality management, unclear or inadequate regulation and lack of compliance, lack of resources and funding.

Threats and risk to Sydney Harbour are assessed in further detail in Chapter 6.

CHAPTER 5 SUMMARY: GOVERNANCE

Sydney Harbour Governance

Sydney Harbour is the maritime gateway to the largest city in Australia. As such, all levels of government have a presence and responsibilities across the range of maritime, economic, social, political and environmental issues and concerns within the Harbour.

Federal government departments with responsibilities in the Harbour include: the Australian Defence Force and Department of Defence, Maritime Border Command, Australian Maritime Safety Authority, Department of Agriculture, Department of the Environment and Energy and the Sydney Harbour Federation Trust.

The state agencies with responsibilities in the harbour most notably include the: Office of Environment and Heritage, Department of Planning and Environment, Roads and Maritime Services, Department of Primary Industry Fisheries, Office of Local Government and the Department of Industry.

There are numerous other state agencies that have an interest in Sydney Harbour, specifically or more generally. In the local government context, the Harbour foreshore is fringed by twelve (12) local government areas, with a total of twenty-one (21) LGAs dispersed across the greater catchment area.

CMP Structure and Project Governance Options

The NSW Coastal Management Framework provides for some flexibility around the scope, structure and governance arrangements of a CMP. For coastal systems as big and complex as Sydney Harbour, flexibility is needed. Three possible options to structure a CMP(s) that covers the Sydney Harbour estuary include: (i) Harbour-wide (Greater Sydney Harbour) CMP; (ii) Sub-catchment specific CMPs; (iii) LGA specific CMPs.

There are clear benefits to developing a system-wide CMP that can address whole-of-catchment issues and capitalise on opportunities available through collaboration and new partnerships. **A Greater Sydney Harbour CMP that includes a partnership between all tiers of government is ultimately recommended.**

Clearly defined governance structures and processes will be required to successfully develop and implement a system-wide CMP that includes all tiers of government. Case study examples of several NRM organisational structures are provided for context, along with a discussion of common approaches to collaboration.

Greater Sydney Harbour CMP Governance Recommendations

A partnership arrangement to progress the Greater Sydney Harbour CMP is recommended for the immediate term, which includes a: (i) Project Coordinator; (ii) Steering Committee and; (iii) Technical Working Group.

This recommended framework will likely evolve (and should be supported to do so) as project partners work through Stages 2 to Stage 5 of the CMP. A study to investigate project governance frameworks and equitable cost sharing arrangements will be warranted at some point. The PRCG and SCCG (in partnership) should take a leading role in the CMP planning process. Project partners will need to co-fund the project coordinator role in the immediate term to drive the CMP forward.

A list of project partners that should collaborate on a whole-of-government Greater Sydney Harbour CMP is provided.

5 Governance

5.1 Sydney Harbour Governance

Sydney Harbour is the maritime gateway to the largest city in Australia. As such, all levels of government have a presence and responsibilities across the range of maritime, economic, social, political and environmental issues and concerns within the Harbour.

Governance in Sydney Harbour is complex and involves a range of government organisations, legislation, policy and plans, with considerable jurisdictional ambiguity existing across the Harbour, its tidal waterways and coastal fringes. This is well recognised as a barrier for effective and strategic management.

Governance, in terms of the following were discussed and clarified at the State Agency workshop held as part of this study:

- Agencies or organisations
- Policy and legislation
- Planning instruments
- Strategic plans

Workshop outcomes in relation to the above are documented in Appendix D.

Federal government agencies with responsibilities in the Harbour include:

- the Australian Defence Force (ADF) and the Department of Defence which are responsible for defence and protecting Australia, operating the defence facilities located within Sydney Harbour (HMAS Kuttabul – Garden Island, HMAS Penguin – Balmoral, HMAS Watson – South Head, HMAS Waterhen – Waverton);
- The Maritime Border Command (comprising staff from the Department of Immigration and Border Protection Command and the ADF) which provide civil maritime security to counter threats such as illegal exploitation of natural resources, marine pollution, compromises to biosecurity, and illegal activities in protected areas;
- Australian Maritime Safety Authority (AMSA) and Department of Infrastructure and Regional Development, which are responsible for maritime safety, and environmental management and pollution prevention from ships;
- Department of Agriculture, whose responsibility relates to quarantine services and biosecurity threats, monitoring all vessels entering and leaving Australian waters via the Harbour;
- Department of the Environment and Energy (DEE), who administers the *Environmental Protection and Biodiversity Conservation Act 1999*, which protects heritage items of national significance in and around Sydney Harbour (such as Cockatoo Island, Old Government House, the Sydney Opera House), and threatened species such as the Eastern Suburbs Banksia Scrub (at North Head); and

- Sydney Harbour Federation Trust, a self-funded federal agency (administered by DEE) that manages trust land in a manner that contributes to enhancing the amenity, protects and interprets its environmental and heritage values, maximises public access, and manages suitable trust land as a park;

State government agencies with responsibilities which play a key role in the management of the Harbour include:

- The Office of Environment and Heritage (OEH), which administers the CM Act and the *Biodiversity Conservation Act 2016*, relevant to environmental protection and conservation. OEH also includes National Parks and Wildlife Service which manage a significant portion of the harbour foreshore area under the *National Parks and Wildlife Act 1974*;
- The Department of Planning and Environment (DPE) which administers the *Environmental Planning and Assessment Act 1979* and the CM SEPP that govern development in the catchment and coastal zone of Sydney Harbour, and other SEPPs specifically relating to Sydney Harbour;
- Roads and Maritime Services (RMS), which manages maritime safety and navigation within the Harbour under various state legislation. Sydney Harbour and its tributaries are publicly owned land that is vested to RMS to be managed for the benefit of the people of NSW (not "Crown Land"). RMS has wide a range of responsibilities on both the waters of Sydney Harbour and the land falling within its catchment beyond the management of maritime safety and navigation. These include undertaking the roles of land owner and approval authority for a range of developments on and abutting Sydney Harbour and its tributaries. RMS also undertakes roles associated with its function as the roads authority within the Sydney Harbour catchment area;
- The Department of Primary Industry Fisheries (DPI Fisheries) that administers the *Fisheries Management Act 1994*, which has a range of responsibilities but in particular for the context of a CMP supports sustainable access to aquatic resources for recreational and commercial fishing and habitat protection particularly for mangroves, saltmarsh and seagrasses. Fishing restrictions are in place for Marine Protected Areas, and no fishing is allowed in polluted areas, including Homebush Bay, Duck River and the Upper Lane Cove River;
- The Office of Local Government which administers the *City of Sydney Act 1988* that makes planning provision for major development in the City of Sydney; and the *Local Government Act 1993* which, for the context of estuary management, sets out requirements for Plans of Management for Community Land;
- Department of Industry – Crown Lands & Water (DoI Crown Lands & Water) administers various acts including the *Crown Land Management Act 2016* that provides for the ownership and management of Crown Land in NSW, including the making of Plans of Management for Crown Lands, issuing licences and permits relating to the use of Crown Land, and approving jetties and other domestic waterfront structures not covered by RMS. In addition to the many Crown reserves above Mean High Water Mark (MHWM) in the catchment, the bed of Sydney Harbour below MHWM off of Sydney Harbour out to 3 nautical miles is Crown Land.

There are numerous other state agencies that have an interest in Sydney Harbour, specifically or more generally (see Appendix D for details).

In a **local government** context, the *Local Government Act 1993* creates local governments and grants them the power to perform their functions which involve management, development, protection, restoration, enhancement and conservation of the environment for the local government area.

In relation to the Sydney Harbour coastal zone, councils have responsibility for land use planning and development approval, as guided by the *Environmental Protection and Assessment Act 1979,* and coastal management, as outlined in the CM Act and CM SEPP. In addition, councils are responsible for the provision of stormwater services, regulation of pollution, open space management, waste collection and disposal and other related functions.

As outlined above, a range of legislation and polices are relevant to managing the coastal zone in NSW which is typically under the care and control of local Councils or public authorities (see also Section 2.5 and Appendix D).

The *Environmental Protection and Assessment Act 1979* is the key legislation for planning, land use and development assessment in NSW. Environmental planning and decision making is governed by the framework set out in this Act:

- Part 3 establishes planning instruments (e.g. SEPP's) and recognises the critical role of councils in strategic planning for their local area (i.e. through LEPs, DCPs).
- Part 4 outlines the process for lodgement and consideration of development applications, and essentially applies where a local council is the consent authority. 'Integrated development' proposals in the coastal zone link Part 4 development consent matters with any associated approval, licence, consent, permission or permit required under other legislation (e.g. permit under *Fisheries Management Act 1994* to carry out dredging or reclamation work, or harm marine vegetation). Integrated development promotes a whole of government assessment approach.
- Part 5 details the requirements for determining authorities to consider the environmental impact of activities, through an environmental assessment for the proposed activity. Part 5 applies where development is permissible without development consent under Part 4 but require approval from a Minister or Public Authority, or is proposed to be carried out by a Minister or Public Authority (including Council).

The **NSW coastal management framework** has been described elsewhere at length (e.g. Section 1.2) to comprise the following key components:

- CM Act
- CM SEPP
- NSW Coastal Management Manual
- Coastal Management Programs
- NSW Coastal Council

Importantly, under the CM Act, Councils are required to take a systems approach to coastal management, which looks at coastal zone issues in a broader and strategic context. The CMP planning process will support councils, state agencies/authorities and other coastal stakeholders to achieve the overarching goal of managing Sydney Harbours coastal zone in a coordinated manner.

The CM SEPP maps the coastal zone across the Greater Sydney Harbour and establishes development controls to be applied by consent authorities under the *Environmental Planning and Assessment Act 1979* in each coastal management area. Councils can to seek amendments to any of the coastal management area maps via a planning proposal. The CM SEPP also establishes the approval pathway for coastal protection works that may be proposed by proponents or public authorities including local councils and state government agencies such as RMS for example.

Coastal management strategies and actions outlined in a Greater Sydney Harbour CMP will be implemented by local council's through their IP&R framework and land use planning systems. The NSW Coastal Council may be required to conduct a performance audit of local council's implementation of its CMP, to determine if they are being implemented.

5.2 CMP Structure and Project Governance Options

The NSW Coastal Management Framework provides for some flexibility around the scope, structure and governance arrangements of a CMP. For coastal systems as big and complex and Sydney Harbour, flexibility is needed. The below discuss several matters relating to a potential scope, structure and governance arrangements for a Greater Sydney Harbour CMP.

A CMP is a tool for local councils and state government agencies to enact actions to manage coastal risks and improve coastal habitats and environments, for both environmental and social (community) benefit.

As a CMP is formed under NSW Legislation, it does not specifically capture the federal agencies, however, it is certainly a tool for accessing federal grant funding, and for galvanising the involvement of the federal agencies in managing the environment of Sydney Harbour, particularly as a number of the federal agencies are already tasked with environmental objectives.

Given the substantial number of state and local authorities who have some responsibility within Sydney Harbour, there needs to be careful consideration and decisiveness regarding the scope and structure of a Greater Sydney Harbour CMP. Presented in the following sections are 3 options for the structure of a CMP(s) covering the Sydney Harbour estuary, as listed briefly below.

- A Harbour-wide (Greater Sydney Harbour) CMP, where the CMP covers the entire Sydney Harbour foreshore, including its tidal waterways and catchment to a scale considered suitable to address key issues. Preparing and implementing a Greater Sydney Harbour CMP would need to be agreed between the 12 foreshore local councils as a minimum (and potentially include all 21 councils within the harbour's catchment), but could potentially utilise an alliance arrangement to assist with the day to day running of the CMP. Many benefits would be achieved by taking a harbour-wide approach, including economies of scale in addressing issues that are common to all (or most) councils, and in achieving larger, more effective grants and assistance from state and federal agencies.

- A set of sub-catchment specific CMPs, which would allow issues that are specific to the sub-catchments to be addressed. It may also be easier to attain agreement between the smaller number of councils within each sub-catchment, making preparation, implementation and management of the CMP more straightforward. This model would not be as effective in improving the jurisdictional uncertainty that exists, and will likely be less successful at attaining buy-in (and financial backing) from government agencies / authorities and business.
- LGA specific CMPs, which would permit each fringing Council greater control of the content and issues addressed in the CMP and reduce the need for collaboration with neighbouring Councils to a small degree. Catchment or estuary scale issues are not likely to be addressed under this model. Engagement and collaboration would still be required for each CMP development and implementation (as per the CM Act), but this approach would lack a binding tool or alliance under which to make negotiations and agreements effectively. It is also unclear if LGA specific CMPs would eligible to be certified, noting the CM Act promotes an integrated and systems approach to coastal zone management.

5.2.1 A Greater Sydney Harbour CMP

There are many advantages from developing a Greater Sydney Harbour CMP (see Table 5-1). The key benefit being that a Greater Sydney Harbour CMP could underpin the development and implementation of a strategic and integrated plan that addresses system-wide opportunities and vulnerabilities. The CMP could be structured to support the addressing of local scale issues.

The Greater Sydney Commission recently finalised the Greater Sydney Region Plan and District Plans. The planning framework set out though this process may be transferable to a Greater Sydney Harbour CMP. The Greater Sydney Region Plan documents the high-level strategic direction for Greater Sydney (based on a vision of three cities). This vision provided an overarching framework to develop the District Plans, that include objectives and action consistent with the vision, but tailored to the environmental, social and economic needs of the respective geographic areas.

A Greater Sydney Harbour CMP could take a similar approach to that summarised above. A CMP could develop a set of shared objectives and actions to collectively manage the whole-of-harbour coastal zone, while including sub-catchment level plans that address regional and local specific issues. Roles, responsibilities and financial commitment to implement actions could be tailored appropriately.

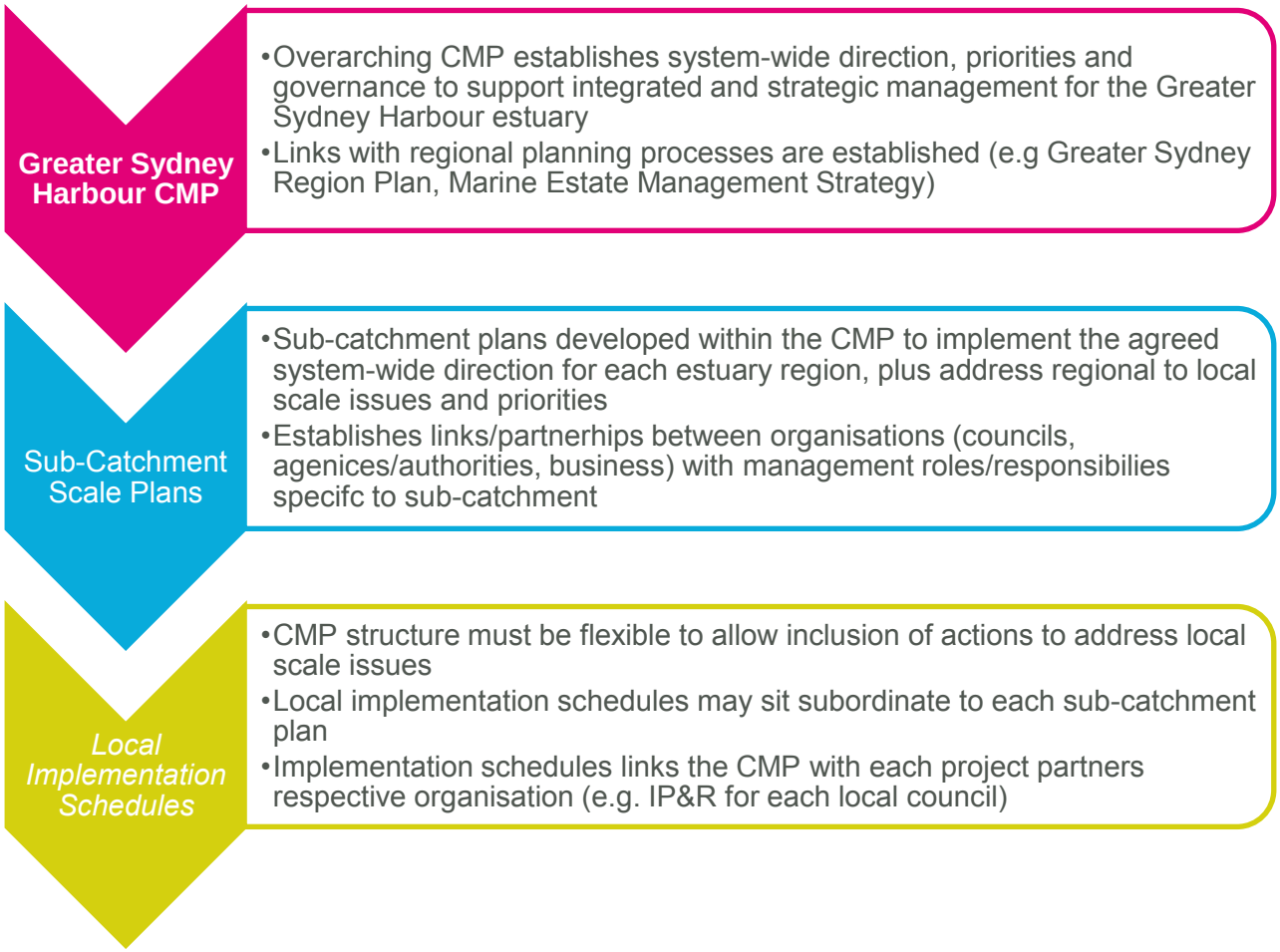

Figure 5-1 Possible Greater Sydney Harbour CMP Structure

Table 5-1 Harbour-Wide CMP Scope: Pros and Cons

Opportunities and Advantages	Challenges and Limitations	Governance Considerations
The CMP would be the vehicle for co-ordinated and strategic management of the Sydney Harbour estuary	History has shown the difficulties in achieving a coordinated whole of harbour approach. Challenges include overcoming individualism of different councils, including getting agreement on a funding model. Suspicion of communities about their rates being used in other areas. The need to fund a secretariat to oversee and coordinate projects How many previous documents have attempted to govern the whole Harbour? How successful were these? What lessons can be learnt?	Establishing a governance model that has buy in from all players at the highest levels. Establishing a funding model which is equitable across all socio-economic areas.

Opportunities and Advantages	Challenges and Limitations	Governance Considerations
Great opportunity to access funds to tackle larger whole-of-system issues that could not be addressed by one or a small collective of councils/agencies alone	Who would oversee preparation and implementation of a Harbour-wide CMP? Surely there is the need for a governing body?	Oversight and ownership of the outputs, ensuring that the needs of the whole of harbour are put ahead of those of a local area.
Increased collaboration between councils and agencies; move away from ad hoc, inefficient studies / management; jurisdictional uncertainty clarified	Who would lead grant funding applications for whole of estuary issues? Limitation could be funding availability – how much is each council prepared to pay? How are cost sharing arrangement made?	Need for a secretariat to drive agenda and report to governance body
Allows use of consistent approaches across all Councils and sub-catchments to manage issues that are common to all areas (but local in nature).	How can the program be structure to ensure that local issues are not missed due to the size and scale of a CMP needing to encompass the whole harbour?	

5.2.2 Sub-Catchment Specific CMPs

Sub-catchment scale CMPs (i.e. one CMP each for Port Jackson, Parramatta River, Lane Cove and Middle Harbour) would encompass regional scale issues while also focussing on local matters. This option would miss the opportunity to address the system wide issues (e.g. governance) and dovetail with regional planning initiatives (e.g. Greater Sydney Region Plan). Sub-catchment scale CMP will have significantly less gravity than a whole-of-harbour model, and may miss opportunity to gain support from federal government and big-business for example. It is currently unclear if a sub-catchment scale CMPs would be acceptable from a State Government perspective, noting the legislation clearly focusses on system scale approaches to management

For the sub-catchment CMP scenario, Councils listed in Table 2-2 would ideally collaborate on each CMP. At the very least, these councils would need to be consulted in preparation of a sub-catchment specific CMP. A first pass list of advantages and disadvantages associated with the sub-catchment scale CMP scenario is provided in Table 5-2.

Table 5-2 Sub-Catchment Scale CMPs: Pros and Cons

Opportunities and Advantages	Considerations and Limitations
The sub catchment scale may still encompass local issues as well as targeting larger issues affecting the estuary at the sub-catchment scale	Sub-catchment scale CMP would have lesser political drive to generate funds outside of typical NSW Coastal Management Funding Program (i.e. Federal, Business)
There is still opportunity at the sub catchment scale to access funds to tackle larger problems that could not be addressed by 1 or even a couple of councils/agencies alone (e.g. Parramatta River CZMP).	The sub-catchment CMP may not adequality address some system wide risks, and certainly will miss the opportunity to address governance issue.
Sub-catchment plans would still increase the collaboration between councils and agencies	The CMPs may be repetitious across catchments, particularly where issues span the entire estuary, and particularly where each CMP must still cover each of the four coastal management areas
	There would be a need for a coordinator for each CMP to ensure implementation
	Individual councils that border more than one sub-catchment may find it difficult to track implementation of actions where they are responsible for different actions within different CMPs for different areas
	How successful have sub-catchment scale plans been in the past to manage issues and improve outcomes for Sydney Harbour? (e.g. Lane Cove CZMP, Manly Cove CZMP etc etc). Can we learn from mistakes and successes?

5.2.3 LGA Specific CMPs

LGA specific CMPs may be considered as an option (e.g. Sydney City, Northern Beaches, and so on), however it is unclear if this CMP model would be acceptable from a State Government perspective. This option might reduce the consultation needed upfront when developing the CMP, but there will still be a need for collaboration where issues occur across LGA boundaries. This approach would miss the opportunity for economies of scale in managing issues that are common across all LGAs.

State agencies and authorities have shown in principal support for a systems approach to management and may become frustrated at the need to consult with individual councils. Councils would be required to consult with other Councils occurring within the estuary catchment border. Also, if an LGA specific CMP addressed coastal hazards (i.e. a coastal vulnerability area), that Council would be required to consult with all Councils within the Sydney Harbour Coastal Sediment Compartment.

Table 5-3 Pros and Cons (LGA specific CMPs)

Opportunities and Advantages	Considerations and Limitations
Enable locality specific issues to be targeted and addressed. This would be seen by the council as directly relevant to their own area.	The CMPs may be repetitious where issues span the entire estuary, and particularly where the CMP for each local council must still cover each of the four coastal management areas
Consultation would be required to provide some consistency between the approaches taken by Council	There is a high likelihood of duplication of resources to tackle issues that are common to all councils
Less complicated to manage and quicker result as no need to work with so many other stakeholders and no need to attend meetings outside each LGA	The ability to address significant whole of estuary issues is reduced because different approaches may be applied across different CMPs.
	The ability to fund actions to address whole of estuary issues may be impeded without a single CMP that compares, costs and selects actions at this scale.

5.3 Examples of Project Governance for Natural Resource Management

Natural Resource Management requires a degree of normative standards to establish effective, multi-level project governance. This is the case particularly for large-scale systems such as the Sydney Harbour, where public, private and voluntary sectors interests are diverse across a range of complex problems. Legitimacy, transparency, accountability, inclusiveness, fairness, integration, capability and adaptability are identified as fundamental principles that should underpin the large-scale, multi-level NRM governance arrangements (Lockwood et al, 2010).

There are many factors to consider for the establishment of a governance arrangement for preparing and implementing a Greater Sydney Harbour CMP. The below sections summarise several NRM organisational structures to provide some context. A project governance arrangement is then recommended to help drive the harbour-wide CMP forward in the immediate term.

5.3.1 South East Queensland Healthy Waterways Partnership Example

Healthy Land and Water is an independent organisation in South East Queensland which works to ensure the sustainable use of land and waterways in the region. While governed by an independent board, the success of Healthy Land and Water is based on the strong partnership with stakeholders that has been established over many years. Partners include relevant commonwealth and state agencies, local governments, Traditional Owners, business and industry and community organisations. The aim is to bring together partners with an interest/influence on the health of Moreton Bay and/or its catchment, ensuring a whole of system approach is taken to achieving outcomes.

Systems have been established which ensure regular engagement with partners. Partners contribute financially to various activities such as monitoring and reporting. The partnership is supported by a number of other independent multidisciplinary groups such as a Science Advisory Panel.

The organisation develops a strategic plan together with its partners, which outlines various activities which will be implemented. These activities are either funded through commitments from partners, or through grants from external sources.

5.3.2 Murray Darling Basin Authority Example

The governance arrangements for the Murray-Darling Basin were established under the *Water Act 2007*. The current governance arrangements precede longstanding forms and levels of collaborative management within individual Basin States. The Basin is now managed through a Commonwealth-State cooperative arrangement that comprises the:

- Commonwealth Minister responsible for water
- Six-member Murray–Darling Basin Authority (MDBA)
- Ministerial Council
- Basin Officials Committee
- Basin Community Committee

The MDBA is an advisory committee made up of a Chair, Chief Executive and four part-time members responsible for managing the system on behalf of joint governments. The MDBA is also responsible for developing, implementing and evaluating the Basin Plan. The plan aims to ensure equal and sustainable allocation of Basin water resources, whilst maintaining a healthy and productive system to support industries and communities.

5.3.3 Parramatta River Catchment Group Example

The Parramatta River Catchment Group (PRCG) is an alliance of local and State Government agencies and the community which provides an overarching strategic and coordination role for the catchment. The PRCG primarily focuses on activities where a catchment-wide effort makes more sense and can achieve greater outcomes than each agency working individually. Key areas of responsibility for the PRCG include: planning and research; coordination; advocacy; communication and engagement; and monitoring and reporting.

Financial Members include all councils within the catchment area, Sydney Water, the Environment Protection Authority, Department of Planning and Environment, and Greater Sydney Local Land Services. Associate (nonfinancial) Members to the group include Parramatta Park Trust, NSW Fire

Brigade, Roads and Maritime Services, the Department of Primary Industries and the Office of Environment and Heritage and 5 elected community members.

Within the PRCG, sub-committees exists representing; Biodiversity, Estuary Management and Water/Stormwater overseeing any given number of relevant projects. These sub-committees are made up of technical staff members from councils and agencies in the catchment to build on networks, pool resources and reduce instances of duplicated efforts. From 2010 to 2013 the Estuary Management committee oversaw the development of the Parramatta River CZMP which enabled access to grant funding for councils who have adopted the Plan.

5.3.4 Sydney Coastal Councils Group

The Sydney Coastal Councils Group (SCCG) is a co-operative organisation made up of 10 Member Councils working together to advance the sustainable management of Sydney's urban coastal environment.

The SCCG Member including the following councils: Bayside, Inner West, Northern Beaches, Mosman, North Sydney, Randwick City, Sutherland Shire, Waverley, Willoughby City and Woollahra Municipal Councils. These LGAs represent a total of nearly 1.3 million Sydney residents.

The SCCG Strategic Plan 2015 – 2019 sets the SCCG's structure, guiding principles, vision and goals, strategic activities it will undertake and monitoring, evaluation and reporting activities. The SCCG comprises of three core Committees and a Secretariat. The Full Group Committee are responsible for directing the core activities of the SCCG, The Executive Committee responsible for addressing operational matters and The Technical Committee who exchange information, collaborate on current and emerging needs and develop regional projects and programs. The Secretariat facilitates the work of the three committees and employs grant-funded Project Officers to work on specific projects for the SCCG.

The functions, powers and governance arrangements of the SCCG are described in their Constitution, which is ratified by all Member Councils.

5.4 Common Approaches to Collaboration

There are a range of different forms of collaboration, from less formal network arrangements that allow for greater autonomy to more formal arrangements that can centralise aspects of decision making and service delivery. Three key approaches are described below: knowledge sharing and organisational development approaches; single sharing approaches; and integrated multi-service sharing approaches. A summary of each collaboration approach including potential advantages and disadvantages is provided in Table 5-4.

Table 5-4 Summary of Potential Local Government Collaboration Models

Collaboration model	Description	Advantages	Disadvantages
Knowledge sharing and organisational development approaches	Bottom-up approach whose primary aim is learning and knowledge exchange on shared challenges	Low implementation and transaction costs. Flexible and can be built over time.	Limited cost savings. Ineffective for generating economies of scale. Difficult to measure benefits.
Single sharing approaches	Shared approach to deliver specific services	Generate significant economies of scale and scope. Improve service delivery. Can be altered in scope.	Higher implementation and transaction costs. Potentially reduced control of services for participating councils.
Integrated multi-service sharing approaches	Long-term strategic relationships between a number of councils to produce a common, mutually beneficial future. Involves creation of a single governance and decision-making entity.	Capable of generating substantial economies of scale, professionalisation, cost savings and service improvement. Retains autonomy of constituents.	Integration between councils can be expensive. Requires robust governance and strategic planning process to be effective.

5.4.1 Knowledge Sharing and Organisational Development Approaches

These collaboration approaches are a relatively low cost and can be either formal or informal in nature. They are specifically focused towards sharing information and organisational learning about shared challenges. Partners councils may form working groups, mentoring schemes, special interest groups or on-line forums to exchange information, develop skills and work on solutions to common interests. Benefits of these approaches include that they are relatively inexpensive to set up and can be scaled in scope over time. However, the benefits can be hard to measure as the primary benefits are intangible. Knowledge sharing and organisational development approaches are less likely to generate vast cost savings from economies of scale as they do not remove duplication of services or drive a high degree of specialisation.

5.4.2 Single Sharing Approaches

Single sharing approaches are a formal collaborative arrangement whereby a number of councils join together to provide common service delivery. In a single sharing approach, policy and governance functions remain separate with a focus on provision of the service; therefore, councils may have less control over delivery of those services than they previously would have. The specific focus of these approaches is achieving greater economies of scale and service delivery than would otherwise be possible in isolation. There are a range of structures that can be used to access services within this approach ranging from simpler contractual agreements to creation of a separate entity. These arrangements require effective monitoring and review mechanisms to ensure benefits are being achieved through collaboration.

5.4.3 Integrated Multi-service Sharing Approaches

An integrated multi-service sharing approach is a long-term strategic relationship between a number of councils to produce a common, mutually beneficial future. This approach is generally geographically based and is often used in situations where councils have interrelated objectives.

The approach involves a set of common policy and governance arrangements and may also include agreements for common business and operational activities. Within an integrated multi-service sharing approach, a common planning and decision-making entity is formed by elected representatives and senior staff from participating councils. This approach enables councils to pool resources, reduce duplication and form a common platform to deliver initiatives. It is effective at concentrating skills and knowledge required on a project basis (which partner councils may opt in or out of) within a single unit and thus encourages a high level of specialisation and professionalisation. Therefore, it can generate significant economies of scale, provide cost savings and improve service delivery.

A key benefit of this approach is that each participating council's autonomy is preserved. Some potential disadvantages of this approach include high transaction and implementation costs. This approach is founded on robust governance and strategic planning process to be effective.

5.5 CMP Project Governance Recommendation

There are clear benefits to developing a system wide CMP that can address whole-of-catchment issues and capitalise on opportunities available through collaboration and new partnerships. The advantages of developing a Greater Sydney Harbour CMP are outlined in this report.

Clearly defined project governance structures and processes will be required to successfully develop and implement a whole-of-harbour CMP. **There is the need for strong and senior leadership to drive the partnership from the outset.** The role of leadership is essential to support the delivery of a whole-of-harbour CMP. Over time there is potential for senior executives of industry and business to become involved which can increase the potential for implementation of the actions outlined in a CMP. The PRCG and SCCG (in partnership) should take a leading role in the CMP planning process. Governance arrangements need to be supported by a fully funded secretariat which reports to the higher-level Steering Committee.

More specifically, the following project governance arrangement is recommended to prepare the subsequent planning stages of the Greater Sydney Harbour CMP:

- **Project Co-ordinator** – which has the responsibility of project managing preparation of the CMP on a day-to-day basis (e.g. preparing grant applications, liaising with project partners, key client contact for consultants)
- **Steering Committee** – made up of representatives from different tiers of government, which are responsible for making decision and ensuring project outcomes are being delivered.
- **Technical Working Group** – advisory only, reporting to Steering Group to would oversee technical aspects of the project (e.g. confirm key management issues), exchange information and, and support decision making based on technical matters.

CMP project partners should ideally include all tiers of government with management roles and responsibility in the Greater Sydney Harbour estuary waterway and catchment land. At very least, the project partners should include all foreshore councils and state agencies that have demonstrated in principle support for a whole-of-catchment CMP thus far (see Table 5-5 for details).

The project partners will need to fund the project co-ordinator role in the immediate term to drive the CMP forward initially (potentially with support from OEH). This role would be based with either the PRCG or SCCG, with a would need to be hosted by a council to be eligible for part funding through the Coastal and Estuary Grant Program. A Memorandum of Understanding is recommended to establish initial governance organisation structure, rules, and practices etc (see Figure 5-2), including funding commitments (see Section 8.5 for further discussion on this topic).

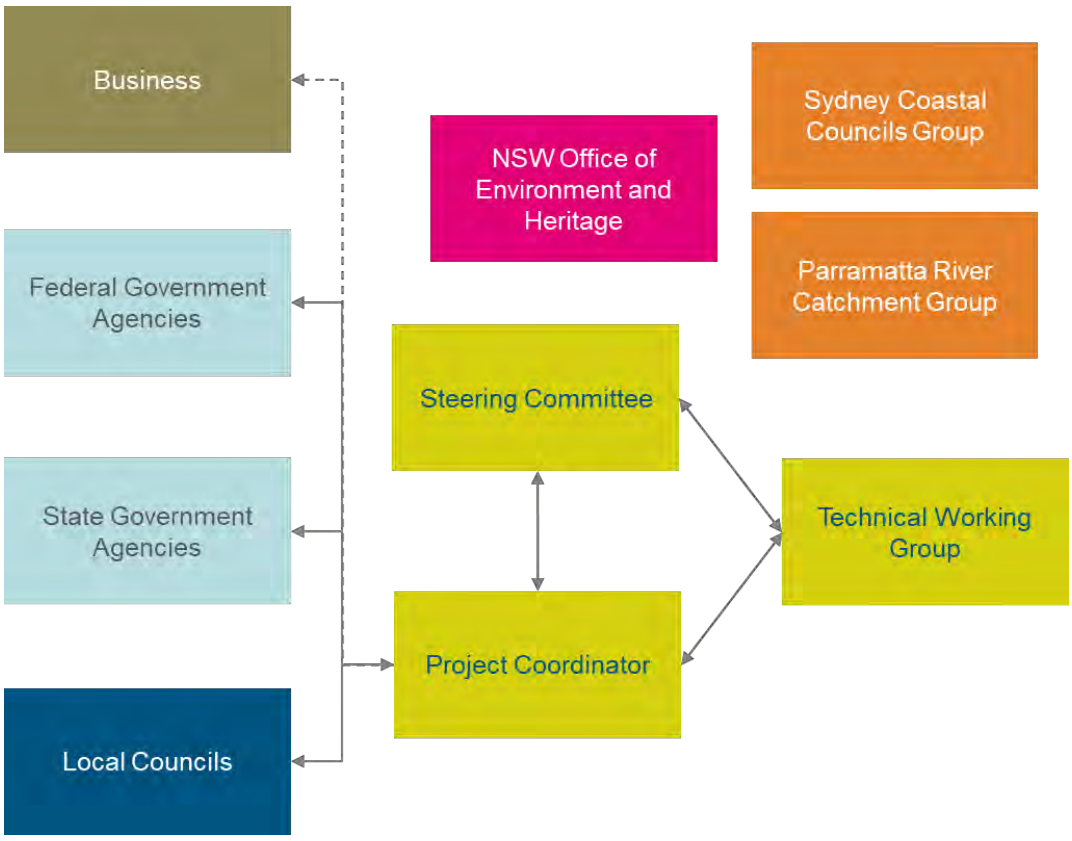

Figure 5-2 Greater Sydney Harbour CMP Interim Planning Governance Structure

It will be important to consider lessons learnt from the Parramatta River Catchment Group experience and governance model, noting that a ~0.3 full time equivalent (FTE) council role was required manage the Parramatta River Estuary Processes Study and CZMP over a 4 years period, which included applying for grants and project management responsibilities undertaken on behalf of all participants.

The above recommended project governance framework will likely evolve (and should be supported to do so) as project partners work through Stages 2 to Stage 5 of the CMP. For example, there may benefit in establishing a communication committee/group to guide internal and external communication and engagement activities (noting internal buy-in from the executive level of each partner organisation will be essential to maximise environmental outcomes from the CMP planning process). There may also be some benefit in the project partnership becoming incorporated as the Greater Sydney CMP transitions from planning to implementation stage. A study that investigates project governance frameworks and cost sharing arrangement will be warranted at some point. The coordinator would need to undertake engagement with the private sector, with a view to bringing them into the partnership and attracting investment into actions.

Table 5-5 Recommended Greater Sydney Harbour CMP Project Partners

Primary Project Partner as a Minimum	Project Partners needed to achieve best outcomes for the Harbour
Local Government • Canada Bay • Hunters Hill • Inner West • Lane Cove • Mosman • North Sydney • Northern Beaches • Parramatta • (Parramatta River Catchment Group) • Ryde • Sydney • (Sydney Coastal Councils Group) • Willoughby • Woollahra **State Government** • Department of Industry - Crown Lands & Water • Department of Primary Industries - Fisheries • Environmental Protection Authority • Office of Environment and Heritage • Local Land Services • Place Management NSW • Roads and Maritime Services • Sydney Water **NGOs** • Sydney Institute of Marine Science	**Local Government** • Blacktown • Burwood • Canterbury-Bankstown • Cumberland • Hornsby • Ku-ring-gai • Strathfield • The Hills Shire • Waverly **State Government** • Barangaroo Delivery Authority • Greater Sydney Commission • Infrastructure NSW • LALCs • Marine Estate Management Authority • Sydney Olympic Park Authority • Sydney Opera House Trust • Sydney Port Authority **Commonwealth Government** • Australian Maritime Safety Authority • Department of Agriculture • Department of Defence • Sydney Harbour Federation Trust **NGOs** • Sydney Business Chamber

CHAPTER 6 SUMMARY: VALUES, THREATS AND RISKS

Stakeholder engagement identified the values and benefits of Sydney Harbour and subsequently the various pressures which affect these values. This resulted in the determination of high-level risks associated with the various pressures that are faced. This first pass risk screening will help inform CMP development by prioritising risk areas which need to be addressed.

Values and Benefits

Eight common values and benefits were identified in the workshops which reflect the views of a range of stakeholders including state and local governments. The common values and benefits include: (1) clean waters (2) biodiversity (ecosystem value) (3) geodiversity (form and process value) (4) amenity / recreation / participation value (5) cultural value (6) education / scientific value (7) economic value, and (8) symbolic value.

Threats and Pressures

The threats to Sydney Harbours coastal zone were identified through discussion with stakeholders, literature reviews (including MEMA Threat and Risk Assessments conducted for the Central Region) and advice from key experts. Threats identified through this process are listed in the preliminary risk assessment table (below).

Preliminary Risk Assessment

A first pass risk screening assessment was conducted with a panel comprising experts NSW coastal and estuary science (OEH), and from expertise in local government planning. In documenting risk, a traffic light colour classification was used:

- Green – existing risk under control, risk management in place and working and little change or improvement into the future.
- Orange - there is little risk or even if the risk is increasing there is little consequence to the harbour as a whole, or where the risk is located in a small area.
- Red - there is current risk, management is not effective and there is residual risk, its likely to get worse in the future.

There are risk management actions in place for many of the threats and many are already not achieving the intended outcomes and residual risk remains. Over time, with increasing population, climate change and the combination of a range of these and other threats, there is likely to be increasing risk on many areas of the harbour. The assessment identified a number of threats where the risk associated with that threat has and will continue to be reduced.

An overview of the results of first pass risk screening for the Sydney Harbour CMP is shown below:

Potential Threats/hazards	Existing Management	Current Residual Risk	Likely Future Hazard Direction	Hazard Likely to Become Problematic in the Future
Urban stormwater discharge				
Sewage discharge (overflows/septics)				
Industrial discharges				

Potential Threats/hazards	Existing Management	Current Residual Risk	Likely Future Hazard Direction	Hazard Likely to Become Problematic in the Future
Foreshore development				
Damaging riparian habitat, wetland drainage				
Clearing of terrestrial vegetation				
Disturbance of contaminated sediment				
Seabed modification (harbour maintenance, service infrastructure)				
Introduction of invasive species				
Extraction, artificial barriers to reduce flow				
Shipping, boating and boating infrastructure				
Public access restricted/disconnected/inadequate				
Conflict of resource use of foreshore areas and facilities				
Conflict of resource use of waterway areas and facilities				
Coastal and tidal inundation				
Overland flooding				
Beach, estuary foreshore and bank erosion/recession				
Cliff instability				
Drought				
Bushfire				
Degraded / failing coastal protection structures (seawalls)				

Priority Risks and Knowledge Gaps for Sydney Harbour

The risk process identified several areas where more detailed knowledge or a more detailed risk assessment is required. These are:

- Present risk – damaging riparian vegetation and wetlands, degraded seawalls and coastal protection* and disturbance of contaminated sediment*
- Future risk – loss of terrestrial vegetation, introduction of invasive species, shipping, boating and associated infrastructure, coastal and tidal inundation from sea-level rise, overland flooding* and effects of drought including on groundwater*

Note asterisks indicate threats where additional knowledge is required to support better understanding of risk.

Many of the priority risks identified above occur at different places around the Harbour and are not risks for the system as a whole. The locations of these risk areas and the prioritisation of associated activities in response, need to be identified in a more detailed risk assessment that will be conducted at a later stage in the CMP process.

A combination of a detailed risk assessment which is location specific, and which identifies when risks are likely to occur, together with outcomes from targeted research, will be used to underpin the development of a sequenced management plan.

6 Sydney Harbour Values, Threats and Risks

6.1 Overview

This Chapter describes the outcomes of engagement with a range of stakeholders to determine the values and benefits of Sydney Harbour, to identify the various pressures which affect these values and to determine the high-level risks associated with the various pressures that are faced. This first pass risk screening helps to inform CMP development by prioritising risk areas which need to be addressed. It is based on available knowledge, expert input, and in completing the assessment it is possible to identify knowledge needs, stakeholder for longer term consultation.

6.2 Values and Benefits

Eight common values and benefits were identified in two stakeholder workshops held in November 2017. These common values reflect the views of a range of stakeholders including state and local governments

Table 6-1 Values of Sydney Harbour identified through stakeholder engagement. Stakeholder engagement was undertaken through two workshops held in November 2017.

Value	Details
Clean waters	Clean and healthy waters in Sydney Harbour and its waterway system are valued for the benefit it provides to the environment, community and economy.
Biodiversity: ecosystem value	Sydney Harbour and its foreshores are valued for the healthy and diverse marine, estuarine and terrestrial ecosystems they provide.
Geodiversity: form and process value	Sydney Harbour and its foreshores are valued for the diversity of geological features, landforms, landscapes and natural coastal and hydrological processes they provide.
Amenity / recreation / participation value	Sydney Harbour has significant natural beauty, and provides opportunity for communities to access and use the harbour and its foreshores safely, and to live along-side a thriving waterway.
Cultural value	Sydney Harbour is significant to Traditional Owners and to new settlers, both in terms of its ongoing importance to communities, but also because of the links to the original owners of the area, and the role the harbour has played in the history of Australia.
Education / scientific value	Sydney Harbour plays a strong role in education of people at all levels, and in multiple disciplines, it provides a place for ongoing scientific discovery and the generation of new knowledge.
Economic value	Sydney Harbour has substantial economic value because of its natural capital. It makes a substantial contribution to the national, state, regional and local economies, including as a means of connecting people, supporting access to workers, and providing a conduit for services including communications and electricity.
Symbolic value	Sydney Harbour is a symbol for Australia, it has global recognition and is a gateway to Australia for tourists and for new immigrants.

6.3 Threats and Pressures

Threats associated with Sydney Harbour were identified and characterised through discussion with stakeholders at two workshops held in November 2017 (see Section 3 and Appendix B) and a literature review. The MEMA Threat and Risk Assessments for the Central Region was reviewed for this process, along with coastal management studies/plans available for the Greater Sydney Harbour. A long list of 58 threats were distilled down to 23 that relate to the following issues:

- land use intensification;
- resource use and conflict;
- public safety; and
- natural hazards.

Table 6.2 lists and describes these threats, which were defined and refined with assistance of key experts while undertaking the first pass risk screening.

6.4 Preliminary Risk Assessment

6.4.1 Risk Assessment Process

A first pass risk screening assessment was conducted with a panel comprising experts from state agencies and from local government expertise. The approach used the range of threats identified through the workshop process (Table 6-2). An assessment was conducted for the whole harbour which looked at the following:

- Management plans which are currently in place to address the threat.
- Whether the management in place is working (identifying residual risk).
- Whether the risk is likely to change in the future (20, 50, 100years) and whether the change is likely to be in a better or worse trajectory of if there will be no change.
- Whether this change is likely to be problematic, and
- If there are any specific locations where this change is likely to occur, and whether the risk should be considered a priority.

The following traffic light colour classification was used to document the risk:

- Green – existing risk under control, risk management in place and working and little change or improvement into the future
- Orange - there is little risk or even if the risk is increasing there is little consequence to the harbour as a whole, or where the risk is located in a small area.
- Red - there is current risk, management is not effective and there is residual risk, its likely to get worse in the future.

6.4.2 Risk Outcomes

Table 6-3 (below) presents the results of the risk screening assessment for Sydney Harbour. There are risk management actions in place for many of the threats, and many are already not achieving the intended outcomes and residual risk remains. Over time, with increasing population, climate change and the combination of a range of these and other threats, there is likely to be increasing risk on many areas of the harbour.

The assessment identified a number of threats where the risk associated with that threat has and will continue to be reduced.

Table 6-2 Threats Summary

Threat	Why does it matter? (environmental)	How does this affect communities? (socio-economic)
Urban stormwater discharge	The significant population and associated development in the catchment of Sydney Harbour results in substantial runoff of nutrients, sediment, contaminants, and marine debris (including micro plastics) into the harbour after rainfall events. This reduces the amenity, the water quality, and the ecosystem health of the harbour. In addition, this also causes damage to creeks and rivers due to increased water velocity.	Water pollution from stormwater discharge can impact amenity and therefore people's enjoyment and relationship (participation) with the estuaries environmental values (e.g. biodiversity and water quality). Stormwater pollution can also degrade/threaten tangible Aboriginal cultural heritage values (e.g. food sources, places of cultural significance). It also adds the cost of repairing damaged creek lines.
Sewage discharge (overflows/septics)	Being a low-lying asset that stretches from the Parramatta to the ocean, the harbour shoreline has been an ideal location for placement of sewerage. This means that many of the overflow points for sewers are close to the harbour. Overflows can cause substantial release of sewage into the harbour (pathogens, nutrients, oils, grease, contaminants, suspended solids). This has been rectified in many places but is still an issue during high rainfall conditions. Environmental impacts arise from combined stressors including nutrients, suspended sediments and toxic contaminants.	Water pollution from sewerage discharge can impact amenity and therefore people's enjoyment and relationship with the estuary environmental values (e.g. biodiversity and water quality). Water pollution occurring from sewerage discharges can also degrade/threaten tangible Aboriginal cultural heritage values (e.g. food sources, places of cultural significance).
Industrial discharges	Sydney Harbour has a long history of industrial activity with industrial land use common in some areas. Industrial discharges threaten water quality from nutrients, suspended sediments, and potentially toxic contaminants.	Water pollution from industrial discharge can impact amenity and therefore people's enjoyment and relationship with the estuary environmental values, plus degrade/threaten tangible Aboriginal cultural heritage values.
Foreshore development	Foreshore development results in physical disturbance which can reduce the extent and condition of foreshore habitat, threaten water quality, and impact wildlife corridors and associated connectivity.	Foreshore development reduces amenity value, but can also restrict access, impacting people's enjoyment and relationship with the Sydney Harbour coastal zone. Development can also reduce harbour views. Development of undisturbed area can limit scientific/education value of a site.
Clearing of riparian habitat, wetland drainage	Clearing of riparian habitat and draining of wetland areas adjacent to the harbour, causes loss of amenity, but also impacts ecosystem services such as processing runoff, destabilising estuarine banks, and reducing habitat of birds and juvenile fish.	Clearing riparian/wetland drainage reduces amenity and people's relationship with the environmental values, in addition to limiting scientific/education values.
Clearing of terrestrial vegetation	Clearing terrestrial vegetation results in loss of connectivity. Also results in exposed land which can increase runoff of sediment into the harbour.	Clearing terrestrial vegetation reduces amenity and people's relationship with the environmental values, in addition to limiting scientific/education values.
Disturbance of contaminated sediment	Sydney Harbour has been home to significant industrial development over a number of years. Past behaviour has resulted in sediment contamination in certain areas of the harbour (e.g. Homebush Bay, with dioxin contaminated sediments). The highest contamination concentrations generally restricted to the upper reaches of bedded embayment's and decrease notably seaward in the Harbour. If sediment is disturbed, it can increase the bioavailability of contaminants, and impact on the ecosystem and waterway health.	Human exposure to pollutants (e.g. heavy metals, dioxins) from contaminated sediments is a public health issue. Disturbance of contaminated sediments in the waterway through dredging, or in the catchment from development could threaten the public health of people who use the harbour through direct exposure (e.g. recreational activities, people undertaking works) or through the marine food chain (e.g. recreational fishing). Water pollution from disturbed sediments can also impact amenity and therefore people's enjoyment and relationship with the estuary environmental values.
Seabed modification (harbour maintenance, service infrastructure)	Mechanical disturbance of the estuarine sediments from seabed modification results disturbance of marine habitats, for example, directly impacting seagrass areas. Water pollution from disturbed sediments can occurs from increased turbidity, mobilisation of toxins in areas of contamination. Bioavailability of contaminants impact on the ecosystem and waterway health.	Water pollution from disturbed sediments can impact amenity through increased turbidity and ecological impacts, which therefore would impact people's enjoyment and relationship with the estuary environmental values.
Population growth	Population growth projections for Sydney are significant. Increased resident and visiting populations will result in land use intensification that exerts a variety of pressures on the Sydney Harbours coastal environmental values.	Population increase will lead to increased demand for the limited community use assets, which may impact on people's engagement and relationship with the coastal zone and may lead to conflict. 'Loss of appeal' and/or 'loss of community cohesion' may also occur from overcrowding and congestion.
Introduction of invasive species	Introduction of invasive species can have adverse impact on habitats and protected species.	Introduction of invasive species threatens enjoyment of biodiversity values, reduces scientific/education values, and threaten Aboriginal cultural food sources.
Extraction, artificial barriers to reduce flow	Estuarine waterways require freshwater inputs to sustain their estuarine character, to support estuarine biodiversity, ensure productivity and maintain geomorphological/hydrological functioning. Extraction and barriers can restrict the freshwater flows to Sydney Harbour.	-
Shipping, boating and boating infrastructure	Physical (mechanical) disturbances impacts coastal wetland vegetation, wildlife, and marine habitats (soft sediments), such as foreshore development and boating mooring. Boating infrastructure (e.g. boat ramps, marina) impacts natural landforms and interrupt natural coastal process. Increased boating activity can lead to boat wash caused bank erosion, more boat ramps mean more habitat lost. Toxic contaminants from shipping (antifouling paints and oil spills) impacts water quality and estuary health.	Impacts to water quality (Ports, marinas, mooring) and mechanical impacts to embankments and wetland areas reduced amenity and enjoyment of environmental values.
Public access restricted / disconnected / inadequate	Inappropriate or inadequate public access infrastructure may lead to sensitive areas being accessed and damaged through mechanical action. Loss or, damage to, habitat may also occur through uncontrolled access.	Many of the social and economic benefits of Sydney Harbour rely on access to viewing of the waterway. Private and government restricted access to general population reduce amenity value and enjoyment. Increasing demand for disability access.
Conflict of resource use of foreshore areas and facilities	-	Increased demand to access the foreshore for recreation, enjoyment, tourism. Intensity and sustainability of use in particular locations around the Harbour (e.g. foreshore parks/reserves, walkway/cycleways) has potential to cause conflict. Competition for use of foreshore areas may reduce participation benefits.

Threat	Why does it matter? (environmental)	How does this affect communities? (socio-economic)
Conflict of resource use of waterway areas and facilities	-	Increased demand for access to harbour and for being able to moor boats or install jetties. The intensity and sustainability of use the Harbour's waterways and associated infrastructure (e.g. boat ramps, mooring) has potential to cause conflict. Competition for use of waterway areas may reduce participation benefits.
Recreational pressures	Extractive or high impact recreational activities can threaten the sensitive or threatened environmental values. For example, recreational fishing has the potential to impact of local fisheries, boat wake has the potential to cause bank erosion, and mechanical activity of kayaking has the potential to impact sensitive wetland (saltmarsh) areas.	Recreational pressures on Sydney Harbours coastal zone may impact amenity and therefore people's enjoyment and relationship with the estuary environmental values.
Climate change	Climate change stressors such as sea level rise, increased temperatures and heavy rainfall events are expected to impact on the water chemistry (salinity, acidification), ecological health and functioning, and the physical (coastal, estuarine, and riverine) processes, dynamics, and form at an increasing rate over time.	Realisation of the physical environmental stressors of climate change will place pressure of the ecological functioning of the harbour, increase the prevalence of natural hazards (including coastal and flooding), and cause major disruption to the private sectors and governments operating with the coastal zone. Structural adjustments will occur in the economy. Environmental and economic changes in response to climate change will have implications for socialisation and sense of community.
Coastal and tidal inundation	Coastal and tidal inundation threaten low lying environmental assets not adapted to coastal processes. Landward migration of coastal wetlands will occur in response to sea level rise, where allowed to do so. Numerous foreshore structures (e.g. seawall) will form a barrier to wetland migration in areas.	Coastal and tidal inundation threatens low lying community use assets and infrastructure now. With increasing sea level rise, there is the potential for increased flooding of infrastructure and housing, loss of access to the foreshores and harbour, and a suite of other challenges (flooding of sewerage infrastructure, ground water intrusion). increased wave overtopping as a result of sea level rise will threaten public safety.
Overland flooding	Overland flooding affects low lying houses, infrastructure and environmental assets. It is also able to impact on the harbour because overland flooding can carry stormwater, sediment and other contaminants into the harbour.	Confusion about SLR benchmarks and varying methods applied across the Harbour will result in inconsistent consideration of inundation hazards, and therefore adaptation planning and response.
Beach, estuary foreshore and bank erosion (and accretion)	Erosion of harbour beaches, estuarine foreshore and river embankments is threat because it causes increased sedimentation in the waterway, and in a loss of foreshore biodiversity. Shoreline variability accretion has impacted seagrass meadows in some places. With sea level rise, erosion impacts will migrate landward.	Erosion is a threat to the built foreshore assets on private and crown land, foreshore access, and amenity values.
Cliff instability	Geotechnical instability resulting in cliff failures causes localised loss of land and habitat impacts. Rates of cliff retreat will likely increase in response to sea level rise (where exposed to wave action).	Cliff instability threatens built headland assets, foreshore access and human life.
Drought	Droughts affect the harbour by impacting riparian vegetation that requires freshwater. There are relatively minor changes to salinity profiles of the harbour as there is little freshwater flow. The largest effect of drought is through the extraction of groundwater and the resultant potential for salinisation of the adjacent aquifer.	Droughts may also increase the demand by the community for a swimmable and usable harbour. An increase in groundwater abstraction may lead to increased salinization of the aquifer.
Bushfire	Bushfire is an issue for a relatively small area along Sydney Harbour and in very dry times, may result in loss of faunal and floral biodiversity and slow regeneration of vegetation. There is potential for runoff of nutrients (ash) and sediment into the Harbour if rains occur soon after the event.	Bushfires affect local communities, and the potential for bushfires can lead to pressure by communities for trees to be removed or cut down.
Degraded / failing coastal protection structures (seawalls)	Much of the edges of Sydney Harbour have been protected from erosion in some way. This has generally been ad-hoc and under no clear plan or design. There is no clarity about the risks associated with many of the sea-walls and of their longevity. Many are not suited to addressing the effects of climate change.	Sea-walls are expensive to build and need maintenance. likely that councils will not be able to afford more than ad-hoc repairs or upgrades, and that in the long-term the design and construction of more appropriate sea-walls will require engagement about options and priorities.

Table 6-3 Results of First Pass Risk Screening for Sydney Harbour CMP

Potential Threats/hazards	Existing management	Is there a residual risk (now)	Likely future direction of the hazard	Is the hazard likely to become problematic in the future
Urban stormwater discharge	Yes (stormwater management plans, WQIP, licensing, education, legislation	Yes, its improving, but still not good enough. Benefits of WQIP will take time	Hazard increase in the future as population increases	Likely to be worse in bays
Sewage discharge (overflows/septics)	Yes (licensing conditions)	Yes (licensed discharges still occur)	Hazard increase in the future	Designated overflows under license agreements, also some areas where there is significant development and growth.
Industrial discharges	Yes (pollutant licence for Sydney Water, no industrial licenses for any waterway discharges)	Yes (legacy issues)	Will improve in the future	Unlikely to be new issues arising, but potential for legacy issues to occasionally become problematic. Mapping is available for declared sites
Foreshore development	Yes, existing spatial landscape won't change but density will	Yes	Increase particularly if landuse changes permits increased density. Also from sea-level rise	Yes, in some areas there will be pressure for more development. If the right planning controls are in place the problem will not get worse apart from greater risk of inundation of existing foreshore development
Damaging riparian habitat, wetland drainage	Yes, weak and inconsistent	Yes	Hopefully will get better because they are now under protection	Yes, including loss of vegetation as a result of boat wakes, and from development pressure
Clearing of terrestrial vegetation	Yes, current legislation is inadequate	Yes, ageing trees, loss of connectivity	Hazard increase	Yes, loss of connectivity on foreshores is a long term challenging issue that is not considered under current legislation.
Disturbance of contaminated sediment	Yes (2 types planned which is picked up through licencing, and unplanned which is disturbance from waves from wind and boat wash driven)	Yes	Hazard increase	Yes, because of climate driven changes to groundwater something that is poorly understood
Seabed modification (harbour maintenance, service infrastructure)	Yes	Yes, but minor	Increase,	Yes, but minor probably as a result of increased population, and demand for additional ferries.
Introduction of invasive species	Yes	Yes	Increase	Yes, species likely to be different under a changing climate and a heavily connected global economy

Potential Threats/hazards	Existing management	Is there a residual risk (now)	Likely future direction of the hazard	Is the hazard likely to become problematic in the future
Extraction, artificial barriers to reduce flow	Yes	Yes (fish passage restricted at some locations)	No change in surface water Groundwater extraction likely to increase.	Groundwater dependent ecosystems are likely to be affected but more work needed in this area to fully understand risk and management requirements.
Shipping, boating and boating infrastructure	Yes but usage plan has never come out of draft stage.	Yes	Increase	Yes, more shipping (cruise ship industry), more pressure for associated infrastructure, and increased demand for moorings with associated loss of seagrass.
Public access restricted / disconnected / inadequate	Yes	Yes	Improve around the Harbour Parramatta north shore is still an issue	No although area specific, more board walks and access infrastructure likely to be built in the future in the main harbour area. But this will depend on public demand and resources.
Conflict of resource use of foreshore areas and facilities	Yes	Yes	Likely to improve over time	No, land use and recreational use will change. Resources conflict will depend on how these areas are managed.
Conflict of resource use of waterway areas and facilities	Yes	Yes	Likely to become worse	Increased population – more boats more demand on facilities and potential conflicts with other users. More ferries etc.
Coastal and tidal inundation	No	Yes	Increase	Yes, sea-level rise will lead to more inundation, which will threaten low lying development. Sea level rise also threatens high value saltmarsh habitats with no 'room to move'.
Overland flooding	Yes	Yes	Increase	Yes, there are knowledge gaps about where such flooding will occur, but known that Parramatta is a real flood risk area. Also, knowledge gaps in the location of stormwater pipes.
Beach, estuary foreshore and bank erosion / recession	Yes	Yes, some risk based management plans are in place, but not everywhere	Increase	Yes, will differ between natural and built environments. About 90% of Sydney Harbour is protected by some form of structure.
Cliff instability	Yes	Yes	Increase	Yes, in areas exposed to wave action, particularly when driven by intense low-pressure systems.

Potential Threats/hazards	Existing management	Is there a residual risk (now)	Likely future direction of the hazard	Is the hazard likely to become problematic in the future
Drought	Yes	Yes	Increase	Yes, long droughts can change species composition, droughts lead to increased extraction, can also lead to salinisation upstream if barriers such as Parramatta weir are removed.
Bushfire	Yes	Yes, in certain areas	decrease	Yes, bushfires likely to be more intense. There is a regulatory requirement that hazardous areas at safe from bushfires.
Degraded / failing coastal protection structures (seawalls)	Yes	Yes, there are controls but little knowledge of who owns sea-walls and they are generally repaired by councils when they fail.	Increase, as sea-levels rise	Yes, aging infrastructure that is designed for lower sea-levels creates additional risk.

6.5 Priority Risks and Knowledge Gaps for Sydney Harbour

The risk process identified several areas where more detailed knowledge or a more detailed risk assessment is required. These are:

Present risk

- Damaging riparian vegetation and wetlands
- Degraded seawalls and coastal protection*.
- Disturbance of contaminated sediment*

Future risk

- Loss of terrestrial vegetation
- Introduction of invasive species
- Shipping, boating and associated infrastructure
- Coastal and tidal inundation from sea-level rise
- Overland flooding*
- Effects of drought including on groundwater*

Note asterisks indicate threats where additional knowledge is required to support better understanding of risk.

Many of the priority risks identified above occur at different places around the Harbour and are not risks for the system as a whole. The locations of these risk areas and the prioritisation of associated activities in response, need to be identified in a more detailed risk assessment that will be conducted at a later stage in the CMP process.

A combination of a detailed risk assessment which is location specific, and which identifies when risks are likely to occur, together with outcomes from targeted research, will be used to underpin the development of a sequenced management plan.

CHAPTER 7 SUMMARY: KNOWLEDGE GAPS

Knowledge gaps and information needed for a Greater Sydney Harbour CMP have been identified through a review of existing information and a series of workshops held as part of this this Scoping Study:

Governance

Study Needs (Action)
CMP project governance structure Develop a formal and agreed Greater Sydney Harbour CMP governance structure and framework. Explore potential governance structures and funding arrangements for a harbour-wide CMP.
Greater Sydney Harbour coastal zone governance Further investigate the existing roles and responsibilities in Sydney Harbour, including identifying barriers to effective coastal management and opportunities for improved coordination between stakeholders.

Coastal Hazards and Threats

Study Needs (Action)
Coastal hazard parameters, assumptions and outputs Identify consistent coastal hazard parameters, assumptions and approaches that can be applied to the assessment of coastal hazards that threaten the Greater Sydney Harbour coastal zone. Determine hazard assessment and mapping outputs needed to inform coastal management going forward.
Coastal erosion and shoreline recession Undertake consistent coastal erosion and shoreline recession assessment and mapping for all sandy / unconsolidated wave exposed shores in Port Jackson.
Coastal and tidal inundation Undertake consistent coastal and tidal inundation assessment and mapping for all tidal waterways.
Coastal cliff and slope instability Undertake coastal geotechnical instability assessment and mapping for all developed cliff top and bluff locations, including wave exposed cliffs and swell sheltered cliffs.
Tidal waterway foreshore erosion Undertake a tidal waterway foreshore erosion assessment for the non-wave exposed estuarine shore – focussing on Middle Harbour, Lane Cover and Parramatta River.
Future ground water levels from projected sea level rise Undertake ground water modelling to assess future conditions under various sea level rise scenarios.
Seawall audit / assessment – mapping, ownership and condition Undertake a comprehensive assessment of foreshore protection structures across Sydney Harbour and its tidal waterways, to clarify ownership, condition, and future management needs.
Site specific coastal wetlands condition, resilience and threat assessment Assess both current threats to coastal wetlands, such as land use pressures, recreational practices and the future threats of SLR and population growth.
Investigate current and long-term trends of commercial and recreational vessel movements (including cruise ships) This information will help to assess opportunity for improved boating infrastructure and management and the threat of shipping and boating to estuarine habitats.

Study Needs (Action)
Sydney Harbour contamination studies Study to (a) report on current dioxin contamination in Sydney Harbour sediments, (b) investigate the potential for dioxin dispersal, and (c) propose options to manage the dioxin contamination and threats. Study to investigate impacts of sea level rise and increasing ground water tables on contaminant leaching.
Recreational fishing surveys / investigations Undertake a study into recreational fishers and non-compliance fishers in the Greater Sydney Harbour.
Studies of non-indigenous species Undertake genetic investigation of invasive species status and origin found within Sydney Harbour. Investigate exotic species considered likely to invade Sydney Harbour. Identify opportunities for monitoring programme targeting high risk exotic species and for improved controls on ballast water discharge, limiting hull fouling and measures to reduce likelihood of recreational vessels spreading marine pests.
Management constraints for sea level rise limited beaches Harbour-wide study to: determine beach amenity impacts from climate change / SLR, identify sustainable source of sand for beach nourishment and develop an approach to equitable access to nourishment sources, that considered the system-wide needs and priorities.

Natural, Social, Cultural and Economic Values and Assets

Study Needs (Action)
Foreshore access database and audit Harbour-side database on waterway access infrastructure that identifies: access infrastructure type, spatial location, elevation, user groups / competition, accessibility for the disabled, management responsibility, asset design life. It should also identify access opportunities and barriers.
Compressive assessment of littoral rainforest condition and conservation significance This would help identify potential threats to and opportunities for improved management practices.
Undertake a seagrass threat assessment Develop a comprehensive strategy for the management of seagrass habitats, that (a) addresses current pressures (b) plans for future stressors, and (c) outlines management roles and responsibilities.
Stormwater outlets audit Audit low lying stormwater infrastructure to enable meaningful risk assessment from tidal inundation under future sea level rise conditions.
Undertake studies into biodiversity of soft sediment habitats and the rocky intertidal habitat and ecological processes/assemblages
Develop an asset register to guide assessment of risks arising from coastal hazards

Socioeconomic Information

Study Needs (Action)
Coastal and Tidal Inundation Flood Damages Assessment Methodology A robust coastal and tidal inundation flood damages assessment methodology to guide cost benefit analysis of low lying high value built assets around Greater Sydney Harbour margin.
Investigate opportunities and constraints for improving little penguin habitat in Sydney Harbour This study should identify the financial costs, and legislative/regulatory barriers to implementing habitat improvement strategies (in Freewater, 2018), and propose a pathway forward to be action in the CMP.

7 Key Knowledge Gaps and Information Needs (Actions)

7.1 Knowledge Gaps and Information Needed

Information needs for a Greater Sydney Harbour CMP have been identified through a review of existing information (including Hedge et al., 2014; GHD, 2015a 2015b; LLS, 2016) and a series of workshops (Council, State Agency, Sydney Harbour risks) held as part of this this Scoping Study. These data gaps are summarised in the in a series of tables within this Chapter, which are split into the following four categories:

- **Governance** (Table 7-2), for Sydney Harbour (general) and a Harbour-wide CMP (moving forward).
- **Coastal hazards and threats** (Table 7-3), including threats to the marine estate.
- **Natural, social, cultural and economic values and assets** (Table 7-4), which contribute to risks and opportunities.
- **Socioeconomic information** (Table 7-5), necessary to evaluate potential management options.

The coastal management areas relating to each knowledge gap are noted against each knowledge gap. Suggested stakeholder who are best places to address each knowledge gap are also identified.

The acronyms shown in Table 7-1 below relate to those used in the following information gaps tables.

Table 7-1 Acronyms Adopted for the Information Gaps and Study Needs Tables

Acronym	Coastal Management Area	Colour
CWLR	Coastal Wetland and Littoral Rainforest Area	
CV	Coastal Vulnerability Area	
CE	Coastal Environment Area	
CU	Coastal Use Area	
Acronym	**Potential Stakeholder**	**Colour**
LG	Local Government	
SG	State Government	
FG	Federal Government	
Ac.	Academia	
Ind.	Industry	

Table 7-2 Identified Knowledge Gaps and Study Needs: Governance

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
G1					**CMP project governance structure** A targeted project is recommended to develop a formal and agreed Greater Sydney Harbour CMP governance structure and framework. A study that explores potential governance structures and funding arrangements for a harbour-wide CMP would be beneficial to guide CMP governance discussions and negotiations.	While many council and state agencies have demonstrated in principal support for a whole-of-harbour CMP, there is currently no formal arrangement and commitment in place to undertake (and co-fund) a Greater Sydney Harbour CMP. This study recommends OEH takes a leading role in driving the CMP forward in the first instance. A stand along study may be warranted however, to develop a project governance arrangement that achieves internal buy-in and support from the executive level within all partner organisations.					
G2					**Greater Sydney Harbour coastal zone governance** A study is needed to further investigation the existing roles and responsibilities in Sydney Harbour, which identifies barriers to effective coastal management and opportunities for improved coordination of planning and management between stakeholders.	Governance arrangements in Sydney Harbour are complex and involve numerous agencies and stakeholders (see Appendix D). This study has outlined that some jurisdictional uncertainty remains (i.e. land and assets ownership, and management roles and responsibilities, management hierarchy), which is a major barrier to integrated and strategic management. Fragmented and *ad hoc* management is being undertaken to date as a result.					

Table 7-3 Identified Knowledge Gaps and Study Needs: Coastal Hazards and Threats

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
T1					**Coastal hazard parameters, assumptions and outputs** Identify consistent coastal hazard parameters, assumptions and approaches that can be applied to the assessment of coastal hazards that threaten the Greater Sydney Harbour coastal zone (e.g. SRL scenario(s), methodology for assessing erosion, cliff instability etc). Determine hazard assessment and mapping outputs needed to inform coastal management going forward. This may include: • hazard mapping suitable for preparing a planning proposal to update the coastal vulnerability area maps in the CM SEPP • hazard mapping outputs enabling assessment of immediate and future coastal vulnerabilities • hazard modelling frameworks that can support option evaluation through application of a Cost Benefit Assessment (CBA) (e.g. probabilistic outputs for inundation)	A number of site specific and LGA wide hazard assessments have been completed to date, which go some way to characterising the coastal hazard risk profile of the Greater Sydney Harbour. However mapping coverage across the Harbour's coastal zone is incomplete for each seven (7) hazards identified in the CM Act. Further, parallel coastal hazard assessments undertaken across various locations have applied inconsistent assumptions. Some of hazard mapping datasets are now becoming dated and are no longer fit-for-purpose – noting the technical guidance/requirements for the coastal hazard assessment has recently progressed through the coastal reforms process.					
T2					**Coastal erosion and shoreline recession** Undertake consistent coastal erosion and shoreline recession assessment and mapping for all sandy/unconsolidated wave exposed shores in Port Jackson. Prioritise areas where no hazard assessment exists and/or where current mapping is deemed not fit-for-purpose.	*As above*					

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
T3					**Coastal and tidal inundation** Undertake consistent coastal and tidal inundation assessment and mapping for all tidal waterways within the Greater Sydney Harbour. *Note: consider how the Sydney Coastal Councils Group/CSIRO inundation mapping may play a role. Also, coastal modelling tools developed for the Woollahra CZMP and Estuary Processes Study should be utilised, where possible/practical.*	*As above*					
T4					**Coastal cliff and Slope Instability** Undertake coastal geotechnical instability assessment and mapping for all developed cliff top and bluff locations, including wave exposed cliffs and swell sheltered cliffs. Prioritise those areas where no assessment exists and/or prior work not fit-for-purpose.	*As above*					
T5					**Tidal waterway foreshore erosion** Undertake a tidal waterway foreshore erosion assessment for the non-wave exposed estuarine shore – focussing on Middle Harbour, Lane Cover and Parramatta River. *Note existing work undertaken (e.g. Parramatta River) should feed into a system-wide assessment.*	*As above*					

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
T6					**Future ground water levels from projected sea level rise** Undertake ground water modelling to assess future ground water conditions under various sea level rise scenarios. Assessment outcomes should ensure management implications can adequately assessed for the following: • ecosystems functioning • built asset and infrastructure risks • contamination impacts	Groundwater plays an important role in sustaining aquatic and terrestrial ecosystems. Groundwater along the estuary margins can constrain coastal infrastructure functioning and longevity, as well as mobilise contaminants from low-lying polluted land. Under future sea level conditions, ground water levels will change along the coastal margin. There is an information gap future ground water response from continued sea level rise, and the multifarious management implications that will arise from these changes.					

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
T7					**Seawall audit / assessment – mapping, ownership and condition** Undertake a comprehensive assessment of foreshore protection structures across Sydney Harbour and its tidal waterways, to clarify ownership, condition, and future management needs. Refer to Sydney Coastal Council Group Seawall Study for guidance on what information should be collected. Consider also environmentally friendly seawall guide by DECCW (2015), and current seawall research project by SIMS. *Note Parramatta River Catchment Group has undertaken good work on this issues across their sub-catchment, and similar local/LGA scale investigation have been completed elsewhere. Existing work should feed into a comprehensive, system-wide seawall/coastal structure assessment.*	A significant proportion of Sydney Harbour's shoreline is comprised of built structures. The ownership, management responsibility, structure condition and associated safety risk is unknown for many of these structures.					

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
T8					**Site specific coastal wetlands condition, resilience and threat assessment** This study should look at both current threats to coastal wetlands, such as land use pressures, recreational practices and the future threats of SLR and population growth. A detailed SLR impact assessment, comparable to that applied to Cooks River by Rogers et a., 2017 should be applied. This information will guide formulation of site specific management options and prioritisation in Stage 3 of a CMP, noting management needs may vary between wetland sites across the Harbour.	Threats to coastal wetlands in the Sydney region are well documented (e.g. sea level rise, mangrove encroachment to saltmarsh, physical disturbance from boat wake and trampling etc; see Rogers *et al.*, 2017, Kelleway *et al.*, 2007. There does not appear to be site specific information available to comprehensively determine local risks and appropriate management responses for Sydney Harbours wetland habitats.					
T9					**Sydney Harbour contamination studies** To build on the work by Freewater (2018), the following should be undertaken: • A study to (a) report on current dioxin contamination in Sydney Harbour sediments, (b) investigate the potential for dioxin dispersal, and (c) propose options to manage the dioxin contamination and threats (for further information, see Freewater (2018)). • A study to investigation the impact of sea level rise and increasing ground water tables on contaminant leaching.	Sydney Harbour has been subject to substantial contamination from industrial activities and widespread urbanisation (heavy metals, nutrients, dioxins). Contaminated land and waterway sediments across the Harbour is common. The highest levels of contamination typically occurring within and around the bays upstream of the Bridge. While some aspects of the Harbours contaminant status (and its associated threats to the Marine Estate) are well characterised (e.g. Freewater, 2018), some information gaps remain.					

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
T10					**Recreational fishing surveys / investigations** Undertake a study into recreational fishers and non-compliance fishers in the Greater Sydney Harbour, which looks at: • patterns of recreational fishing • potential human health risks from fish consumption • threats to the Sydney Harbour fishery • reasons for non-compliance • improved design and delivery of education programs, including educational packages for culturally and linguistically diverse communities (as proposed by Freewater, 2018) • recommendations for ongoing management (e.g. regular 5-year assessments, as proposed by Freewater, 2018)	Recreational fishing has the potential to adversely impact habitats and protected species. Recreational fishing in Sydney Harbour has around twice the catch compared to nearby estuaries, with an estimated 74 tonnes of fish were caught by recreational fishers during the 2008 summer period (Hedge et al., 2014). Commercial fishing has been banned Sydney Harbour since 2008 due to human health risks associated with high dioxin levels in fish The patterns and drivers for recreational fishing in Sydney Harbour are currently not clear.					
T11					**Investigate current and long-term trends of commercial and recreational vessel movements (including cruise ships)** This information will help to assess: • opportunity for improved boating infrastructure and management • threat of shipping and boating to estuarine habitats	Shipping and boating have the potential to adversely impact habitats and protected species. There is an information gap on the long-term trend of commercial and recreational boating and shipping use.					

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
T12					**Studies of non-indigenous species** The following studies are recommended: • undertake genetic investigation of invasive species status and origin found within Sydney Harbour. This information will assist with identifying invasive species management strategies. • investigate exotic species considered likely to invade Sydney Harbour (from abroad and also other Australian harbours). Again, this information will assist with identifying invasive species management strategies. • identify opportunities for monitoring programme targeting high risk exotic species. • identify opportunities for improved controls on ballast water discharge, limiting hull fouling and measures to reduce likelihood of recreational vessels spreading marine pests	Invasive species has the potential to advisedly impact habitats and protected species. Invasive species are often distributed through ballast water discharge or hull fouling. Contamination also facilitates spread of invasive species. Sydney Harbour is likely to be the first Australian point of invasion from exotic species from neighbouring regions. It is also at risk from invasion of exotic species transported from other Australian Ports (Freewater, 2018). There is a knowledge gap on the types of conditions that encourage spread of invasive species (Hedge et al., 2014).					

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
T13					**Management constraints for sea level rise limited beaches** A Harbour-wide study is needed to: • determine beach amenity impacts from climate change / SLR • identify sustainable source of sand for beach nourishment • develop an approach to equitable access to nourishment sources, that considered the system-wide needs and priorities	There are 52 sandy beaches east of the Harbour Bridge, of which 25 or more a frequently used for swimming (SCCG, 2015b). Many of these recreational beaches are backed by seawalls, meaning the upper (subaerial) beach will become progressively lost with sea level rise (in the absence of sediment supply or room to move landwards). Access and use of sandy beaches within Sydney Harbour is an important community benefit. Sand nourishment will be needed to maintain recreational amenity of seawall backed beaches with increased SLR. It will be cost prohibitive to maintain all such beaches with an artificial sand supply. There is also an information gap on potential sand sources, nourishment costs and beach maintenance priorities across the Harbour					

Table 7-4 Identified Knowledge Gaps and Study Needs: Natural, Social, Cultural and Economic Coastal Values and Assets

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
V1					**Foreshore access database and audit** A Harbour-side databased on waterway access infrastructure is needed, that identifies the following attributes: • access infrastructure type • spatial location • elevation (or elevations) • user groups / competition • accessibility for the disabled • ownership / management responsibility • asset design life This study should also identify access opportunities and barriers, noting unapproved/illegal private structure (e.g. fencing) may be limiting access. Opportunities of improved/future access may extend to: • public land • easements not currently utilised for access.	Public access to the Greater Sydney Harbour foreshore and waterway provides a vitally important service to society and the economy. User groups place very high value on access for passive and active recreation, commercial opportunities, transport, tourism and amenity (GHD, 2015). Threats to foreshore access include: • current and future coastal hazards • user group competition • accessibility for all • connectivity • population growth and increasing need / competition There is no compiled foreshore access database for the Greater Sydney Harbour Estuary. Such a database is needed to guide the strategy planning that meets the current and future needs.					
V2					**Compressive assessment of littoral rainforest condition and conservation significance** This information would help identify potential threats to and opportunities for improved management practices. Further, management efforts can be prioritised based on habitat condition and conservation significance of remaining Littoral Rainforest habitats	There does not appear to be a recent survey that documents the condition and conservation significance of the Littoral Rainforest stands relative to the Greater Sydney Harbour catchment study area.					

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
V3					**Undertake a seagrass threat assessment** With increased catchment development and waterway usage planned for Sydney Harbour, there is a need to develop a comprehensive strategy for the management of seagrass habitats, that (a) addresses current pressures and (b) plans for future stressors, and (c) outlines management roles and responsibilities.	Seagrass mapping is intermittently updated by State Government, however there does not appear to be a whole-of-harbour strategy that documents the site-specific threats and/or management priorities.					
V4					**Stormwater outlets audit** An audit of low lying stormwater infrastructure is needed to enable meaningful risk assessment from tidal inundation under future sea level rise conditions. The audit will require an elevation survey of outlets and connecting pipes. This information should be documented in a spatial database.	There is an information gap on the locations and elevation of stormwater assets around the fringed of Sydney Harbour.					
V5					**Undertake studies into biodiversity of soft sediment habitats** Noting the importance in biogeochemical cycling, maintain water quality and providing natural coastal defence **Undertake studies into the rocky intertidal habitat and ecological processes/assemblages**	A comprehensive review of scientific research specific to Sydney Harbour conducted by Hedge *et al.,* (2014) identified a number of information gaps on habitat characteristics, ecological patterns and processes within the Harbour including: • bottom sediment habitats • rocky intertidal habitats • modified habitats					

Key Knowledge Gaps and Information Needs (Actions)

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
V6					**Develop an asset register to guide assessment of risks arising from coastal hazards**	Knowledge of assets types and locations is needed to assess coastal hazard risk. Various organisations and management authorities hold this information. There is currently no single repository/databased that contains the information for the Greater Sydney Harbour Coastal Zone.					

Table 7-5 Identified Knowledge Gaps and Study Needs: Socioeconomic Information

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
S1					**Coastal and Tidal Inundation Flood Damages Assessment Methodology** A robust coastal and tidal inundation flood damages assessment methodology is needed to guide cost benefit analysis of low lying high value built assets around Greater Sydney Harbour margin (and the NSW coastal zone in general). A robust damages assessment framework should be developed that considers both temporary inundation (e.g. storm surge and catchment events) and permanent inundation impacts due from future SLR conditions (as opposed to periodic inundation impacts like that typically assessed for catchment flooding). Damages incurred from SLR impacts must consider permanent ground water impacts to underground services and building foundation etc, plus permanent tidal inundation to above ground building and structures.						

ID #	CW LR	CV	CE	CU	Study Needs (Action)	Information Gap	LG	SG	FG	Ac.	Ind.
S2					**Investigate opportunities and constraints for improving little penguin habitat in Sydney Harbour** Habitat improvement strategies identified by Freewater (2018) include to: • expand existing North Harbour Aquatic Reserve • implement environmentally friendly moorings in habitat areas • implement no take fishing restrictions within the reserve • declare Preservation Zones around actual nesting sites This study should identify the financial costs, and legislative/regulatory barriers to implementing the above, and propose a pathway forward to be action in the CMP.	The little penguin is listed as an endangered population under the Threatened Species Act. Freewater (2018) identifies a suite of options to improve the little penguin habitat in Sydney Harbour, including for example to expand the existing aquatic reserve. Some additional socio-economic information would be helpful to evaluate opportunities and barriers for including these options as actions within the CMP.					

CHAPTER 8 SUMMARY: PRELIMINARY BUSINESS CASE

Opportunity Statement

The Greater Sydney Harbour coastal zone contains a rich diversity of valuable natural and cultural assets and is also a vital economic zone, supporting industrial and commercial activity, tourism and recreational use. The significant and important values supported by this area are threatened by increased pressures including coastal hazards, climate change, population growth and development pressures.

The new NSW coastal management legislative and regulatory framework present a unique opportunity to build on this existing good work and prepare a system-wide CMP for Greater Sydney Harbour. A coordinated and collaborative approach to managing the Sydney Harbour coastal zone will result in additional benefits to individual councils and other organisations undertaking coastal planning in isolation.

Benefits of Undertaking a Greater Sydney Harbour CMP

Many benefits can be realised through collaboration on a whole-of-estuary Greater Sydney Harbour CMP. The benefits available through collaboration are:

- Working collaboratively to attract funding and investment.
- Efficiency savings (economies of scale, reducing duplication).
- Improved capacity to address strategic and harbour-wide issues and interests.
- Improved communication, advocacy and promotion.

Many local and state government organisation consulted through this project have provided in principle support for a Greater Sydney Harbour CMP.

Collaboration and Cost Sharing Approach

Collaboration and cost sharing arrangements need to be discussed and negotiated with all project partners. Each project partners will have a different appetite for financial commitment and there will be several matters to consider in this regard. A well-defined governance arrangement and decision-making process will facilitate negotiations around cost sharing. While it is beyond the scope of this study to address these matters in detail, hypothetical cost sharing arrangements are provided for context.

Assuming an indicative $3M CMP planning budget, distributed over 3-years and between project partners, foreshore Councils may be looking at a $30,000 to $40,000 per annum, whereas non-coastal councils may be looking at a $5,000 to $10,000 per annum (see below table showing a *hypothetical* example).

CMP project partner category	Count	*~3 year* contribution	Annual contribution	TOTAL Cost	TOTAL Cost %
Coastal zone councils	12	$100,000	$33,333	**$1,200,000**	*40%*
Catchment councils	9	$20,000	$6,667	**$180,000**	*6%*
OEH grants program*	1	$1,380,000	$460,000	**$1,380,000**	*46%*
Other govt agencies	4	$60,000	$20,000	**$240,000**	*8%*
			TOTAL CONTRIBUTION	**$3,000,000**	*100%*

8 Preliminary Business Case

8.1 Overview and Context

A preliminary business case is provided herein to outline the benefits of and recommendation for, progressing with a joint CMP for the Greater Sydney Harbour Estuary. Considerations and context for collaboration and cost sharing arrangement are also provided. A preliminary business case is a requirement of the Stage 1 CMP Scoping Study.

8.2 Opportunity Statement

The Sydney Harbour coastal zone contains a rich diversity of valuable natural and cultural assets and is also a vital economic zone, supporting industrial and commercial activity, tourism and recreational use. The significant and important values supported by this area are threatened by increased pressures including coastal hazards, climate change, population growth and increasing development pressures.

In response to these challenges and opportunities, a large body of work has been undertaken by local government which seeks to facilitate a strategic approach to coastal management. In addition, recent reforms to the NSW coastal management legislative and regulatory framework present a unique opportunity to build on this existing work and prepare a system-wide Sydney Harbour CMP. A coordinated and collaborative approach to managing the Sydney Harbour coastal zone will result in additional benefits to individual councils undertaking the CMP process in isolation.

8.3 Benefits of Undertaking Stage 2 of a CMP

The Manual outlines the process and requirement for undertaking a CMP. Stage 2 of the CMP process involves undertaking detailed studies that help councils to identify, analyse and evaluate risks, vulnerabilities and opportunities. **The information generated during State 2 is fundamental for identifying the evidence based management strategies that can be adopted in the CMP to provide for protection and sustainable development of the coastal zone**.

Decisions surrounding coastal management exhibit deep uncertainty and complexity through:

- numerous uncertain processes and a large number of future scenarios (including sea level rise, development pressures and storm intensity and frequency)
- a large number of potential mitigation and management options (including statutory planning and structural interventions).

Therefore, within the coastal management framework and specifically a CMP, it is critical that decision-makers have a proper understanding of the risks and opportunities within the coastal zone and the consequences of specific courses of action. Accurate and detailed information about risk and consequence is necessary to assist decision makers generate effective management strategies which identify and prioritise future actions or justify a business-as-usual approach. Collecting high-quality, structured and targeted information within this stage is critical to best assist councils, stakeholders and communities to make informed decisions about the coastal zone. Without this information, there is a risk of a number of suboptimal outcomes:

- not taking actions that should be taken, because investors cannot be convinced of the genuine benefits of investment or the beneficiaries cannot be identified.
- taking actions that should not be taken, imposing significant costs today without the prospect of sufficient benefits in the future.

The information generated in Stage 2 will allow decision makers to have the confidence and understanding they require to make sound investments of the right scale and at the right time. In addition, the outputs of studies should be presented in a transparent and insightful way that can be easily communicated to stakeholders and the community.

While completion of Stage 2 is a critical component of the CMP process in its own right, there are significant benefits for individual councils that can be achieved through collaboration.

8.4 Benefits of Undertaking a System-wide Sydney Harbour CMP

There are a range of benefits that can be realised through council collaboration on a system-wide Sydney Harbour CMP. It is important to note that while considered here in the context of preparing a coastal management plan, the benefits of collaboration are likely to extend beyond coastal management into broader services provided by local government. Indicatively, the types of benefits available through collaboration can be categorised under four broad themes:

- **Working collaboratively to attract funding and investment**
- **Efficiency savings (economies of scale, reducing duplication)**
- **Improved capacity to address strategic and harbour-wide issues and interests**
- **Improved communication, advocacy and promotion**

8.4.1 Working Collaboratively to Attract Funding and Investment

A single overarching CMP for Sydney Harbour will help to provide a clear and strategic value proposition for achieving a common vision. It will support local government partners to align their priorities and seek funding alone or collaboratively to achieve them under the banner of a whole of system strategic plan.

A whole of system CMP will also enable projects to be identified which may be of interest to investor sector financiers. The large scale provides for a strongly recognised outcome to be achieved, and for suitably large sized projects to be funded. The strong governance that would be required to be in place would also be important considerations of investors.

8.4.2 Efficiency Savings

The principal benefits of collaboration are cost savings for local government resulting from streamlined management, planning and execution of a CMP at the regional scale, rather than independently.

- **Project management:** Collaboration allows partner councils to centrally project manage the CMP process. This allows for consistent project management across the region, and improved

coordination and timing of CMP related projects and activities. In addition, the broader pool of project management capability and capacity can lead to better quality project management.

- **Procurement:** Collaboration can deliver significant time and cost savings on procurement as a result of shared tender and contract management processes, a larger pool of suppliers or contractors to select from and combined purchasing power.
- **Reduced duplication of effort:** a shared, harbour-wide approach to coastal management should result in better coordination of effort, and therefore fewer activities or projects that duplicate one another. This should mean that on balance, more resources are able to be put toward specific activities. In turn, this can lead to improvements in the quality and comprehensiveness of activities. Standardised processes, documentation and the experience of working together can also drive consistency out outputs, assumptions and formats generated during CMP activities. This will mean that the results of studies can be used across the whole project area.

8.4.3 Improved Capacity to Address Strategic and Harbour-wide Issues and Interests

Importantly, collaboration should result in benefits that contribute to improved environmental, economic and social outcomes through strategically addressing regional issues and interests.

- **Resilience generated by networks and relationships:** networks and relationships developed through collaboration can lead to improved understanding of the specific context of partner councils, and more effective relationships with key stakeholders. As a result, partner councils are likely to have stronger organisational ties and the ability to respond to change more effectively.
- **Knowledge sharing:** mentioned above, collaborative networks and relationships with other councils, practitioners and experts offers an opportunity for knowledge transfer and learning. Council staff can access the network to ask questions, share experiences or call on one another for support. Knowledge sharing can provide councils with the information required for decision-making, feed into improved planning and stimulate innovative solutions to common challenges.
- **Access to broader skillsets:** Collaboration allows councils to draw on a broader pool of skills, expertise, experience and specialist services among participating councils. Councils may benefit from the respective skills offered by different councils or build greater combined capability with respect to shared challenges.
- **Cross-boundary issues:** coastal management issues are not constrained by municipal borders. Collaboration allows councils to address common challenges strategically at a regional level, which is more likely to be successful than a siloed approach.

8.4.4 Improved Communication, Advocacy and Promotion

Additional to the benefits explained above, other key benefits of collaboration relate to improved capacity to advocate, raise finance and communicate effectively.

- **Consistent communication:** A collaborative approach provides for greater consistency in communication with agencies, stakeholders and the community. This is important for two main reasons; to support provision of timely information and stakeholder feedback into key activities at the right time, and to ensure messaging and information flow is the same across the whole harbour.
- **Better promotion:** councils with a unified voice in their representations at the state or other levels are more likely to be able to operate effectively within the broader system of government. This can have strategic importance as partner councils are more successful applications for funding and ensuring important issues such as land-use and infrastructure planning are being adequately addressed.

8.5 Collaboration and Cost Sharing Approach

Collaboration and cost sharing arrangements will need to be discussed and negotiated with all project partners (see Table 7-2, #G1). It is likely that various project partners will have different appetites for financial commitment. For example, it should be expected that catchment councils will contribute less to the CMP planning process relative to neighbouring foreshore fringing councils. It is also necessary to consider equity and relative sizes of rate payer bases.

A well-defined governance arrangement and decision-making process will facilitate negotiations around cost sharing. Without early agreement of cost sharing arrangements, it is unlikely that the approach will achieve desired objectives. While it is beyond the scope of this study to address these matters in detail, the below hypothetical cost sharing arrangements are provided for context:

- Table 8-1 provides an example cost sharing breakdown for a $3M planning budget distributed over three (3) years between the twelve (12) foreshore fringing (coastal zone) councils, nine (9) remaining councils within the catchment, and say four (4) government agencies / authorities that commit and contribute financial to the planning process.
- Table 8-2 outlined and alternate $3M / 3 year planning budget that includes the same local council makeup without government agency or authority financial support.

Note these examples should not be viewed as a recommendation for levels of financial contribution, but rather simply seen as a hypothetical arrangement that provides an indicative breakdown of payer project partners costs for a $3M planning process spanning 3-years. Note also that the State Government matches contributions (dollar for dollar) by the local council under the Planning Stream in the Coast and Estuary Grants Scheme.

Based on the below, foreshore Councils may be required to budget $30,000 to $40,000 per annum over three years, whereas non-coastal catchment council may be looking at a $5,000 to $10,000 per annum over the same timeframe, for example.

Table 8-1 Example 1 (of 2) CMP planning cost sharing arrangement between project partners (with agency/authority contribution)

CMP project partner category	Count	Individual contribution *(~3 years)*	Annual contribution	TOTAL Cost CMP preparation	TOTAL Cost %
Coastal zone councils (foreshore frontage)	12	$100,000	$33,333	**$1,200,000**	*40%*
Catchment councils (no foreshore frontage)	9	$20,000	$6,667	**$180,000**	*6%*
NSW government (OEH grants program)*	1	$1,380,000	$460,000	**$1,380,000**	*46%*
Other government agencies / authorities	4	$60,000	$20,000	**$240,000**	*8%*
			TOTAL CONTRIBUTION	***$3,000,000***	*100%*

* Noting OEH coast and estuary grant program provide 50:50 funding support to local council undertaking coastal management planning projects

Table 8-2 Example 2 (of 2) CMP planning cost sharing arrangement between project partners (no agency/authority contribution)

CMP project partner category	Count	Individual contribution *(~3 years)*	Annual contribution	TOTAL Cost CMP preparation	TOTAL Cost %
Coastal zone councils (foreshore frontage)	12	$110,000	$36,667	**$1,320,000**	44%
Catchment councils (no foreshore frontage)	9	$20,000	$6,667	**$180,000**	6%
NSW government (OEH grants program)*	1	$1,500,000	$500,000	**$1,500,000**	50%
			TOTAL CONTRIBUTION	***$3,000,000***	*100%*

* Noting OEH coast and estuary grant program provide 50:50 funding support to local council undertaking coastal management planning projects

CHAPTER 9 SUMMARY: FORWARD PLAN

This Scoping Study has made considerable progress is establishing the foundation for a Greater Sydney Harbour CMP. The potential benefits from preparing a Greater Sydney Harbour CMP are huge, including:

- **potential to establish a clear governance framework for managing Greater Sydney Harbour** (for the first time).
- **potential to secure significant funding to undertake planning and implement action** (e.g. State and Federal Government, business) if the benefits of a whole-of-government CMP are well articulated.
- **opportunity to develop a strategic and integrated long-term plan** that can address the system-wide opportunities and threats, while also addressing local issues.
- **opportunity to dovetail with parallel planning process and management strategies underway** (e.g. Greater Sydney Region Plan and District Plans; draft NSW Marine Estate Management Strategy).

The following key recommendations are provided:

- **progress with the preparation of Greater Sydney Harbour CMP** that encompasses Sydney Harbour tidal waterways and its catchment lands, guided by the forward plan outline in this report (Table 9-1).
- **establish a whole-of-government partnership for the CMP planning and implementation process**. Section 5.5 lists the recommended project partners. Buy-in and participation by all government tiers for the CMP is needed to ensure a truly strategic and coordinated management framework is established.
- **establish a collaborative governance arrangement to drive the CMP forward.**

The below summarises the Forward Plan to progress the Greater Harbour CMP (see Table 9-1 for details).

CMP Stage	Timing	Overview	Resourcing Estimates*
Stages 2 to 4 **Project coordination & engagement**	3 - 4 years	**Establish CMP project coordinator** **Implement engagement strategy**	Moderate (up to $400K) Moderate (~$250K)
Stage 2 **Risks, vulnerabilities & opportunities**	~2 years	**Governance study** **Technical studies: hazards/threats and values/assets**	Low (~$100K) High (~$1M)
Stage 3 **Identify and evaluate options**	~2 years	**Options assessment** **Cost benefit assessment (CBA)** **Business plans**	High (~$1M)
Stage 4 **Finalise, certify and adopt CMP**	~6 months	**Prepare and exhibit draft CMP** **Review, finalise and certify CMP**	Moderate (~$250K)
Stage 5 **Implement, monitor, evaluate and report**	>5 years	**Council implement through IP&R** **Other organisations implement through relevant work programs**	*Unknown*
		TOTAL CMP PLANNING COSTS	**Approx. $3M**

Once partner organisations are committed and project governance is established, there may be the need to revisit and refine the: preliminary business case, forward plan and engagement strategy outlined in this study.

9 Forward Plan: Greater Sydney Harbour CMP

9.1 The Way Forward

The scoping work undertaken for this project has made considerable progress in establishing foundations of a Greater Sydney Harbour CMP. This study has:

- synthesised relevant literature (Appendix B); established the context for management (Chapter 2), scope and issues (Section 4); and reviewed current governance arrangements (Section 5 and Appendix D).
- initiated engagement through council and state agency workshops (Appendix B) – and prepared a CMP engagement strategy (Appendix A).
- distilled the important coastal zone values and threats and identified key risks for the Greater Sydney Harbour coastal zone, through undertaking a preliminary risk assessment (Section 6).
- completed a detailed gap analysis and identified information needs to progress a CMP (Chapter 7).
- outlined a preliminary business case (Chapter 8) that highlights the value to councils and other stakeholder organisation in preparing a Greater Sydney Harbour CMP, and provides a hypothetical cost breakdown to provide context (Section 8.5).
- set out a CMP forward plan (herein) that recommends preparing a whole-of-government CMP for the Greater Sydney Harbour coastal zone.

Many government organisations and local councils have demonstrated clear in principle support for preparing a Greater Sydney Harbour CMP. The potential benefits from preparing a system-wide CMP are huge and articulated in this report.

Key opportunities from a Greater Sydney Harbour CMP include:

- **Potential to establish a clear governance framework for managing Sydney Harbours coastal zone / marine estate**, noting governance is currently complex and unclear.
- **Provides a vehicle to potentially secure significant funding** (e.g. State and Federal Government, business), if the benefits of implementing a strategic whole-of-government plan are well articulated (in addition to the 50% grant funding available through the Coastal and Estuary Management Grants Program, administered by OEH).
- **Provides an opportunity to develop a strategic and integrated long-term plan** that can address the system-wide opportunities and threats, while also addressing local issues.
- **Provide the ideal and suitable mechanism to guide implementation of parallel planning process and management strategies underway** (e.g. Greater Sydney Region Plan and District Plans; draft NSW Marine Estate Management Strategy).

To achieve the above benefits, a Greater Sydney Harbour CMP requires cooperation, collaboration and funding commitment from all foreshore fringing councils at least and possibly all 21 LGA's within the catchment.

Buy-in and funding commitment is required especially from State (and also Federal) government agencies and authorities that have a significant management role in the waterways and coastal zone, to help address the governance ambiguity and jurisdictional uncertainty within and around the Harbour. Substantial in-kind time and resourcing contributions and financial support, from State (and Federal) Government agencies is required. Ultimately business and industry should also be in the mix, noting that they are integral managers of foreshore areas, and beneficiaries of outcomes arising from a whole-of-harbour plan.

With consideration to the above, the following recommendations are made:

- **Prepare a Greater Sydney Harbour CMP that encompasses Sydney Harbour Estuary tidal waterways and its catchment lands.** Progress through CMP Stages 2 to 5 in accordance with the Manual and guided by the Forward Plan outlined below (note a fast track process is not warranted due to the complexity of the system and the varied progress in coastal zone planning by all councils).
- **Establish a whole-of-government partnership for the CMP planning and implementation process.** Table 5-5 outlines the suite of project partners this study proposed should collaborate in the CMP process. Buy-in and participation by all tiers of government for a system-wide CMP is needed to ensure a truly strategic and coordinated management framework is established for the Greater Sydney Harbour (for the first time).
- **Establish a collaborative governance arrangement to drive the CMP forward** that includes a (i) Project Coordinator, (ii) Steering Committee, and (iii) Technical Working Group in the first instance. Council funding is needed to support the CMP Project Coordinator in the immediate term. The CMP Project Coordinator, in collaboration with the PRCG, SCCG, must demonstrate leadership and initiative to progress the project initially (i.e. prior to the proposed project governance arrangement being established (see Section 5.5 for details). A study may be needed at some point to support/refine the project governance structure and facilitate cost sharing negotiations.

The CMP Forward Plan provided below outlines how a CMP could/should progress for Sydney Harbour. Broad timing and the indicative resourcing estimates (high, medium, low) for each CMP Stage is provided as a starting point.

Once the partner organisations are committed and a project governance framework established – there may be a need to revisit and refine the following:

- CMP preliminary business case
- CMP forward plan
- CMP engagement strategy

Future updates to the above components must reflect the ultimate CMP scope that is agreed upon and associated roles, responsibility and resourcing commitments negotiated by all project partners.

Table 9-1 Indicative Forward Program for a Greater Sydney Harbour CMP

CMP Stage	Indicative Timing	Overview	Indicative Resourcing Estimates*	Details / Comments
Stages 2 to 4 **Project coordination** **Engagement**	3 - 4 years	**Establish a CMP project coordinator** • Fund a ~0.5 to 1.0 FTE position to coordinate and manage the CMP preparation, and support governance arrangements **Engagement: implement, review and refine**	Moderate (up to $400K) Moderate (~$250K)	**Project coordinator** • A dedicated CMP project coordinator is recommended to liaise with many project partners and stakeholders and ensure the CMP is driven forward in a timely manner • Opportunity for position to be part (50%) funded by OEH, if such a role was supported by a local council(s) **Engagement** Implement community and stakeholder engagement strategy, noting: • Internal/external engagement ongoing • Develop/maintain website, facilitate info sessions, surveys, outreach • Periodic need to review, evaluate and refine the strategy
Stage 2 **Determine risks, vulnerabilities and opportunities**	~2 years	**Governance** • Study to identify CMP governance options and facilitate negotiations **Technical studies: hazards/threats and values/assets** Depending on CMP scope, partners, interests: • Sydney Harbour governance • Coastal hazards • Ground water	Low (~$100K) High (~$1M)	**Governance** Drive CMP planning forward initially as recommended in Section 5.4) Undertake CMP governance study to: • Reach an agreed project governance arrangement through consultation. • Facilitate cost sharing negotiations for CMP preparation, noting it is unlikely costs will be split equally) • Determine CMP framework to bring together councils at different stages in coastal planning process

Forward Plan: Greater Sydney Harbour CMP

CMP Stage	Indicative Timing	Overview	Indicative Resourcing Estimates*	Details / Comments
		• Seawalls • Asset surveys • Asset register • Habitat studies • Risk assessment		**Studies** • Undertake technical studies of Sydney Harbour governance, coastal hazards, environmental/social threats, and management opportunities (see Chapter 7) • Develop asset register in GIS • Undertake detailed risk assessment, with input from stakeholders
Stage 3 **Identify and evaluate options**	~2 years	**Options assessment** **Cost benefit assessment (CBA)** **Prepare business plan**	High (~$1M)	• Collate proposed options from stage 2 studies (e.g. Estuary Processes Study) • Review and collate options/actions from existing plans (CZMPs, WQIP etc) • Evaluate options/actions through internal/external stakeholder and consultation, CBA • Clarify roles, responsibilities and implications of actions • Undertake economic studies to determine equitable & transparent cost sharing arrangements / funding mechanisms for implementation
Stage 4 **Prepare, exhibit, finalise, certify and adopt the CMP**	~6 months	**Prepare and exhibit draft CMP** **Review, finalise and certify CMP**	Moderate (~$250K)	• Prepare CMP with IP&R links; in line with Stages 1 to 3 outcomes; & in consultation with all project partners • Exhibit, review, finalise and submit CMP for certification
Stage 5 **Implement, monitor, evaluate and report**	>5 years	**Council implement CMP through IP&R** **Other organisations implement CMP through relevant work programs**	*Unknown*	• Implement CMP for 5 to 10-year period (councils through IP&R) • Monitor, evaluate, report (ongoing)
TOTAL CMP PLANNING COSTS			Approx. $3M	

** Resourcing estimates are indicative only at this, noting that further consideration and negotiations are needed to seek agreement on CMP scope, project governance and cost sharing arrangement between all project partners.*

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Appendix A Community and Stakeholder Engagement Strategy

A.1.1 Introduction and Context

A.1.1.1 The Project

A Coastal Management Programs (CMP) that encompasses Greater Sydney Harbour's coastal zone is being proposed to provide a whole-of-system, integrated and strategic planning approach that addresses current needs (both local, regional and system-wide scale) and plan for future challenges (including population growth and climate change, for example).

A Greater Sydney Harbour CMP would be driven and co-funded by councils that fringe Sydney Harbour and its tidal waterways, with support from the NSW Office of Environment and Heritage (OEH), and prepared in accordance with the *Coastal Management Act 2016* (CM Act) and the *Coastal Management Manual* (the Manual). The CM Act and Manual outline requirements for preparing a CMP consistent with the State Government coastal management framework.

A CMP may be completed over five-stages, as outlined in Figure A-1. This Community and Stakeholder Engagement Strategy ('Engagement Strategy') has been prepared in accordance with the Manual and in parallel with the CMP Stage 1 Scoping Study completed for the Greater Sydney Harbour.

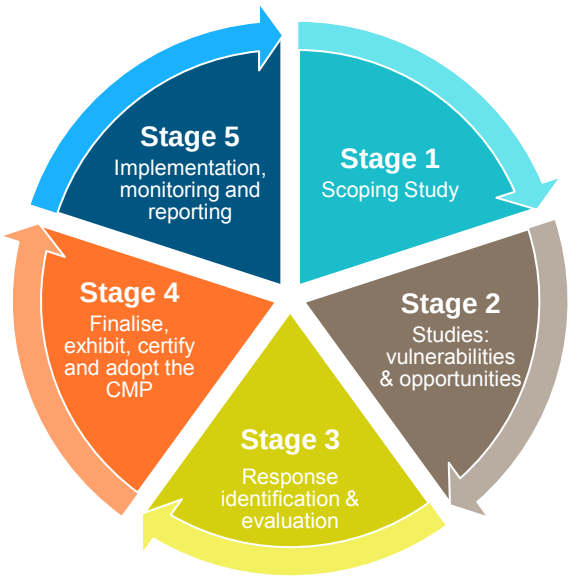

Figure A-1 Five Stage Process for Preparing a Coastal Management Program

A.1.1.2 This Engagement Strategy

This document establishes a framework and sets the strategic direction for how communication and engagement will be undertaken with internal and external stakeholders, including the community, throughout development of a Sydney Harbour CMP. This Engagement Strategy is

focussed on the development of the CMP, and will need to be revised once the CMP is certified, and ongoing. Without effective and ongoing engagement with stakeholders, it is unlikely that the CMP will be successful. It is essential that the engagement strategy is meaningfully resourced.

A.1.2 Engagement Aims and Requirements

A.1.2.1 Aims and Objectives

The overarching objectives of this Engagement Strategy are to:

- Highlight the purpose of the overarching Greater Sydney Harbour CMP, how it adds value to what has been done and what will be done by individual councils and stage agencies within the Harbour;
- Assist Council staff to gain internal buy-in for undertaking a whole-of-harbour CMP;
- De-risk the CMP process by bring stakeholders and community on board;
- Provide an overarching engagement approach that is adaptive and flexible, and can be modified/refined throughout the remaining CMP stages; and
- Facilitate meaningful exchange of information.

In addition, the specific aims of this Engagement Strategy are to:

- Outline which individuals and organisations should be involved in the CMP process;
- Clarify process and benefits of developing a CMP for the Harbour;
- Support involvement of community and stakeholders over the life of the plan, highlighting when there will be opportunities for input and what the nature of these opportunities may be; and
- Outline how community and stakeholder input will be incorporated into the CMP.

A.1.2.2 CMP Engagement Requirements

Genuine and effective engagement and communication are important aspects of a successful CMP. Part B Stage 1 of the Coastal Management Manual recommends that the scoping study includes a community and stakeholder engagement strategy. The strategy should outline:

- which individuals and organisations should be involved in the review, preparation and implementation of the CMP;
- how and when they will be offered engagement opportunities; and
- how their input will be incorporated into the planning process.

This Strategy meets and exceeds the minimum requirements of CM Act, as well as the Manual.

A.1.2.3 Key Messages

Key messages are an important element of stakeholder engagement strategies and plans. They support all people involved in stakeholder engagement to provide consistent advice and information to stakeholders. This helps to reduce confusion and misunderstanding and ensure that desired outcomes can be achieved. Key messages help to present important information accurately and succinctly. An important basis to the key messages in this strategy is the need to get buy-in from all stakeholders.

The key messages are targeted to highlight the benefits for Councils to (1) undertake a CMP; and (2) taking part in a Harbour-wide CMP].

It is important to note that key messages will need to be changed over the life of the CMP development process, as new lessons are learned, in response to feedback, and once the scope and structure of a Sydney Harbour CMP or CMPs has been determined.

A.1.3 CMP Overview / Introduction (Process, Purpose and Value)

General

- Under the newly established NSW coastal management framework, the NSW government supports the development of Coastal Management Plans for coastal and estuarine systems by local councils to achieve the objectives of the Coastal Management Act (2016). Under this new approach, it is not possible for a CMP to be certified if it does not take a system wide approach.
- Sydney Harbour is the jewel in Sydney's crown. It is iconic, commercially, socially, ecologically important, and is home to some of Australia's best-known features.
- It is essential that the Harbour is managed effectively, in a way that aligns with global and state leading practice, and with a whole-of-harbour focus.
- A Greater Sydney Harbour CMP will provide a whole-of-system, strategic planning approach, that will drive effective management of the system for the long term. It will help to ensure that the Harbour is managed as a whole and that the individual management initiatives taking place in other management areas, contribute to whole of systems outcomes.
- The development of a CMP for Sydney Harbour is consistent with and supports the delivery of other important initiatives such as Greater Sydney Regional Plan.

To Councils

- Important to come on board, is not going to take away your autonomy, but will help to deliver outcomes for Sydney Harbour as a whole.
- You should be able to develop a separate (more targeted) plans/strategies for your Council, that will support the achievement of objectives of the Greater Sydney Harbour CMP but deliver on Council specific needs and interests.
- It will help to inform councils about issues that cross council boundaries, helping to determine where collaboration is required to achieve best outcomes. This is particularly important for

identifying and managing up or downstream effects and important system issues such as transport, foreshore access and wildlife corridors.

- The CMP will identify areas where councils and other organisations can work together and achieve economies of scale, saving money while delivering important outcomes.

To Commonwealth and State Government

- The Sydney Harbour CMP presents an opportunity to drive action on a whole of system basis for the premier waterway in Australia. Aligning all activities and the integration of these activities is essential to ensure long term sustainability of the Harbour.
- An overarching CMP for Sydney Harbour is consistent with the objectives of the Greater Sydney Commission, and should be supported by all state government bodies who have a role on or adjacent to the Harbour.

To Business and Industry

- Sydney Harbour is a critical resource for the business and industries sectors in Sydney. Global recognition of Sydney is often driven through the Harbour. A Harbour environment which is continually improving, will ensure continual recognition.
- An integrated CMP for Sydney Harbour needs the support and commitment from business and industry. It is not enough to a government or local government plan, it needs to be owned and implemented in partnership.

To Other Stakeholders and Community

- The Sydney CMP will help to drive a whole of system approach to the management of Sydney Harbour. It is important that all people and groups with an interest in the Harbour are aware of the plan and are committed to supporting the plan to achieve its objectives.
- Important that all local governments are aware of the commitment by relevant stakeholders, as this will strengthen their resolve to commit to, and support the implementation of the CMP.

A.1.4 Key Messages by CMP Stage

Stage 1 - Scoping Study

- Stage 1 of a CMP involves identifying the scope of a CMP and outlining the forward plan for its development
- The goal of this stage is to determine the context, purpose and scope of a CMP, and initiate engagement and buy-in

Stage 2 - Studies of Opportunities and Vulnerabilities

- Stage 2 of a CMP involves determining the risk, vulnerabilities and opportunities associated with the CMP study area coastal zone
- The goal of this stage is to undertake studies to provide information to support evidenced based decision-making in later stages of the CMP planning process

Stage 3 – Response Identification and Evaluation

- Stage 3 of a CMP involves identifying and evaluating the coastal management options, to improve environmental, social and economic benefit of the coastal zone and marine estate
- The goal of this stage is to identify preferred coastal management actions in consultation with stakeholders and the community, that addresses issues in an integrated and strategic manner

Stage 4 – Finalise, Exhibit, Certify, Adopt the CMP

- Stage 4 of a CMP involves preparing, exhibiting, finalising, certifying and adopting the CMP
- The goal of this stage is to finalise a CMP that achieved certification from the Minister

Stage 5 – Implementation, Monitor, Reporting

- Stage 5 of a CMP involves implementation of the CMP and monitoring and reporting on its outcomes
- The goal of this stage is to implement actions within the CMP and monitor the effectiveness of the plan

A.1.5 Connecting with Other Planning and Operational Mechanisms

A Greater Sydney Harbour CMP has the opportunity to guide and facilitate implementation of parallel strategic planning process, such as:

- Greater Sydney Region Plan (GSC, 2018)
  - Eastern City District Plan (GSC, 2018)
  - Central City District Plan (GSC, 2018)
  - North District Plan (GSC, 2018)
- NSW Marine Estate Management Strategy (currently in draft form)

Council's will give effect to the CMP through their integrated Planning and Reporting (IP&R) framework.

A.1.6 Key Stakeholders and Communities

Key stakeholder and community groups that will be engaged and provide input to a Harbour-wide CMP are provided below.

Internal Council Stakeholders • Councillors • Executive management team • Resilient Sydney • Council departments: – *Planning and development* – *Assets and infrastructure* – *Natural resource management* – *Community services* **Business and Industry** • Local businesses • Business chambers • Industrial associations • Professional associations • Infrastructure providers • Property / land owners	**Community and Interest Groups** • Residents and community • Community groups: sporting, cultural and other special interest groups • Traditional owners, Aboriginal people, Local Aboriginal Land Councils **Commonwealth Agencies/Organisations** • Commonwealth department (e.g. Defence, Environment and Energy) • Commonwealth authorities and trusts (e.g. Sydney Harbour Federation Trust) **State Agencies and Organisations** • Government departments (e.g. Planning and Environment) • State authorities (e.g. EPA, MEMA), trusts (e.g. Royal Botanic Gardens and Domain Trust), and commissions (e.g. Greater Sydney Commission) **Research and Education** • Universities • Other research institutions (e.g. SIMS)

A.1.7 Engagement Strategy

A.1.7.1 Engagement Framework

Our engagement framework is based on leading practice, including consideration of (International Association for Public Participation (IAP2) and communication and engagement guidance delivered through CoastAdapt. A range of engagement activities are provided, that can be applied in a fit for purpose manner.

- Inform (stakeholders are informed about the project and process)
- Consult (engaged and feeding advice and information into the project)
- Involve (two-way engagement and joint learning)
- Collaborate (two-way engagement; joint learning, decision-making and actions)
- Empower (to place final decision-making in the hands of the public).

A.1.7.2 Stakeholder Analysis

Engagement outcomes are best achieved when consultation activities have specific objectives and are tailored to a specific audience/participant group. The below table identifies a number of stakeholder groups which need to be informed about the CMP and the process and suggests the type of engagement that is required. The below can and should be continually reassessed and as the project progresses.

Table A-1 Key Stakeholder and Engagement Approach

Stakeholder Group	Engagement
Local Government Councillors and Executive Staff	*Involvement* – imperative that Councillors have an awareness of the plan and are supportive of its intentions and role.
Local Government Staff	*Collaborate* – local government staff will need to take an active involvement in delivering the plan and helping to ensure that their own council planning activities are fully integrated and aligned with the CMP, while retaining any aspects and priorities that are unique to their own organisation or geographic needs.
Business and Industry	*Collaborate, Involvement, Consultation and Inform* - there will be a need to collaborate effectively with some of the larger business and infrastructure entities who play a large role in the Harbour. Smaller players will need to be informed about what is being done and why.
State Agencies	*Involvement and Collaboration* – State government agencies must be supportive of the intentions of the plan, and collaborate as required to ensure it can be delivered effectively. Leadership and support from state agencies will help to drive commitment from local government. Agencies which own land along the foreshore need to be heavily involved in the development of the CMP. At this stage LLS and OEH are the drivers of the CMP and will need to continue to be an integral collaborator in the project.
Commonwealth Agencies (e.g. Navy)	Relevant agencies such as Department of Defence have a key role to play in the CMP and will need to be involved in a collaborative way.
Community	The community around the Harbour will need to be informed about the CMP, and its role in driving a whole-of-harbour agenda. Their input may be sought along the way through various means (public meetings, outreach events at fairs, or markets), newsletter, email blasts, signage and websites. This will a mixture of consultation and informing.
Traditional Owners	Important that Traditional Owners are involved in the project in a meaningful way. Mechanisms for collaboration must be established.

A.1.7.3 Communication and Engagement Tools

A wide range of tools should be used to ensure people are aware of opportunities to be informed of, and have input to, the CMP as it progresses. These include:

- Project website (+/- individual Council webpages)
- Social media (eg Face Book and Twitter)
- Media release(s)
- Fact sheets
- Meetings and briefings
- Targeted workshops
- Information drop-in sessions
- Online surveys
- Speaking engagements and presentation
- Working with a champion.

A.1.7.4 Engagement Strategies

A number of engagement strategies are identified in Table A-2 to enable effective communication with different stakeholders. These strategies are based on the engagement approaches outlined in Table A-2.

Table A-2 Summary of Engagement Strategies

Strategy	Considerations	Target Audience	Outputs
Pull communication. Establish a website, or a web-page on the LLS website, which provides information about the project, and is updated as it progresses. All Councils should be asked to include a link to the site from their own websites.		• Community • Government • All stakeholders	• Website established • Website analytics assessed, including collation of referrals (this will help to identify whether interest is being driven through partner council sites).
Media release	Media release from the LLS together with State Government about the CMP and what is hoped to be achieved will help drive awareness. Try and get quote from a Minister.	• All stakeholders	• Media release prepared and distributed • Number of media outlets picking up release, or radio/television interviews.
Identify and engage a high profile champion for the project (supports push and pull communication).	Having a high profile champion for the project will help to get commitment from stakeholders. Is there a well known academic, media personality who would do this?	• All stakeholders	• High profile champion identified and "recruited" • Number of opportunities for champion to talk about the CMP.
Letters to collaborators	Send letters seeking their commitment and support for the project and emphasising the benefits of a whole of Harbour CMP. Include information about how it is intended to engage with them during the process.	• Councils • Relevant State and Commonwealth agencies • Targeted business and industry, academic organisations such as SIMS	• Letters written and sent to collaborators • Responses received (number of affirmatives)
Community presentations	These will be developed together with each of the Councils involved. It is important that the approaches used are supported by Councils and they are actively involved in the sessions.	• All Council areas • *Potentially other interested parties*	• Number of community events organised • Distribution of community events organised • Number of attendees at each event

Strategy	Considerations	Target Audience	Outputs
Meetings	Meetings with key stakeholder groups should be held to seek their input and involvement.	• Traditional Owners • Business and Industry	• Number of meetings organised and held • Responses to meetings ie number of organisations coming on board
Information sessions	These provide an opportunity for stakeholders to provide input outside of formal meetings. They are generally more relaxed and informal, and accordingly interactive. These will be arranged in collaboration with Councils and Project Manager to determine appropriate locations.	• Community	• Number of information sessions organised • Geographic distribution of information sessions • Number of people attending information sessions
Pop ups	These are information sessions which are held opportunistically. They can include having a stall at markets, Council or community events.	• Community	• Number of pop-up events organised • Distribution of pop-up events • Attendees at pop-up events
Opportunistic presentations	Presentations can be made on request from interested organisations. These may include community groups, academic organisations, business and industry, government, or local government.	• All	• Number of presentations made about the CMP • Number of attendees at presentations.
Letters to community	Letters informing about the project can be sent to community members by their individual councils.	• Community	• Number of council partners sending out letters to their communities • Number of letters sent out to communities
Council updates	Individual Councils can be asked to include information about the CMP and their role in delivering it, in their regular newsletters to ratepayers.	• Community	• Number of Councils distributing information about the CMP to their ratepayers through newsletters.

A.1.8 Engagement Approach by CMP Stage

The following table provides an indication of the engagement approach that is required at each stage of the CMP, the target audiences for the engagement, and the outcomes that are sought.

Table A-3 Summary of Engagement Approach by CMP Stage

Engagement Approach	Target Audience	Outcomes
Stage 1 - Scoping Study		
Stage 1 involves setting the framework for the CMP. Upfront stakeholder engagement and knowledge of community values is required for this stage	• Councillors and executives • Council staff • Key external stakeholders (e.g. State Government agencies) • Business and Industry • Commonwealth	• Relevant internal and external stakeholders identified • Key stakeholders assist in fist pass risk assessment • Internal buy-in achieved in Council(s) • Governance of the Sydney Harbour CMP established
Stage 2 - Studies of Opportunities and Vulnerabilities		
Stage 2 involves conducting detailed studies to fill knowledge gaps to support decision making and improve community awareness of management issues. Engagement is needed with community and stakeholders to confirm values and threats, plus exchange information on specific issues - to inform the detailed studies and the refined risk assessment	• Council estuary and coastal management staff • State Government Experts • Research community • Councillors and executives • Business Industry and the community	• Relevant stakeholders involved in the process and considering detailed risks in relation to their entity • Internal stakeholders and key external stakeholders (including technical experts) input to detailed risk assessment, and feeding information into technical studies
Stage 3 – Response Identification and Evaluation		
Stage 3 involves identifying potential actions to address issues and opportunities, and an evaluation of actions Community and stakeholder input at this stage will be focused on having input into management and adaptation strategies, and into prioritisation and guiding action evaluation	• Council estuary and coastal management staff • State Government Experts • Research community • Councillors and executives • Business Industry and the community	• Management and strategic options are identified and considered. • Coast benefit analysis is conducted effectively and stakeholders are satisfied with the prioritisation of the resultant actions
Stage 4 – Finalise, Exhibit, Certify, Adopt the CMP		
Stage 4 involves preparing a draft CMP document consistent with the State requirements that meets the management objectives of the project.	• Councillors and executives • Key external stakeholders (e.g. State Government agencies) • All stakeholders	• Public exhibition legislative requirements met • Letter of support received from Stage agencies and other organisations that will

Engagement will involve liaison with State Agencies, engaging with the community, and placing the draft CMP on public exhibition.		play a role in implementing the CMP(s) • Council(s) formally adopted certified CMP
Stage 5 – Implementation, Monitor, Reporting		
Stage 5 involves obtaining funds and finance to support implementation of adaptation actions following the sequenced, prioritised plan. Implementing actions and monitoring and reporting on the effectiveness of those actions. Engagement will involve working with key stakeholders to obtain their support, including engagement with business and industry	• Councillors and executives • Key external stakeholders (e.g. State Government agencies) • Business and industry	• Management options are implemented in accordance with the CMP • Monitoring of trigger levels is being undertaken. • Monitoring of the performance of management actions and associated evaluation of the plan is conducted and used to feed into the adjustment of the CMP going forward.

A.1.8.1 Timeframes and Sequencing

It is difficult at this stage of the CMP process to propose a timeframe and sequence for the various engagement exercises. This component will be fleshed out once a timeframe for the full program has been developed and agreed (with partners).

A.1.9 Engagement Strategy Monitoring Evaluation and Review

To ensure that the Engagement Strategy can be evaluated and changed over time and that the desired outcomes from the evaluation process are achieved, it is essential that monitoring and evaluation of the strategy is undertaken.

A cost-effective approach for monitoring the Engagement Strategy is proposed. The approach is focussed on output monitoring, because outcomes are difficult and costly to measure.

Monitoring will focus on the measures suggested in Table 2. The information obtained will support evaluation about what additional engagement practices are required, and where they might need to be located.

The ongoing evaluation CMP engagement strategies is important. The Strategy needs to be 'living' document, that is reviewed and updated at each stage of the CMP (i.e. with improved knowledge of community/stakeholder groups and their engagement needs, what strategies work well/what don't' etc), or more frequently as required.

This Sydney Harbour CMP engagement strategy need to be revisited and refined once there if further clarification on CMP structure and scope (e.g. when there is clarification on which Councils are participating, and also what their specific engagement needs/processes may be).

Appendix B Summary of Previous Work and Existing Knowledge

B.1 Overview

An extensive review of information was undertaken to gain an understanding of the strategic context for Sydney Harbour's coastal zone, identify the values/benefits and issues/threats, in addition to identifying critical information gaps for progressing with a CMP. This section details the documents reviewed in this process.

B.2 Great Sydney Commission Plans

The draft Greater Sydney Commission is an independent organisation established to lead metropolitan planning for the Greater Sydney Region. The GSC was established under the *Greater Sydney Commission Act 2015* and tasked with preparing a Plan for Greater Sydney over the next 40 years. The Greater Sydney Region Plan (see Section B.2.1.1) outlines the vision and strategy for Greater Sydney, that will be implemented at a local level through District Plans (see Section B.2.1.2). Many background studies were undertaken to help prepare the regional and district plans (see Section B.2.1.3 for example GSC information sources relevant to this study).

The draft Region Plan and draft District Plans were exhibited until December 2017. The final Plan will be submitted to the NSW Government for consideration, once the submissions have been considered. Once finalised, local councils will implement the Regional Plan and District Plans over a two- to three-year timeframe, and the plans will be subject to review every five years.

B.2.1.1 Greater Sydney Regional Plan / Towards our Greater Sydney 2056

The draft Greater Sydney Regional Plan set out an overarching vision and strategy for the Greater Sydney Region. The GSC sees Greater Sydney's future as a metropolis of three unique but connected cities; a Western Parkland City west of the M7, a Central River City with Greater Parramatta at its heart and an Eastern Harbour City (that broadly includes the Port Jackson, Lane Cover and Middle Harbour sub-catchments). The draft Regional Plan sets out a 40-year vision and 20-year plan that aims to meet the needs of current and future generations. The Plan contains:

- **Four (4) Key Themes** - including infrastructure and collaboration, liveability, productivity and sustainability
- **Ten (10) Directions** – to guide delivery of the themes in a balanced way (see **Error! Reference s ource not found.**)
- **40 Objectives** – linked to the ten directions, with a range of *Strategies* and *Actions* assigned to each.
- **14 Metrics** – linked to the ten Directions, to measure the successful delivery of the Plan

A number of objectives in the Draft Greater Sydney Regional Plan would be align with, and be supported by, the development of a harbour-wide CMP. Particularly relevant objectives in the draft Regional Plan include (but are not limited to):

- **Objective 3:** Infrastructure adapts to meet future needs

- **Objective 12:** Great places that bring people together
- **Objective 13**: Environmental heritage is conserved and enhanced
- **Objective 25:** Coast and waterways are protected and healthier
- **Objective 27**: Biodiversity is protected, urban bushland and remnant vegetation is enhanced
- **Objective 28**: Scenic and cultural landscapes are protected
- **Objective 36**: People and places adapt to climate change and future shocks and stresses
- **Objective 37**: Exposure to natural and urban hazards is reduced

Strategies outlined against the above Objectives, which are particularly aligned with preparing a CMP include:

- *Strategy 12.1: Conserve and enhance environmental heritage by: engaging with the community early in the planning process to understand Aboriginal, European and natural heritage values; conserving and interpreting Aboriginal, European and natural heritage to foster distinctive local places.*
- *Strategy 25.1: Protect environmentally sensitive coastal areas and waterways.*
- *Strategy 25.2: Enhance sustainability and liveability by improving and managing access to waterways, foreshores and the coast for recreation, tourism, cultural events and water-based transport.*
- *Strategy 25.3: Improve the health of catchments and waterways through a risk-based approach to managing the cumulative impacts of development including coordinated monitoring of outcomes.*
- *Strategy 25.4: Reinstate more natural conditions in highly modified urban waterways.*
- *Strategy 36.1: Support initiatives that respond to the impacts of climate change.*

Sitting below the draft Regional Plan are five revised draft District Plans, which provide the framework to implement the draft Regional Plan. The Central City District Plan, the Eastern City District Plan and the Northern City District Plan cover Sydney Harbour, its tidal waterways and the wider Sydney Harbour coastal zone. The distribution of Harbour fringing local government areas across these three the Greater Sydney districts are listed in Table B-4 below.

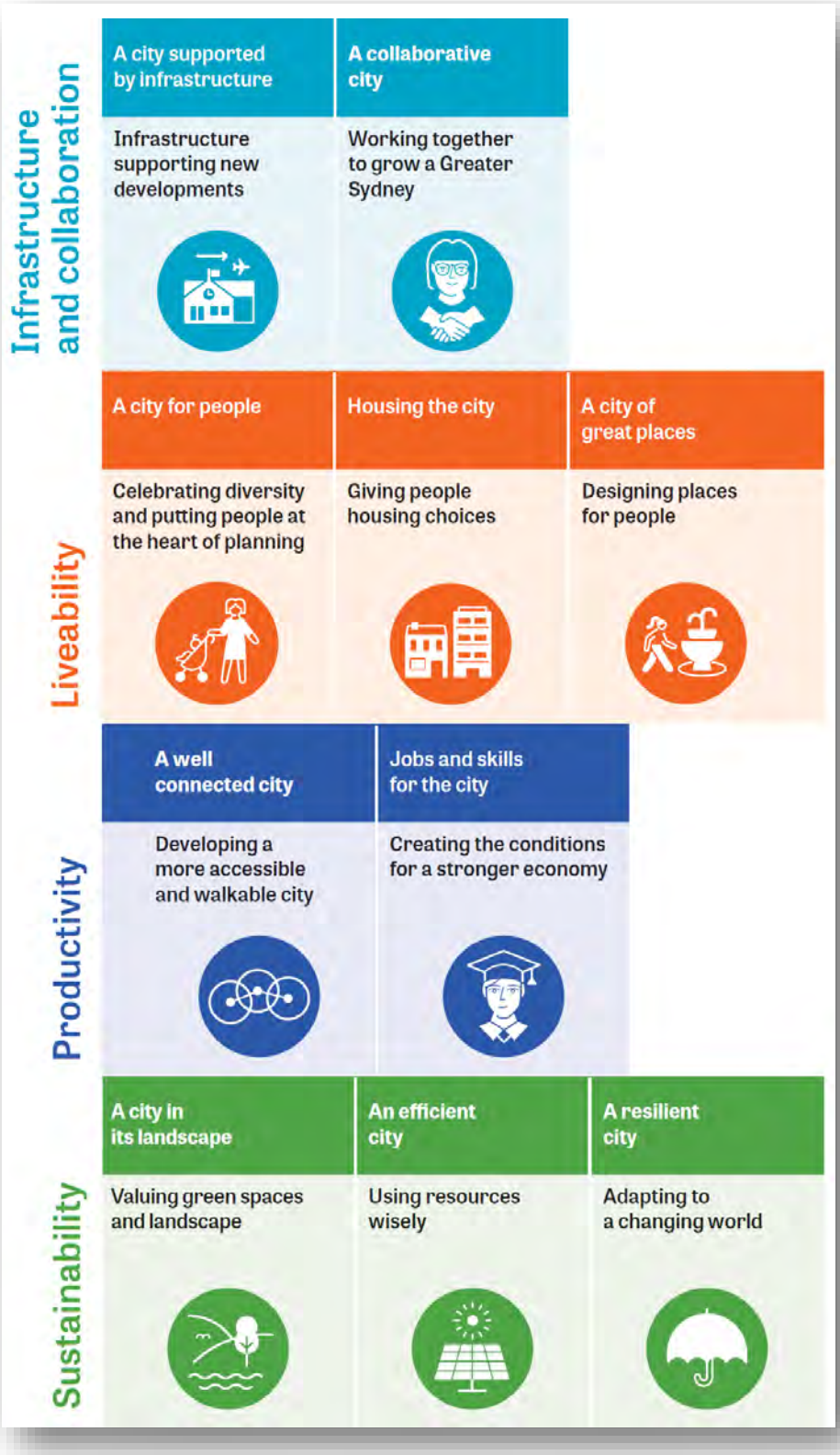

Figure B-2 Draft Greater Sydney Regional Plan: Four Key Themes and Ten Directions for Greater Sydney (GSC, 2017)

Table B-4 Distribution of the Sydney Harbour Fringing Councils Across the Greater Sydney District Area

Eastern District	Central District	Northern District
• Woollahra Municipal Council • City of Sydney Council • Inner West Council • City of Canada Bay Council	• City of Parramatta Council	• Lane Cove Council • Mosman Municipal Council • Hunter's Hill Council • City of Ryde Council • North Sydney Council • Willoughby City Council • Northern Beaches Council

B.2.1.2 GSC District Plans

The overarching vision and strategy for Greater Sydney outlined in the Regional Plan will be implemented at a local level through District Plans. The three District Plans specifically relevant to Sydney Harbour's coastal zone, which are summarised below. Each District Plan outlines Planning Priorities, which are mapped against each of the ten Directions proposed for Greater Sydney Region, serval of which parallel with the objectives of a CMP, including *Planning Priority (E14, C13 and N14): Protecting and improving the health and enjoyment of Sydney Harbour, and the District's waterways.*

Eastern City District Plan

The draft Eastern City District Plan recognises the Eastern City as a mature, global city and national economic powerhouse – centred on the Harbour CBD. This District is part of the Eastern Harbour City, and comprises iconic built places and natural attractions, including Sydney Harbour, the east coast beaches, parks and rivers. The vision for the Greater Sydney will see the Eastern City District become more innovative and globally competitive. The Eastern District Plan outlines 20 Planning Priorities.

Central City District Plan

The draft Central City District Plan recognises the Central City as a modern multicultural region that is one of the most dynamic and rapidly growing regions in Australia. The District is part of the Central River City, and centres on the Parramatta River. The Olympic Peninsula will be the focus of development, jobs and skills growth within this District, while the Parramatta CBD will be the driver of the Central River City. The Parramatta River and Duck Creek are identified as important natural features that contribute to a sense of place. The Central City District Plan outlines 20 Planning Priorities.

North District Plan

The draft North District Plan recognises the North District as comprises expansive national parks, waterways and beaches provide a natural setting for its vibrant, productive centres and strong community connections. The District comprises geographically diverse, economically strong and environmentally aware communities who value and embrace progress, the local landscape and a

great quality of life. The district includes part of the Harbour CBD, plus other strategic centres including Chatswood and Macquarie Park. The North District Plan outlines 22 Planning Priorities.

B.2.1.3 GSC Supporting Document and Information Sources

Environment Panel Advisory Paper for the GSC (Environmental Advisory Panel, 2016)

An Environmental Panel was established to by the GSC and Total Environment Centre, to provide advice to GSC on strategic environmental policies, develop an Advisor Paper and liaise with the community on environmental issues relevant to the GSC planning process. The Environment Panel Advisory Paper developed an Environmental Statement and Vision for Sydney that identifies 15 key environmental issues that should be addressed win the District Plans, which included waterways, biodiversity, open space, local character, scenic protection, climate change and natural hazards (amongst others). For each of the 15 environmental parameters, the paper provides:

- A *description* of the issue
- *evidence* detailing why the issue is important for Sydney
- *barriers* which have prevented these issues being addressed adequately to date
- suggested *metrics* to benchmark and review change over time, and
- possible *solutions* to consider in the drafting of the District Plans.

The waterways, or 'Blue Grid', extending across Greater Sydney was recognised as containing vital environmental resources and include features that define the international character of the city. The paper identified the need to manage Sydney's waterways in an integrated way and from coast to catchment boundaries. This supports the concept of developing a harbour-wide CMP, as opposed to LGA specific alternative CMP structures. Integrated government planning was identified an important process to manage Sydney's blue grid, which could be achieved through the coastal reforms framework, MEMA and the GSC processes.

Sydney Green Grid (Tyrrell, 2017)

The Green Grid is a draft green infrastructure policy developed to inform the Greater Sydney Regional Plan and District Plans. The Green Grid was prepared by a Tyrrell Studies and the Office of the Government Architects (GANSW). The Sydney Green Grid is composed of four landscape layers, or 'grids', that underpin the geographic and urban structure of Sydney. These are:

- **The Hydrological Grid** (i.e. the blue grid), including natural and man-made manipulated water systems of the city.
- **The Ecological Grid**, including geomorphology, biodiversity, ecological communities.
- **The Recreational Grid**, including open space provision for active and passive recreation, walking and cycling networks, urban open space, public domain and streetscapes.
- **The Agricultural Grid** including rural and peri-urban landscapes, food and productive landscapes as well as those with scenic rural landscape values.

The Green Grid proposed a network of high quality green spaces that connect town centres, public transport hubs and major residential areas, which acknowledges that green space is the key hallmark of liveability. The Green Grid proposes to pull together the above listed landscape layers into a cohesive green infrastructure network, through small project that provides missing links, and large projects that have transformational potential.

Many Green Grid project opportunities are provided for each District Plan area, including some within the Sydney Harbour coastal zone. These will align with the objectives of the CM Act and individual CMAs (e.g. Coastal Environment Areas, Coastal Use Area). Such project should be considered as part of a CMP. Additional environmental and social opportunities developed through a CMP should consider the strategic and integrated land use planning framework outlined in the Sydney Green Grid, where appropriate.

GSC: Demographics Characteristics (GSC, 2018)

Demographic characteristics were summarised for each District Plan area in 2016, based on a variety of data sources. A summary of the key findings is presented here to help set the context for future coastal management and planning across the Sydney Harbour coastal zone.

The former 'central district', renamed to *Eastern City District* had a population of over 1,000,000 in 2016, which is expected by 19 percent to by 2036. A high proportion of working people (15 – 64) live in this district, smaller households are common (including dominated by single person occupied), with dwelling types most commonly flats, units or apartments. The knowledge intensive sector is a major employer (45 per cent) in, followed by population serving (25 per cent) (GSC, 2018a).

The *North District* (spanning from North of the Harbour to the Hawkesbury and westerly to Wisemans Ferry) had a population of 886,000 in 2016, which is expected to increase by 11 per cent by 2036. The North District is also heavily populated by working people with separate housing accounts for more than 50% of housing types. The knowledge intensive sector is a major employer (35 per cent) in, followed closely by population serving (30 per cent) (GSC, 2018b).

The *Central City District* (which includes Parramatta heading west to Ropes Crossing and North to Wisemans Ferry) had a population of over 970,000 in 2016 which is expected to increase by 31 per cent by 2036. The Central City district is populated by population serving (32 per cent) and (industrial (26 per cent) with 65 per cent of housing types being separate houses (GSC, 2018c).

A summary of population projections specific to the Sydney Harbour coastal zone, including each of its four sub-catchments, is provided in Section B.6.

B.3 Coastal Zone Management Plans (CZMPs)

B.3.1 CZMPs

Under the State Governments' former coastal management framework, councils were provided technical guidance and financial assistance to prepare coastal zone management plans (CZMP). The primary purpose of a CZMP was to outline proposed actions to be implemented by a council or public authority to address priority issues. Priority issues typically ranged from risks to safety and built assets, pressures on coastal ecosystems and community use aspects of the coastal zone. The former *Guidelines for Preparing Coastal Zone Management Plans* (OEH, 2013) provided guidance

and instruction to councils for assessing coastal risks and preparing CZMPs, in accordance with the former *Coastal Management Act 1979*.

A number of CZMP's have now been completed for Sydney Harbour and its tidal waterways (see Table B-5). A number of these have been certified by the Minister and are now gazetted (or in the process of becoming gazetted). The new State Government coastal management framework requires councils to transition from CZMPs to Coastal Management Programs (CMPs) by 2021.

Table B-5 Coastal Zone Management Plan completed within Sydney Harbour and its Tidal Waterways

Coastal Zone/Coastline/Estuary Management Plan	Author / Year	Status	Local Government Area
Port Jackson Sub-catchment			
Woollahra Coastal Zone Management Plan	N/A	On hold	Manly (former)
Forty Baskets Coastline Management Plan	Manly Council, 2004	Completed	Manly (former)
Little Manly Coastline Management Plan	Manly Council, 2004	Completed	Manly (former)
Manly Cove Coastal Zone Management Plan	Manly Council, 2011	Completed	Manly (former)
North Harbour Coastline Management Plan	Manly Council, 2010	Completed	Manly (former)
Mosman Coastal Zone Management Plan	*Author unknown*	*Status unknown*	Mosman
Lane Cove River Sub-catchment			
Lane Cove Coastal Zone Management Plan	BMT WBM, 2013	Completed, Certified	Hunters Hill, Lane Cove, Ryde, Willoughby.
Parramatta River Sub-catchment			
Parramatta River Estuary Coastal Zone Management Plan	Cardno, 2013	Completed, Certified	Leichhardt (former), Ashfield (former), Auburn (former), Canada Bay, Strathfield, Parramatta, Ryde, Hunters Hill
Middle Harbour Sub-catchment			
Clontarf / Bantry Bay Estuary Management Plan	Manly Council, 2008	Completed	Manly (former)
Mosman Coastal Zone Management Plan	*Author unknown*	*Status unknown*	Mosman

B.3.2 CZMP Background Documents

A number of coastal zone management planning background documents have been prepared to inform preparation of the CZMPs listed in Table B-5. These include a range of study types which can be generally summarised to include the following investigations:

- data compilation and literature reviews,
- estuary processes and health studies,
- coastal hazard and risk assessments, and
- coastal and estuary management options studies.

A list of the (post-2000) background studies prepared to guide the development of the CZMPs outlined in Section B.3.1 is provided in Table B-6 below.

Table B-6 Background Documents to the CZMPs completed within Sydney Harbour

CZMP Background Documents	Author / Year	Status	Local Government Area
Port Jackson Sub-catchment			
North Harbour Coastline Hazard Definition Study	Manly Council, 2004	Completed	Manly (former)
North Harbour Coastline Management Study	Manly Council, 2009	Completed	Manly (former)
Manly Cove Coastline Management Study	Manly Council, 2009	Completed	Manly (former)
Mapping and Responding to Coastal Inundation: Modelling and Mapping of Inundation Under Future Sea Level Rise	CSIRO & SCCG, 2012	Completed	Woollahra, Sydney, Leichhardt (former), North Sydney, Mosman, Willoughby, Manly (former).
Sydney Harbour CZMP Scoping Study	GHD & SCCG, 2014	Completed	
Sydney Harbour CZMP Scoping Study: Data Compilation and Literature Review	GHD & SCCG, 2014	Completed	
Woollahra Coastal Zone Management Study	Cardno, 2015	Completed	Woollahra
Geotechnical Assessment for a Coastal Zone Management Study, Woollahra LGA	JK Geotechnics, 2015	Completed	Woollahra
Lane Cove River Sub-catchment			
No CZMP background documents post the year 2000.			
Parramatta River Sub-catchment			
Parramatta River Estuary Data Compilation and Review Study	Cardno, 2008	Completed	Leichhardt (former), Ashfield (former),

			Auburn (former), Canada Bay, Strathfield, Parramatta, Ryde, Hunters Hill
Parramatta River Estuary Processes Study	AECOM, 2010	Completed	Leichhardt (former), Ashfield (former), Auburn (former), Canada Bay, Strathfield, Parramatta, Ryde, Hunters Hill
Parramatta River Estuary Coastal Hazard Assessment	Cardno, 2013	Completed	Leichhardt (former), Ashfield (former), Auburn (former), Canada Bay, Strathfield, Parramatta, Ryde, Hunters Hill
Middle Harbour Sub-catchment			
Clontarf / Banty Bay Data Compilation and Estuary Processes Study	Manly Council, 2007	Completed	Manly (former)
Clontarf / Banty Bay Estuary Management Study	Manly Council, 2007	Completed	Manly (former)
Mapping and Responding to Coastal Inundation: Modelling and Mapping of Inundation Under Future Sea Level Rise	CSIRO & SCCG, 2012		Woollahra, Sydney, Leichhardt (former), North Sydney, Mosman, Willoughby, Manly (former).
Sydney Harbour CZMP Scoping Study	GHD & SCCG, 2014	Completed	
Sydney Harbour CZMP Scoping Study: Data Compilation and Literature Review	GHD & SCCG, 2014	Completed	

B.3.3 Sydney Harbour CZMP Scoping Study Documents (SCCG, 2015a; SCCG 2015b)

Sydney Coastal Councils Group (SCCG) completed a scoping study for Sydney Harbour in 2015, that was intended to inform the future preparation of a coastal zone management plan (CZMP, under the former state government guidelines; OEH, 2013). The CZMP scoping study area focussed on land and waterway areas downstream of Clarkes Point (i.e. the confluence of Lane Cove and Parramatta Rivers). The CZMP scoping study project comprised two reports, the first including a comprehensive literature and data review (SGGC, 2015a), and the second being the scoping study report which outlines seven priority issue themes for Sydney Harbour. Table B-7 lists the priority themes and associated issues.

Table B-7 Priority Management Issues for Sydney Harbour, outlined in the Sydney Harbour Scoping Study (SCCG, 2015b)

Sydney Coastal Zone Management Plan Scoping Study Themes and Issues	
Theme 1: Estuarine and Riparian Terrestrial Habitat	**Theme 4: Coastal Inundation Theme**
Loss of foreshore habitat	Coastal Risk Management Prioritisation (Differing Priorities between Councils)
Recreational Fishing	(Differing) Inundation Management Approaches
Shipping and Boating	Lack of Study Outcomes
Invasive Species	Integration with Other Programs
Climate Change (Habitats)	Data Accessibility
Theme 2: Water and Sediment Quality Theme	Investigation Costs
Stormwater Contamination	Coastal Reforms
Faecal Contamination	Sea Level Rise Benchmark
Contaminated Land	**Theme 5: Shoreline Stability Theme**
Climate Change (Rainfall and Water Circulation)	Erosion Hazard Assessment Inconsistencies
Theme 3: Foreshore Access Theme	Beach Nourishment Sources
Disabled Access	Cliff Erosion
Competition for Access	Coastal Protection Structures Ownership and Maintenance
Connectivity of Access	Ageing and Failing Seawalls
(Lack of/inconsistent) Supporting Infrastructure	Flexible Erosion Management
Private Structure Impacts on Access	**Theme 6: Cultural and Heritage Protection**
Private Use of Public Land	Cultural Heritage Consistency
	Theme 7: Recreational Use and Amenity
	User conflicts

While the subsequent CZMP was not completed, the CZMP scoping study documents (i.e. SGGC, 2015a, 2015b) remains a good source of information. The current CMP Scoping Study provides an update to and extension of the Sydney Coastal Council Group work. This current study extends; across all of Sydney Harbour tidal waterway areas; reviews relevant information post 2015 and those information sources specific to the Parramatta River and Lane Cove River estuaries (i.e. outside the CZMP scoping study area); and addresses the current state government guidelines (draft Coastal Management Manual) and new legislative framework (including the CM Act and CM SEPP). These additional information sources are summarised within this Chapter.

Sydney Harbour Coastal Zone Management Plan Scoping Study: Literature and Data Review – Management and Use of Sydney Harbour (SCCG, 2015a)

The CZMP scoping study literature review provided an overview of the management of the Port Jackson and Middle Harbour estuaries reaches of Sydney Harbour. The literature review also identified issues and information gaps, and provided a background to the CZMP scoping study (i.e. SCCG, 2015b).

The SCCG 2015 literature review confirmed several widely held assumptions about the management of Sydney Harbour. It found that existing management is complex and governed by Federal, State and local governments. This study also highlighted that it was unclear how the "coastal zone" definition current at the time that report was published (i.e. under the former NSW coastal management framework) applied to Sydney Harbour (SCCG, 2015c).

The SCCG 2015 literature review identified that management of coastal risks and hazards throughout its study area was inconsistent. Inconsistencies were particularly prevalent for risks relating to projected sea level rise and extreme storm events. At the time of that study, only five CZMPs had been completed and two Council's within its study area had started preparing technical studies (SCCG, 2015c).

The SCCG 2015 literature review identified major factors impacting the Harbour. Faecal contamination and stormwater inputs were found to be affecting the water and sediment quality of the Harbour, while the loss of habitat and direct and indirect impacts from Harbour uses were found to be a continuing threat to ecological values (SCCG, 2015c).

Harbour users were found to represent a broad section of the wider community. Key user values include access to the Harbour for active and passive recreations, views and water quality (SCCG, 2015c).

Sydney Harbour Coastal Zone Management Plan Scoping Study (SCCG, 2015b)

The Sydney Harbour CZMP scoping study was completed based on a literature review (summarised above), stakeholder survey and stakeholder workshop. Key values and important management issues were identified as part of the CZMP scoping study. Key values outlined are listed below:

- safe and healthy access to the Harbour
- maintenance or enhancement of Harbour views,
- high quality of outdoor experience,
- maintenance and improvement of high water quality,
- appreciation of low key/natural public areas,
- preservation of natural areas and threatened species,
- sustainable use and management of the Harbour,
- presentation and appreciation of cultural heritage.

Important management issues were in grouped into seven management themes. Each theme was presented in terms of: an overview, context, data/information gaps, values addressed, risks,

variability of the issues, primary stakeholders, expected outcomes, and recommended actions. The seven management themes identified in order of importance are listed below, with their associated management issues outlined in Table B-7.

(1) Protection and Maintenance/Improvement of Estuarine and Riparian Terrestrial Habitats. Management Issues

(2) Maintenance/Improvement of Water/Sediment Quality

(3) Foreshore Access

(4) Coastal Inundation

(5) Shoreline Stability. Management Issues

(6) Cultural and Heritage Protection

(7) Recreational Use and Amenity

B.4 Community Strategy Plans

A summary of the strategic direction and objectives for the coastal environments of the 12 Council LGAs, as stated in their respective Community Strategic Plans, is provided in Table B-1.

Table B-1 Summary of Greater Sydney Harbour Foreshore Council's Community Strategic Plans

Community Strategic Plan	Strategic Directions Relevant to the Coastal Zone and Coastal Zone Management
Woollahra Woollahra Community Strategic Plan 2010 - 2025	• Strategy 3.1: Preserve and promote local history and heritage. • Strategy 4.3: Protect local heritage and residential amenity, including protection of significant architecture and the natural environment. • Strategy 5.1: Enhance local community, cultural and recreation facilities to become more attractive, integrated and accessible. • Strategy 5.2: Provide and maintain safe, clean, serviceable public infrastructure including roads, footpaths, parks, open space, stormwater drains and seawalls. • Strategy 5.3: Provide attractive, accessible, connected and safe parks, sportsgrounds, foreshore areas and other public spaces. • Strategy 5.6: Reduce impacts of local flooding and improve floodplain risk management. • Strategy 5.7: Renew and upgrade ageing public infrastructure including roads, footpaths, stormwater drains and seawalls. • Strategy 7.1: Protect natural landscapes, systems and biodiversity. • Strategy 7.3: Support cleaner, healthier waterways including improved water quality and healthy water catchments, creeks and harbour. • Strategy 8.2: Monitor and strategically manage environmental risks and impacts of climate change.
Sydney Sustainable Sydney 2030 Community Strategic Plan 2017 – 2021	• Strategic Target 9: Every resident will be within a 3-minute walk (250 m) of continuous green links that connect to the harbour foreshore, harbour parklands, Moore or Centennial or Sydney parks. • Objective 2.3: Across the city, potable water use is reduced through efficiency and recycling and gross pollutant loads to waterways are reduced. • Objective 4.1: The city and neighbouring areas have a network of accessible, safe, connected pedestrian and cycling paths integrated with green spaces. • Objective 6.4: There is equitable access to community facilities and places, parks and recreational facilities to support wellbeing in daily life. • Objective 9.3: There are great public buildings, streets, squares and parks for everyone to use and enjoy.
Inner West Leichhardt 2025+ Community Strategic Plan	• 'Community Wellbeing' Strategy: Build on the unique identity of the LGA and foster a strong sense of place, particularly relating to Aboriginal and Heritage initiatives. • 'Community Wellbeing' Strategy: Provide democratic access to public places and spaces for residents and visitors. • 'Place' Strategy: Identify, protect and conserve environmental and cultural heritage, public spaces and community buildings. • 'Place' Strategy: Maximise the community's access to sustainable transport, community services, employment and economic opportunities, public open space, recreation facilities and the waterfront. • 'Sustainable Environment' Strategy: Protect, restore and enhance our natural environment.

	• 'Sustainable Environment' Strategy: Design and retrofit the built environment to protect the natural environment and waterways. • 'Sustainable Environment' Strategy: Manage the risk of flooding within the LGA. • 'Sustainable Environment' Strategy: Protect, conserve and enhance items of physical, social and cultural heritage within the Leichhardt LGA.
Canada Bay Futures Plan 20	• 'Active and Vibrant' Direction: We will support a range of local recreation facilities. • 'Sustainable Spaces and Places' Direction: We will facilitate and protect the environmental, cultural and social value of open spaces and foreshore areas. • 'Sustainable Spaces and Places' Direction: We will protect and enhance biodiversity. • 'Sustainable Spaces and Places' Direction: We will maintain and enhance streets and open spaces and operate an effective sustainable waste service. • 'Sustainable Spaces and Places' Direction: We will encourage sustainable design and conserve and celebrate local heritage.
Parramatta Parramatta 2038 Community Strategic Plan	• Environment (Natural Environment) Strategy: Improve, protect and value our natural heritage and systems, including the extensive network of parks and bushland reserves; continue to protect biodiversity while improving connections between these areas and people; and focus on: waterways rehabilitation, biodiversity and bushland management, local air quality and land and soil management. • Environment (Risks and Resilience) Strategy: Minimise and manage environmental risks; increase resilience; improve recovery times; and focus on: preparation for extreme weather events and/or other extreme events that disrupt food, water, energy or other resource supply, identification of risk and putting plans in place to better deal with events when they happen and flooding risk. • Culture and Sport (Distinct Places) Strategy: Formulate great experiences and recognise, celebrate and promote our dynamic history and heritage and unique places.
Ryde The City of Ryde 2025 Community Strategic Plan	• 'Liveable Neighbourhoods' Strategy: To encourage and support local identity and character in our suburbs and neighbourhoods and protect our local heritage. • 'Liveable Neighbourhoods' Strategy: To create active public places and spaces through good planning and design. • 'Environmental Sensitivity' Strategy: To raise awareness in our community on the future challenges to our natural environment and the actions required to mitigate them. • 'Environmental Sensitivity' Strategy: To work collaboratively with neighbouring councils to develop measures to protect our natural environment and bio-diversity. • 'Environmental Sensitivity' Strategy: To take a leadership role and enhance our capacity to manage any impact of climate change and protect our community. • 'Connections' Strategy: To improve connectivity between and accessibility to our suburbs, centres, open spaces and places.
Hunters Hill	• 'Environment' Strategy: Educate and support residents about ecologically sustainable practices. • 'Environment' Strategy: Reduce our environmental footprint in the context of climate change and growing population pressures.

Community Strategic Plan 2030	• 'Environment' Strategy: Identify and plan opportunities for building a sustainable community.
Lane Cove Community Strategic Plan Lane Cove 2025	• 'Sustainable Development' Strategy: Support State Government initiatives to promote sustainability. • 'Sustainable Development' Strategy: Focus infrastructure planning and management on supporting sustainable 'local living' and resilience to climatic events. • 'Sustainable Development' Strategy: Review the impact of flooding on the community. • 'Natural Environment' Strategy: Implement catchment management plans to protect and rehabilitate high priority waterways and manage impacts on medium and low priority waterways. • 'Natural Environment' Strategy: Encourage use of innovative stormwater pollution waterways reduction. • 'Natural Environment' Strategy: Review and integrate estuary, bushland and catchment management plan.' • 'Culture' Strategy: Support programs that promote Aboriginal heritage and culture.
Willoughby Willoughby City Strategy 2013 – 2029	• Strategy 1.1.3.c: Acknowledge, respect and protect Aboriginal heritage. • Strategy.1.3.1.g: Increase linkages to foreshore areas, bushland and open space. • Strategy 1.3.1.i: Incorporate climate change adaptation measures into open space and recreational facility management. • Strategy 2.1.1.b: Protect environmentally sensitive areas from human impact and climate change. • Strategy 2.1.1.c: Manage natural areas using a water catchment approach. • Strategy 2.1.2.d: Build partnerships with stakeholders and other councils to integrate management of environmentally sustainable issues. • Strategy 2.1.3.b: Work with NSW Government, other councils and stakeholders to improve air and water quality on a regional basis. • Strategy 2.2.1.f: Develop and implement an action plan that addresses climate change mitigation and adaptation. • Strategy 3.1.3.a: Identify and protect heritage items, conservation areas, environmentally sensitive areas and Aboriginal sites.
North Sydney Community Strategic Plan 2013 – 2023	• Strategy 1.3.1: Implement water quality improvements. • Strategy 1.4.6: Prepare for the impacts of climate change and sea level rise. • Strategy 1.5.3: Provide a welcoming and vibrant waterfront with integrated green public spaces and enhanced foreshore access. • Strategy 4.4.1: Protect and maintain sacred and historic sites.
Mosman MOSPLAN 2013 - 2023	• Built Environment Strategy 3: Effectively manage the conservation of Mosman's heritage. • Built Environment Strategy 6: Provide, maintain and sustainably manage Mosman's public infrastructure including roads, footpaths, drainage and marine structures.

	• Healthy Environment Strategy 2: Preserve and enhance biodiversity on both public and private land, including Mosman's urban forest, bushland, reserves, open space, beaches, intertidal zone and the marine environment. • Healthy Environment Strategy 3: Implement total water cycle management approaches to maximise water conservation, reuse and efficiency, and improve water quality. • Healthy Environment Strategy 6: Lobby and/or work with the Federal and State Governments, and regional organisations/ local Councils to advocate for stronger policy and legislation, and implement programs to achieve robust sustained environmental outcomes.
Northern Beaches Shape 2028 Community Strategic Plan 2018 - 2028	• Strategy 1.a: Minimise the risk to life and property from storm events, floods, erosion, landslides, bushfires and impacts of climate change. • Strategy 1.b: Increase the resilience of the environment to the effects of natural hazards and climate change. • Strategy 1.c: Maintain productive partnerships with government agencies and the community to effectively manage and respond to natural hazards. • Strategy 2.b: Protect and improve ecological conditions in catchments, creeks and lagoons. • Strategy 2.c: Protect and manage the condition and safe access to the coast, lagoons, Middle Harbour, and Pittwater. • Strategy 2.d: Provide sustainable access to the natural environment, while recognising and protecting its cultural and heritage value. • Strategy 3.b: Invite community participation in restoring the natural environment through volunteering programs and education. • Strategy 12.c: Recognise and honour Aboriginal culture and heritage.

B.5 Harbour Wide Information Sources

B.5.1 Sydney Harbour Catchment Water Quality Improvement: Data Compilation and Review (WRL, 2011)

A catchment-wide study to compile and review data and information for Sydney Harbour was completed by WRL in 2011. The study was undertaken to inform the development of a Water Quality Improvement Plan for Sydney Harbour, with a specific focus on data required to develop a Catchment Pollutant Export Model and Ecological Response Model. The report presents and discusses key datasets that supplement a database collated as part of this study. The report also highlights information gaps, outlines available modelling software, identifies key indicator pollutants, maps pollution hot spots and makes recommendation for further data collection and management. Recommendations are made with respect to further data collection and model development costs and approaches.

B.5.2 Sydney Harbour: Systematic Review of the Science (SIMS, 2014a)

The Sydney Institute of Marine Science (SIMS) undertook a comprehensive review of the peer reviewed, scientific literature on the biophysical characteristics and condition of the Harbour. This review provided a concise and accurate summary the shape and form of Sydney Harbour, its natural environment and threats to biodiversity and ecosystem function. A specific description of the following was provided:

- geological history,
- hydrology,
- circulation,
- subtidal rock reef,
- rocky intertidal shores,
- soft bottoms and beaches,
- soft sediment macrophytes,
- open water / pelagic systems,
- contaminated sediments,
- nutrients and turbidity,
- non-indigenous and novel species,
- habitat modification,
- fishing and aquiculture, and
- climate change

Data gaps and future research directions on the above were also outlined, in addition to stressor interactions. Major knowledge gaps were identified on: the Harbour's resilience to climate change;

understanding the quality ecological value of the of fragment and remnant habitat patches; distribution, movement and contamination status of fish within the Harbour and hence risk of fishing to ecosystem and human health; distribution of emerging contaminants; distribution and effects of non-indigenous species; and options/benefits for green engineering programs/approaches to reduce the ecological impact of artificial shoreline structures, noting that nearly 50% of the harbours foreshore has been modified in some way.

B.5.3 Sydney Harbour Background Report (SIMS, 2014b)

SIMS prepared a report on the available information for ecological assets of Sydney Harbour, threats to those assets, and the economic and social values attribute to the Harbour. This report was prepared for the NSW Marine Estate Management Authority (MEMA) as part of a larger initiative to investigate current natural resource management within and around Sydney Harbour. The report objectives were to: outline data on the spatial distribution of ecological assets; outline data on the spatial patterns of resource use; synthesis the current knowledge of the contamination status of the Harbour and likely future trends and distributions; synthesise current knowledge of economic benefits from the harbour use; and synthesise current knowledge of community values.

The report highlights that Sydney Harbour is a complex waterway exposed to interactions of intense commercial and recreational activity with the great diversity of ecological habitats, species and geological environments. This report addressing the current knowledge of Sydney Harbour and outlines future research areas that will help with the management of the complex waterway.

B.5.4 NSW Marine Estate: Threat and Risk Assessment (BMT WBM, 2017)

An evidence based threat and risk assessment was completed for the NSW marine estate (statewide TARA) by the Marine Estate Management Authority, to inform the Marine Estate Management Strategy. The statewide TARA identifies and assesses risks to environmental assets and social, cultural and economic benefits or the NSW marine estate (i.e. how various activities may affect the NSW marine estate values). Accordingly, the TARA considers threats to the social benefits of the marine estate (such as public participation and enjoyment of various uses and activities), economic benefits derived from the marine estate (such as employment and the value of production) as well as stressors on a broad range of natural assets such as clean water, marine habitats and protected species and communities across both estuaries and open coasts.

THREATS	BENEFIT 1	BENEFIT 2	BENEFIT 3	BENEFIT 4	OVERALL RISK LEVEL
THREAT 1	HIGH	HIGH	MINIMAL	LOW	HIGH
THREAT 2	LOW	MINIMAL	MINIMAL	MINIMAL	MINIMAL
THREAT 3	MODERATE	LOW	LOW	MINIMAL	LOW
THREAT 4	MODERATE	MODERATE	MINIMAL	MODERATE	MODERATE
OVERALL RISK LEVEL	HIGH	HIGH	LOW	MODERATE	

Figure B-3 Threat and Risk Matrix Adopted for the TARA

Threats and their associated risks were assessed at a state and regional scale, with the three regions including the: 'North region' from Tweed Heads to Stockton; the 'Central region' from Newcastle to Shellharbour, including Sydney Harbour; and 'South region', from Shellharbour to the NSW / Victorian border. Threats and risks were assessed for 'Coastal and Marine Waters' (i.e. the open coast) and 'Estuaries'.

At a state level, the TARA identified water pollution from diffuse sources and stormwater discharge as the number one threat to the marine estate, with physical disturbance from clearing riparian vegetation, foreshore development, dredging and various on-water activities also significant. The priority threats to the Central region were comparable to the state-wide results listed here, with urban stormwater being more significant than agriculture.

B.5.5 Sydney Harbour Catchment Water Quality Improvement Program (Freewater and Kelly, 2015)

Water quality and the ecological health of Sydney Harbour is threatened by pollutants that enter the Harbour and its tidal waterways through stormwater and sewerage overflows. Toxic sediments from past industrial also contribute to the pollution of the Harbour. The Sydney Harbour Catchment Water Quality Improvement Plan (WQIP) was developed to provide a catchment approach to managing and improving water quality within the Harbour. The Sydney Harbour WQIP encompass the whole of Sydney Harbour's tidal waterways and catchment areas, which encompasses 25 local government areas, 11 stage agencies and 2 federal agencies (LLS, 2016). The primary objective of the plan it to set targets for pollutant load reductions to address threats to water quality in the Harbour and its tributaries and protect the ecological health and associated values of the waterway. Central to the WQIP, was the development of numerical models to simulate catchment and receiving water quality, and ecological response to changes in catchment loads and estuary pollutants.

The Sydney Harbour WQIP identified sources of pollution entering the Harbour and classified levels of risk associated with the water quality threats. The WQIP evaluates six potential options to address the future growth pressures, which included incorporating Water Sensitive Urban Design into redevelopment in the catchment and retrofitting the urban landscape. Pollutant load and conditions targets for Sydney Harbour and its catchment are proposed (based on 70% WSUD to infill redevelopment, 10% retrofit of existing urban areas and capping sewer overflows) and management actions to achieve these targets are outlined.

A key recommendation of the WQIP is the need for a whole of government and co-ordinated approach to managing Sydney Harbour catchment that is sufficiently resourced and funded (e.g. a collaborative Urban Water Management Program). A modelling and monitoring strategy to address knowledge gaps identified in the WQIP is also provided, along with an evaluation framework to measure the progress and success of the key recommendations provided.

B.5.6 Sydney Harbour Estuary Processes Study (Freewater, 2018)

The Sydney Harbour Estuary Processes Study (SHEPS) provides a series of detailed studies to fill current knowledge gaps about the coastal management issues affecting the Harbour. These studies will be used to support council decision-making processes and assist the broader community in

understanding the relevant coastal management issues. This will enable the development of actions to address both current and future risk issues from coastal hazards.

This report contributes to Stage 2 of the CMP detailing vulnerabilities and opportunities to fill gaps in current knowledge about coastal management issues affecting Sydney Harbour. This knowledge will help in the identification and selection of appropriate management actions to; *"support ecologically sustainable development, manage and reduce risks from coastal hazards, promote public access, improve community awareness and understanding and support the well-being of the local community and coastal ecosystems"*.

The improved knowledge generated by these studies will help support and inform Stage 3 of the Greater Sydney Harbour CMP process.

B.5.7 Our Harbour Our Asset: An overview of economic activities and values associated with Australia's most iconic harbour, and its use by the city that surrounds it (Hoisington, 2015)

Sydney Harbour and the coastal beaches are arguably the greatest environmental assets Sydney has. Many economic activities and values are dependent upon the Harbour however it is very complex and challenging to value these. Hoisington (2015) attempted to assess the economic value of Sydney Harbour using the entire estuary, reaching from the Parramatta Weir to North and South Heads as the boundaries.

The report assesses value beyond a strictly monetary approach and recognises value in relation to any aspects of the Harbour that society would want to retain or enhance and for which it would consider incurring a sacrifice i.e. investment to protect ecosystems. The following groups have been used to value the Harbour:

(1) Harbour functions: ports, maritime activities, transport, the Royal Australian Navy

(2) Cruising industry and tourism

(3) Harbour foreshore landscape value

(4) Incremental values of land and real estate

(5) Private businesses

(6) Outdoor leisure and sporting activities

(7) Environmental quality

(8) Cultural heritage, arts, science, option, existence and bequest values

The report documents values that represent economic values for which Sydney Harbour plays a central role i.e. without the Harbour these values would not exist or would be significantly reduced. The report found that where estimates were available, the financial value of Sydney Harbour was significant. The largest economic values sat under the categories: domestic real estate, cruise ship expenditure, harbour port revenues and major events on and around Sydney Harbour (as outlined in Section 2.10). It also found that for many important values estimates have not been made and as such have no financial value attributed to them.

B.6 Population Growth Projections

Sydney's population is forecast to increase by 80% by 2054, which indicates that an additional three million people will live and work in metropolitan Sydney by that time (Tyrrell Studio (2017). This will require significant changes to the built environment that will place additional pressure on the Sydney Harbour coastal zone.

The NSW Department of Planning and Environment produced population projections in 2016 for which provides a picture and structure of the population in NSW and its LGAs from 2016 to 2036. The below provides a summary of population statistics and projections for the twelve (12) LGAs that fringe Sydney Harbour and its tidal waterways. This is included to provide a snap shot of population growth challenges that must be considered as part of a CMP (or CMPs) for Sydney Harbours coastal zone as presented in Figure B-4.

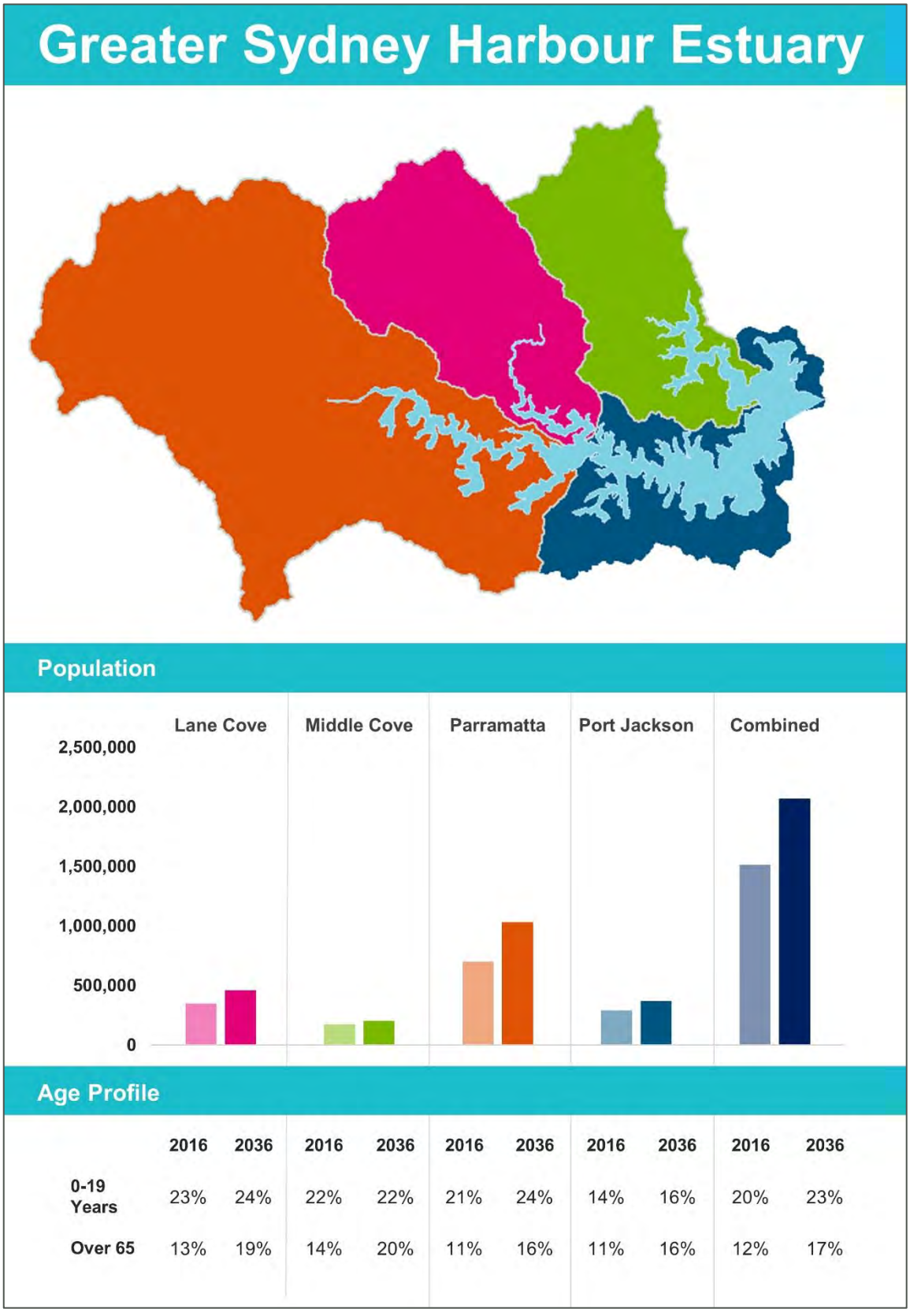

Figure B-4 Sydney Harbour coastal zone population statistics

Appendix C Council and Stakeholder Engagement Workshop Summary

Technical Memorandum

From:	Paul Donaldson, Greg Fisk	**To:**	Dr Peter Freewater (OEH/LLS), Tim Macdonald (OEH)
Date:	13 November 2017	**CC:**	Workshop participants
Subject:	**Sydney Harbour CMP Scoping Study Workshop Summary and Outputs**		

Workshop Summary

Overview

Stakeholder workshops were held over two consecutive days, forming a key task to guide the preparation of the Sydney Harbour Coastal Management Program: Stage 1 Scoping Study ('the CMP Scoping Study'). Representatives from ten state agencies and organisations participated in the Day 1 Agency Workshop, and representatives from nine of the 12 local government areas that fringe Sydney Harbour participated in the Day 2 Council Workshop. The workshops were highly interactive and participatory, and included a series of open forum discussion sessions and group activities.

Objectives from the workshop included: (i) communicating the context and drivers for the CMP Scoping Study; (ii) identifying key stakeholders and confirming the legislation, policy and plans that govern Sydney Harbour; (iii) confirming a relevant list of background information and stakeholders; and (iv) seeking high level feedback on the asset/value and threat categories, to help guide the preliminary risk assessment to be completed as part of the CMP Scoping Study. An additional aim was to investigate the potential benefits, challenges, and barriers for preparing a harbour-wide CMP.

As part of the workshop activities held throughout each day, the following worksheets were completed: (a) background study list; (b) stakeholder List: review and update; (c) Sydney Harbour governance; (d) assets and values; and (e) threats.

Urban stormwater and foreshore development were identified as the highest priority issues in the Agency open forum discussion session. Natural coastal hazards, sewerage assets and inadequate foreshore access/infrastructure plus lack of connectivity were also highlighted as high priority issues.

Key words highlighting the advantages and opportunities for completing a harbour-wide CMP in a Council whiteboard discussion session included: 'one harbour', 'improved environmental outcomes', 'integrated and holistic', 'coordinate and collaborate', 'clarity and transparency', 'consistent approach', 'power in numbers', and 'shared ownership, shared success'.

Opportunities, Ideas and Support for a Harbour-Wide CMP

The importance and opportunities of a harbour-wide CMP were emphasised in the Agency workshop, and included to: address catchment scale issues/opportunities; ensure sustainable and strategic management of a globally-iconic waterway; and develop a framework for interagency co-ordination. Cost advantages to Council for undertaking a harbour-wide CMP were highlighted, i.e. economies of scale, platform for attracting government +/- private funds, and it was noted that the vision and scope of a CMP should not be limited by Council budget constraints. The Western Sydney Infrastructure Plan was highlighted as a possible parallel funding model, recognising the importance of Sydney Harbour on a national scale.

A harbour-wide CMP should link with the Greater Sydney Commission (e.g. to ensure the GSC growth and infrastructure plans recognise the coastal zone values and accommodate coastal hazard risks). Several draft Greater Sydney Regional Plan objectives would be supported by, and best achieved through, a harbour-wide CMP.

Barriers, Drivers and Structure of a Harbour-Wide CMP

Learnings from the Parramatta Coastal Zone Management Plan were highlighted, noting that time-commitment, organisation and governance becomes more complex with an increasing number of parties and partners. A harbour-wide CMP would need to recognise that Sydney's coastal Councils are progressed to various stages of coastal zone planning. It was also noted that convincing Council executives and elected members to be involved in a CMP process will be important. Key messages that Council officers can use internally to promote the benefits of a coordinated harbour-wide approach to the CMP are needed.

Drivers and governance models for a harbour-wide CMP were discussed. As a potential model, an agreement between Council and State Government has been developed for the Healthy Waterways Partnership in Moreton Bay dealing with similar issues to Sydney Harbour.

Clearly defined governance structures and processes will be required to be able to develop a CMP for Sydney Harbour and its tidal catchments. An approach for this could be: (i) a senior steering committee; (ii) officer-level committees that would oversee technical aspects, for example; and (iii) a communications committee/group to guide communication and engagement activities etc.

Priority Values and Threats

Group worksheet activities were undertaken to identify important values and priority threats. This will feed into the preliminary risk assessment, completed during the CMP Scoping Study. A long list of values and threats relating to environmental, social/community use, and economic aspects of Sydney Harbour were assessed.

The majority of the 21 potential values for Sydney Harbour were considered to be 'important' to 'very important' by both the Agency and Council workshop attendees. 'Sydney Harbour fishery' was the only value identified by both an Agency and Council group as being 'less important'

Land use intensification and coastal hazards were identified as priority environmental threats. A wide range of priority socio-economic threats were highlighted under the themes of 'environment', 'governance', 'public safety', 'critical knowledge gaps', 'lack of access availability' and 'coastal hazards.'

The outputs from the values and threats worksheet activities are provided as an appendix to this technical memorandum.

Introduction

State Agency and Council workshops were held on 2nd and 3rd of November 2017 to help guide preparation of a Sydney Harbour Coastal Management Program (CMP) Scoping Study. A Scoping Study forms the mandatory Stage 1 (of a five-stage process) for preparing a CMP under the draft NSW Coastal Management Manual ('the draft Manual').

Representatives from the harbour foreshore fringing councils and state government agencies that play an important role in the governance of Sydney Harbour were invited to attend their respective workshops. The workshops were held at the Office of Environment and Heritage (OEH) Regional Operations office in Parramatta.

The workshops formats were designed to be highly interactive and somewhat fluid, to encourage thoughtful discussion amongst participants and maximise the usefulness of the workshop for both the study team and participants. The generally structure of each workshop included (i) powerpoint presentation slides, (ii) interactive group activities (including worksheets) with feedback, and (iii) open forum information gathering sessions, with results captured on whiteboard.

Workshop Aims and Objectives

The broad outcomes sought from both CMP Scoping Study workshops were as follows.

- Communicate the context and drivers for the scoping study to participants.
- Confirm the legislation, policy and statutory plans that govern Sydney Harbour.
- Build on the list of stakeholders prepared through the information review, including validation of current and potentially new stakeholders given the broader area and intent of the CMP.
- Seek high level feedback on the asset/value and threat categories, to help guide the preliminary risk assessment component of the Scoping Study.

An additional aim of the Scoping Study is to investigate the potential benefits, challenges and barriers for preparing a harbour-wide CMP.

This document summarises the information discussed and outcomes arising from the workshops.

Workshop Content and Activities

The workshops were split into three blocks, with each covering a range of coastal management content and issues relevant to Sydney Harbour. Interactive group activities and discussion occurred throughout each block. The workshop structure was broadly similar between the two days. The Agency Workshop agenda is shown in Figure 1 and the Council Workshop agenda is shown in Figure 2.

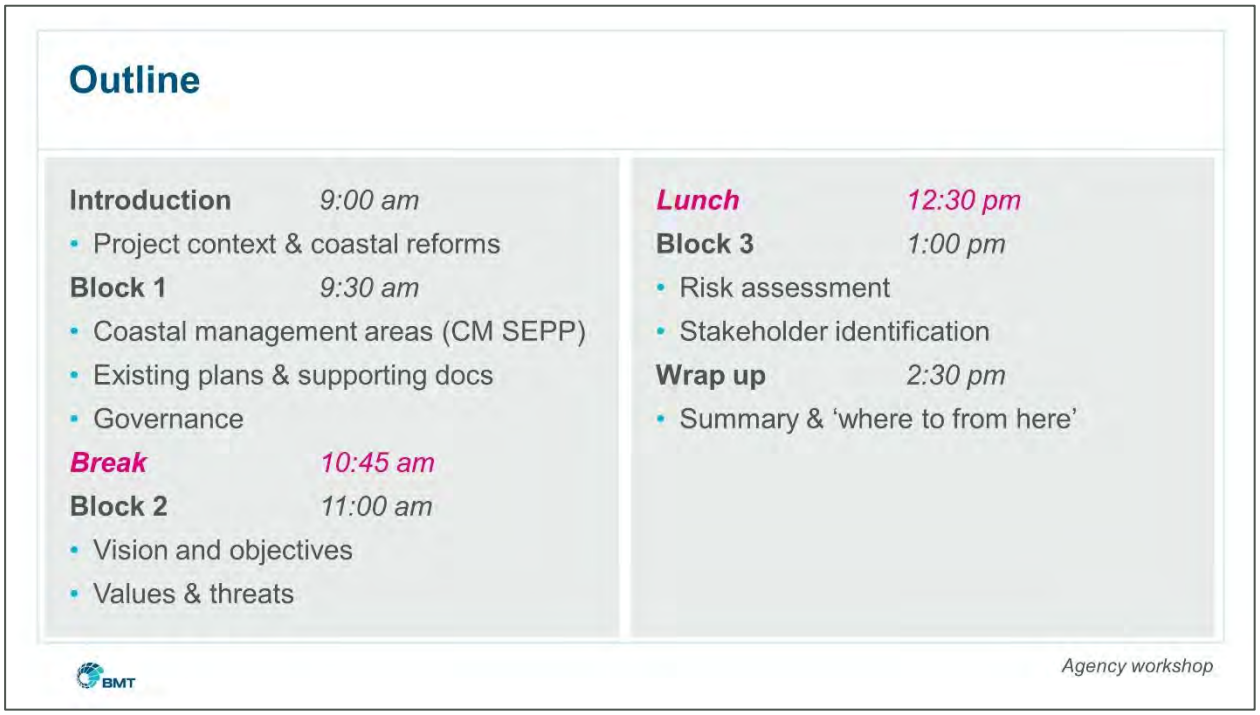

Figure 1 Day 1 Agenda: State Agency Workshop

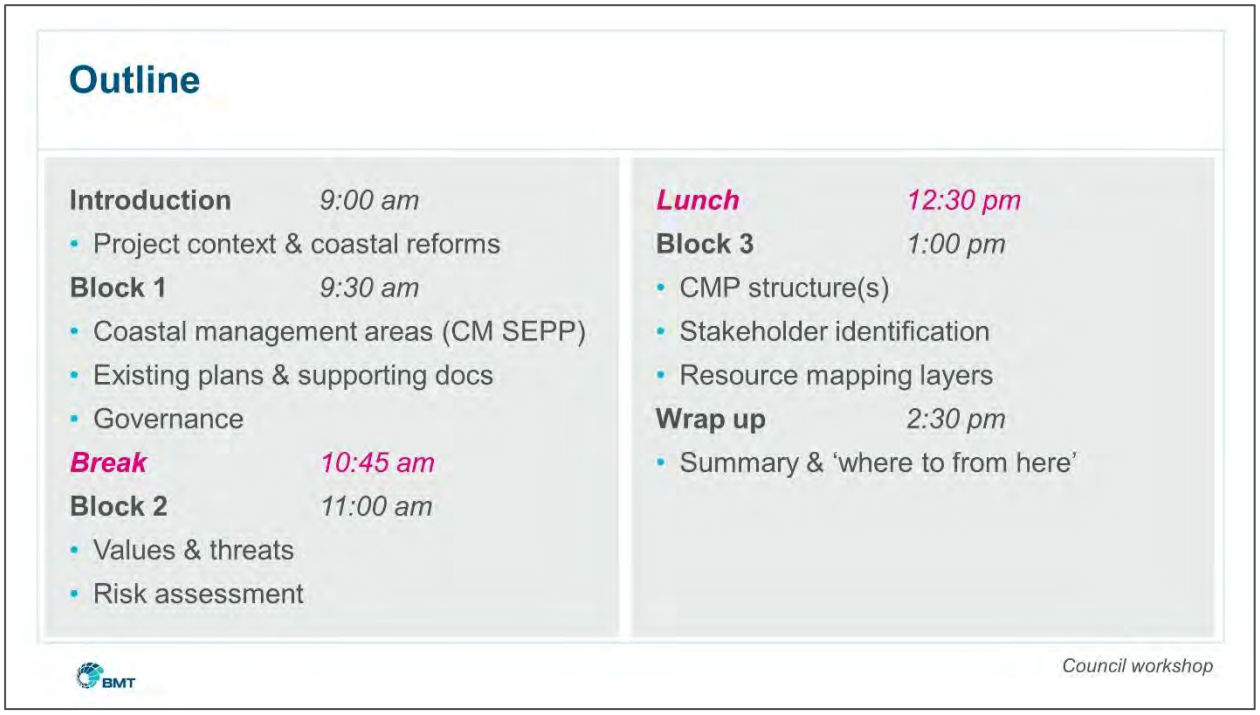

Figure 2 Day 2 Agenda: Council Workshop

Table 1 lists the worksheet group activities completed during the workshops. The background studies, governance and stakeholder worksheets comprised a list of relevant information obtained from the Sydney Harbour CZMP Scoping Study (GHD, 2015) commissioned by the Sydney Coastal Councils Group, which was reviewed and updated for the workshops.

Table 1 Worksheet Activities

Agency workshop	Council workshop
• *Background Study List*: review and update • Sydney Harbour Governance: review and update • *Assets and Values*: review, updated and prioritise • *Threats*: review, updated and prioritise	• *Background Study List*: review and update • *Assets and Values*: review, updated and prioritise • *Threats*: review, updated and prioritise • *Stakeholder List*: review and update

Values and threats previously documented for Sydney Harbour were synthesised into a comprehensive list from the following key documents:

- Sydney Harbour CZMP Scoping Study (GHD, 2015),
- Parramatta River Estuary CZMP (Cardno, 2013),
- Lane Cove River CZMP (BMT WBM, 2013), and
- NSW Marine Estate Threat and Risk Assessment Report (BMT WBM, 2017).

The updates to this information and knowledge gathered during the workshop activities has been collated and will be included in the Sydney Harbour CMP Scoping Study Report.

Sydney Harbour: Overview

An overview of the Sydney Harbour Coastal Zone was presented to set the context for both workshops. A summary of the information presented is provided below.

Stretching from its upper tidal limits on the Parramatta River downstream to the ocean entrance between North and South Head, Sydney Harbour is a natural wonder on which the commercial and social foundations of the greater Sydney region are built.

Sydney Harbour is diverse, and encompasses a wide range of:

- natural features and values,
- cultures and communities,
- human uses and infrastructure,
- pressures and threats, and
- agencies / organisations with management roles and responsibilities.

The *Coastal Management Act 2016* defines **four management areas** for the coastal zone. The Sydney Harbour coastal zone includes all four management areas, namely:

- coastal wetland and littoral rainforest area,
- coastal vulnerability area,
- coastal environment area, and
- coastal use area.

The draft Manual outlines that the scope and structure of a CMP is flexible. An area covered by CMP may include all or any part of the coastal zone within a council area, but may also extend outside the council boundaries and be prepared in cooperation with adjoining councils.

Geographically, **four (4) sub-catchments** drain into the harbour estuary (SIMS, 2014). These include:

- Port Jackson sub-catchment,
- Parramatta River sub-catchment,
- Lane Cove River sub-catchment, and
- Middle Harbour sub-catchment

The Sydney Harbour estuary foreshore is fringed by **twelve (12) local government areas** (LGAs):

- Woollahra Municipal Council
- City of Sydney
- Inner West Council
- City of Canada Bay
- City of Parramatta
- Ryde City Council
- Municipality of Hunters Hill
- Ryde City Council
- Willoughby City Council
- Lane Cover Municipal Council
- North Sydney Council
- Mosman Municipal Council
- Willoughby City Council
- Northern Beaches Council

The distribution of these twelve councils across the four sub-catchments is demonstrated in Table 2 and Figure 3. Note that Figure 3 shows that many council with waterway frontage span two-adjoining sub-catchments.

Table 2 Sydney Harbour Sub-Catchments and harbour side LGAs

Port Jackson Sub-Catchment	Parramatta River Sub-Catchment
• Woollahra Municipal Council • City of Sydney • Inner West Council • Lane Cove Municipal Council • North Sydney Council • Mosman Municipal Council • Northern Beaches Council	• Inner West Council • City of Canada Bay • City of Parramatta • Ryde City Council • Municipality of Hunters Hill
Lane Cove Sub-Catchment	**Middle Harbour Sub-Catchment**
• Municipality of Hunters Hill • Ryde City Council • Willoughby City Council • Lane Cover Municipal Council	• Mosman Municipal Council • North Sydney Council • Willoughby City Council • Northern Beaches Council

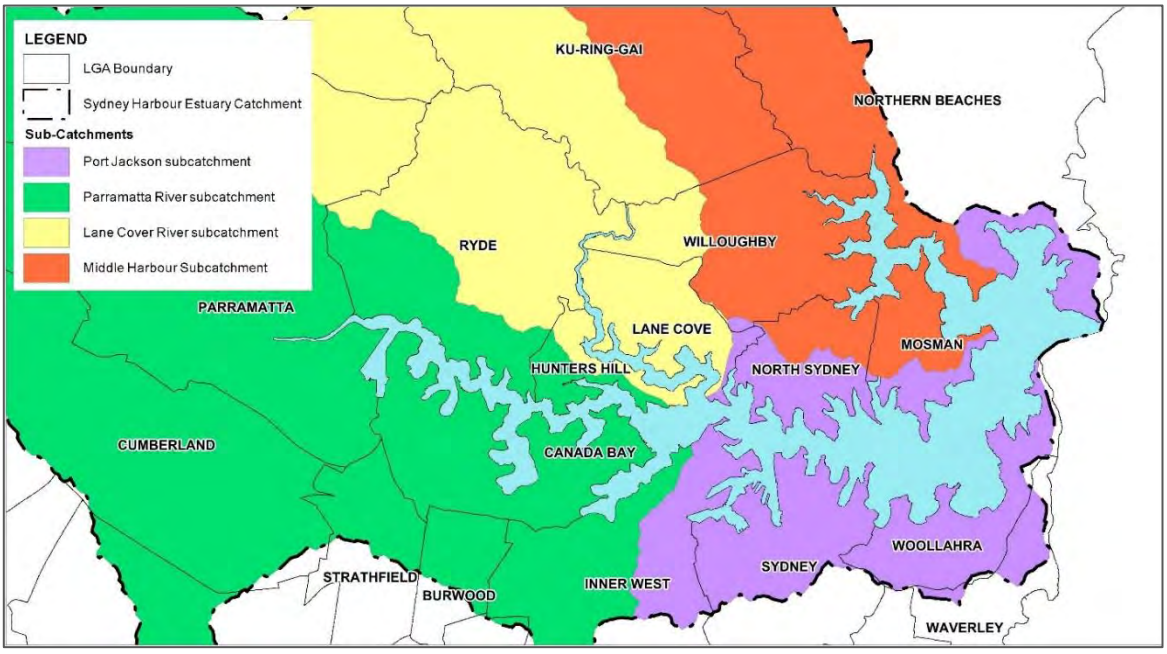

Figure 3 Sydney Harbour Estuary Sub-catchment and LGA Map

State Agency Workshop Overview

Workshop Participants

The Agency Workshop was held on 2nd November 2017, and was attended by representatives from 10 different state agencies and stakeholder organisations, with all participants listed in Table 3. The Agency workshop was facilitated by Greg Fisk and Paul Donaldson from BMT.

Table 3 Agency Workshop Participants

Agency / Organisation	Representatives
NSW Office of Environment and Heritage, Department of Environment and Planning	Dr Peter Freewater, Tim Macdonald, Daylan Cameron, Elizabeth Irwin
Planning NSW, Department of Environment and Planning	Maria Plytarias
Place Management, Property NSW *(former Sydney Harbour Foreshore Authority)*	Kylie Seretis
Fisheries NSW	Karen Astles
Local Land Services, Greater Sydney	Den Barber, Robert Adam
RMS, Centre for Urban Design	Jenny Burge
Environment Protection Authority NSW	Paul Wearne
NSW Health	Graham Burgess (Sydney Local Health District) Haylee Sheesby (Western Sydney Local Health District)
Sydney Water	Rodd Kerr, Phillip Birtles, Freya Hartley
Sydney Coastal Council Group	Geoff Withycombe
BMT	Paul Donaldson, Greg Fisk

Agency Workshop Open Forum Outputs

Several open forum information gathering sessions were held throughout the Agency Workshop on various issues and topics. The information was captured on whiteboard during the workshop (see example in Figure 4), with the output from each session documented in Table 4 to Table 7 below.

Table 4 Agency Workshop Whiteboard Activity: Key Points of Discussion

Key Points Highlighted	
• Role of govt authorities in CMP – Place Management and the Place Management Act – Defence? • "Compact" Approach to Implementation – Western Sydney Approach – Don't limit extent of plan due to budget constraints	• Exhaustion from Plan Making – Complement the Greater Sydney 2056 Plan (package up) • Outcomes / Targets Focussed – Outcomes / targets essential for the GSC 3-cities • Boat Wash/Wake Affecting Shorelines • Drivers and Usage Map

Table 5 Agency Workshop Whiteboard Activity: Advantages / Disadvantages and Implications of the Newly Defined Coastal Zone for Sydney and Expanded Planning Areas

Key Points Highlighted	

• Coastal wetlands
  – Planning proposal
  – Infrastructure
• Thematic values
	• Delivery mechanisms (most appropriate)
	• Maps can be adapted/updated over time
	• Prevent of close holes

Table 6 Agency Workshop Whiteboard Activity: Existing Studies for Sydney Harbour

Key Points Highlighted	

• Ad hoc | No consistency | Too qualitative
• Collaboration
• Statuary requirement
• Opportunity for Councils
• Community strategic plan
• Stitching existing plans better – not a "new" plan
• Lack of interaction – spatial, thematic, temporal
• Lack of effective / measurable monitoring
	• Restore + enhance – not just maintain / manage
	• Values based – community benefit
	• Strategic approach
	  – integrated legislation
	  – better consultation
	  – cost management
	  – accountability
	  – KPIs

Table 7 Agency Workshop Whiteboard Activity: Threats

Key Points Highlighted	

• **Urban stormwater ✓✓✓**
• **Foreshore development ✓✓✓**
• Lack of understanding / governance / tenure / jurisdictional ambiguity
• Land use change – coast to catchment
• Legacy issues
  – Sediment contamination
  – Restoration / remediation
  – Vector + disease
• Natural coastal hazards ✓
  – Sea level rise
  – Foreshore stability
• Aging infrastructure
• Water pollution (diffuse urban)
	• Water pollution (diffuse urban)
	• Overcrowding and inadequate provision of access | Lack of connectivity and ability to provide ✓
	• Water quality / sewerage assets ✓
	• Conflict over resource use
	  – Population growth
	  – Land use scarcity
	  – Multi-use harbour, but finite resource
	• Vegetation management
	  – Pests
	  – Views
	  – Mangroves
	• Vessel impact on marine environment

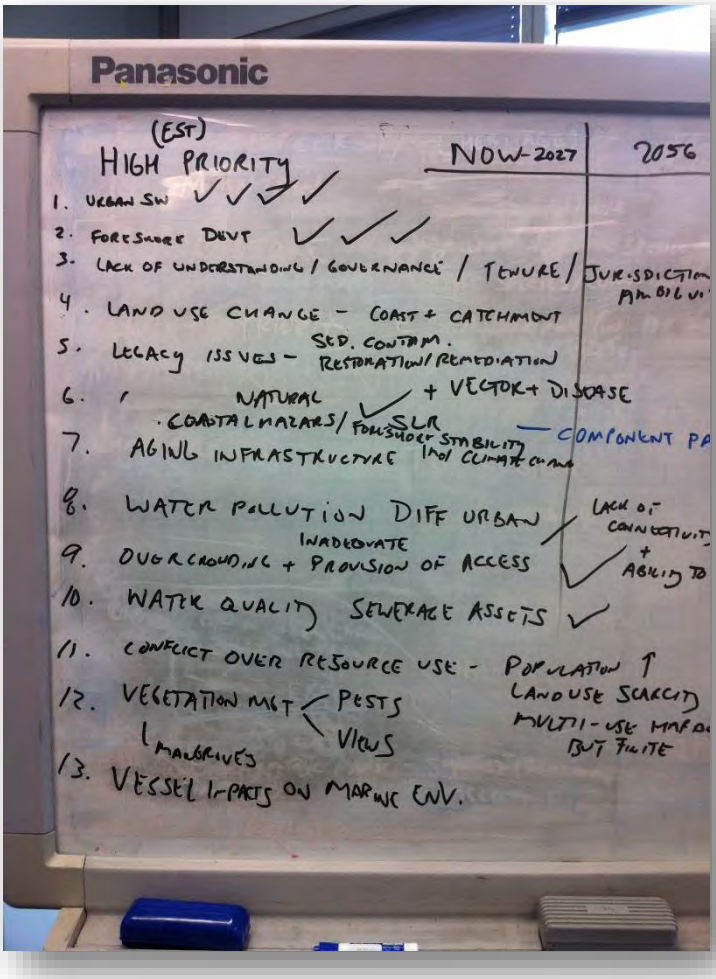

Figure 4 Agency Workshop Whiteboard Session Example: Priority Threats

Opportunities, Ideas and Support for a Harbour-Wide Coastal Management Program for Sydney Harbour

Support

The Sydney Harbour estuary system is Australia's most iconic waterway. The importance of the harbour was highlighted throughout the day, noting that it forms the social and commercial foundations of greater Sydney – a global city.

To date, much good work has been done on coastal management issues relating to Sydney Harbour. This includes for example the work completed under the Sydney Institute of Marine Science (SIMS) Sydney Harbour research program; coastal and estuary studies completed by councils; a Coast Zone Management Plan (CZMP) Scoping Study by the Sydney Coastal Councils Group; the Water Quality Improvement Program for Sydney Harbour, by the Local Land Services; and the Marine Estate Management Authority threat and risk assessment for the central region.

It was noted that a number of the studies and information sources are isolated, out of date, or at a scale too coarse to inform development of a CMP. For example, several LGA or site specific CZMPs exist across the harbour, however some of these are over decade old. Alternatively, there are many locations where there is no CZMP in place. Further, the existing CZMPs do not address all areas of the new coastal management framework.

A harbour-wide CMP provides a vehicle to bring all this exiting work together, make updates where required, and fill in the information, knowledge and management gaps. An enormous amount of support was shown by the state agency representatives for a harbour-wide CMP. It was also recognised that a harbour-wide CMP has the ability to address catchment scale issues/threats and provide a strategic/overarching direction for the entire estuary – noting that no such direction exists at present.

A number of priority threats were identified for Sydney Harbour during the workshop, as listed in Table 7. Urban stormwater, foreshore development, coastal hazards, foreshore access infrastructure and connectivity, and water quality were seen as particularly important issues. It was noted that a number of these issues (water quality, foreshore access and connectivity) are best addressed at a catchment scale. During the Agency Workshop, the opportunity to address issues at a strategic level was highlighted as a key reason for undertaking a harbour wide CMP (as opposed to site or LGA specific CMPs for example).

Greater Sydney Commission

The Greater Sydney Commission (GSC) metropolitan planning currently underway was discussed at length. The GSC has developed a Draft Greater Sydney Regional Plan (currently on exhibition) that sets out the strategic direction for Greater Sydney by 2056 (see Figure 5). Opportunities to link with, and the relevance of, the GSC planning was highlighted.

Sitting below the draft Regional Plan are five revised draft District Plans, which provide the framework to implement the GSC planning. The Central City District Plan, the Eastern City District Plan and the Northern City District Plan cover Sydney Harbour, its tidal waterways and the wider Sydney Harbour coastal zone (see Figure 6).

A number of objectives in the Draft Greater Sydney Regional Plan would be supported by, and are likely best achieved through, the development of a harbour-wide CMP. Particularly relevant objectives in the draft GSC plan include (but are not limited to):

- Objective 25: Coast and waterways are protected and healthier
- Objective 27: Biodiversity is protected, urban bushland and remnant vegetation is enhanced
- Objective 36: People and places adapt to climate change and future shocks and stresses
- Objective 37: Exposure to natural and urban hazards is reduced

GSC background studies were also highlighted as being highly relevant information source to a harbour-wide CMP, including the Sydney Green Grid by the Office of the Government Architect, for example.

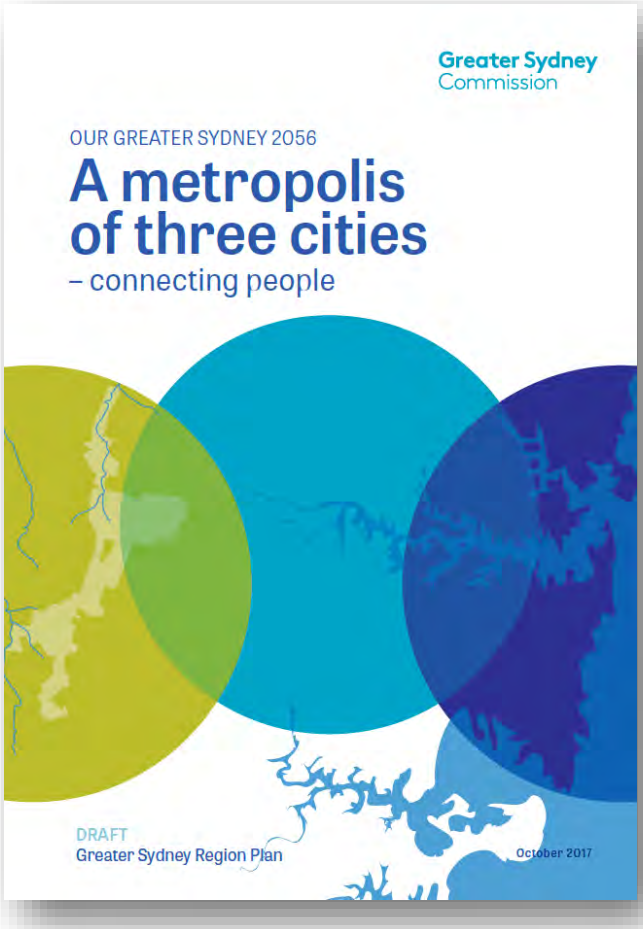

Figure 5 Greater Sydney Commission 2056 Vision: A Metropolis of Three Major Cities (Source, Draft Greater Sydney Regional Plan (GSC, 2017))

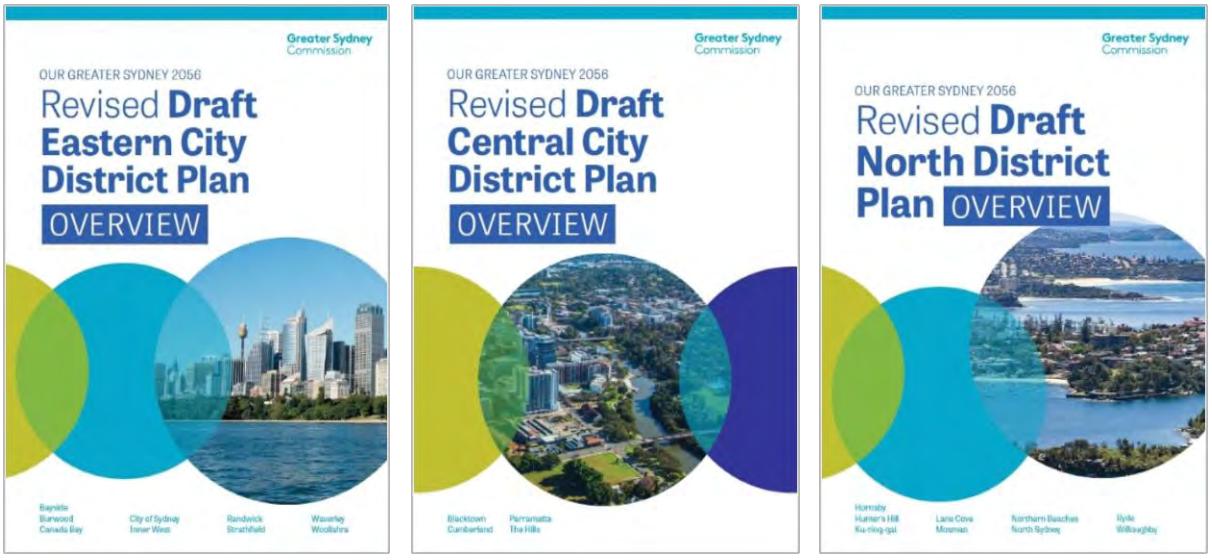

Figure 6 Greater Sydney Commission: Eastern, Central and North District Plans (GSC, 2017)

CMP Scope and Funding

A harbour-wide CMP provides a great platform to address catchment scale coastal management issues and opportunities, and develop a framework for inter-agency organisation and collaboration. These outcomes cannot be achieved through preparing LGA specific or localised CMPs.

It is vitally important to achieve sustainable and strategic management of the Sydney Harbour coastal zone, for the social, environmental and economic benefit of the Greater Sydney region. This was a key message coming out of the Agency Workshop. A harbour-wide CMP provides a framework to achieve sustainable and strategic management of Sydney Harbour and its tidal estuary reaches.

A harbour-wide CMP also provides advantages to Councils for reducing their costs associated with developing and implementing a CMP. For example, economies of scale could be achieved for future stages of the CMP for technical work that spans multiple LGAs, for example, Stage 2 coastal hazard modelling or Stage 3 cost-benefit analysis of options.

With regards to implementation, a harbour-wide CMP that clearly outlines the long term, stainable strategy for managing Sydney Harbour would likely attract (or demand) a suite of atypical government and private funding opportunities, particularly the national and international significance of Sydney Harbour. With this in mind, Agency participants emphasised that the aspirations and scope of a harbour-wide CMP should not be limited to Council budget constraints.

Funding and governance models were discussed, with the State and Federal approach to developing the Western Sydney Infrastructure Plan (WSIP) provided as an example. The WSIP is a 10 year, $3.6 billion road investment program funded by the Australian and NSW governments. The WSIP plans to deliver new and upgraded roads to support integrated transport in the region and capitalise on the economic benefits from developing the Western Sydney Airport (RMS, 2017).

Council Workshop Overview

Workshop Participants

The Council Workshop was held on 3rd November 2017, and was attended by representatives from nine of the 12 harbour-side councils, plus the Sydney Coastal Councils Group and the Office of Environment and Heritage, with the list of participants given in Table 8. The Council Workshop was facilitated by Greg Fisk and Paul Donaldson from BMT.

Table 8 Council Workshop Participants

Council / Organisation	Representatives
Woollahra Municipal Council	Emma Hawkins
City of Sydney	Lisa Currie
Inner West Council	Sarah Kamarudin, Lana Frost
City of Canada Bay	Robert Marshall
City of Parramatta	Paul Hackney
Municipality of Hunters Hill	Jaiqui Vollmer
Lane Cove Municipal Council	Kerry Heatley, Anthony Crichton
Mosman Municipal Council	Chandra Chandrawansa
Northern Beaches Council	Jodi Crawford
Sydney Coastal Council Group	Geoff Withycombe
NSW Office of Environment and Heritage	Dr Peter Freewater, Tim Macdonald, Daylan Cameron
BMT	Paul Donaldson, Greg Fisk

Council Workshop Open Forum Outputs

Similar to the Agency Workshop, several open forum information gathering sessions were held throughout the Council Workshop on various issues and topics. The information was captured on whiteboard during the workshop (see example in Table 9), with the output from each session documented in Table 9 to Table 13.

Table 9 Council Workshop Whiteboard Activity: Key Points of Discussion

Key Points Highlighted	
• Extent of indemnity (Section 733) • Third party challenge to Section 733 • Role of Coastal Council to Mediate ("have regard") • CZMP – Group – Implementation • "Commitment" to pay – more about funding sources to implement • Using a range of tool to address hazard areas	• Sydney Harbour environment planning policy – Draft Coastal Management SEPP – Sydney Harbour Catchment Regional Environmental Plan 2005 (proposed consolidation into the Draft Environment SEPP) – Local Environmental Plans

Table 10 Council Workshop Whiteboard Activity: Advantages / Disadvantages and Implications of the Coastal Reforms, including New Coastal Zone Definition and the Expanded Planning Areas

Key Points Highlighted	
• Capacity to implement • Overlap with REP / additional layers / policy SEPP • Sydney Harbour Council – "Satisfied" meets D.A. • Lots of players: – opportunities (economy/scale)	– How to allocate responsibility / inputs – need for compact? • Harbour-wide CMP can address catchment scale issues • Top down and bottom up approach needed – who is doing what in Council • Timing with Council election

Table 11 Council Workshop Whiteboard Activity: Governance Ambiguity / Issues

Key Points Highlighted	
• Indigenous heritage - discovery procedure • Water quality / beaches – council/Sydney Water/RMS/Beach watch – beach closure • Litter (Crown Land / Council / Other) • Fishing on foreshore	• Mooring impacts on seagrass • Coastal land tenure – legacy – private seawalls • Aging public infrastructure and marinas • Sea level rise policies

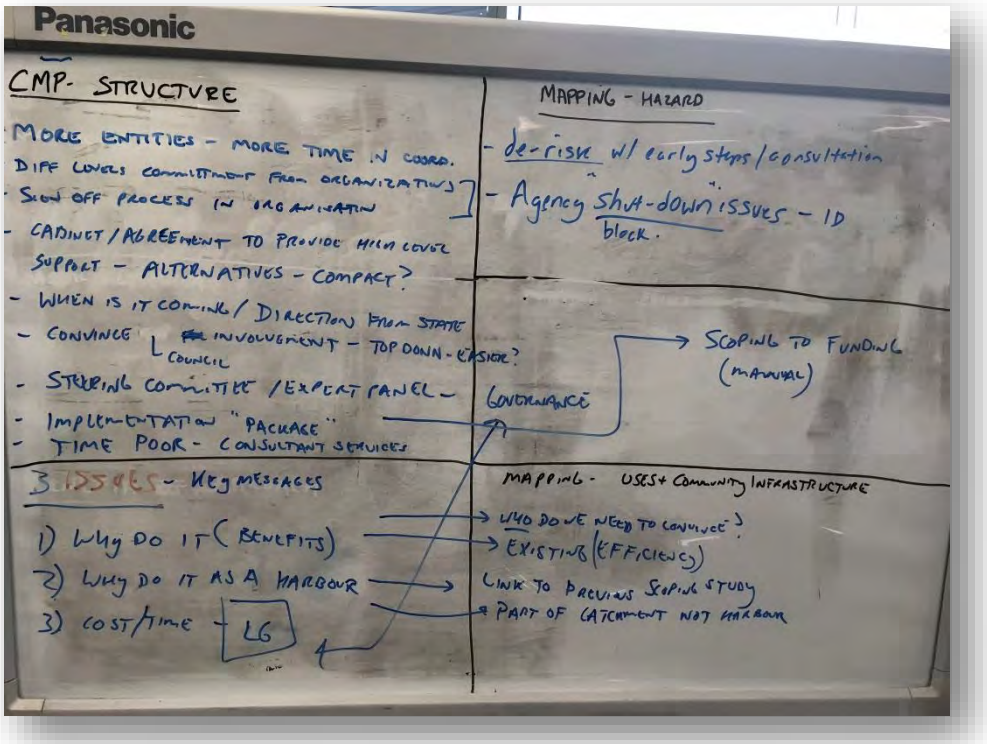

Figure 7 Council Workshop Whiteboard Session Example: CMP Structure, Drivers and Barriers

Table 12 Council Workshop Whiteboard Activity: Advantages of Developing a Harbour-Wide Coastal Management Program

Key Words Highlighted	
• Integrated and holistic • Eco – bio – geo etc • Nature not admin boundaries • Accountability • One harbour • Enhances environmental outcomes • Guidance document • Determine priorities • Public involvement • Coordinate and collaborate • Clarity and transparency	• Common goals • Improved capacity Sydney based identify • Shared responsibility / risk • Funding and implementation • Consistent approach • Long term and strategic • High profile • Avoid duplication • Power in numbers • Shared ownership, shared success

Table 13 Council Workshop Whiteboard Activity: Coastal Management Program Structure and Harbour Wide – CMP Key Messages

Key Points Highlighted	
CMP Structure • More entities – more time in co-ordination • Difference levels of commitment from organisations – Agencies "shut down" / block issues • Sign off process in organisation • Cabinet / agreement to provide high level support – alternatives – compact? • Direction from the State • Convince council involvement – top down – easier? • Governance – steering committee – expert panel	• Implementation "package" – Scoping to funding (manual) • Council's time poor – consultant services • De-risk with early steps / consultation **CMP Issues** • Why do it (benefits)? – Who do we need to convince? – Existing (efficiency) • Why do it as a harbour? – Part of catchment not harbour – Link to previous scoping study Cost / time

Barriers, Drivers and Structure of a Harbour-Wide Coastal Management Program for Sydney Harbour

Barriers

Learnings from the Parramatta River CZMP were highlighted, noting that the more parties involved, the harder it is to organise and more time commitment required. Different levels of commitment from the organisations involved also makes it difficult to reach consensus and get sign off on various matters.

Any process for developing a CMP needs to recognise that some councils are far progressed along the track of developing management plans for their coastal zone, and some already have CZMPs in place. That being said, the new *Coastal Management Act 2016* requires all CZMPs to be updated to a CMP format. Regardless, these Councils may seek less involvement in the broader CMP for Sydney Harbour, and

instead, it may be a case of updating their current plans to (i) be consistent with and contribute to harbour-wide outcomes and targets set as part of the broader CMP and (ii) include actions for implementation that do not preclude achievement of the harbour-wide outcomes and targets. This process could be undertaken via the Harbour-wide CMP and as the existing CZMPs are converted to CMPs (which is required by 2021).

It is important for Councils to know when the CMP process is coming and what level of involvement will be required, including to get the CMP certified. Once a Harbour-wide CMP is certified, Councils will also need implementation advice to explain what to do and when to be able to access funding to implement actions that are relevant to them.

It is also important for Councils to be able to convince their senior management and elected members to be involved in such a process. Three issues identified include:

- Why do a CMP (benefits)?
- Why take a whole-of-harbour approach to the CMP (benefits)?
- Cost and time implications of involvement (programme of staff and other costs during prep)?

A large planning area is another barrier to effective integration. For example, Council and the community in the Parramatta River don't feel they are a part of the Harbour in day to day planning and decision making.

Councils need to think about how they can implement something like a CMP when they don't have clear internal governance structures in Council or specific coastal management expertise.

The Council attendees also recognised that it is difficult to gain equitable access to funds across the multitude of players involved. The Harbour-wide CMP would need to provide guidance on how funding applications across multiple councils would be undertaken, who should be the lead council for specific actions, and how the funding should be split between the councils for different actions.

Potential Solutions

A 'top-down' approach to instigate the CMP process was suggested, for example: OEH could write to each Council seeking their involvement in the Sydney Harbour CMP process; or the Councils, NSW Government and other implementing parties develop a compact, MOU or similar agreement that commits the parties to the development of a CMP for Sydney Harbour and addresses:

(1) shared outcomes and targets,

(2) proposed governance arrangements and

(3) the relevant roles and responsibilities of Councils, State and statutory authorities as key players in implementation.

As a model, similar agreements have been developed for the Healthy Waterways Partnership in Moreton Bay dealing with similar issues.

The CMP Scoping Study can identify the 'gaps' across the planning area noting it may be useful to think of this in the context of a hierarchy of involvement in the future process whereas local governments who do not have a CZMP in place would be responsible for greater involvement in the process compared to those that do, needing only to 'tweak' and re-submit their plans under the broader umbrella plan (following a consistency check with the new manual, legislative processes and in the context of the shared outcomes and targets).

Clearly some more defined governance structures and processes will be required to develop a CMP for Sydney Harbour and its tidal catchments. Some principles and approaches for this could be:

- a senior steering committee (made up senior officials from Councils and OEH as the lead State agency with support from DPE, and LLS, or other agencies), noting there will need to be some senior champions for this process to maintain momentum in progressing the CMP over time;
- officer-level committees that would oversee development of the technical aspects of the plan (may be separated by geography or else by technical discipline).
- a communications committee that would oversee communication and engagement activities associated with the development of the plan and ensure consistent messaging and communications are maintained across the organisations involved and the community.

Such an approach would also aid the early identification of impediments within different agency or council organisations, with the senior steering committee notified. These organisations would be able to seek input to preparing and giving briefings to their senior management teams to assist in resolving the impediment.

It was apparent during the Council Workshop that key messages for Council officers to use internally around the need for and benefits of a coordinated harbour wide approach to a CMP are needed. This Scoping Study can develop these in consultation with OEH and LLS as project sponsors and SCCG, building from the previous CZMP scoping study and incorporating outcomes of the current workshops.

Councils will need to evaluate the revised draft Coastal Management Manual when released and advise OEH if more targeted guidance is required to address Council concerns about the level of detail of implementation guidance.

The CMP preparation process will also need to recognise that there will be time commitment on all parties, but some Councils may not be able to be involved as much as they would like. How this fits with the proposed funding model and the role of various Council consultants feeding into the broader CMP process needs to be further considered.

Priority Threats, Values and Management Objectives for Sydney Harbour's Coastal Zone

In preparing a CMP Stage 1 Scoping Study, a 'first pass' or preliminary risk assessment will be undertaken to determine the priorities for subsequent actions in the CMP process. A key objective of the Agency and Council Workshops was to identify the priority values and threats for the Sydney Harbour. A list of known values / assets and documented threats within Sydney Harbour were compiled to initiate the workshop prioritisation activities (see Figure 8 for example). The values and threats were taken from a review of the four key documents considered to represent the Sydney Harbour and its adjoining tidal waterways, namely:

- **Marine Estate Management Authority (MEMA) – Threat and Risk Assessment** (all four estuary sub-catchments),
- **Sydney Harbour CZMP Scoping Study** (Port Jackson and Middle Harbour),
- **Lane Cove River CZMP** (Lane Cove), and
- **Parramatta River CZMP** (Parramatta River).

Workshop attendees were required to assign the attributes shown in Table 14 against each value / asset and threat / stressor listed for Sydney Harbour (see following section for risk terminology).

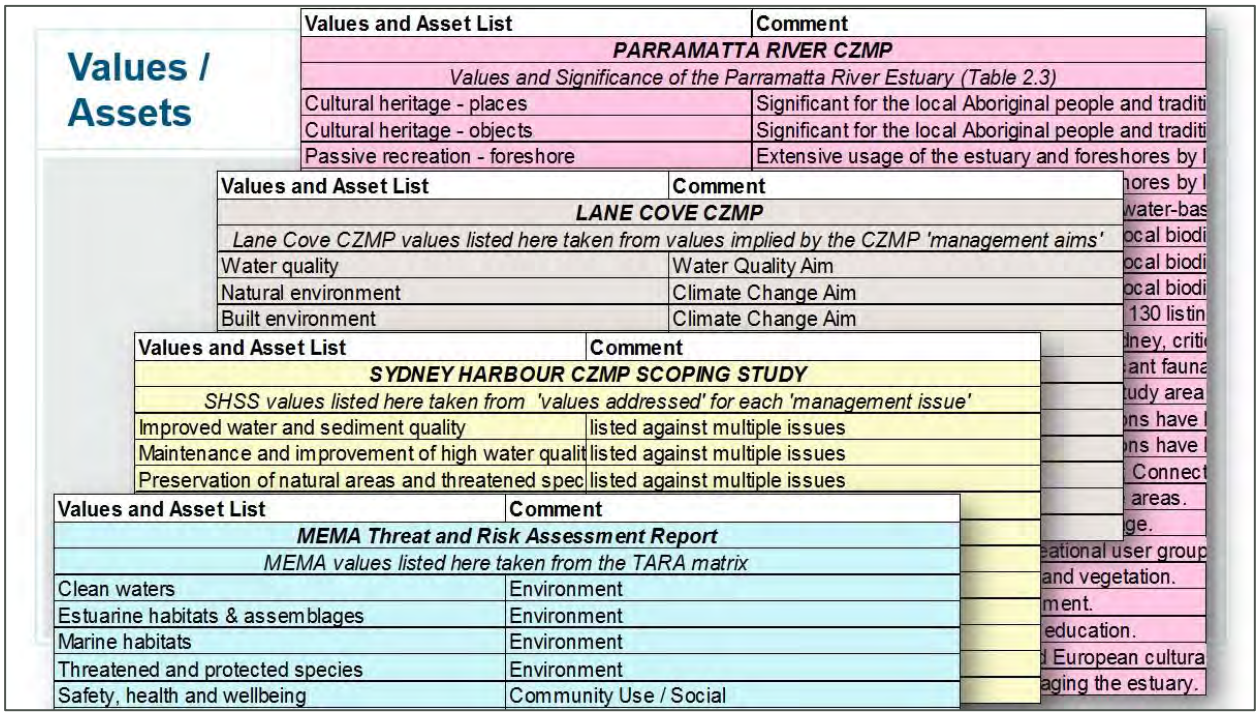

Figure 8 Sydney Harbour Values Documented in Key Coastal Zone Management Documents

Table 14 Value and Threat Worksheet Attribute Options

Value / Asset Importance Level	*Value / Asset* Management Goal	*Threat / Stressor* Priority Level
• Very important • Important • Less important	• Enhance • Restore • Maintain • Protect	• High priority • Medium priority • Low priority

Risk Assessment Terminology

Risk assessment terminology and definitions were presented to attendees to assist in their completion of worksheet activities. These definitions are provided below, and are based on the MEMA glossary of terms.

Value, include *assets* (natural, social, cultural or economic [built] assets), or *community benefits* (swimming at the beach; boating in an estuary; running a business in the coastal zone charter fishing, clean waters and marine biodiversity; intrinsic values).

Threat, includes a broad activity, event or process that poses a potential level of risk to an environmental asset or social or economic benefit. Threats often affect multiple assets/benefits and may be made up of one or more stressors (see below)

Stressor, includes a consequence of a threat activity (e.g. water pollution) that causes an effect on an environmental asset (e.g. clean waters) or social and economic benefit (e.g. recreation and tourism activities at a local beach or waterway).

Different threat activities may lead to the same stressors (e.g. foreshore development and dredging activities can produce different forms of water pollution if not managed effectively). Inversely a single threat may have multiple stressors (dredging can direct impact on benthic flora like seagrass as well as have indirect impacts on water quality).

Risk, in the context of MEMA process, includes a measure of how a threat will or may impact a value(s) (e.g. the threat being realised). Risk levels include Extreme, High, Moderate, or Low Risk based on an assessment of consequence and likelihood, and can be applied across various spatial (state-wide, regional, estuary) and temporal (now, 2050, 2100) scales.

'Management issue' is a broad term that does not fit within a risk assessment framework, however it is referred to (but not defined) in the Coastal Management Manual. Management issue has been found elsewhere to relate to any of the following: threats (and associated stressors); protection, maintenance or enhancement of values, assets and benefits of the coastal zone; the intersection between threats and values; or more generally how the threats, values and assets are being managed.

Priority Values

A total of 21 'values and assets' were compiled for Sydney Harbour. These were categorised as having either an '*environmental'*, '*community use / social'*, or '*economic'* benefit. For the *environmental* benefits, the following values were identified as 'very important' in over two thirds (i.e. >67%) of both the Agency and Council Workshop results: 'clean waters', 'clean sediments', 'terrestrial and riparian habitats', 'estuarine habitat and assemblages', 'marine habitats', and 'threatened and protected species'.

Similarly, over two thirds of both the Agency and Council responses identified the following *social* and *economic* values as 'very important': 'safety, health and wellbeing', 'recreational amenity', 'intrinsic value', 'natural areas / open space', 'foreshore and harbour access', 'cultural heritage', 'built assets and infrastructure', 'educational value' (community use and social benefits) and 'economic intrinsic value' (economic benefit). 'Socialising / sense of community' and 'European / built heritage' were also identified as 'very important' in over 67% of responses from the Agency Workshop only.

In general, the identified values were largely considered very important to important by most groups. 'Sydney Harbour Fishery' was the only value considered to be 'less important' by some Agency and Council groups.

With regards to management objectives. the Agency attendees identified a strong preference for 'restoring' *environmental* values within the Sydney Harbour and 'enhancing' the *community use* and *economic* values. The management goals outlined by the Council attendees for *environmental* and *community use* benefits within the harbour were more varied and ranged between 'enhance', 'restore', 'maintain' and 'protect'. Council attendees clearly outlined the preference to 'enhance' the *economic* benefits within the harbour.

Priority Threats

An extensive list of 81 'threats' and 'stressors' potentially relevant to Sydney Harbour were identified from the literature, including 37 *'environmental'* threats and 44 *'socio-economic'* threats. These threats were further classified into the categories listed in Table 15.

Table 15 Threat and Stressor Categories

Environmental Threats	Socio-Economic Threats
• Resource use • Land-based impacts • Climate change • Coastal hazards	• Resource use conflict • Environmental • Governance • Lack of access availability • Public safety • Coastal hazards • Critical knowledge gaps

'High priority' *environmental* threats identified in over 67% of both the Agency and Council workshop results include: 'boating and boating infrastructure', 'modified freshwater flows', 'disturbance of contaminated sediment on seabed', 'urban stormwater discharge', 'foreshore development', 'clearing riparian and adjacent habitat including wetland drainage', 'clearing terrestrial habitat', 'coastal protection', 'sewage effluent and septic runoff', 'estuary foreshore erosion and bank instability' and *future* coastal erosion and inundation related hazards.

Several workshop groups did not complete the *social-economic* threats worksheets due to time constraints, however the 'high priority' *social-economic* threats identified by some groups include: 'conflict over resource access and use', 'water pollution on environmental values', 'land use intensification', 'habitat disturbance', 'bank erosion from foreshore development', 'reductions in abundances of species and trophic levels', 'modified hydrology / hydraulics and flow regime', 'sediment contamination', 'climate change stressors', 'inadequate, inefficient regulation, over-regulation', 'lack of or ineffective community engagement', 'lack of compliance with regulations or lack of compliance effort', 'lack of understanding / agreement on governance', 'ageing and failing seawalls', 'water pollution/contamination affecting human health and safety', 'inadequate environmental, social and economic information', 'inadequate or lack of education on coastal management and estuary health', 'limited or lack of supporting infrastructure' and 'coastal hazards'. Projected population growth was consistently highlighted as a reason for increasing socio-economics threats levels for future timeframes.

Outcomes

The 'Values' and 'Threats' Council and Agency worksheets have been collated and are attached as an appendix to this document. The priority values and threats identified through this workshop activity will be used to guide the preliminary risk assessment for the Sydney Harbour CMP Scoping Study.

Appendix: Values and Threats Worksheet Activity Results

This appendix documents the results from the Values and Threats group worksheet activities conducted for the Agency and Council workshops. The results tables are provided in the following order:

- **Sydney Harbour Values Worksheet - Summary of Results** (Table 16), which shows the Agency (yellow header) and Council (tan header) worksheet responses as a percentage.
- **Sydney Harbour Threats Worksheet – Summary of Results** (Table 17), which shows the Agency (yellow header) and Council (tan header) worksheet responses as a percentage.
- **Sydney Harbour Values Worksheet – Agency Response Details** (Table 18), which provides a total count of Agency responses and their comments.
- **Sydney Harbour Values Worksheet – Council Response Details** (Table 19), which provides a total count of Council responses and their comments.
- **Sydney Harbour Threat Worksheet – Agency Response Details** (Table 20), which provides a total count of Agency responses and their comments.
- **Sydney Harbour Threats Worksheet – Council Response Details** (Table 21), which provides a total count of Council responses and their comments.

Table 16 Sydney Harbour Values Worksheet - Summary of Results

Benefit Category	Values and Assets		Very Important (all groups)	Important (all groups)	Less Important (all groups)		Enhance (all groups)	Restore (all groups)	Maintain (all groups)	Protect (all groups)		Very Important (all groups)	Important (all groups)	Less Important (all groups)		Enhance (all groups)	Restore (all groups)	Maintain (all groups)	Protect (all groups)
Environment	Clean waters		100%	0%	0%		25%	75%	0%	25%		100%	0%	0%		50%	50%	0%	0%
Environment	Clean estuarine sediments		100%	0%	0%		25%	75%	0%	0%		100%	0%	0%		25%	75%	0%	25%
Environment	Terrestrial and riparian habitats		100%	0%	0%		33%	100%	0%	0%		75%	25%	0%		25%	100%	0%	25%
Environment	Estuarine habitats & assemblages		100%	0%	0%		25%	100%	0%	25%		75%	25%	0%		33%	67%	33%	33%
Environment	Marine habitats		100%	0%	0%		25%	100%	0%	25%		75%	25%	0%		0%	100%	33%	33%
Environment	Threatened and protected species		100%	0%	0%		50%	75%	0%	25%		75%	25%	0%		0%	100%	100%	50%
Environment	Sydney Harbour Fishery		17%	67%	17%		33%	67%	33%	0%		25%	50%	25%		33%	33%	33%	0%
Community Use / Social	Safety, health and wellbeing		100%	0%	0%		75%	0%	50%	0%		100%	0%	0%		67%	33%	0%	0%
Community Use / Social	Recreational amenity		100%	0%	0%		100%	0%	25%	0%		75%	25%	0%		75%	0%	25%	25%
Community Use / Social	Socialising; sense of community		80%	20%	0%		100%	0%	33%	0%		50%	50%	0%		25%	0%	75%	50%
Community Use / Social	Intrinsic value (biodiversity & geodiversity)		100%	0%	0%		100%	0%	67%	0%		100%	0%	0%		25%	50%	75%	25%
Community Use / Social	Natural areas / open space		80%	20%	0%		100%	0%	67%	0%		100%	0%	0%		67%	67%	33%	0%
Community Use / Social	Foreshore and harbour access		80%	20%	0%		100%	0%	67%	0%		75%	25%	0%		67%	0%	67%	33%
Community Use / Social	Aboriginal cultural heritage		83%	17%	0%		50%	0%	100%	50%		100%	0%	0%		0%	0%	100%	33%
Community Use / Social	European / built heritage		83%	17%	0%		50%	25%	100%	50%		50%	50%	0%		0%	0%	100%	33%
Community Use / Social	Built assets and infrastructure (private and public)		83%	17%	0%		100%	0%	75%	25%		100%	0%	0%		67%	100%	67%	67%
Community Use / Social	Educational value		75%	25%	0%		100%	0%	67%	33%		67%	33%	0%		33%	0%	67%	33%
Economic	Economic intrinsic value		100%	0%	0%		100%	0%	67%	33%		67%	33%	0%		100%	0%	0%	0%
Economic	Coastal economy & employment		50%	50%	0%		100%	0%	100%	33%		67%	33%	0%		100%	0%	0%	0%
Economic	Individual enjoyment value (consumer surplus)		33%	67%	0%		100%	0%	67%	33%		67%	33%	0%		100%	0%	0%	0%

Table 17 Sydney Harbour Threats Worksheet - Summary of Results

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)
Environmental Threat	Resource use	Shipping and boating	Large and large commercial vessels, port activities		29%	29%	43%		33%	67%	0%
Environmental Threat	Resource use	Recreational fishing	Shore-based fishing; Boat-based fishing; spear fishing; hand gathering		50%	0%	50%		0%	33%	67%
Environmental Threat	Resource use	Cultural Fishing	Line fishing, spearfishing, hand gathering, traditional fishing methods		0%	17%	83%		0%	33%	67%
Environmental Threat	Resource use	Charter activities	Whale and dolphin watching		0%	14%	86%		0%	33%	67%
Environmental Threat	Resource use	Bait and aquarium trade	Imported baits, imported fish and other aquatic species		17%	50%	33%		0%	100%	0%
Environmental Threat	Resource use	Recreation and tourism	Boating and boating infrastructure		67%	17%	17%		67%	33%	0%
Environmental Threat	Resource use	Recreation and tourism	Snorkelling and diving, and other recreational use		0%	14%	86%		0%	0%	100%
Environmental Threat	Resource use	Recreation and tourism	Passive recreational use		0%	0%	100%		0%	0%	100%
Environmental Threat	Resource use	Dredging & Placement	Navigation, harbour maintenance, beach nourishment		33%	33%	33%		67%	33%	0%
Environmental Threat	Resource use	Modified freshwater flows	Extraction, artificial barriers to riverine and estuarine flow (e.g. dams, weirs,		67%	17%	17%		67%	33%	0%
Environmental Threat	Resource use	Service infrastructure	Pipelines, cables, trenching and boring		50%	17%	33%		0%	33%	67%
Environmental Threat	Land-based impacts	Hydrologic Modifications	Disturbance of contaminated sediment on seabed (e.g. dredging)		80%	0%	20%		100%	0%	0%
Environmental Threat	Land-based impacts	Land use Intensification	Urban stormwater discharge		100%	0%	0%		100%	0%	0%
Environmental Threat	Land-based impacts	Land use Intensification	Foreshore development		100%	0%	0%		67%	33%	0%
Environmental Threat	Land-based impacts	Land use Intensification	Beach nourishment and grooming		0%	67%	33%		0%	33%	67%
Environmental Threat	Land-based impacts	Land use Intensification	Clearing riparian and adjacent habitat including wetland drainage		100%	0%	0%		67%	33%	0%
Environmental Threat	Land-based impacts	Land use Intensification	Clearing littoral rainforest habitat		67%	17%	17%		33%	67%	0%
Environmental Threat	Land-based impacts	Land use Intensification	Clearing terrestrial habitat		86%	0%	14%		100%	0%	0%
Environmental Threat	Land-based impacts	Land use Intensification	Agricultural diffuse source runoff		20%	0%	80%		0%	0%	100%
Environmental Threat	Land-based impacts	Land use Intensification	Deliberate introduction of animals and plants (e.g. foxes, cats, bitou bush)		43%	29%	29%		0%	100%	0%
Environmental Threat	Land-based impacts	Land use Intensification	Disturbance of contaminated land		100%	0%	0%		33%	67%	0%
Environmental Threat	Land-based impacts	Land use Intensification	Coastal protection (e.g. seawalls)		83%	17%	0%		67%	0%	33%
Environmental Threat	Land-based impacts	Point Discharges	Industrial discharges		17%	50%	33%		33%	33%	33%
Environmental Threat	Land-based impacts	Point Discharges	Sewage effluent and septic runoff		67%	33%	0%		100%	0%	0%

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)
Environmental Threat	Land-based impacts	Hydrologic Modifications	Estuary entrance modifications		25%	0%	75%		0%	33%	67%
Environmental Threat	Land-based impacts	Hydrologic Modifications	Increased sedimentation (e.g. infilling channels and changing flows)		50%	33%	17%		100%	0%	0%
Environmental Threat	Climate change	Climate change	Altered ocean currents & nutrient inputs		33%	33%	33%		0%	0%	100%
Environmental Threat	Climate change	Climate change	Climate and sea temperature rise		40%	40%	20%		0%	33%	67%
Environmental Threat	Climate change	Climate change	Ocean acidification		40%	40%	20%		0%	0%	100%
Environmental Threat	Climate change	Climate change	Altered storm/cyclone activity		33%	33%	33%		0%	67%	33%
Environmental Threat	Climate change	Climate change	Sea level rise		60%	40%	0%		33%	0%	67%
Environmental Threat	Climate change	Climate change	Altered salinity levels / profile		25%	25%	50%		33%	0%	67%
Environmental Threat	Coastal hazards	Coastal inundation	Tidal inundation		60%	40%	0%		33%	33%	33%
Environmental Threat	Coastal hazards	Coastal inundation	Coastal inundation		60%	20%	20%		33%	33%	33%
Environmental Threat	Coastal hazards	Shoreline instability	Coastal erosion and recession		40%	20%	40%		67%	33%	0%
Environmental Threat	Coastal hazards	Shoreline instability	Estuary foreshore erosion and bank instability		80%	20%	0%		100%	0%	0%
Environmental Threat	Coastal hazards	Shoreline instability	Cliff and slope instability		20%	40%	40%		33%	67%	0%
Socio-Economic Threats	Resource use conflict	Conflict over resource access and use	-		100%	0%	0%		0%	100%	0%
Socio-Economic Threats	Resource use conflict	Anti-social behaviour and unsafe practices	-		17%	33%	50%		0%	100%	0%
Socio-Economic Threats	Resource use conflict	Overcrowding / congestion	-		33%	50%	17%		0%	100%	0%
Socio-Economic Threats	Resource use conflict	Navigation problems from sedimentation	-		40%	0%	60%		0%	100%	0%
Socio-Economic Threats	Environmental	Water pollution on environmental values - septic runoff, point source pollution and sewage overflows (such as outfalls, STPs, etc)	-		86%	14%	0%		100%	0%	0%
Socio-Economic Threats	Environmental	Water pollution on environmental values - urban stormwater discharge	-		100%	0%	0%		100%	0%	0%
Socio-Economic Threats	Environmental	Water pollution on environmental values - litter, solid waste, marine debris and microplastics	-		100%	0%	0%		100%	0%	0%
Socio-Economic Threats	Environmental	Wildlife disturbance and impacts to ecological health by dog walkers, 4WD, marine vessels etc.	-		60%	20%	20%		0%	0%	100%
Socio-Economic Threats	Environmental	Land use intensification	-		100%	0%	0%		100%	0%	0%

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)
Socio-Economic Threats	Environmental	Habitat disturbance from development (foreshore, catchment)	-		100%	0%	0%		0%	100%	0%
Socio-Economic Threats	Environmental	Habitat disturbance from excessive recreational use	-		75%	25%	0%		0%	100%	0%
Socio-Economic Threats	Environmental	Clearing riparian vegetation for views	-		100%	0%	0%		100%	0%	0%
Socio-Economic Threats	Environmental	Bank erosion from foreshore development and excavation on bank stability	-		50%	25%	25%				
Socio-Economic Threats	Environmental	Bank erosion from foreshore development and excavation on riparian vegetation	-		75%	25%	0%				
Socio-Economic Threats	Environmental	Reductions in abundances of species and trophic levels	-		100%	0%	0%		100%	0%	0%
Socio-Economic Threats	Environmental	Pests and diseases	-		60%	20%	20%		0%	100%	0%
Socio-Economic Threats	Environmental	Modified hydrology / hydraulics and flow regime	-		50%	25%	25%				
Socio-Economic Threats	Environmental	Sediment contamination / pollution (toxicants in sediment; dioxins in Sydney Harbour)	-		80%	20%	0%		100%	0%	0%
Socio-Economic Threats	Environmental	Climate change stressors	-		100%	0%	0%		0%	0%	100%
Socio-Economic Threats	Governance	Inadequate, inefficient regulation, over-regulation (agencies)	-		80%	20%	0%		100%	0%	0%
Socio-Economic Threats	Governance	Lack of or ineffective community engagement or participation in governance	-		50%	50%	0%		0%	100%	0%
Socio-Economic Threats	Governance	Lack of community awareness of the marine estate, associated threats and benefits, regulations and opportunities for participation	-		75%	0%	25%		100%	0%	0%
Socio-Economic Threats	Governance	Lack of compliance with regulations (by users) or lack of compliance effort (by agencies)	-		100%	0%	0%		100%	0%	0%
Socio-Economic Threats	Governance	Different approaches / methods applied to coastal management (e.g. SLR benchmarks, erosion calculation methods)	-		67%	0%	33%		100%	0%	0%
Socio-Economic Threats	Governance	Data accessibility	-		20%	40%	40%		0%	100%	0%
Socio-Economic Threats	Governance	Prohibitive costs for investigation and action implementation	-		60%	20%	20%		0%	100%	0%
Socio-Economic Threats	Governance	Lack of understanding / agreement on governance (e.g. Coastal Protection Structures Ownership and Maintenance)	-		80%	0%	20%		0%	100%	0%
Socio-Economic Threats	Public safety	Coastal hazards (cliff instability, wave overtopping)	-		25%	25%	50%				

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)
Socio-Economic Threats	Public safety	Ageing and Failing Seawalls	-		67%	33%	0%		0%	100%	0%
Socio-Economic Threats	Public safety	Water pollution/contamination affecting human health and safety	-		100%	0%	0%		100%	0%	0%
Socio-Economic Threats	Critical knowledge gaps	Inadequate environmental, social and economic information	-		75%	25%	0%		100%	0%	0%
Socio-Economic Threats	Critical knowledge gaps	Inadequate or lack of education on coastal management and estuary health	-		100%	0%	0%				
Socio-Economic Threats	Lack of access availability	Loss of public access (either by private development or Government area closures)	-		67%	0%	33%				
Socio-Economic Threats	Lack of access availability	Limited or lack of foreshore and waterway access	-		67%	0%	33%				
Socio-Economic Threats	Lack of access availability	Limited or lack of disability infrastructure	-		33%	33%	33%				
Socio-Economic Threats	Lack of access availability	Limited or lack of supporting infrastructure	-		50%	50%	0%				
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of low lying land (storm surge)	-		67%	33%	0%				
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of stormwater/sewer infrastructure	-		100%	0%	0%				
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - low of beach amenity	-		67%	33%	0%				
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - impacts to foreshore infrastructure	-		67%	33%	0%				
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of low lying land (storm surge)	-		50%	50%	0%				
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of stormwater/sewer infrastructure	-		100%	0%	0%				
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - low of beach amenity	-		67%	33%	0%				
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - impacts to foreshore infrastructure	-		67%	33%	0%				

Table 18 Sydney Harbour Values Worksheet – Agency Response Details

Benefit Category	Values and Assets		Very Important (all groups)	Important (all groups)	Less Important (all groups)	Local Examples (all groups)	Enhance (all groups)	Restore (all groups)	Maintain (all groups)	Protect (all groups)	
Environment	Clean waters		6	0	0	G1: Across whole area; existing dedicated swimming areas; options to open up new swimmable areas. G2: Port Jackson (current example); Parramatta River (future example); Restore value. G3: Applies across the whole estuary. G4: Watsons Bay and Camp Cove. 'Restore' value. G5: 'Restore' value. G6 (OEH-Science): stormwater, sewage overflow, litter; 'Enhance' and 'Protect' value.	1	3	0	1	
Environment	Clean estuarine sediments		6	0	0	G1: Main trunk cleaner than tributaries; industrial areas major issue. G2: Clontarf (current example); Parramatta River (future example); 'Restore' value. G3: Kendall Bay being resorted. G4: Bantry Bay. 'Restore' value. G5: 'Restore' value. G6 (OEH-Science): stormwater outlets, Iron Cove, Homebush; 'Enhance' value.	1	3	0	0	
Environment	Terrestrial and riparian habitats		6	0	0	G1: Existing reserve areas and open space reserves; fringing mangroves and vegetation. G2: Sydney Harbour National Park (current example); Crown land on foreshores and inaccessible land (future example); 'Enhance' and 'Restore' value. G3: Catchment water quality. G4: Lane Cove River. 'Restore' value. G5: 'Restore' value. G6 (OEH-Science): parra river saltmarsh and mangroves.	1	3	0	0	
Environment	Estuarine habitats & assemblages		6	0	0	G1: As above; mangroves; seagrass; saltmarsh areas; rocky foreshores; connectivity between them. G2: Homebush Bay saltmarsh (current example); Areas where habitat migration can be achieved with sea level rise (future example); 'Enhance' and 'Restore' value. G3: Direct ecosystem health. G4: Lane Cove River. 'Restore' value. G5: 'Restore' value. G6 (OEH-Science): saltmarsh, mangrove, seagrass, river banks, beaches, mudflats, rocky shores, shallow soft, deep soft, shallow reefs; 'Restore' and 'Protect' value.	1	4	0	1	
Environment	Marine habitats		6	0	0	G1: East of Rose Bay. G2: Seagrass at Little Collins for Penguins (current value). 'Enhance' and 'Restore' value. G3: Marine (ocean) waters outside of harbour impacted by harbour (e.g. plastics). G4: North Head. 'Restore' value. G5: 'Restore' value. G6 (OEH-Science): reefs, sediments, rocky shore, beach; 'Restore' and 'Protect' value.	1	4	0	1	
Environment	Threatened and protected species		6	0	0	G1: Mainly Little Penguins, whales + sharks; marine mammals in Middle Harbour and around. G2: Sygnathid spp (including seahorses). 'Enhance' value. G3: Wetland habitats, green and golden bell frogs, sea eagles. G4: Fairy Penguins at Manly. 'Restore' value. G5: 'Restore' value. G6 (OEH-Science): FMA and BCA spp; 'Enhance', 'Restore' and 'Protect' value.	2	3	0	1	
Environment	Sydney Harbour Fishery		1	4	1	G1: Commercial fisheries currently closed due to historic contamination; recreational fishing not recommended. G2: Unclear, may be a threat; Not an environmental asset. G3: Recreational fishing off piers, indigenous fishing? G4: Harbour wide. 'Enhance' and 'Restore' value. G5: 'Restore' value. G6 (OEH-Science): recreational only; 'Maintain' value.	1	2	1	0	

Benefit Category	Values and Assets		Very Important (all groups)	Important (all groups)	Less Important (all groups)	Local Examples (all groups)	Enhance (all groups)	Restore (all groups)	Maintain (all groups)	Protect (all groups)	
Community Use / Social	Safety, health and wellbeing		6	0	0	G1: Use conflict and accessibility to the harbour are issues; many complexity uses/users. G2: Coastal walks. 'Maintain' value. G3: Physical activities/fitness; safety from flooding; mental health. G4: Barangaroo foreshore access and walk. 'Enhance' and value. G5: 'Enhance' value.. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	2	0	
Community Use / Social	Recreational amenity		6	0	0	G1: As above; Scarcity, maintenance and funding. G2: Little Manly Reserve (current example); Parramatta Masterplan (future example). 'Enhance' value. G3: Boating (e.g. rowing, sailing); Swimming (e.g. designated sites and other); Passive (e.g. walking, cycling, parks, open space). G4: Bay run at Lane Cove. 'Enhance' and value. G5: Public infrastructure/domain. 'Enhance' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	4	0	1	0	
Community Use / Social	Socialising; sense of community		4	1	0	G1: Educational opportunities?; community activities, tourism, venue to major events (e.g. N.Y, Vivid). G3: NYE, community events. G4: Abbotsford Sailing Club. 'Enhance' and value. G5: If not values by a local community - why are we doing it? % Western Sydney visitors to Darling Harbour. 'Enhance' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	1	0	
Community Use / Social	Intrinsic value (biodiversity & geodiversity)		6	0	0	G1: Manage through development controls. e.g. avoid cliff face development. G3: Mental health; sustainability. Kellys Bush and North Sydney Aquatic Reserve. 'Enhance' and value. G5: Enhance species and communities that are loved and appreciated by the local community. 'Enhance' and 'Maintain' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	2	0	
Community Use / Social	Natural areas / open space		4	1	0	G1: Differentiate between natural values areas and other open space; Reserve areas and existing open space, coastal recreation areas, walks, cycleways etc. G3: Linked to recreation and health; Even more important with increased urban density (e.g. Rhodes). G4: Sydney Harbour National Park. 'Enhance' and 'Maintain' value.. G5: 'Enhance' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	2	0	
Community Use / Social	Foreshore and harbour access		4	1	0	G1: limited access, many barriers to disabled access; connectivity needs enhancement. G3: Green grid. E.g. Urban renewal areas access for different uses (e.g. dogs). G4: Pyrmont - Woolloomooloo foreshore access via Circular Quay. 'Enhance' and 'Maintain' value. G5: 'Enhance' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	2	0	
Community Use / Social	Harbour views		3	3	0	G1: Very important for public open space (but just important for private land); view lines very important - especially heritage view lines. G2: Foreshore vegetation. 'Maintain' value. G3: Conflict between vegetation and views. G4: Opera House, Balmoral. 'Enhance' and 'Maintain' value. G5: 'Maintain' value.. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	2	0	4	0	
Community Use / Social	Aboriginal cultural heritage		5	1	0	G1: Maintaining integrity of secret areas, opening up others for broader education, interpretation, access and tourism. G2: Midden various. 'Maintain' value. G3: Intangible heritage / country and artefacts. G4: Harbour Islands. 'Enhance' and 'Maintain' value. G5: Continue traditions. 'Protect' and 'Maintain' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	2	0	4	2	

Benefit Category	Values and Assets		Very Important (all groups)	Important (all groups)	Less Important (all groups)	Local Examples (all groups)	Enhance (all groups)	Restore (all groups)	Maintain (all groups)	Protect (all groups)	
Community Use / Social	European / built heritage		5	1	0	G1: Listed heritage sites; linking local \registers with state registers. G2: Quarantine Station. 'Restore' and 'Maintain' value. G3: Waverly harbour; World heritage; State and Local. G4: Cockatoo Island, Sydney Harbour Bridge. 'Enhance', 'Maintain' and 'Protect' value. G5: 'Protect' and 'Maintain' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	2	1	4	2	
Community Use / Social	Built assets and infrastructure (private and public)		5	1	0	G1: limited application to CMPs other than coastal protection works and access infrastructure. G2: Incorporate environmentally friendly design. 'Enhance' value. G3: Essential public infrastructure (e.g. sewer, water, stormwater, roads, power etc, jetties). G4: Commuter wharfs. 'Enhance', 'Maintain' and 'Protect' value. G5: 'Enhance' and 'Maintain' value.. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	4	0	3	1	
Community Use / Social	Educational value		3	1	0	G1: Maritime trade educational facilities, SIMS and other educational facilities focused on marine education. G4: Barangaroo Aboriginal walks. 'Enhance', 'Maintain' and 'Protect' value. G5: 'Enhance' value.. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	2	1	
Economic	Economic intrinsic value		3	0	0	G3: Harbour transport, including Ferries (future increase), water taxis, cruise ships. G4: Cruise ships. 'Enhance', 'Maintain' and 'Protect' value. G5: Intrinsic = non-market. 'Enhance' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	2	1	
Economic	Coastal economy & employment		2	2	0	G2: Boat hire. G4: Sydney Fish Markets. 'Enhance', 'Maintain' and 'Protect' value. G5: 'Enhance' and 'Maintain' value. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	3	1	
Economic	Individual enjoyment value (consumer surplus)		1	2	0	G4: Aquarium, harbour areas. 'Enhance', 'Maintain' and 'Protect' value. G5: 'Enhance' value.. G6 (OEH-Science): 'Enhance' and 'Maintain' value.	3	0	2	1	

Table 19 Sydney Harbour Values Worksheet – Council Response Details

Benefit Category	Values and Assets		Very Important (all groups)	Important (all groups)	Less Important (all groups)	Local examples (all groups)	Enhance (all groups)	Restore (all groups)	Maintain (all groups)	Protect (all groups)	
Environment	Clean waters		4	0	0	G2: Greenwich Baths, beaches, Marine Ecology; G3: Restore for swimming, e.g. Callan Park water play; G4: Parramatta River project to return swimming; Balmoral Beach WQ	2	2	0	0	
Environment	Clean estuarine sediments		4	0	0	G1: Metals in sediment plumes throughout harbour; G2: Fisheries, recreation fishers, marine life	1	3	0	1	
Environment	Terrestrial and riparian habitats		3	1	0	G2: Habitat, river systems, urban bushland, Lane Cove River; G3: Restore and enhance Iron Cove; G4: Kelly's Bush, Boronia Park (i.e. ID biodiversity corridors)	1	4	0	1	
Environment	Estuarine habitats & assemblages		3	1	0	G2: Habitat, river systems, Lane Cove River, Manly Cove - seagrass beds; G4: PRCG Mascot program	1	2	1	1	
Environment	Marine habitats		3	1	0	G2: Manly Cove - seagrass beds; ; G4: Seagrass in Mosman LGA	0	3	1	1	
Environment	Threatened and protected species		3	1	0	G2: Marine flora and fauna; G3: Saltmarsh;	0	2	2	1	
Environment	Sydney Harbour Fishery		1	2	1	G1: Non-commercial	1	1	1	0	
Community Use / Social	Safety, health and wellbeing		3	0	0	G1: Well-being, access to open space; also physical safety - water quality; cliff faces; storm surge; G2: Safe use of harbour, boating, swimming, fishing; G3: Properties vulnerable to SLR, e.g. Leichardt foreshore	2	1	0	0	
Community Use / Social	Recreational amenity		3	1	0	G1: Linked with open space; G2: Walking, swimming, general enjoyment of harbour; G3: Especially RBG, Circular Quay, All parks and reserves along foreshore, range of experiences	3	0	1	1	
Community Use / Social	Socialising; sense of community		2	2	0	G3: Especially RBG, Circular Quay, All parks and reserves along foreshore, range of experiences	1	0	3	2	
Community Use / Social	Intrinsic value (biodiversity & geodiversity)		4	0	0	G2: International / state value; G3: Bushcare sites in reserves; natural sites around Callan Park, Botanic Gardens	1	2	3	1	
Community Use / Social	Natural areas / open space		3	0	0	G1: Mort Bay Park, Elkington Park, Illoura Reserve, Birchgrove Oval, Leichardt park, Bay Run; G2: Access to foreshore (e.g. Manly to Spit walk); G4: Clifton Garden	2	2	1	0	
Community Use / Social	Foreshore and harbour access		3	1	0	G1: Interrelated with harbour views; G2: Access to foreshore (e.g. Manly to Spit walk)	2	0	2	1	
Community Use / Social	Harbour views		2	1	1	G1: Interrelated with foreshore and harbour access; issue to tree poisoning for view (by residents); G2: most enjoyed e.g. from office, roads; ; G4: DAs for foreshore properties in Mosman	1	0	3	1	
Community Use / Social	Aboriginal cultural heritage		4	0	0	G2: Site protection	0	0	3	1	
Community Use / Social	European / built heritage		2	2	0		0	0	3	1	
Community Use / Social	Built assets and infrastructure (private and public)		3	0	0	G2: How people use the harbour, roads and wharves (e.g. circular quay); G4: Balmoral and Clifton Garden jetties	2	3	2	2	
Community Use / Social	Educational value		2	1	0	G1: White brick wetland (Sydney Water and IWC); National Parks; SIMS Research	1	0	2	1	

Benefit Category	Values and Assets		Very Important (all groups)	Important (all groups)	Less Important (all groups)	Local examples (all groups)	Enhance (all groups)	Restore (all groups)	Maintain (all groups)	Protect (all groups)	
Economic	Economic intrinsic value		2	1	0		3	0	0	0	
Economic	Coastal economy & employment		2	1	0		3	0	0	0	
Economic	Individual enjoyment value (consumer surplus)		2	1	0		3	0	0	0	

Table 20 Sydney Harbour Threat Worksheet – Agency Response Details

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)	Notes (all groups)
Environmental Threat	Resource use	Shipping and boating	Large and large commercial vessels, port activities		2	2	3	G(a): Future priority level change to high, due to projected population growth; G(f): Increased priority level in future to high.
Environmental Threat	Resource use	Recreational fishing	Shore-based fishing; Boat-based fishing; spear fishing; hand gathering		3	0	3	
Environmental Threat	Resource use	Cultural Fishing	Line fishing, spearfishing, hand gathering, traditional fishing methods		0	1	5	
Environmental Threat	Resource use	Charter activities	Whale and dolphin watching		0	1	6	G(a): Future priority level change to high, due to projected population growth.
Environmental Threat	Resource use	Bait and aquarium trade	Imported baits, imported fish and other aquatic species		1	3	2	
Environmental Threat	Resource use	Recreation and tourism	Boating and boating infrastructure		4	1	1	
Environmental Threat	Resource use	Recreation and tourism	Snorkelling and diving, and other recreational use		0	1	6	
Environmental Threat	Resource use	Recreation and tourism	Passive recreational use		0	0	7	G(b): With the exception of dog walking.
Environmental Threat	Resource use	Dredging & Placement	Navigation, harbour maintenance, beach nourishment		2	2	2	
Environmental Threat	Resource use	Modified freshwater flows	Extraction, artificial barriers to riverine and estuarine flow (e.g. dams, weirs,		4	1	1	
Environmental Threat	Resource use	Service infrastructure	Pipelines, cables, trenching and boring		3	1	2	
Environmental Threat	Land-based impacts	Hydrologic Modifications	Disturbance of contaminated sediment on seabed (e.g. dredging)		4	0	1	G(e): Particular issue in places due to legacy sediment contamination.
Environmental Threat	Land-based impacts	Land use Intensification	Urban stormwater discharge		7	0	0	G(f): [tick]
Environmental Threat	Land-based impacts	Land use Intensification	Foreshore development		7	0	0	G(f): [tick]
Environmental Threat	Land-based impacts	Land use Intensification	Beach nourishment and grooming		0	4	2	G(b): Future priority level change to high.
Environmental Threat	Land-based impacts	Land use Intensification	Clearing riparian and adjacent habitat including wetland drainage		7	0	0	
Environmental Threat	Land-based impacts	Land use Intensification	Clearing littoral rainforest habitat		4	1	1	
Environmental Threat	Land-based impacts	Land use Intensification	Clearing terrestrial habitat		6	0	1	
Environmental Threat	Land-based impacts	Land use Intensification	Agricultural diffuse source runoff		1	0	4	
Environmental Threat	Land-based impacts	Land use Intensification	Deliberate introduction of animals and plants (e.g. foxes, cats, bitou bush)		3	2	2	
Environmental Threat	Land-based impacts	Land use Intensification	Disturbance of contaminated land		6	0	0	G(e): Particular issue in places due to legacy sediment contamination.
Environmental Threat	Land-based impacts	Land use Intensification	Coastal protection (e.g. seawalls)		5	1	0	G(a): Future priority level change to low priority due to better engineering of seawalls.
Environmental Threat	Land-based impacts	Point Discharges	Industrial discharges		1	3	2	
Environmental Threat	Land-based impacts	Point Discharges	Sewage effluent and septic runoff		4	2	0	

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)	Notes (all groups)
Environmental Threat	Land-based impacts	Hydrologic Modifications	Estuary entrance modifications		1	0	3	G(e): N/A.
Environmental Threat	Land-based impacts	Hydrologic Modifications	Increased sedimentation (e.g. infilling channels and changing flows)		3	2	1	
Environmental Threat	Climate change	Climate change	Altered ocean currents & nutrient inputs		2	2	2	
Environmental Threat	Climate change	Climate change	Climate and sea temperature rise		2	2	1	
Environmental Threat	Climate change	Climate change	Ocean acidification		2	2	1	
Environmental Threat	Climate change	Climate change	Altered storm/cyclone activity		2	2	2	
Environmental Threat	Climate change	Climate change	Sea level rise		3	2	0	G(a): Future priority level change to high due to projected sea level rise increases and associated coastal hazard impacts; G(e): Priority level change to high in future, due to increasing
Environmental Threat	Climate change	Climate change	Altered salinity levels / profile		1	1	2	
Environmental Threat	Coastal hazards	Coastal inundation	Tidal inundation		3	2	0	G(a): Future priority level change to high due to projected sea level rise increases and associated coastal hazard impacts.
Environmental Threat	Coastal hazards	Coastal inundation	Coastal inundation		3	1	1	G(a): Future priority level change to high due to projected sea level rise increases and associated coastal hazard impacts.
Environmental Threat	Coastal hazards	Shoreline instability	Coastal erosion and recession		2	1	2	G(a): Future priority level change to high due to projected sea level rise increases and associated coastal hazard impacts.
Environmental Threat	Coastal hazards	Shoreline instability	Estuary foreshore erosion and bank instability		4	1	0	
Environmental Threat	Coastal hazards	Shoreline instability	Cliff and slope instability		1	2	2	
Socio-Economic Threats	Resource use conflict	Conflict over resource access and use	-		6	0	0	
Socio-Economic Threats	Resource use conflict	Anti-social behaviour and unsafe practices	-		1	2	3	
Socio-Economic Threats	Resource use conflict	Overcrowding / congestion	-		2	3	1	G(a): Future priority level change to high due to population growth pressures, but threat/pressure is very localised in nature;.
Socio-Economic Threats	Resource use conflict	Navigation problems from sedimentation	-		2	0	3	
Socio-Economic Threats	Environmental	Water pollution on environmental values - septic runoff, point source pollution and sewage overflows (such as outfalls, STPs, etc)	-		6	1	0	G(b): Group with other two listed water pollution threats.
Socio-Economic Threats	Environmental	Water pollution on environmental values - urban stormwater discharge	-		7	0	0	G(b): Group with other two listed water pollution threats.
Socio-Economic Threats	Environmental	Water pollution on environmental values - litter, solid waste, marine debris and microplastics	-		7	0	0	G(b): Group with other two listed water pollution threats.
Socio-Economic Threats	Environmental	Wildlife disturbance and impacts to ecological health by dog walkers, 4WD, marine vessels etc.	-		3	1	1	

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)	Notes (all groups)
Socio-Economic Threats	Environmental	Land use intensification	-		5	0	0	
Socio-Economic Threats	Environmental	Habitat disturbance from development (foreshore, catchment)	-		4	0	0	
Socio-Economic Threats	Environmental	Habitat disturbance from excessive recreational use	-		3	1	0	
Socio-Economic Threats	Environmental	Clearing riparian vegetation for views	-		4	0	0	
Socio-Economic Threats	Environmental	Bank erosion from foreshore development and excavation on bank stability	-		2	1	1	
Socio-Economic Threats	Environmental	Bank erosion from foreshore development and excavation on riparian vegetation	-		3	1	0	
Socio-Economic Threats	Environmental	Reductions in abundances of species and trophic levels	-		4	0	0	
Socio-Economic Threats	Environmental	Pests and diseases	-		3	1	1	G(e): Change to high priority in the future.
Socio-Economic Threats	Environmental	Modified hydrology / hydraulics and flow regime	-		2	1	1	
Socio-Economic Threats	Environmental	Sediment contamination / pollution (toxicants in sediment; dioxins in Sydney Harbour)	-		4	1	0	
Socio-Economic Threats	Environmental	Climate change stressors	-		4	0	0	G(d): Mozzies, dengue, climate change.
Socio-Economic Threats	Governance	Inadequate, inefficient regulation, over-regulation (agencies)	-		4	1	0	G(c): Future priority level changed to low (reason not stated, but possibly due to outcomes from a harbour wide CMP?); G(d): Stormwater not regulated.
Socio-Economic Threats	Governance	Lack of or ineffective community engagement or participation in governance	-		2	2	0	G(c): Future priority level changed to low (reason not stated, but possibly due to outcomes from a harbour wide CMP?).
Socio-Economic Threats	Governance	Lack of community awareness of the marine estate, associated threats and benefits, regulations and opportunities for participation	-		3	0	1	G(c): Future priority level changed to low (reason not stated, but possibly due to outcomes from a harbour wide CMP?).
Socio-Economic Threats	Governance	Lack of compliance with regulations (by users) or lack of compliance effort (by agencies)	-		4	0	0	G(c): Future priority level changed to low (reason not stated, but possibly due to outcomes from a harbour wide CMP?).
Socio-Economic Threats	Governance	Different approaches / methods applied to coastal management (e.g. SLR benchmarks, erosion calculation methods)	-		2	0	1	
Socio-Economic Threats	Governance	Data accessibility	-		1	2	2	
Socio-Economic Threats	Governance	Prohibitive costs for investigation and action implementation	-		3	1	1	
Socio-Economic Threats	Governance	Lack of understanding / agreement on governance (e.g. Coastal Protection Structures Ownership and Maintenance)	-		4	0	1	G(f): [tick]

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)	Notes (all groups)
Socio-Economic Threats	Public safety	Coastal hazards (cliff instability, wave overtopping)	-		1	1	2	
Socio-Economic Threats	Public safety	Ageing and Failing Seawalls	-		2	1	0	
Socio-Economic Threats	Public safety	Water pollution/contamination affecting human health and safety	-		4	0	0	
Socio-Economic Threats	Critical knowledge gaps	Inadequate environmental, social and economic information	-		3	1	0	
Socio-Economic Threats	Critical knowledge gaps	Inadequate or lack of education on coastal management and estuary health	-		3	0	0	
Socio-Economic Threats	Lack of access availability	Loss of public access (either by private development or Government area closures)	-		2	0	1	
Socio-Economic Threats	Lack of access availability	Limited or lack of foreshore and waterway access	-		2	0	1	
Socio-Economic Threats	Lack of access availability	Limited or lack of disability infrastructure	-		1	1	1	
Socio-Economic Threats	Lack of access availability	Limited or lack of supporting infrastructure	-		1	1	0	
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of low lying land (storm surge)	-		2	1	0	
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of stormwater/sewer infrastructure	-		3	0	0	
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - low of beach amenity	-		2	1	0	
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - impacts to foreshore infrastructure	-		2	1	0	
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of low lying land (storm surge)	-		2	2	0	
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of stormwater/sewer infrastructure	-		3	0	0	
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - low of beach amenity	-		2	1	0	
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - impacts to foreshore infrastructure	-		2	1	0	

Table 21 Sydney Harbour Threat Worksheet – Council Response Details

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)	Notes (all groups)
Environmental Threat	Resource use	Shipping and boating	Large and large commercial vessels, port activities		1	2	0	G(b): Priority level change to high in the future
Environmental Threat	Resource use	Recreational fishing	Shore-based fishing; Boat-based fishing; spear fishing; hand gathering		0	1	2	
Environmental Threat	Resource use	Cultural Fishing	Line fishing, spearfishing, hand gathering, traditional fishing methods		0	1	2	
Environmental Threat	Resource use	Charter activities	Whale and dolphin watching		0	1	2	
Environmental Threat	Resource use	Bait and aquarium trade	Imported baits, imported fish and other aquatic species		0	3	0	
Environmental Threat	Resource use	Recreation and tourism	Boating and boating infrastructure		2	1	0	G(b): Priority level change to high in the future
Environmental Threat	Resource use	Recreation and tourism	Snorkelling and diving, and other recreational use		0	0	3	
Environmental Threat	Resource use	Recreation and tourism	Passive recreational use		0	0	3	
Environmental Threat	Resource use	Dredging & Placement	Navigation, harbour maintenance, beach nourishment		2	1	0	
Environmental Threat	Resource use	Modified freshwater flows	Extraction, artificial barriers to riverine and estuarine flow (e.g. dams, weirs,		2	1	0	
Environmental Threat	Resource use	Service infrastructure	Pipelines, cables, trenching and boring		0	1	2	
Environmental Threat	Land-based impacts	Hydrologic Modifications	Disturbance of contaminated sediment on seabed (e.g. dredging)		2	0	0	
Environmental Threat	Land-based impacts	Land use Intensification	Urban stormwater discharge		3	0	0	
Environmental Threat	Land-based impacts	Land use Intensification	Foreshore development		2	1	0	G(b): Priority level change to high in the future
Environmental Threat	Land-based impacts	Land use Intensification	Beach nourishment and grooming		0	1	2	G(a): Priority threat level changed to medium in future; G(b): Priority level change to medium in the future
Environmental Threat	Land-based impacts	Land use Intensification	Clearing riparian and adjacent habitat including wetland drainage		2	1	0	G(a): Now protected
Environmental Threat	Land-based impacts	Land use Intensification	Clearing littoral rainforest habitat		1	2	0	G(a): Now protected
Environmental Threat	Land-based impacts	Land use Intensification	Clearing terrestrial habitat		3	0	0	
Environmental Threat	Land-based impacts	Land use Intensification	Agricultural diffuse source runoff		0	0	2	G(a): N/A
Environmental Threat	Land-based impacts	Land use Intensification	Deliberate introduction of animals and plants (e.g. foxes, cats, bitou bush)		0	3	0	G(a): Priority threat level changed to high in future
Environmental Threat	Land-based impacts	Land use Intensification	Disturbance of contaminated land		1	2	0	
Environmental Threat	Land-based impacts	Land use Intensification	Coastal protection (e.g. seawalls)		2	0	1	G(b): Priority level change to medium in the future
Environmental Threat	Land-based impacts	Point Discharges	Industrial discharges		1	1	1	G(a): Don't have the data
Environmental Threat	Land-based impacts	Point Discharges	Sewage effluent and septic runoff		3	0	0	

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)	Notes (all groups)
Environmental Threat	Land-based impacts	Hydrologic Modifications	Estuary entrance modifications		0	1	2	
Environmental Threat	Land-based impacts	Hydrologic Modifications	Increased sedimentation (e.g. infilling channels and changing flows)		3	0	0	
Environmental Threat	Climate change	Climate change	Altered ocean currents & nutrient inputs		0	0	3	G(b): Priority level change to medium in the future; G(c): Priority level change in future to medium-high
Environmental Threat	Climate change	Climate change	Climate and sea temperature rise		0	1	2	G(b): Priority level change to high in the future; G(c): Priority level change in future to medium-high
Environmental Threat	Climate change	Climate change	Ocean acidification		0	0	2	G(b): Priority level change to medium in the future; G(c): Priority level change in future to high
Environmental Threat	Climate change	Climate change	Altered storm/cyclone activity		0	2	1	G(b): Priority level change to high in the future; G(c): Priority level change in future to high
Environmental Threat	Climate change	Climate change	Sea level rise		1	0	2	G(b): Priority level change to medium in the future; G(c): Priority level change in future to high
Environmental Threat	Climate change	Climate change	Altered salinity levels / profile		1	0	2	G(b): Priority level change to high in the future; G(c): Priority level change in future to high
Environmental Threat	Coastal hazards	Coastal inundation	Tidal inundation		1	1	1	G(b): Priority level change to high in the future; G(c): Priority level change in future to high
Environmental Threat	Coastal hazards	Coastal inundation	Coastal inundation		1	1	1	G(b): Priority level change to high in the future; G(c): Priority level change in future to high
Environmental Threat	Coastal hazards	Shoreline instability	Coastal erosion and recession		2	1	0	G(b): Priority level change to medium in the future
Environmental Threat	Coastal hazards	Shoreline instability	Estuary foreshore erosion and bank instability		3	0	0	
Environmental Threat	Coastal hazards	Shoreline instability	Cliff and slope instability		1	2	0	
Socio-Economic Threats	Resource use conflict	Conflict over resource access and use	-		0	1	0	G(d): Priority level changed in future to high
Socio-Economic Threats	Resource use conflict	Anti-social behaviour and unsafe practices	-		0	1	0	G(d): Priority level changed in future to high
Socio-Economic Threats	Resource use conflict	Overcrowding / congestion	-		0	1	0	G(d): Priority level changed in future to high
Socio-Economic Threats	Resource use conflict	Navigation problems from sedimentation	-		0	1	0	G(d): Priority level changed in future to high
Socio-Economic Threats	Environmental	Water pollution on environmental values - septic runoff, point source pollution and sewage overflows (such as outfalls, STPs, etc)	-		1	0	0	
Socio-Economic Threats	Environmental	Water pollution on environmental values - urban stormwater discharge	-		1	0	0	
Socio-Economic Threats	Environmental	Water pollution on environmental values - litter, solid waste, marine debris and microplastics	-		1	0	0	
Socio-Economic Threats	Environmental	Wildlife disturbance and impacts to ecological health by dog walkers, 4WD, marine vessels etc.	-		0	0	1	G(d): Priority level changed in future to medium

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)	Notes (all groups)
Socio-Economic Threats	Environmental	Land use intensification	-		1	0	0	
Socio-Economic Threats	Environmental	Habitat disturbance from development (foreshore, catchment)	-		0	1	0	G(d): Priority level changed in future to high
Socio-Economic Threats	Environmental	Habitat disturbance from excessive recreational use	-		0	1	0	G(d): Priority level changed in future to high
Socio-Economic Threats	Environmental	Clearing riparian vegetation for views	-		1	0	0	
Socio-Economic Threats	Environmental	Bank erosion from foreshore development and excavation on bank stability	-		0	0	0	
Socio-Economic Threats	Environmental	Bank erosion from foreshore development and excavation on riparian vegetation	-		0	0	0	
Socio-Economic Threats	Environmental	Reductions in abundances of species and trophic levels	-		1	0	0	
Socio-Economic Threats	Environmental	Pests and diseases	-		0	1	0	G(d): Priority level changed in future to high
Socio-Economic Threats	Environmental	Modified hydrology / hydraulics and flow regime	-		0	0	0	
Socio-Economic Threats	Environmental	Sediment contamination / pollution (toxicants in sediment; dioxins in Sydney Harbour)	-		1	0	0	
Socio-Economic Threats	Environmental	Climate change stressors	-		0	0	1	G(d): Priority level changed in future to high
Socio-Economic Threats	Governance	Inadequate, inefficient regulation, over-regulation (agencies)	-		1	0	0	
Socio-Economic Threats	Governance	Lack of or ineffective community engagement or participation in governance	-		0	1	0	
Socio-Economic Threats	Governance	Lack of community awareness of the marine estate, associated threats and benefits, regulations and opportunities for participation	-		1	0	0	
Socio-Economic Threats	Governance	Lack of compliance with regulations (by users) or lack of compliance effort (by agencies)	-		1	0	0	
Socio-Economic Threats	Governance	Different approaches / methods applied to coastal management (e.g. SLR benchmarks, erosion calculation methods)	-		1	0	0	
Socio-Economic Threats	Governance	Data accessibility	-		0	1	0	
Socio-Economic Threats	Governance	Prohibitive costs for investigation and action implementation	-		0	1	0	
Socio-Economic Threats	Governance	Lack of understanding / agreement on governance (e.g. Coastal Protection Structures Ownership and Maintenance)	-		0	1	0	

Issue Category	Issue	Threat	Stressor		High Priority (all groups)	Medium Priority (all groups)	Low Priority (all groups)	Notes (all groups)
Socio-Economic Threats	Public safety	Coastal hazards (cliff instability, wave overtopping)	-		0	0	0	
Socio-Economic Threats	Public safety	Ageing and Failing Seawalls	-		0	1	0	G(d): Priority level changed in future to high
Socio-Economic Threats	Public safety	Water pollution/contamination affecting human health and safety	-		1	0	0	
Socio-Economic Threats	Critical knowledge gaps	Inadequate environmental, social and economic information	-		1	0	0	
Socio-Economic Threats	Critical knowledge gaps	Inadequate or lack of education on coastal management and estuary health	-		0	0	0	
Socio-Economic Threats	Lack of access availability	Loss of public access (either by private development or Government area closures)	-		0	0	0	
Socio-Economic Threats	Lack of access availability	Limited or lack of foreshore and waterway access	-		0	0	0	
Socio-Economic Threats	Lack of access availability	Limited or lack of disability infrastructure	-		0	0	0	
Socio-Economic Threats	Lack of access availability	Limited or lack of supporting infrastructure	-		0	0	0	
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of low lying land (storm surge)	-		0	0	0	
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of stormwater/sewer infrastructure	-		0	0	0	
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - low of beach amenity	-		0	0	0	
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - impacts to foreshore infrastructure	-		0	0	0	
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of low lying land (storm surge)	-		0	0	0	
Socio-Economic Threats	Coastal hazards	Coastal inundation - flooding of stormwater/sewer infrastructure	-		0	0	0	
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - low of beach amenity	-		0	0	0	
Socio-Economic Threats	Coastal hazards	Coastal erosion and recession - impacts to foreshore infrastructure	-		0	0	0	

Appendix D Sydney Harbour Governance Tables

Table D-1 Sydney Harbour Governance: Organisations and Responsibilities

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
Federal	Australian Defence Force	• The military organisation responsible for defence in Australia, and forms the Maritime Border Command in partnership with the Department of Immigration and Border Protection. • In partnership with the Department of Defence, makes up the Australian Defence Organisation.
Federal	Australian Maritime Safety Authority (AMSA)	• Established by the *Australian Maritime Safety Authority Act 1990* • Administers the *Protection of the Sea Act 1983* • Co-ordinates maritime safety, including environmental management and pollution prevention
Federal	Department of Agriculture	• Designs and implements Australian Government policy, programs and services improve the productivity, competitiveness and sustainability of the food and agriculture industry. • Administers all biosecurity threats and associated quarantine services. It is responsible for the monitoring of all vessels scheduled to enter and leave Australian waters, including Sydney Harbour.

Federal	Department of Defence	• Responsible for protecting Australia and it's national interests
		• Operates defence facilities in Sydney Harbour including:
		  • HMAS Kuttabul – Garden Island
		  • HMAS Penguin – Balmoral
		  • HMAS Watson – South Head
		  • HMAS Waterhen – Waverton
		• Prepares Plans of Management for Defence Lands

Federal	Department of Immigration and Border Protection Command	• Department staff work with the Australian Defence Force to form the Maritime Border Command.
Federal	Department of Infrastructure and Regional Development	• Responsible for administration of the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
Federal	Department of the Environment and Energy	• Designs and implements Australian Government policy and programs to protect and conserve the environment, water and heritage, promote climate action, and provide adequate, reliable and affordable energy. • Administers the *Environmental Protection and Biodiversity Conservation Act 1999* • Heritage items of national environmental significance in and around Sydney Harbour protected under the EPBC Act include: • Cockatoo Island • Old Government House • Sydney Opera House • Threatened species occurring in and around Sydney Harbour are protected under the EPBC Act, including for example the Eastern Suburbs Banksia Scrub (at North Head) • Administers the *Sydney Harbour Federation Trust Act 2001*
Federal	Maritime Border Command	• Australia's lead civil maritime security authority that operates primarily offshore to safeguard Australia's maritime jurisdiction.• Comprises staff from the Department of Immigration and Border Protection, and the Australian Defence Force.• Has various roles and responsibilities, including to counter civil maritime security threats such as illegal activity in protected areas, illegal exploitation of natural resources, marine pollution and compromises to bio-security.• Liaises with a range or partner agencies including the Australian Fisheries Management Authority and the Australian Maritime Safety Authority.
Federal	National Health and Medical Research Council	• Australian government body expert body promoting the development and maintenance of public and individual health standards. • Oversees the ongoing development of the National Water Quality Management Strategy, that consists of policy, process and guidelines (including the 'ANZECC guidelines')
Federal	Sydney Harbour Federation Trust	• Established by the *Sydney Harbour Federation Trust Act 1990* and administered by the Department of Environment and Energy • A self-funded self-funded federal agency responsible for vision planning and management of Sydney Harbour, that is tasked with: • Ensuring that management of Trust land contributes to enhancing the amenity of the Sydney Harbour region • Protecting, conserving and interpreting the environmental and heritage values of Trust land • Maximising public access to Trust land • Establishing and managing suitable Trust land as a park on behalf of the Commonwealth

Sydney Harbour Governance Tables

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
State	Barangaroo Delivery Authority	• Stage government agency responsible for the development of Barangaroo and management of its public spaces, including the Bangaroo Reserve.
State	Botanic Gardens and Centennial Parklands	• This entity is established under the Office of Environment and Heritage and tasked with delivering sustainable and world leading botanic gardens and parklands across Sydney. This includes harbour-side sites such as the Royal Botanic Gardens and the Domain.
State	Department of Health	• Department of Health has a diverse set of responsibilities centred around improving the health and wellbeing of all Australians both now and in the future. They provide evidence-based policy advice, program management, research and regulation.
State	Department of Industry	• Supports the growth and advancement of globally competitive and sustainable NSW industries to attract investment increase trade and create new jobs.
State	Department of Industry, Crown Lands and Water	• Agency within the Department of Industry. • Develops strategy, programs and policy for the management of the Crown land estate and Water, with key business areas aiming to deliver social and economic outcomes for the state.• Administers the *Crown Land Management Act 2016,* which provides for ownership and management of NSW Crown land.• Administrator for Crown land above the Mean High Water Mark (MHWM) within the Sydney Harbour catchment area, and below the MHWM to the 3 nautical mile limit off of Sydney Harbour. • Many Crown reserves are managed by Local Government either through appointment as trust managers or by devolvement under the *Local Government Act 1993*.• Approves jetties and other domestic waterfront structures on estuaries not covered by RMS.• Investigates and assesses Aboriginal land claims across the state under the *NSW Aboriginal Land Rights Act 1983*. The Crown estate is managed in accordance with Commonwealth Native Title legislation.• Manage NSW water resources, both groundwater and surface waters, through planning, policy and regulation including implementing the *Water Management Act, 2000*.
State	Department of Industry, Regional Development Advisory Council - Sydney	• Regional Development Australia (RDA) is a joint partnership between the Australian, State, Territory and Local Government to support growth and development of Australia Region; RDA Sydney is one of 14 committees in NSW and covers the Greater Sydney region • RDA Sydney's purpose is to build partnerships between governments, key regional organisations, local businesses, community groups and key regional stakeholders to provide strategic and targeted responses to economic, environmental and social issues affecting Sydney. • RDA Sydney believes ongoing, economic analysis for the “Whole of Sydney” Metropolitan Region is critical for current and future planning and decision making.

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
State	Department of Planning and Environment (DPE)	• State government department tasked at making NSW a great place to live and work, by providing homes and services, building communities, creating jobs and protecting the environment • Is affiliated with multiple agencies that have various roles and responsibilities in managing Sydney Harbour, including: • Office of Environment and Heritage • Office of Local Government • Urban Growth NSW • Environment Protection Agency
State	Department of Planning and Environment, Office of Environment and Heritage	• Agency within the Department of Planning and Environment portfolio.• Cares for and protects NSW's environment and heritage (natural, cultural and built), and supports the community, business and government in protecting, strengthening and making the most of a healthy environment and economy in NSW.• Administers the *Biodiversity Conservation Act 2016,* which establishes a balanced approach to land management and biodiversity conservation in NSW• Administers the *Coastal Management Act 2016*, which provides framework for strategic management of the NSW coastal zone now and into the future• Provides technical advice and financial assistance to Councils with preparing and implementing Coastal Management Programs, in line with the Coastal Management Manual and CM Act
State	Department of Planning and Environment, Office of Local Government	• Agency within the Department of Planning and Environment portfolio • Is responsible for local government across NSW and is an advisor to the NSW Government on Local Government matters. • Has a policy, legislative, investigative and program focus in matters ranging from Local Government finance, infrastructure, governance, performance, collaboration and community engagement. • Administers the *Local Government Act 1993*, which provides the legal framework for the system of local government for New South Wales. • Administers the *City of Sydney Act 1988*, which outlines the constitution of the City of Sydney and makes planning provision for major development.
State	Department of Primary Industries, Biosecurity and Food Safety	• Agency within the Department of Primary Industries. • Responsible for the protection of the NSW economy, environment and community from biosecurity and food safety risks. • Administers the *Biosecurity Act 2015*, which provides flexible and responsive statutory framework to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants, for the benefit of the NSW economy, environment and community.

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
State	Department of Primary Industries, Fisheries	• Agency within the Department of Primary Industries • Administers the *Fisheries Management Act 1994*, which provides the legislative framework for conserving, developing and sharing the fishery resources of NSW for present and future generations. • Supports economic growth and sustainable access to aquatic resources through commercial and recreational fisheries management, research, aquaculture development, marine protected areas management, habitat protection and rehabilitation, regulation and compliance. Also mitigates and manages risks from use of land and water. • Responsible for ensuring that fish stocks are conserved and key fish habitat is protected. • Responsible for ensuring the sustainable management of commercial, recreational and Aboriginal cultural fishing, aquaculture, aquatic habitat and biodiversity, and marine protected areas within NSW, including North Harbour Aquatic Reserve in Sydney Harbour. • In Sydney Harbour, undertakes compliance of recreational fishing and assessing development applications within waterway (e.g. jetties).
State	Destination NSW	• Destination NSW is the lead government agency responsible for the major events and tourism sectors.• Their role is to devise and implement strategies to grow the State's visitor economy. They are responsible for events around Sydney Harbour including Vivid Sydney and the Blackmores Sydney Running Festival
State	Greater Sydney Commission	• The Greater Sydney Commission is an independent organisation funded by the NSW Government that has a specific role in coordinating and aligning planning for Greater Sydney. • They are responsible for leading and guiding the planning for development, transport and housing to ensure a productive and sustainable city.
State	Independent Pricing and Regulatory Tribunal (IPART)	• IPART provides advice and independent regulatory decisions to protect and promote the interests of taxpayers, citizens and consumers of NSW. They are the independent pricing regulator for water, public transport and local government as well as the licence administrator of water, gas and electricity. • IPART is responsible for reviewing Sydney Waters operating licence every 5 years.
State	Infrastructure NSW	• Infrastructure NSW is an independent statutory agency tasked with identifying and prioritising the delivery of critical public infrastructure for NSW. • Infrastructure NSW is involved in harbourfront projects including the Walsh Bay Arts and Cultural Precinct and Darling Harbour ICC development.
State	Local Government NSW	• Local Government NSW is the industry association that represents the interests of NSW general and special purpose councils.

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
State	Local Land Services (LLS)	• LLS are a regionally based NSW Government agency that delivers quality services to farmers, landholders and the community. LLS have 11 regions, one of which is Greater Sydney. • The *Local Land Service Act 2013* requires the development of regional strategies to set the vision, priorities and strategy for the delivery of LLS in each region. Greater Sydney Local Land Services consulted with landholders, customers and the community to develop their local strategic plan. The plan was adopted in the first half of 2016 for the period from 2016 to 2020. • Each LLS region is governed by a board of local community representatives. The statewide LLS Board is responsible for safeguarding the delivery of state-wide priorities under the direction of the Minister for Primary Industries.
State	Marine Estate Management Authority	• The NSW Government Marine Estate Management Authority assist in ensuring that policies and programs address priority issues, are efficient and evidence based and result in positive outcomes. Their vision is to have a healthy coast and sea managed for the greatest wellbeing of the community now and in the future. • MEMA has initiated a Sydney Harbour project which includes establishing the Sydney Harbour Strategic Initiatives Network. The purpose of the network is to promote and facilitate information sharing and collaboration to support coordinated management of the harbour. Numerous key projects have been undertaken by members of this network. • The Marine Estate Management Act 2014 and Marine Estate Management Regulation 2017 provides for the strategic and integrated management of the whole marine estate.
State	National Parks and Wildlife Service (NPWS)	• NPWS manages more than 870 protected areas in NSW including national parks, nature reserves, flora reserves, World Heritage areas, beaches etc. This includes the management on numerous sites that front Sydney Harbour within Sydney Harbour National Park, Garigal National Park and Lane Cove National Park. These include; North Head, Dobroyd Head, Georges Head, Bradleys Head, Fort Denison, Goat Island, Rodd Island, Cadmans Cottage, Clark Island, Shark Island, Obelisk Beach, Nielson Park, South Head and Davidson Park (Roseville).
State	NSW Coastal Council	• The NSW Coastal Council provides independent expert advice to the Minister administering the *Coastal Management Act 2016* on coastal planning and management issues. • The NSW Coastal Council was appointed under the *Coastal Management Act 2016 and* replaced the NSW Coastal Panel and the Coastal Expert Panel. • The Minister can request the NSW Coastal Council to audit a local council's implementation of its coastal management program to determined if they are being effectively implemented.
State	NSW Environment Protection Authority	• The EPA is the primary environmental regulator for NSW and aims to reduce pollution and waste, protect human health and prevent degradation of the environment. • The NSW EPA is an independent statutory authority that sits in the Environment Portfolio under the Minister for the Environment as part of the Planning and Environment Cluster. • Responsible for administering the Protection of the Environment Operations Act 1997.

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
State	NSW Land Registry Services (LRS)	• The NSW LRS is maintains a secure, efficient and guaranteed system of land ownership for NSW, defines the legal ownership and boundaries of land parcels throughout the State, both private and public, and records changes as they occur. • NSW LRS collects, collates and integrates property information in NSW and makes it readily available. • The community, business and government rely on this information for a variety of purposes including land management, conveyancing, property development, investment, local planning, state economic and social development and historical research.
State	Place Management NSW (former Sydney Harbour Foreshore Authority)	• Place Management NSW, part of Property NSW, manages Sydney's most historically and culturally significant waterfront locations including The Rocks and Darling Harbour. They also own and manage a number of other waterfront sites around the harbour including Ballast Point Park and the King Street Wharf Promenade. • Property NSW are responsible for leading property reform, strategic planning and management of government property portfolios but also "place making" and heritage conservation. • Property NSW is currently renewing Darling Harbour and The Rocks areas utilising a $73 million Government investment to protect and enhance heritage assets along the Sydney Harbour foreshore.
State	Port Authority of NSW	• The Port Authority of NSW manages the navigation, security and operational safety needs of commercial shipping in Sydney Harbour (and number other NSW harbours). • They also manage and operate the ports at Glebe Island and White Bay and the cruise facilities at the Overseas Passenger Terminal and White Bay Cruise Terminal. • Port Authority is a state-owned corporation that is responsible for: the safe navigation of shipping movements, management of harbour approaches and channels, pilotage, port security, safety of port operations and emergency responses.

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
State	Roads and Maritime Services	• The NSW RMS is an agency within the NSW Transport Cluster responsible for delivering safe and efficient journeys throughout NSW and managing the operations and programs of waterways (and roads).• Regulator of the bed of Sydney Harbour and its tributaries. Within these areas RMS regulates maritime activities and is responsible for leasing domestic, commercial and community waterfront facilities.• The RMS is responsible for administering the following Acts:- City of Sydney Act 1988, Part 4A and Schedule 2, jointly with the Minister for Transport (remainder, the Minister for Local Government)- Driving Instructors Act 1992- Heavy Vehicle (Adoption of National Law) Act 2013 and the Heavy Vehicle National Law (NSW)- Marine Pollution Act 2012- Marine Safety Act 1998- Marine Safety Legislation (Lakes Hume and Mulwala) Act 2001- Motor Vehicles Taxation Act 1988- Photo Card Act 2005- Ports and Maritime Administration Act 1995- Recreation Vehicles Act 1983, Parts 4 and 6 (remainder, the Minister for the Environment)- Road Transport Act 2013- Roads Act 1993 (except parts, jointly the Minister for Primary Industries and other Ministers, parts, the Minister for the Environment, and parts, the Minister for Local Government)- Sydney Harbour Tunnel (Private Joint Venture) Act 1987- Transport Administration Act 1988, Part 4A, Divisions 1 to 3, so far as it relates to Roads and Maritime Services, Part 6, and so much of the Act as relates to Roads and Maritime Services (remainder, the Minister for Transport
State	Sydney Olympic Park Authority	• The Sydney Olympic Park Authority is responsible for managing Sydney Olympic Park including all public places, 430 hectares of parkland and 7 sporting venues. • Part of there role includes the protection of ecosystems, environment and heritage.
State	Sydney Opera House Trust	• The Sydney Opera House Trust consists of 10 members who are responsible for managing and administering the site as an arts centre and meeting place, caring for and controlling the Opera House building and site, promoting achievement in all areas of performing arts and fostering scientific research to encourage the development of new forms of entertainment and presentation.
State	Sydney Water	• Sydney Water supplies water, wastewater, recycled water and some stormwater services to the people in Sydney, the Illawarra and the Blue Mountains. Their operating licence sets out standards and requirements they must meet as a water utility. • Sydney Water operates wastewater treatment plants and deep water outfalls at North Head, Bondi and Malabar.
State	Taronga Conservation Society Australia (Taronga)	• Taronga Zoo is located on Sydney Harbour. Taronga Zoo has a management and executive team that oversees its operation and sits under the Minister for Environment and Minister for Heritage. • The Taronga Conservation Society Australia's primary objective is to facilitate visitor and community education, biological research and wildlife conservation.
State	Transport for NSW	• Transport for NSW is the lead agency of the NSW Transport cluster.• Tasked with leading the development of a safe, efficient, integrated transport system that connects communities and regions.• Responsible for strategy, planning, policy, regulation, funding allocation and other non-service delivery functions for all modes of transport in NSW (including ferry, cycling and walking)

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
State	Treasury	• NSW Treasury manage the State's finances and assets, monitor the performance of its commercial agencies and develop its financial and industrial relations policies. • They assist the NSW government in establishing, implementing and delivering the State Budget and provide funding to government agencies and programs.
State	UrbanGrowth NSW Development Corporation (previously part of Urban Growth NSW)	• UrbanGrowth NSW Development Corporation is responsible for promoting, co-ordinating, managing and securing the economic development of five growth centres across metropolitan Sydney, one of the growth centres is The Bays Precinct. • The Bays Precinct comprises 5.5 km of harbourfront, 95 hectares of largely government owned land and 94 hectares of waterways in Sydney Harbour. The plan is to transform The Bays Precinct into a bustling hub of enterprise, activity and beautiful spaces over the next 20-30 years. • The Bays Precinct Urban Transformation Program is a whole-of-government approach being led by UrbanGrowth NSW Development Corporation, and includes a large suite of government agencies.
State	Western Sydney Parklands	• Western Sydney Parklands is a self-funded NSW Government agency responsible for maintaining and expanding the Parklands facilities. • The Parklands cover an area of 5,280 hectares and encompass numerous waterways as well as Prospect Reservoir.
Local	Local Aboriginal Land Councils *(Metropolitan LALC, La Perouse LALC, Deerubbin LALC, Gandangara LALC)*	• LALCs established following the *Aboriginal Land Rights Act 1983 (ALRA)* • LALCs bound by key legislative requirements in the amended ALRA. • The objects of each LALC are to " improve, protect and foster the best interests of all Aboriginal persons within the Council's area and other persons who are members of the Council". • Functions include acquiring and managing land, and promoting/protecting culture and heritage, facilitating business enterprise, provide community benefits
Local	Local Government Areas administering lands on Sydney Harbour (x21)	• Each local council is an independent entity responsible for administering the local government area over which it has jurisdiction as per the *Local Government Act 1993.* • Councils are responsible for administering various legislation and developing their own plans and policies for their LGA (i.e. LEPs, CMPs etc). • Councils have key responsibilities in relation to Coastal Zone Management in Sydney including: land use planning, development approval, water quality and pollution regulation, open space and stormwater management etc.
Local	Northern Sydney Regional Organisation of Councils (NSROC)	• NSROC is a voluntary organisation comprised of eight councils who work together to address regional issues, work co-operatively for the benefit of the region and advocate on agreed regional positions and priorities. This includes waterways and land fronting Sydney Harbour.

Govt Level	Agency / Organisation	Responsibility: Agency / Organisation
Local	Parramatta River Catchment Group *(Blacktown, Burwood, Canada Bay, Canterbury-Bankstown, Cumberland, Hunters Hill, Inner West, Parramatta, Ryde, Strathfield)*	• The Parramatta River Catchment Group is a regional organisation of local councils, state agencies and community representatives whose aim is to work together to improve the health of the Parramatta River catchment. • They provide for a range of estuary management projects, including the Parramatta River CZMP, the Parramatta River Master Planning project and the Our Living River initiative to make Parramatta River swimmable by 2025.
Local	Southern Sydney Regional Organisation of Councils (SSROC)	• SSROC is an association of 11 councils aiming to serve large and diverse communities and work together to address the challenges and utilise the opportunities of a metropolitan city. This includes waterways and land fronting Sydney Harbour.
Local	Sydney Coastal Councils Group *(Bayside, Inner West, Northern Beaches, Mosman, North Sydney, Randwick City , Sutherland Shire, Waverley, Willoughby City and Woollahra Municipal)*	• The Sydney Costal Councils Group is a co-operative organisation responsible for leading sustainable management of the coastal and estuarine environment across Sydney. • They provide advocacy, facilitate and promote collaboration and capacity building between member Councils and identify and adders current and emerging regional coastal issues.

Table D-2 Sydney Harbour Governance: Relevant Legislation and Policy

Govt Level	Type	Legislation / Policy
Federal	Legislation	Australian Maritime Safety Authority Act 1990
Federal	Legislation	Environment Protection and Biodiversity Conservation Act 1999
Federal	Legislation	Protection of the Sea (Prevention of Pollution from Ships) Act 1983
Federal	Legislation	Water Act 2007
State	Legislation	Biodiversity Conservation Act 2016
State	Legislation	Contaminated Land Management Act 1997
State	Legislation	Coastal Management Act 2016
State	Legislation	Crown Land Management Act 2016
State	Legislation	Greater Sydney Commission Act 2015
State	Legislation	Environmental Planning and Assessment Act 1979
State	Legislation	Fisheries Management Act 1994
State	Legislation	Heritage Act 1977
State	Legislation	Independent Pricing and Regulatory Tribunal Act 1992
State	Legislation	Local Government Act 1993
State	Legislation	Local Land Services Act 2013
State	Legislation	Environmental protection
State	Legislation	Marine Pollution Act 2012
State	Legislation	Maritime Services Act 1935
State	Legislation	National Parks and Wildlife Act 1974
State	Legislation	Natural Resources Commission Act 2003
State	Legislation	Ports and Maritime Administration Act 1995
State	Legislation	Protection of the Environment Administration Act 1991
State	Legislation	Protection of the Environment Operations Act 1997
State	Legislation	Public Health Act 2010
State	Legislation	Sydney Harbour Federation Trust Act 2001
State	Legislation	Sydney Water Act 1994
State	Legislation	Threatened Species Conservation Act 1995
State	Legislation	Transport Administration Act 1988
State	Legislation	Water Act 1912
State	Legislation	Water Industry Competition Act 2006
State	Legislation	Water Management Act 2000
State	Planning Instrument	Draft Coastal Management SEPP

State	Planning Instrument	State and Regional Development SEPP
State	Planning Instrument	Sydney Regional Growth Centres SEPP
State	Planning Instrument	Urban Renewal SEPP
State	Planning Instrument	Infrastructure SEPP
State	Planning Instrument	State Significant Precinct SEPP
State	Planning Instrument	SEPP 33 – Hazardous and Offensive Development
State	Planning Instrument	SEPP 62 - Sustainable Aquaculture
State	Planning Instrument	SEPP (Infrastructure) 2007
State	Planning Instrument	SEPP (Sydney Drinking Water Catchment) 2011
State	Planning Instrument	Three Ports SEPP
State	Planning Instrument	Sydney REP (Sydney Harbour Catchment) (under review)
State	Planning Instrument	Draft Environment SEPP
State	Planning Instrument	Sydney Drinking Water Catchment SEPP
State	Planning Instrument	Western Sydney Parklands SEPP
Local	Planning Instrument	Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005
Local	Planning Instrument	Sydney Regional Environmental Plan No 24 - Homebush Bay Area
Local	Planning Instrument	Local Environment Plans - all local council managing land adjacent to Sydney Harbour
Local	Planning Instrument	Development Control Plans - made by all local council under their LEPs
Local	Planning Instrument	Sydney Harbour Foreshore and Waterway Area DCP

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