



Appendix A

COMPENDIUM OF MAPS

RG-01-1952-0B-Report Maps_01.qgz



RG-01-1952-08-Report Maps_01.qgz



Legend

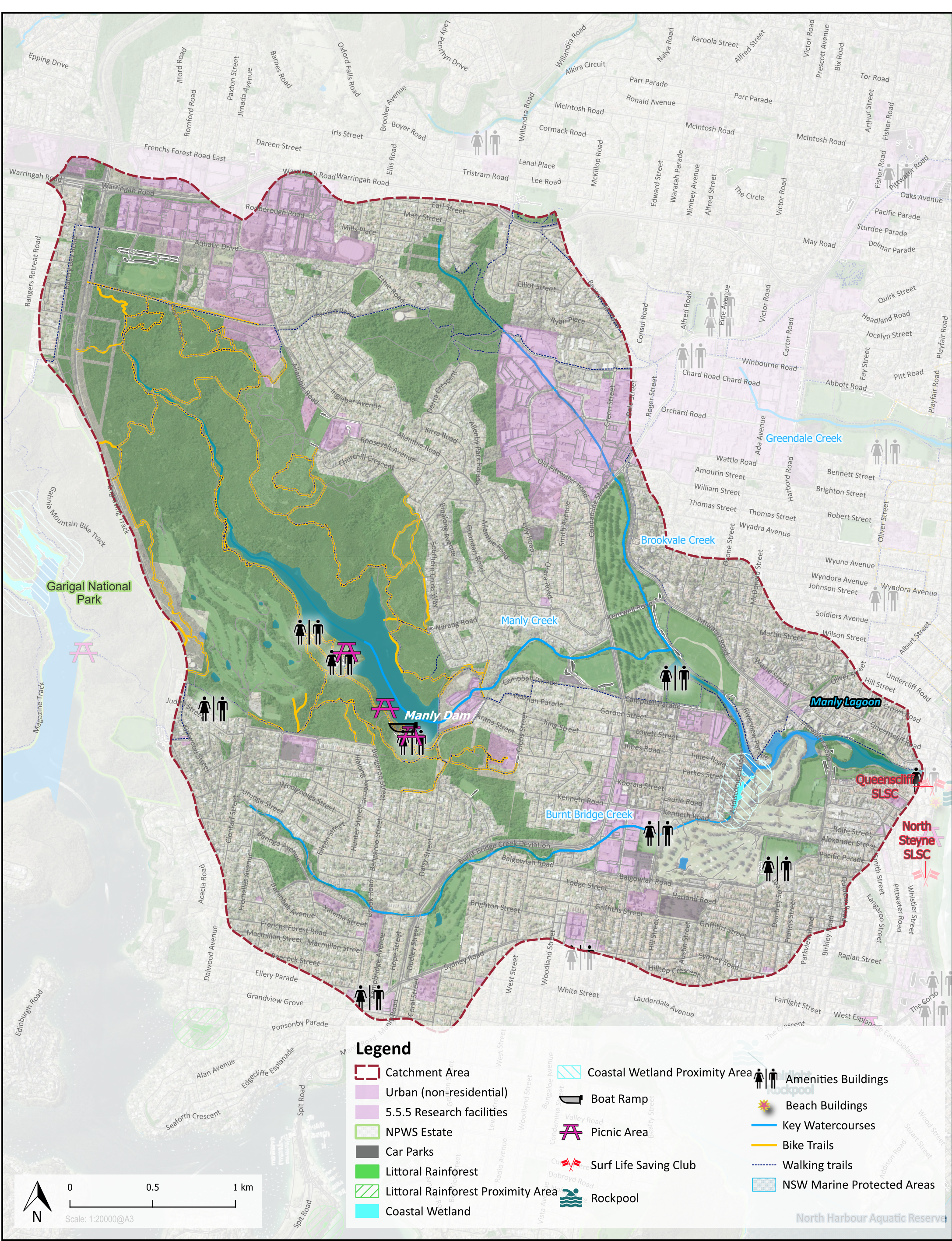
-  Rockpool
-  Amenities Buildings
-  Beach Buildings
-  Sea Wall
-  Council Reserves
-  NPWS Estate
-  Intertidal Protected Areas
-  NSW Marine Protected Areas



Date : 06/03/2025
Revision : 01
Created by : LJR
Reviewed by :
Coordinate System : GDA2020 / MGA zone 56
Imagery Source: NSW Six Maps

RG-01-1952-08-Report Maps_01.qgz





RG-01-1952-0B-Report Maps_01.qgz



Legend

 Surf Life Saving Club

 Rockpool

 Beach Buildings

 Sea Wall

 Walking trails

 Car Parks

 Council Reserves

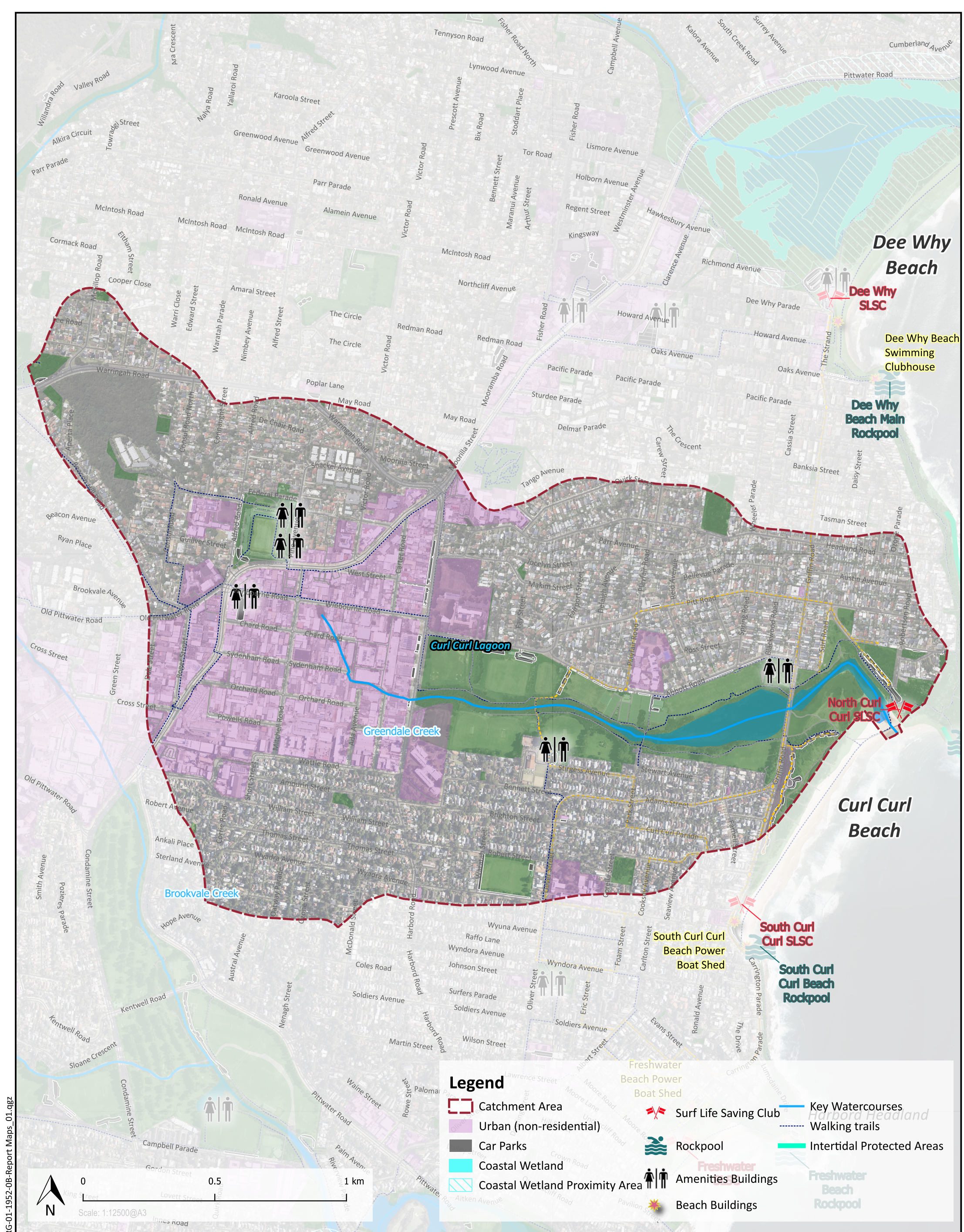
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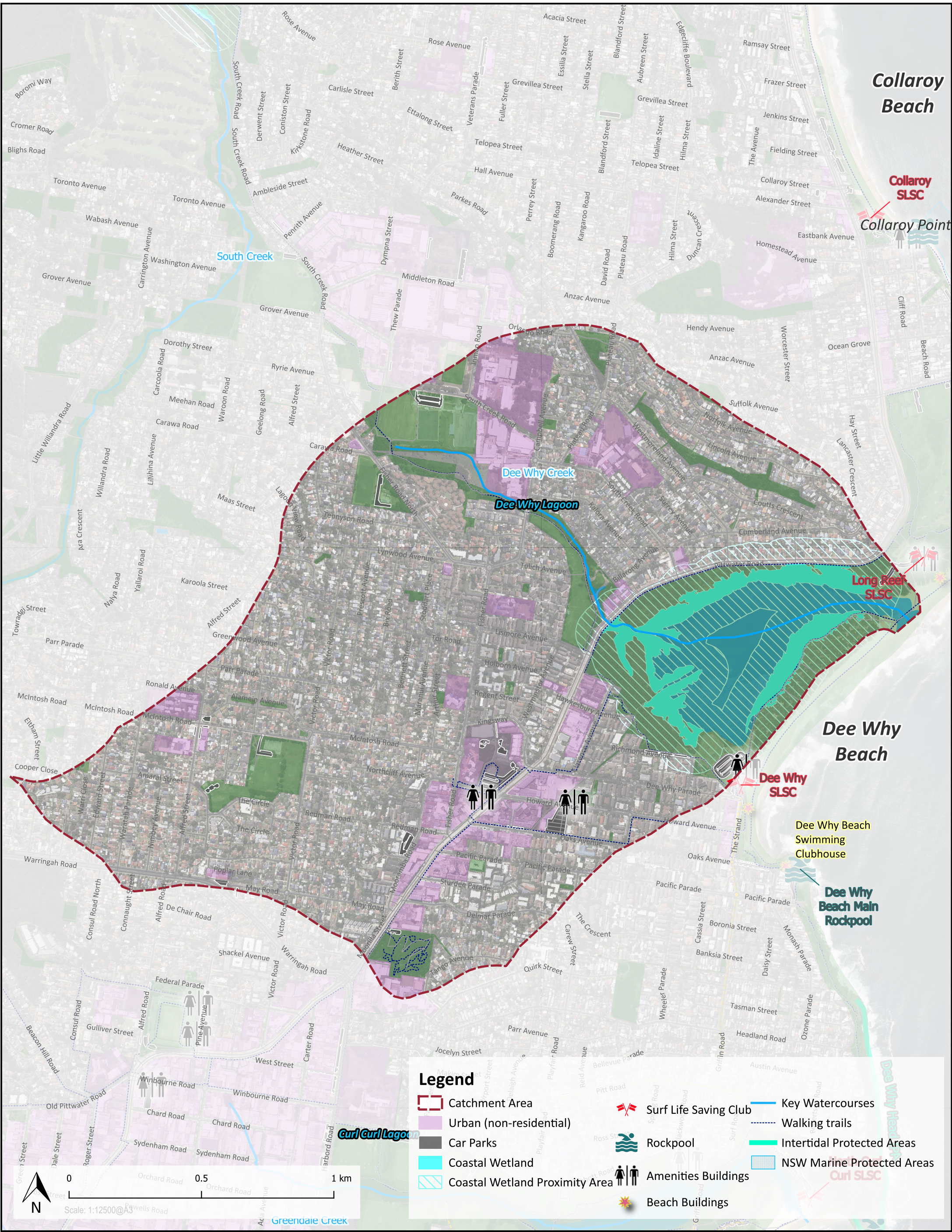
-  Surf Life Saving Club
-  Rockpool
-  Amenities Buildings
-  Beach Buildings
-  Sea Wall
-  Key Watercourses
-  Walking trails
-  Car Parks
-  Council Reserves
-  Intertidal Protected Areas
-  Lagoons





RG-01-1952-0B-Report Maps_01.qgz

RG-01-1952-08-Report Maps_01.qgz



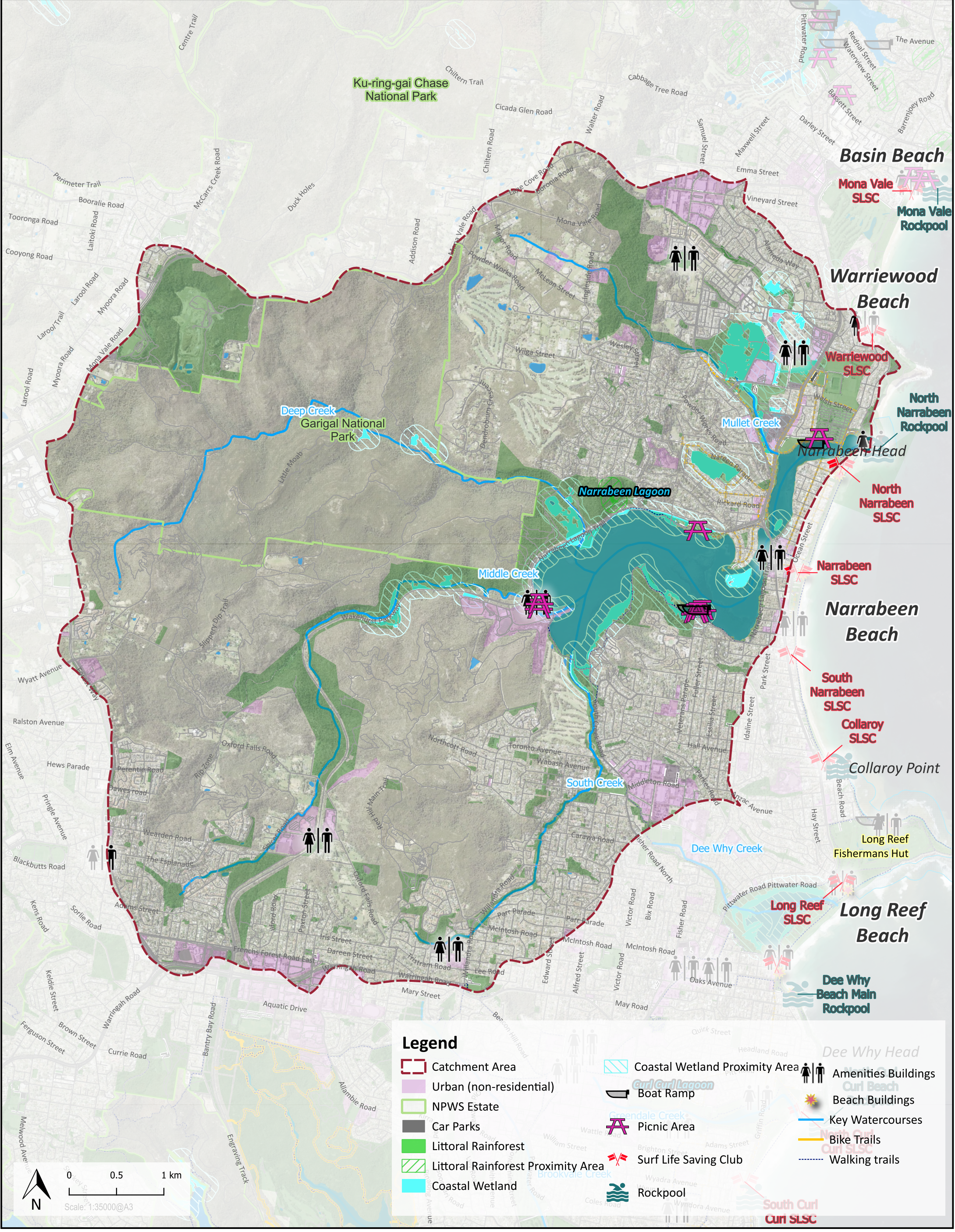
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Legend

-  Rockpool
-  Amenities Buildings
-  Sea Wall
-  Walking trails
-  Car Parks
-  Council Reserves
-  NSW Marine Protected Areas
-  Lagoons

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Legend



Picnic Area



Surf Life Saving Club



Rockpool



Amenities Buildings



Sea Wall



Car Parks



Council Reserves



Intertidal Protected Areas

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RG-01-1952-0B-Report Maps_01.qgz



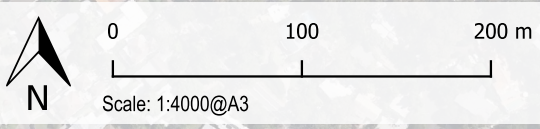
RG-01-1952-0B-Report Maps_01.qgz



RG-01-1952-08-Report Maps_01.qgz



RG-01-1952-08-Report Maps_01.qgz



Legend

- Surf Life Saving Club
- Rockpool
- Amenities Buildings
- Sea Wall
- Car Parks
- Council Reserves
- Study Area



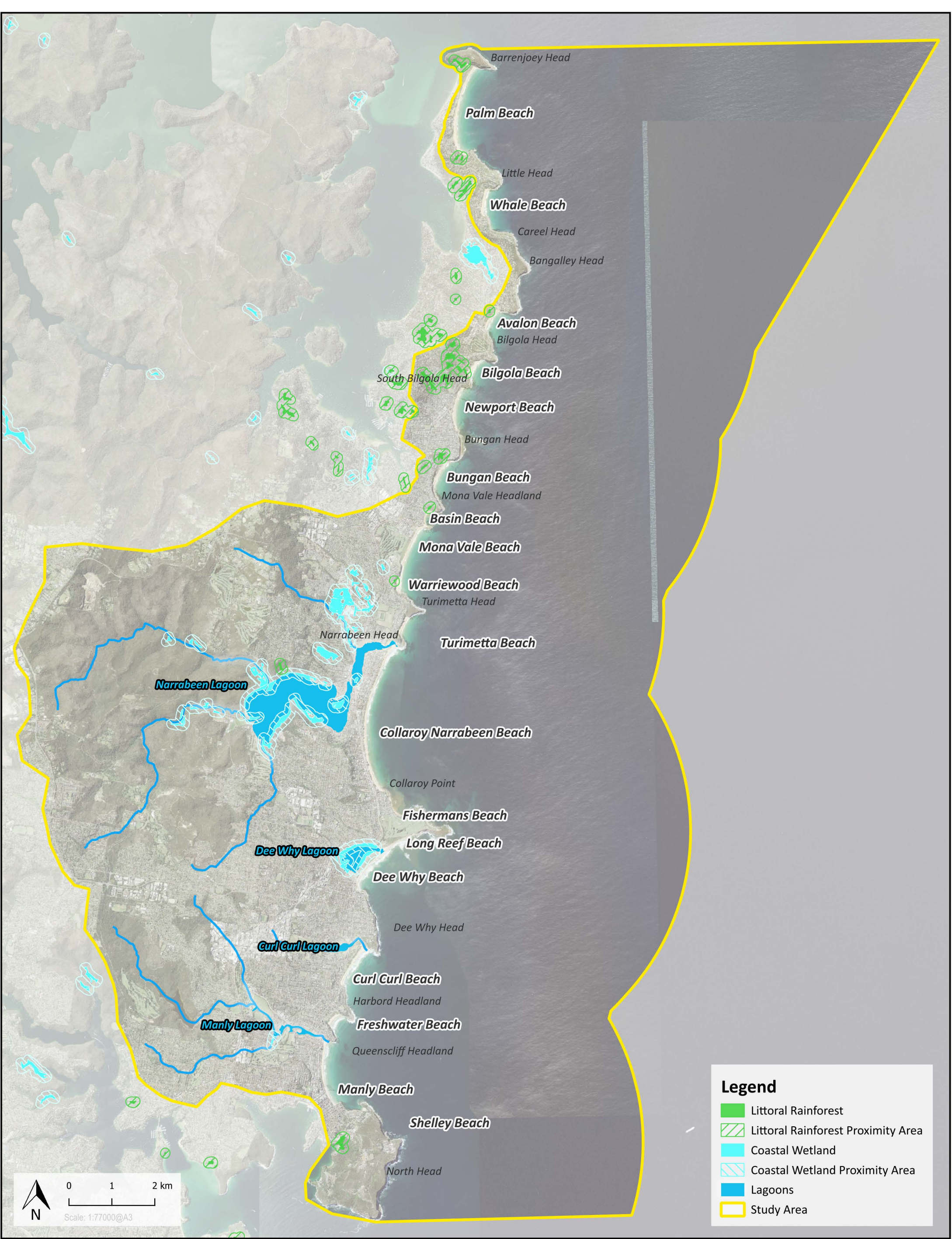
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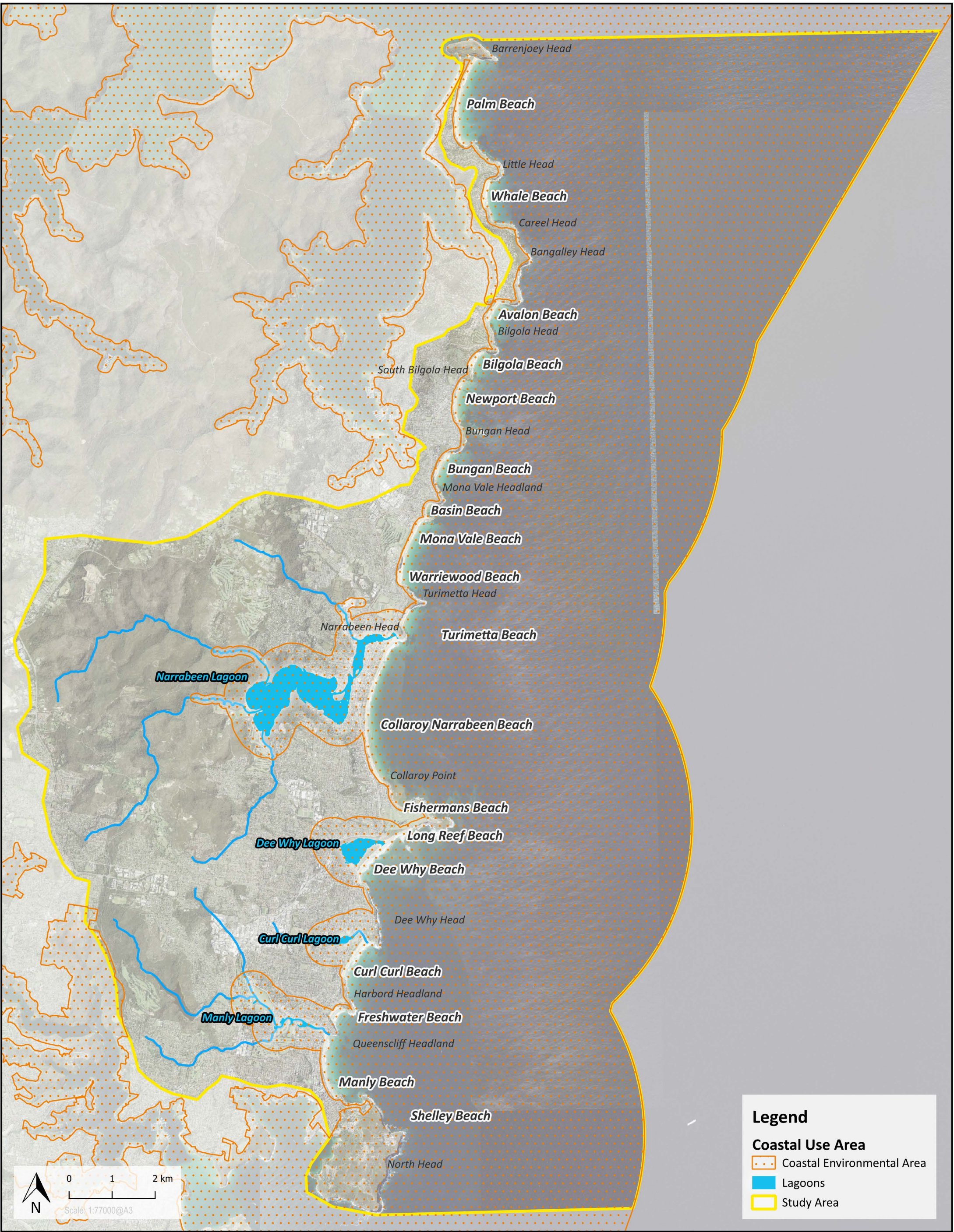


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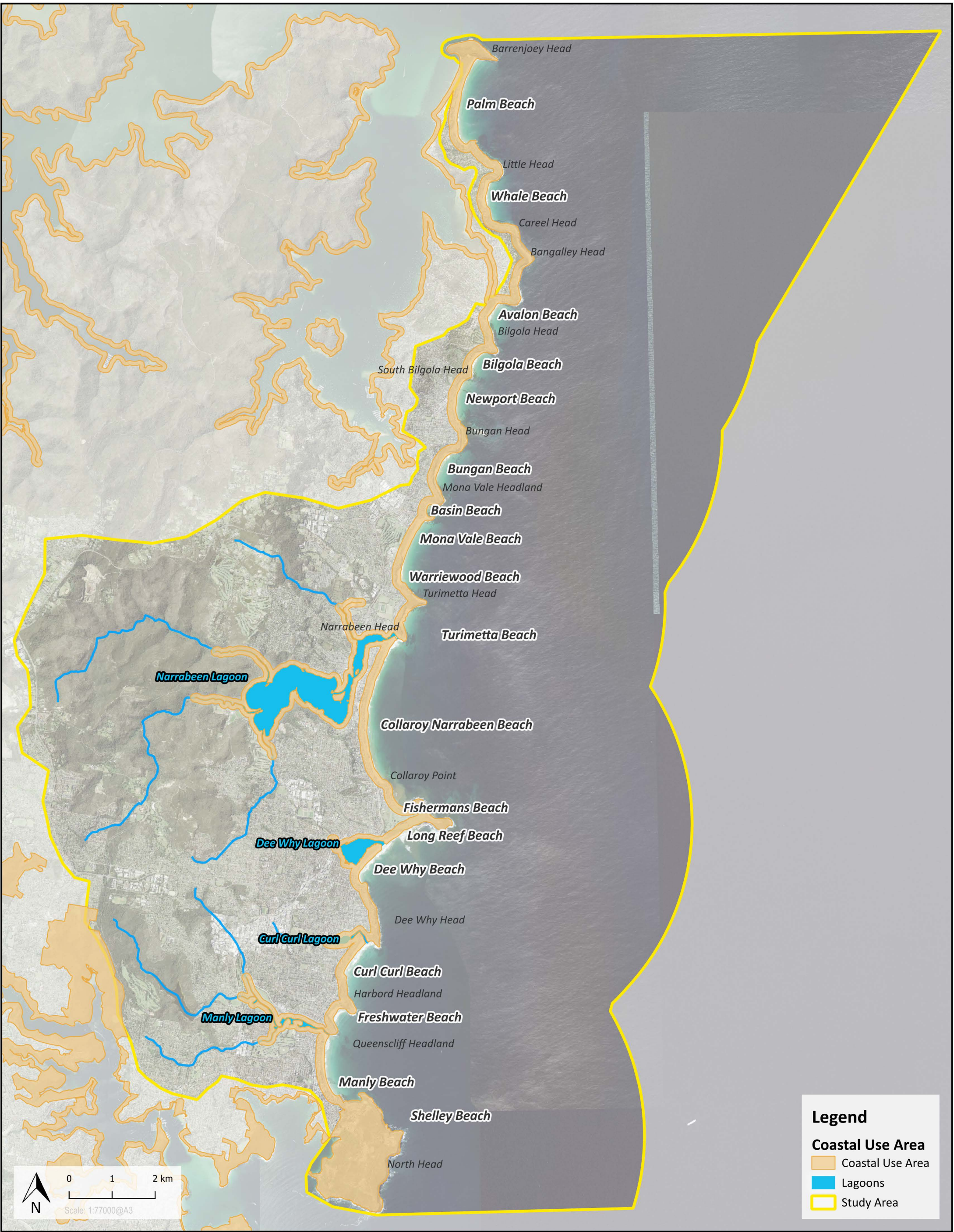


Legend

Coastal Use Area

-  Coastal Environmental Area
-  Lagoons
-  Study Area

RG-01-1952-0B-Report Maps_01.qgz





Appendix B

COMPENDIUM OF RELEVANT REPORTS AND DATA

Full Title	Location	Category	Author/ Agency	Client	Year	Format	Brief Description
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Cabbage Tree Bay	Biodiversity	Department of Environment, Climate Change and Water NSW (Now DCCEEW)	Department of Environment, Climate Change and Water NSW (Now DCCEEW)	2010	Report	Draft fisheries management (aquatic reserve) regulation 2009 and implementation strategy prepared for Cabbage Tree Bay, the report includes: • Reserve values • Management objectives • Issues and responses (a) protecting habitat, plants, and animals (b) visitor use (c) development control (d) research, monitoring and education (e) climate change (f) impact on heritage values
Northern Beaches Bushland and Biodiversity Action Plan	Northern Beaches	Biodiversity	Northern Beaches Council		Unknown	Action Plan	The Action Plan sets the aspirations and commitments in relation to bushland and biodiversity in the Protect, Create, Live - Northern Beaches Environment and Climate Change Strategy 2040. It provides a list of actions to be implemented by Council over four years, including annual measuring, monitoring, and reporting, as well as review every four years.
Northern Beaches Tree Canopy Action Plan	Northern Beaches	Biodiversity	Northern Beaches Council		2023	Action Plan	The Action Plan sets the aspirations and commitments in relation to protecting tree canopy cover in the Local Strategic Planning Statement and the Protect, Create, Live - Northern Beaches Environment and Climate Change Strategy 2040. It sets the framework for the management of tree canopy on Council managed land and private land, where possible. It provides a list of actions to be implemented by Council over four years, including actions to measure, monitor and report on progress, as well as review every four years.
Manly LGA Climate Change Actions 2008	Manly	Climate Change	Cardno	Manly Council (former)	2008	Report	Climate change actions report prepared for the former Manly Council. The report includes: • Predicted effects of climate change (a) SLR (b) increase in intensity of regular and rare catchment flood events (c) increase in the number of ocean wave storm events (d) increase in oceanic inundation associated with ocean wave events (e) decreases in annual average rainfall (f) increases in temperature and solar radiation (g) increase in sea surface temperature (h) increases in evapotranspiration (i) increases in wind speeds (j) coastal groundwater level rise (incl. changes to groundwater chemistry) (k) increased tidal dominance of estuaries • Costing of options and cost analysis • Prioritisation of actions • Forward program
Northern Beaches Climate Change Action Plan	Northern Beaches	Climate Change	Northern Beaches Council		Unknown	Action Plan	The Action Plan sets the aspirations and commitments in relation to climate change in the Protect, Create, Live - Northern Beaches Environment and Climate Change Strategy 2040. It provides a list of actions to be implemented by Council over four years, including annual measuring, monitoring, and reporting, as well as review every four years.
Manly Embayment seawall stability analysis - 1995	Manly Embayment (Shelly Beach to Queenscliff Beach)	Coastal Protection	Patterson Britton & Partners Pty Ltd	Manly Council (former)	1995	Report	Landscape management plan prepared for Manly Council • Seawall construction and damage history • Beach fluctuations (erosion, shoreline recession, scour level) • Seawall stability analysis • Seawall stability models and test program • Remedial options and considerations
Manly Ocean Beach report on seawall protection 2000	Manly Beach	Coastal Protection	Professor B G Thom Manly Hydraulics Laboratory	Manly Council (former)	2000	Report	Report prepared for Manly Council to offer advice on upgrading the Manly seawall. The report includes: • The need to ensure seawall stability • Beach amenity and infrastructure protection • Beach behaviour • Design and construction concerns • Management options • Management / upgrade recommendations
Manly - Assessment of the New Seawall Protection Measures at Manly Beach 2000	Manly Beach	Coastal Protection	NSW Department of Public Works and Services Manly Hydraulics Laboratory	Manly Council (former)	2000	Report	Prepared for the former Manly Council to conduct a review of the current (2000) seawall protection and future options for beachfront management • Assessment of existing conditions • Specific objectives: appropriateness of the Rock Scour Apron, alternate methods of protection, contribution of Victoria Parade Steps to erosion and feasibility/cost of removal • Management options
Manly Ocean Beach Seawall Study Wall Stability Assessment 2003	Manly Beach	Coastal Protection	Tony Phillips Consulting Pty Ltd Water Research Laboratory UNSW	Manly Council (former)	2003	Report	Report on the risk of failure of the Manly Beach seawall under storm events. The report includes: • Assessment of wall stability • Analysis of wall sections/types • Groundwater conditions • Analysis of failure mechanisms • Scour protection
Manly Ocean Beach Seawall and Beach Amenity Risk Assessment and Remedial Options 2003	Manly Beach	Coastal Protection	Water Research Laboratory UNSW	Manly Council (former)	2003	Technical Report	Report prepared for Manly Council to provide a risk assessment and remedial options for the seawall at Manly Beach. The report includes: • Previous expert opinions • Stability and risk assessment of existing (2002) works (incl. SLR and groundwater conditions) • Remedial and management options • Manly beach knowledge gaps and suggested data collection and modelling
Collaroy-narrabeen-beach-coastal-protection-works-design-specifications	Collaroy-Narrabeen Beach	Coastal Protection	Royal HaskoningDHV	Northern Beaches Council	2016	Design	Prepared for the Northern Beaches Council to show design specifications of coastal protection works at Collaroy-Narrabeen Beach.
Collaroy-narrabeen-beach-coastal-protection-works-benefit-distribution-analysis 2016	Collaroy-Narrabeen Beach	Coastal Protection	Marsden Jacob Associates	Northern Beaches Council	2016	Report	Prepared for the Northern Beaches Council to assess the distribution of benefits between stakeholders from building coastal protection works at Collaroy-Narrabeen.

Full Title	Location	Category	Author/ Agency	Client	Year	Format	Brief Description
Collaroy-narrabeen-beach-coastal-protection-assessment_2016	Collaroy-Narrabeen Beach	Coastal Protection	Manly Hydraulics Laboratory Royal HaskoningDHV	Northern Beaches Council	2016	Report	Coastal protection assessment of proposed works for Collaroy-Narrabeen, prepared for Northern Beaches Council. The report includes: • Description of key coastal processes • Assessment of erosion, impacts and visual amenity of proposed coastal protection improvement works (incl. consistency with CZMP and Coastal Erosion Policy) • Physical impacts of seawalls • Structural considerations • Wave overtopping rates for seawall structures • Beach recovery rates in front of seawalls
Collaroy and Narrabeen Review of Beach Width Impacts of Alternative Coastal Protection Works_2020	Collaroy-Narrabeen Beach	Coastal Protection	Manly Hydraulics Laboratory	Northern Beaches Council	2020	Report	Prepared for the Northern Beaches Council as an addendum to the Collaroy-Narrabeen Beach Coastal Protection Assessment to determine the impact of three proposed sea wall types on beach width. The report includes: • Review of seawall and beach interactions (incl. under SLR scenarios) • Review of beach width amenity • Modelling approach and results • Seawall sensitivity analysis
Fairy Bower Seawall Remediation Project_2018	Fairy Bower (Manly)	Coastal Protection	Water Research Laboratory UNSW	Northern Beaches Council	2018	Technical Report	Prepared for the Northern Beaches Council to determine remediation options for the Fairy Bower sea wall. The report includes: • Wave modelling • Risk of failure of existing sea wall • Remediation options: Extension of existing vertical parapet wall, new seawall with wave return wall, addition of stepped concrete bleachers, offshore reef, addition of olympic sized ocean pool, and restoration of Fairy Bower Beach.
Collaroy_Narrabeen Sea Wall Survey & Assessment-Final Draft MHL974-March 1999	Collaroy-Narrabeen Beach	Coastal Protection	NSW Department of Public Works and Services Manly Hydraulics Laboratory	Warringah Council (former)	1999	Draft Report	Prepared for the former Warringah Council to assess the state of the existing (1999) beach sea wall at Collaroy/Narrabeen. Concludes the revetment which exists does not satisfy current (1999) design standards and could not be certified as providing adequate protection to development behind the beach.
Collaroy-narrabeen-fishermans-beach-criteria-for-development_1991	Collaroy-Narrabeen-Fishermans Beach	Coastal Protection	Geomarine P/L Coffey Partners International Pty Ltd	Warringah Council (former)	1991	Report	Prepared for the former Warringah Shire Council containing recommendations for beachfront development at Collaroy-Narrabeen-Fishermans Beach. The report includes: • Foreshore stability (incl. water levels, wave runoff, seepage, beach and dune erosion) • Stability assessment • Considerations for development foundations
North Head-draft-concept-first-nations-consultation-report-oct-2021	North Head	Community and TO Engagement	Two Point Co.	Harbour Trust	2021	Community Consultation Report	Report prepared for Harbour trust, documents the results of targeted consultations to understand the First Nations communities aspiration and sentiments towards the proposed development of North Head.
CoastalErosion-report-AHO-FINAL-smlFile-2015	Northern Sydney	Community and TO Engagement	Aboriginal Heritage Office	Ku-ring-gai, Lane Cove, North Sydney, Manly, Pittwater, Warringah, Willoughby and City of Ryde Councils	2015	Report	Report prepared by the Aboriginal Heritage Office to better understand issues affecting Aboriginal sites in northern Sydney's foreshore. The report includes: • Coastal erosion management • SLR
Coastal_Erosion-Aboriginal Heritage Strategy-AHO-2019-FINAL	Northern Sydney	Community and TO Engagement	Aboriginal Heritage Office	Ku-ring-gai, Lane Cove, North Sydney, Northern Beaches, Strathfield and Willoughby Councils	2019	Report	Report conducted by the Aboriginal Heritage Office documenting a two year coastal erosion project to plan for Aboriginal sites protections. The report includes: • Coastal erosion management • SLR • Flood behaviour • Wave action from storm surges and boating traffic • Archaeological background • Monitoring results • Local heritage strategy
NBC_community-strategic-plan_2018-2028	Northern Beaches	Community and TO Engagement	Northern Beaches Council	Northern Beaches Council	2018	Strategic Plan	Strategic plan for the Northern Beaches Council. To protect and enhance the natural and built environments, to create more connected and caring communities, to embrace our diverse sports and recreation culture, and to live more sustainably
McCarrs Creek Mona Vale and Bayview Flood Study Report 2017 Appendix B_Community Consultation	Mona Vale and Bayview	Community and TO Engagement	Pittwater Council (former)	Pittwater Council (former)	2014	Email	Email notice of flood study and flood survey
Dee Why South Catchment Flood Study -community guide brochure_2013	Dee Why	Community and TO Engagement	Warringah Council (former)	Warringah Council (former)	2013	Flood Study	Community guide to flood study
Northern Beaches Environmental Education and Sustainable Living Action Plan	Northern Beaches	Community and TO Engagement	Northern Beaches Council		2021	Action Plan	The Action Plan sets the aspirations and commitments in relation to protecting and enhancing the natural environment in the Protect, Create, Live - Northern Beaches Environment and Climate Change Strategy 2040. It identifies how Council will support community to make more environmentally aware choices, and provides actions to be implemented by Council over four years to drive environmental education and sustainable living. This includes annual measuring, monitoring, reporting and review every four years.
Northern Beaches Thematic History	Northern Beaches	Community and TO Engagement	GML Heritage	Northern Beaches Council	2022	Report	Report prepared by GML Heritage for the Northern Beaches Council providing a thematic history of the Northern Beaches LGA, including its natural environment, Aboriginal heritage, European settlement and colonisation up to present day cultural landscapes.
Narrabeen Lagoon Case Study Planning responses for waterway health_2022	Narrabeen Lagoon	Creeks and Lagoons	Department of Planning Industry and Environment	Department of Planning Industry and Environment	2022	Case Study	Report prepared by DPIE to review and determine if required stormwater management targets to be incorporated into the DCP and provide evidence base to support enhanced stormwater management targets. The report includes: • Catchment context • Stormwater impact on Narrabeen Lagoon • effects-based assessment • Comparison with waterway objectives • Strategic impact assessment • Design and implementation of stormwater management measures
Narrabeen Lagoon Catchment Pilot Application_2021	Narrabeen Lagoon	Creeks and Lagoons	Alluvium	Department of Planning Industry and Environment Northern Beaches Council	2021	Report	Report on the application of a risk based framework for Narrabeen Lagoon. The report includes: • Risk assessment (land uses, stormwater) • Middle Creek case study (flow management for erosion control)

Full Title	Location	Category	Author/ Agency	Client	Year	Format	Brief Description
Narrabeen-lagoon-plan-management-2013	Narrabeen Lagoon	Creeks and Lagoons	SMEC	Department of Primary Industries Warringah Council (former)	2011	Management Plan	The report includes: • Key environmental values of the lagoon • Key social and heritage values • Flood management • Management plan
Manly Lagoon estuary management study Appendices 1995	Manly Lagoon	Creeks and Lagoons	Patterson Britton & Partners Pty Ltd	Manly and Warringah Councils (former)	1995	Appendices	Appendices support the above management study and include: • Historical aerial photography • Investigation of low flow structure entrance to Manly Lagoon • Particle size distribution • Petrographic assessment • Sediment chemical contamination • Water quality monitoring report • Sewage overflows • Survey of macrobenthic infauna and fishes • Wet weather flow analysis
Manly Lagoon estuary management plan 1998	Manly Lagoon	Creeks and Lagoons	Manly and Warringah Councils (former)	Manly and Warringah Councils (former)	1998	Management Plan	Estuary management plan prepared jointly by the former Manly and Warringah councils for Manly Lagoon. The report includes: • Management plan • Community consultation • Management schedule (incl. water quality, entrance , vegetation and habitat management, recreational areas, constructed wetlands and infrastructure)
Manly Lagoon estuary management study 1995	Manly Lagoon	Creeks and Lagoons	Patterson Britton & Partners Pty Ltd	Manly and Warringah Councils (former)	1995	Management Study	Prepared jointly by the former Manly and Warringah councils for Manly Lagoon. The report includes: • Existing environment assesments (1995) • Description of existing environment (incl. general, land use and zoning) • Description of existing environment: vegetation assessment, microclimate, visual quality, relationship between land uses, waterway geometry, lagoon water level and entrance management, flooding, sediments and sedimentation, services, water quality, aquatic flora and fauna • Options for lagoon improvement and management
Narrabeen Lagoon Entrance Management Strategy 2022	Narrabeen Lagoon	Creeks and Lagoons	Royal HaskoningDHV	Northern Beaches Council	2002	Management Plan	Narrabeen Laggon Entrance Management Strategy. The report includes: • Physical environment of the lagoon • Coastal processes and entrance dynamics • Lagoon entrance environment • Flood behaviour • Recreation • Heritage • Literature review • Review of state, national and international entrance management • Entrance management strategies
Manly Lagoon Integrated Catchment Management Strategy 2004	Manly Lagoon	Creeks and Lagoons	University of Western Sydney	Sydney Water Manly Council (former)	2004	Report	Report prepared for the Sydney Water-Manly Council Partnership to develop a lagoon management strategy. The report includes: • Catchment study and evaluation • State of catchment overview • Manly lagoon ICM strategy • Catchment water quality • Ensuring healthy catchment through ICM monitoring and a reporting system
Narrabeen Lagoon Estuary Management Plan final 2002	Narrabeen Lagoon	Creeks and Lagoons	WBM Oceanics Australia	Warringah and Pittwater Councils (former)	2002	Management Plan	Estuary Management Plan developed for the former Warringah and Pittwater councils. The report includes: • Summary of estuary processes • Recreational activities, landuses, interactions between processes and key management outcomes • Summary of community consultation • Management objectives • Implementation of management plans
Narrabeen-lagoon-foreshore-rehabilitation-plan 2003	Narrabeen Lagoon	Creeks and Lagoons	Patterson Britton & Partners Pty Ltd	Warringah and Pittwater Councils (former)	2003	Rehabilitation Plan	Rehabilitation plan prepared for the former Warringah and Pittwater Councils for Narrabeen Lagoon. The plan aims at improving bank stability and extending areas of stabilised bank, establishing foreshore areas with indigenous vegetation and enhancing riparian habitat. • Review of background information (bank erosion and foreshore habitat) • Assessment of mechanisms for erosion • Foreshore protection options (incl. macrophyte plantings, boardwalks, platforms and ramps, back beach berm wall, flattened and stabilised beach, periodic beach nourishment)
Curl Curl Lagoon Estuary Management Plan 2000	Curl Curl Lagoon	Creeks and Lagoons	AWT Environment, Science & Technology	Warringah Council (former)	2000	Management Plan	Estuary Management Plan prepared for the former Warringah Council. The report includes: • Status of Curl Curl Lagoon • Management objectives, strategies and actions • Community consultation
South-creek-bank-management-plan-2008	South Creek (Warringah)	Creeks and Lagoons	Cardno	Warringah Council (former)	2008	Management Plan	Report prepared for the former Warringah Council to aid the management of South Creek and identify type and scale of works to secure unstable sections of the creek bank. The report includes: • Creek management issues • Fluvial geomorphic assessment • Sediment flow balance • Bank management measures and strategy
Warringah Lagoons Entrance Management Operational Management Standard 2012	Curl Curl Lagoon, Dee Why Lagoon, Narrabeen Lagoon	Creeks and Lagoons	Warringah Council (former)	Warringah Council (former)	2012	Management Plan	Report prepared for the former Warringah Council to provide guidance for the entrance management of Curl Curl, Dee Why and Narrabeen Lagoons.
Warringah Coastal Lagoons Entrance Management Review 2009	Narrabeen Lagoon, Dee Why Lagoon, Curl Curl Lagoon, Manly Lagoon	Creeks and Lagoons	BMT WBM Pty Ltd	Warringah Council (former)	2009	Management Review	Report prepared for the former Warringah Council as a review of lagoon entrance management. The report includes: • Existing management policies (2009) • Review of statutory approvals • Review of aproccals and land tenure • Review of opening water levels • Ecological and environmental impacts of artificial entrance management • Implications of climate change and variability • Knowledge Gaps • Recommended lagoon opening and closing procedures

Full Title	Location	Category	Author/ Agency	Client	Year	Format	Brief Description
NBC Warringah Creek Management Study 2004 03	Warringah Creeks	Creeks and Lagoons	Montgomery Watson Harza 4site Natural Solutions	Warringah Council (former)	2004	Management Study	The report aims at providing a sound basis for deciding how best to protect and repair Warringah's creeks, it includes: • Impact of land use on creeks • Current waterway management approaches • Health of Warringah's creeks • Planning and development controls (riparian zones, catchment land use etc.) • Creek policy and management plans
Narrabeen Lagoon Estuary Process Study - February 2001	Narrabeen Lagoon	Creeks and Lagoons	WBM Oceanics Australia	Warringah Council (former)	2000	Report	Estuary Proceses Study prepared for the former Warringah Council. Report includes: • Historical overview • Catchment inputs • Hydrodynamics • Sediment processes • Water quality • Ecology • Entrance dynamics • Human activities • Process interactions • Management directions
NBC Water-sensitive-warringah-strategic-plan	Warringah	Creeks and Lagoons	Warringah Council (former)	Warringah Council (former)	Unknown	Strategic Plan	Report prepared to strengthen Council's policies and decision making processes in the path to becoming a water sensitive council. The report includes: • Future challenges (population growth, climate change, legacy issues, future management) • Water sensitive designs
Northern Beaches Waterways and Catchments Action Plan			Northern Beaches Council		Unknown	Action Plan	The Action Plan sets the aspirations and commitments in relation to waterways and catchments in the Protect, Create, Live - Northern Beaches Environment and Climate Change Strategy 2040. It provides a list of actions to be implemented by Council over four years to address issues relating to waterways and catchments. This includes annual measuring, monitoring, and reporting, as well as review every four years.
	Northern Beaches	Creeks and Lagoons					
Manly Lagoon Entrance Management Procedures 2024	Northern Beaches	Creeks and Lagoons	Northern Beaches Council		2024	Management Plan	The report details the entrance management procedure and trigger levels for Manly Lagoon.
		Creeks and Lagoons	Water Research Laboratory UNSW	Northern Beaches Council	2023	Report	Report prepared by WRL provides a comprehensive review of environmental processes affecting Manly Lagoon, including an assessment of water quality, ecological health, and key pressures such as climate change, bank stability and urbanisation. Includes a risk assessment of pressures and threats and provides potential management opportunities.
Manly Lagoon: Review of environmental processes	Manly Lagoon						
McCarrs Creek Mona Vale and Bayview Flood Study Report 2017 Appendix A Flood Mapping	McCarrs Creek	Flood Risk	Royal HaskoningDHV	Northern Beaches Council	2017	Appendices	Flood mapping for the above flood study
McCarrs Creek Mona Vale and Bayview Flood Study Report 2017 Appendix B Community Consultation	McCarrs Creek	Flood Risk	Royal HaskoningDHV	Northern Beaches Council	2017	Appendices	Community consultation/survey for the above flood study, incl. results of flooding experience at property, properties affected by specific flood events, and period of residence.
McCarrs Creek Mona Vale and Bayview Flood Study Report 2017 Appendix C Hydrographs	McCarrs Creek	Flood Risk	Royal HaskoningDHV	Northern Beaches Council	2017	Appendices	Flood hydrographs prepared for the above flood study.
Ingleside, Elanora and Warriewood Overland Flow Flood Study Appendices - Vol 2	Ingleside, Elanora and Warriewood	Flood Risk	WMA Water	Northern Beaches Council	2019	Appendices	Flow flood study report prepared for northern beaches council, the report includes: • Hydraulic and hydrological model setup • Model calibration and design event modelling • Sensitivity analysis • Preliminary flood planning area • Design flood behaviour analysis
Manly Lagoon Floodplain Risk Management Study and Plan Figures 2018	Manly Lagoon	Flood Risk	WMA Water	Northern Beaches Council	2018	Figures	Figures for the above floodplaining management study and plan, figures include: • Study area • Land use • Stormwater assets • Flood extents • Impact on peak pipe flow • Hotspot flood locations • Hydraulic categories and hazard • Mitigation and management options • Emergency classification and access roads
Newport Flood Study Final Report Volume 2 Figures 2019	Newport	Flood Risk	Catchment Simulation Solutions	Northern Beaches Council	2019	Figures	Figures for the above flood study
McCarrs Creek Mona Vale and Bayview Flood Study Report 2017	McCarrs Creek	Flood Risk	Royal HaskoningDHV	Northern Beaches Council	2017	Flood Study	Flood study prepared for Northern Beaches council, the report includes: • Water level and rainfall gauges used and operational timeframes • Hydrological model: XP-RAFTS • Hydraulic model: TUFLOW • Calibrated to the April 1998 flood event • Validated to the October 1987 and January 1989 flood events • Design events modelling and results • Climate change SLR analysis uses NSW Sea Level Rise Policy Statement (now OEH, 2009)[0.4 and 0.9m] • Climate change rainfall analysis uses Practical Consideration of Climate Change in Flood Investigations (OEH 2007)[10%, 20% and 30% increase in 1% AEP rainfall intensity)
Ingleside, Elanora and Warriewood Overland Flow Flood Study Report - Vol 1	Ingleside, Elanora and Warriewood	Flood Risk	WMA Water	Northern Beaches Council	2019	Flood Study	Overland flow flood study prepared for the northern beaches council. The report includes: • Rainfall gauges used and operational timeframes • Hydrologic model: DRAINS • Hydraulic model: TUFLOW • Calibrated to the June 2016 flood event • Validated to August 1998 flood eventDesign events modelling and results • Design events modelling and results • Climate change impact analysis using: 1% AEP storm event plus 9m SLR, 9m SLR & 10% rainfall increase, 9m SLR & 30% rainfall increase • Climate change impact analysis using: PMF storm event plus 9m SLR, 9m SLR & 10% rainfall increase, 9m SLR & 30% rainfall increase

Full Title	Location	Category	Author/ Agency	Client	Year	Format	Brief Description
Manly to Seaforth Flood Study Final Report 2019	Manly to Seaforth	Flood Risk	Cardno	Northern Beaches Council	2019	Flood Study	Manly to Seaforth flood study prepared for northern beaches council, the report includes: • Water level and rainfall gauges used and operational timeframes • Flood model: SOBEK • Model Validated to the February 2010, June 2013 and October 2013 flood events • Hydrologic verification by comparing SOBEK model to XP-RAFTS model • Design events modelling and results • Climate change rainfall analysis uses 1% AEP 120 min storm increased by 10%, 20% and 30% • Climate change SLR analysis: tailwater levels were increased by 0.9m
Newport Flood Study Final Report July 2019 - Volume 1 - Report	Newport	Flood Risk	Catchment Simulation Solutions	Northern Beaches Council	2019	Flood Study	Flood study developed for the Northern Beaches Council at Newport, the report includes: • BoM rainfall and (single) stream gauges used and operational timeframes • Hydraulic model: TUFLOW • Calibrated to the February 2012 and November 2015 flood events • Validated to the the June 2016 flood event • Design flood results • Climate change SLR analysis uses NSW Sea Level Rise Policy Statement (now OEH, 2009)[0.4 and 0.9m] • Climate change rainfall analysis uses Practical Consideration of Climate Change in Flood Investigations (OEH 2007)[10%, 20% and 30% increase in 1% AEP rainfall intensity]
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Avalon to Palm Beach Floodplain	Flood Risk	Manly Hydraulics Laboratory	Northern Beaches Council	2017	Management Plan	Report prepared for the former Pittwater Council to assess flood impacts, risks and management options. The report includes: • Catchment characteristics (incl. flood history) • Relevant urban planning laws and literature • Flood impact on property values • Emergency planning context • Flood behaviour, patterns and risk assessment • Flood, property and response modification options • Impacts of climate change • Floodplain risk management plan
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Narrabeen Lagoon	Flood Risk	Cardno	Northern Beaches Council	2019	Management Plan	Floodplain risk management plan prepared from the above risk management study, the report includes: • Flood behaviour and economic damages • Development and planning considerations • Floodplain management options (19 flood modification measures, 4 property modification measures, 5 emergency management measures)
Narrabeen Lagoon Floodplain Risk Management Study 2019	Narrabeen Lagoon	Flood Risk	Cardno	Northern Beaches Council	2019	Management Study	Risk management study prepared for Northern Beaches Council, the study includeS: • Catchment description, incl. heritage values • Review of available data • Community consultation process • Existing flood behaviour • Economic impact of flooding • Flood emergency response assessment • Policies and planning • Flood risk for future development • Entrance management • Floodplain risk management options • Economic assessment of options • Public exhibition and multi-criteria assessment
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Manly Lagoon	Flood Risk	WMA Water	Northern Beaches Council	2018	Management Study & Plan	Flood risk management study and plan report prepared for Northern Beaches Council, the report includes: • Manly lagoon catchment, land use, flooding behaviour • Previous studies • Consultation • Floodplain management policy • Flood behaviour and environment • Flood emergency response arrangements • Future flood behaviour • Economic flood impact • Floodplain risk management measures and plan
Great Mackerel Beach Flood Study Appendices-2005	Great Mackerel Beach	Flood Risk	Cardno	Pittwater Council (former)	2005	Appendices	Appendices for the above document. The appendices includes: • Survey data • Pluviograph traces • Flow hydrographs (Design events and 1987 event) • Sample resident survey • Local newspaper articles of flood events • Rational method calculations • Model sensitivity • Management of creek entrance
Newport Beach Floodplain Risk Management Plan Figures	Newport Beach	Flood Risk	SMEC	Pittwater Council (former)	2003	Figures	Figures prepared for the Newport Beach Floodplain Management Plan 2003
Great Mackerel Beach Flood Study Figures-2005	Great Mackerel Beach	Flood Risk	Cardno	Pittwater Council (former)	2005	Figures	Figures for the above study
Great Mackerel Beach Flood Study Report-2005	Great Mackerel Beach	Flood Risk	Cardno	Pittwater Council (former)	2005	Flood Study	Flood study developed for the former Pittwater Council for the Great Mackerel Beach. The report includes: • Hydrological model: XP-RAFTS • Hydraulic model: SOBEK • Calibrated to the the November 1987 flood event • Design events modelling and results • Climate change not considered
Newport Floodplain Risk Management Plan Report 2004	Newport	Flood Risk	SMEC	Pittwater Council (former)	2004	Floodplain Risk Management Plan	Floodplain risk management plan prepared for the former Pittwater Council at Newport, the report includes: • Flood behaviour, hazard and damages • Floodplain risk management measures (flood, property and response modification measures)

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Great-Mackerel-Beach-FRM-StudyandPlan-2010	Great Mackerel Beach	Flood Risk	WMA Water	Pittwater Council (former)	2010	Management Study & Plan	Floodplain risk management study and plan prepared for the former Pittwater Council at Great Mackerel Beach. The report includes: • Floodplain risk management plan • Flood history • Estuary processes, management study and planning level mapping • Existing flood environment (incl. flood behaviour, hydraulic classification, flood hazard etc.) • Flood damages cost • Floodplain risk management measures • Climate change implications (incl. SLR)
Manly-lagoon-flood-study-mapping-compendium-2013	Manly Lagoon	Flood Risk	BMT WBM Pty Ltd	Warringah and Manly Council (former)	2013	Figures	Mapping compendium for the above flood study, figures include: • Design catchment flood mapping • Design ocean flood mapping • Coincident catchment and ocean flood mapping • Design flood sensitivity impact mapping • Climate change scenario mapping
Narrabeen-lagoon-flood-study-mapping-compendium-2013-part1	Narrabeen Lagoon	Flood Risk	BMT WBM Pty Ltd	Warringah and Manly Council (former)	2013	Figures	Mapping compendium for the above flood study, includes: • Design catchment flood mapping • Design ocean flood mapping • Coincident catchment and ocean flood mapping • Design flood sensitivity impact mapping • Climate change scenario mapping
Narrabeen-lagoon-flood-study-mapping-compendium-2013-part2	Narrabeen Lagoon	Flood Risk	BMT WBM Pty Ltd	Warringah and Manly Council (former)	2013	Figures	Mapping compednium for the above flood study
Manly-lagoon-flood-study_2013	Manly Lagoon	Flood Risk	BMT WBM Pty Ltd	Warringah and Manly Council (former)	2013	Flood Study	Manly Lagoon flood study prepared for Manly and Warringah Council's, the report includes: • Manly Lagoon and Manly Dam characteristics • Water level and rainfall gauges used and operational timeframes • Hydrological model: XP-RAFTS • Hydraulic model: TUFLOW • Lagoon entrance model": TUFLOW-MORPH • Calibrated to the 2011 flood event • Validated to the April 1998 flood event • Design events modelling and results • Climate change SLR analysis uses NSW Sea Level Rise Policy Statement (now OEH, 2009)[0.4 and 0.9m] • Climate change rainfall analysis uses Practical Consideration of Climate Change in Flood Investigations (OEH 2007)[10%, 20% and 30% increase in 1% AEP rainfall intensity]
Narrabeen-lagoon-flood-study-2013	Narrabeen Lagoon	Flood Risk	BMT WBM Pty Ltd	Warringah and Manly Council (former)	2013	Flood Study	Risk management plan developed from the above risk management study, the report includes: • History of lagoon entrance management • Water level and BoM rainfall gauges used and operational timeframes • Historical flood levels incl. flood mechanism • Hydrological model: RAFTS-XP • Hydraulic model: TUFLOW (downstream water level limit corresponds o the tidal water level) • Calibrated to the April 1998 flood event • Validated to the March 2011, and August 1998 flood events • Design flood results • Climate change SLR analysis uses NSW Sea Level Rise Policy Statement (now OEH, 2009)[0.4 and 0.9m] • Climate change rainfall analysis uses Practical Consideration of Climate Change in Flood Investigations (OEH 2007)[10%, 20% and 30% increase in 1% AEP rainfall intensity]
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Study Volume 2_2005	Dee Why and Curl Curl Lagoon	Flood Risk	Lyall & Associates	Warringah Council (former)	2005	Appendices	Appendices support the above management study and include: • Community questionare for residents and businesses • Assessment of flood damages on flood plains of Dee Why and Curl Curl Lagoons • Damage frequency curves • Existing planning instruments and policies • Draft local flood policy • Lagoon entrance behaviour and management • Curl Curl Lagoon extension of flood study • Flood planning level considerations • Rehabilitation of Dee Why Creek
Dee Why South Catchment Flood Study - community guide brochure 2013	Dee Why Catchment	Flood Risk	Warringah Council (former)	Warringah Council (former)	2013	Community Guide	Community guide floody study prepared for the former Warringah Council, the guide includes: • Flood behaviour and risk • Frequently asked question
Frenchs creek flood study report_2010	Frenchs Creek	Flood Risk	DHI Water and Environment Pty Ltd	Warringah Council (former)	2010	Flood Study	Flood study report prepared for the former Warringah Council. The report includes: • Overland flow model: Mike Storm • Calibrated using April 1998 and March 2003 flood events • Model validated against regional estimates of catchment runoff (Kinematic Wave Method) • Design events modelling and results • Climate change not considered
Dee Why South Catchment Flood Study 2013	Dee Why South Catchment	Flood Risk	Cardno	Warringah Council (former)	2013	Flood Study	Flood study developed for the former Warringah Council. The report includes: • Hydrological model: SMEC XP-SWMM model • Hydraulic model: SMEC XP-SWMM model • Calibrated using June 2012 and July 2011 flood events • Validated against XP-RAFTS model • Design events modelling and results • Climate change SLR analysis uses NSW Sea Level Rise Policy Statement (now OEH, 2009)[0.4 and 0.9m] • Climate change rainfall analysis uses Practical Consideration of Climate Change in Flood Investigations (OEH 2007)[10%, 20% and 30% increase in 1% AEP rainfall intensity]
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Plan_2005	Dee Why and Curl Curl Lagoon	Flood Risk	Lyall & Associates	Warringah Council (former)	2005	Management Plan	Report prepared for the former Warringah Council to assess flood impacts, risks and management options. The report includes: • Flooding pattern and impact • Flood, property and response modification measures • Recommended measures and funding

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Dee-why-south-catchment-floodplain-risk-management-study-2014	Dee Why South Catchment	Flood Risk	Cardno	Warringah Council (former)	2014	Management Plan	Floodplain risk management study developed for the former Warringah Council. The report includes: • Catchment description (incl. geology and soils, contaminated land and licensed discharges, aboriginal and non-aboriginal cultural heritage) • Existing flood behaviour • Flooding economic impact • Emergencyresponse arrangements • Policies and planning • Flood planning level review • Floodplain risk management options • Economic assessment of options and multi-criteria options assessment
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Dee Why South Catchment	Flood Risk	Warringah Council (former)	Warringah Council (former)	2015	Management Plan	Floodplain risk management plan developed for the former Warringah Council. The report includes: • Catchment characteristics • Existing flood risk (incl. historical flooding, flood behaviour, economic impact) • Floodplain risk management options • Flood, property and emergency response modification options
Frenchs creek flood plain risk management study-2010	Frenchs Creek	Flood Risk	DHI Water and Environment Pty Ltd	Warringah Council (former)	2010	Management Study	Floodplain risk management study developed for the former Warringah Council at Frenchs Creek. The report includes: • Catchment description • Catchment flooding (incl. flood behaviour, flood hazard, climate change) • Flood damage assessment (incl. social, economic and environmental impacts) • Existing floodplain risk management options and flood planning levels • Floodplain risk management options (incl. comparison of options)
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Study-2005	Dee Why and Curl Curl Lagoon	Flood Risk	Lyall & Associates	Warringah Council (former)	2005	Report	Report prepared for the former Warringah Council to assess flood impacts, risks and management options. The report includes: • Baseline flooding conditions • Floodplain management measures (potential and selected) • Appendices as above
Stability of cliff face - Marine Parade between Fairy bower and Shelly Beach	Fairy Bower and Shelly Beach	Geotechnical Hazards	Golder Associates	Manly Council (former)	1984	Report	Provides the outcomes of a geotechnical assessment conducted for the cliff face between Fairy Bower and Shelly Beach, including the outcomes of a risk assessment and recommendations
Annual Geotechnical Inspections of Coastal Cliff Sites, 2022	Northern Beaches	Geotechnical Hazards	GHD	Northern Beaches Council	2022	Report	Provides the outcomes of a geotechnical assessment conducted for the northern beaches cliffs, including the outcomes of a risk assessment and recommendations
Annual Geotechnical Inspections of Coastal Cliff Sites, 2023	Northern Beaches	Geotechnical Hazards	GHD	Northern Beaches Council	2023	Report	Provides the outcomes of a geotechnical assessment conducted for the northern beaches cliffs, including the outcomes of a risk assessment and recommendations
Annual Inspection Regime (Geotech)	Northern Beaches	Geotechnical Hazards	Northern Beaches Council	Northern Beaches Council	Unknown	Table	Details the requirements of frequency of geotechnical inspections at the northern beaches headlands
Geotechnical feasibility assessment, Bicentennial walkway	Bangalley Head, Careel Head	Geotechnical Hazards	GHD	Pittwater Council (former)	2001	Report	Provides the outcomes of a geotechnical assessment conducted for the Bicentennial Walkway between Bangalley and Careel Heads, including the outcomes of a risk assessment conducted for users of the Bicentennial Walkway and recommendations
Coast Adapt Sediment Compartments NBC	Northern Beaches	Open Coast	Coast Adapt	Coast Adapt	2002	Report	Sediment compartment and sensitivity rating report for the northern beaches coastline. Sensitivity rating is a 4, limited supply of sand from offshore.
HawkNepeanRiverSystemCMP+Scoping+Study-2020	Hawkesbury-Nepean River	Open Coast	Water Technology	Hornsby Shire Council	2020	CMP Stage 1	Coastal management program, scoping study, developd for Hornsby Shire Council. The report includes: • Strategic context, incl. governance context • First pass risk assessment (a) tidal inundation of estuaries (b) estuary foreshore erosion and bank instability (c) coastal shoreline recession (d) estuary entrance instability (e) cliff and slope instability (f) coastal storm erosion and inundation (g) catchment and coastal flooding (h) bushfire (i) drought (j) tsunami (k) dam breach / break (l) climate change impacts (incl. ocean currents and nutrient inputs) (m) water pollution and sediment contamination (n) habitat disturbance (o) hydrologic modifications (p) commercial fishing and boating (q) recreation and tourism (r) access and availability (s) public health and safety (t) governance (u) information gaps • Knowledge gaps
CoastalErosion-report-AHO-FINAL-2015	Northern Sydney	Open Coast	Aboriginal Heritage Office	Ku-ring-gai, Lane Cove, Manly, North Sydney, Pittwater, Ryde, Warringah and Willoughby Councils	2015	Report	• Aboriginal heritage and coastal erosion, incl.: (a) coastal erosion (b) rising sea levels and flooding behaviour (c) wave action from storm surges and boat traffic • Monitoring program (every 2-3 months where possible, otherwise annually)

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Coastal Erosion Aboriginal Heritage Strategy AHO 2019	Northern Sydney	Open Coast	Aboriginal Heritage Office	Ku-ring-gai, Lane Cove, North Sydney, Northern Beaches, Strathfield and Willoughby Councils	2019	Report	Coastal erosion Aboriginal heritage strategy, the report includes: • Environmental framework (a) rising sea levels (b) flooding behaviour (c) wave action from storm surges and boating traffic • Sites monitored were 10m horizontally and 2m vertically from mean high tide level • Local heritage strategy
Greater-Sydney-Harbour-Coastal-Management-Plan-Scoping-Study	Greater Sydney Harbour	Open Coast	BMT WBM Pty Ltd	Local Land Services	2018	CMP Stage 1	Coastal management program, scoping study, developd for Local Land Services. The report includes: • Strategic context, incl. governance context • Knowledge gaps • Risk assessment: (a) urban stormwater discharge (b) sewage discharge (c) industria discharges (d) foreshore development (e) clearing of riparian habitat, wetland drainage (f) clearing of terrestrial vegetation (g) disturbance of contaminated sediment (h) seabed modification (i) population growth (j) introduction of invasive species (k) extraction, artificial barriers to reduce flow (l) shipping, boating and boating infrastructure (m) public access restricted/disconnected/inadequate (n) conflict of resource use of foreshore areas and facilities (o) conflict of resource use of waterway areas and facilities (p) recreational pressures (q) cliamte change (r) coastal and tidal inundation (s) overland flooding (t) beach, estuary foreshore and bank erosion (u) cliff instability (v) drought (w) bushfire
Manly Ocean Beach Emergency Action Plan for Coastal Erosion 2008	Manly Ocean Beach	Open Coast	Patterson Britton & Partners Pty Ltd	Manly Council (former)	2008	Emergency Action Plan	Emergency action plan for coastal erosion prepared for the former Manly Council. The report includes: • Roles and responsibilities • Evaluation of emergency protection measures • Emergency action plan
Cabbage Tree Bay Management Plan 2000 Action Plan	Cabbage Tree Bay	Open Coast	Manly Council (former)	Manly Council (former)	2000	Management Plan	Cabbage Tree Bay management plan prepared for the former Manly Council, the report includes: • Exhibition and amendments to draft management plan • Management plan structure and objectives (establishment of a 'no take' reserve)
Manly Ocean Beach Coastline Management Plan	Manly Beach	Open Coast	Patterson Britton & Partners Pty Ltd	Manly Council (former)	2008	Management Plan	Manly ocean beach coastline management plan prepared for the former Manly Council, the plan includes: • Study area wide issues (a) beach erosion (b) shoreline recession (c) coastal inundation (d) climate change (e) recreation and competing beach user groups (f) waste management and beach raking (g) aquatic ecology (h) water quality (i) conservation items of heritage significance (j) aesthetics • Specific area issues (e.g. lagoon entrance) • Management options and Administrative management
Manly Ocean Beach & Cabbage Tree Bay Coastline Hazard Definition Study 2003	Manly Beach and Cabbage Tree Bay	Open Coast	Patterson Britton & Partners Pty Ltd	Manly Council (former)	2003	Report	Coastline hazard definition study prepared for the former Manly Council. The report includes: • Coastal processes, incl. short term onshore/offshore sand movement, longer term sand movement and aeolian sand movement • Seawall stability • Coastline hazards (a) beach erosion (b) shoreline recession (c) sand drift (d) coastal inundation (e) stormwater erosion (f) climate change (incl. SLR) (g) slope and cliff instability • Conceptual coastline management options for cabbage tree bay
Manly SLR Coastal Hazard Risk Report 2012	Manly	Open Coast	Water Research Laboratory UNSW	Manly Council (former)	2012	Report	Coastal hazard risk areas to projected SLR report conducted for the former Manly Council. The report includes: • Field surveys • Coastal erosion hazard lines • Coastal inundation determination • Assessment of assetts impacted by Coastal Hazards • Vulnerability assessment and coastal management options
Manly Identification of Properties Potentially at Risk from Erosion and Inundation in the Manly Council Local Government Area 2018	Manly Council	Open Coast	Water Research Laboratory UNSW	Manly Council (former)	2013	Report	Adendum to WRL Technical Report 2011, prepared for the former Manly Council. The report includes: • Estimation of properties impacted by erosion • Estimation of properties impacted by inundation

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Cabbage Tree Bay Management Plan 2000 Support Doc	Cabbage Tree Bay	Open Coast	Manly Council (former)	Manly Council (former)	2000	Supporting Documentation	Supporting documentation for the above management plan, the report includes: • Planning framework • Land ownership and responsibilities • Aquatic impacts and issues (a) aquatic biodiversity (b) conservation management (c) user groups and conflicts (d) boating (e) fairy bower rock pool • Terrestrial impacts and issues (incl. ecological, water quality and stormwater, cliff stability, etc.) (a) terrestrial flora and fauna (b) water quality and stormwater (c) sand migration and grass interface (d) pollution (e) sewage pumping station (f) cliff stability (g) heritage (h) access (i) interpretation and signage (j) administrative management
CZMP bilgolabasin 2016 Appendices	Bilgola Beach, Basin Beach	Open Coast	Royal HaskoningDHV	Northern Beaches Council	2016	Appendices	Appendices for the above coastal zone management program. The appendices include: • Historical coastal storm damage and protection works • Threats to and management of coastal ecosystems in study area • Legislative and planning context • Risk assessment to define appropriate beachfront development setbacks and controls • Private property risk and response categories • Coastal erosion emergency action subplan • Evaluation of CZMP management options
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - with Appendices	Manly Ocean Beach	Open Coast	Royal HaskoningDHV	Northern Beaches Council	2016	Appendices	Above report incl. appendices. Appendices include: • Geotechnical assessment • Ecosystem assessment • Properties at risk
NBC Scoping Study Significant Open Coastal Hazards 2021	Northern Beaches Open Coast	Open Coast	Rhelm, Baird	Northern Beaches Council	2021	CMP Stage 1	CMP scoping study prepared for the former Northern Beaches Council. The report includes: • Scope of the CMP • Current coastal management arrangements • Roles and responsibilities • First pass risk assessment and knowledge gaps. The threats posing a very high or high risk area are: (a) Insufficient involvement of Aboriginal people in the management of cultural heritage (b) Beach erosion (c) Slope instability (d) Habitat and wildlife disturbance (e) Ocean water and beach sand pollution (f) Lack of compliance with regulations or lack of compliance resources (g) Insufficient community and visitor awareness of values and threats (h) Lack of collaboration between private foreshore property owners on management of coastal hazards.
CZMP Bilgolabasin certified 2016	Bilgola Beach, Basin Beach	Open Coast	Royal HaskoningDHV	Northern Beaches Council	2016	Coastal Zone Management Plan	CZMP prepared for Northern Beaches Council. The management plan includes: • Study area description • Coastline hazards and risks (a) erosion/recession related hazards (b) stormwater and overland flow (c) tidal and coastal inundation • Proposed management options for current and projected future risks
CZMP collaroy-narrabeenbeachandfishermansbeach 2016	Collaroy-Narrabeen Beach and Fishermans Beach	Open Coast	Royal HaskoningDHV	Northern Beaches Council	2016	Coastal Zone Management Plan	CZMP prepared for Northern Beaches Council. The manageent plan includes: • Study area description • Coastline hazards (a) beach erosion (b) beach rotation (c) shoreline recession (d) stormwater erosion hazard (e) slope instability (f) coastal inundation • Proposed management options for current and projected future risks • Management actions, incl. sources of funding, implementation, monitoring and reporting
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Manly Ocean Beach	Open Coast	Royal HaskoningDHV	Northern Beaches Council	2016	Management Options Assessment	Management options assessment report prepared for Northern Beaches Council. The report includes: • Coastal processes, incl. Manly Lagoon entrance breakout • Planning, zoning and development controls • Summary of coastal hazards and risks (a) wave overtopping (b) beach erosion (c) seawall stability (d) shoreline recession (e) coastal inundation (f) catchment flooding (g) beach scour (h) cliff, slope and retaining wall instability (i) coastal ecosystem pressures • Coastal ecosystem pressres • Management option recommendations

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Coastal-erosion-policy_NBC_2016	Collaroy-Narrabeen Beach and Fishermans Beach	Open Coast	Northern Beaches Council	Northern Beaches Council	2016	Policy	Northern Beaches coastal erosion policy prepared for the Collaroy-Narrabeen and Fishermans beaches, the report includes: • Management framework • Protection works design, siting, alignment, approval and impact • Maintenance of beach amenity and access and protection works
Shelly Beach Rockfall Hazards Geotechnical Options - geotech report_2018	Shelly Beach	Open Coast	GHD	Northern Beaches Council	2018	Report	Geotechnical assessment report prepared for the Northern Beaches Council. The report includes: • Potential instability mechanisms: (a) Softening or erosion of basal soil by rainfall (b) Undercutting and collapse of fractured rock masses through increased recessive weathering and erosion on open rock mass defects (c) Dislodgement by tree growth and by tree root jacking during high wind periods (d) Dislodgement by human interaction. • Rockfall hazard management options
Marine Parade Rock Slope Assessment Geotech Geotechnical Report Fairy Bower to South Steyne_2018	Marine Parade	Open Coast	GHD	Northern Beaches Council	2018	Report	Rock slope assessment report prepared for the Northern Beaches Council. The report includes: • Hazard mapping and UAV inspection • Geology, geomorphology and site features • Rock fall hazard assessment
North Bilgola_Geotech_Dune Stabilisation and Passive Recreation Area_2007	North Bilgola Beach	Open Coast	GHD	Pittwater Council (former)	2007	Report	Dune stabilisation and passive recreation area report prepared for the former Pittwater Council. The report includes: • Risk reduction approaches, incl.: (a) stabilise the cliff face and crest (b) construct a protection barrier (c) exclude public entry
Beach_sand_nourishmentscopingstudy_2010	Sydney Coastline	Open Coast	Aecom	Sydney Coastal Councils Group	2010	Report	Beach sand nourishment scoping study prepared for the sydney coastal councils group, the report includes: • Climate change and SLR (IPCC 4th assessment report) • Beach nourishment as a management strategy (incl. relevant national/international projects) • Physical and ecological impacts of sand extraction at Providential Head and Cape Banks • Social impacts • Nourishment technique (offshore vs onshore placement vs beach scraping) • Environmental Impact Assessment Requirements
NBC_Mapping and Responding to Coastal Inundation Project - 4 Reports		Open Coast	CSIRO	Sydney Coastal Councils Group	2012	Report	Three reports prepared for Sydney Coastal Councils Group. 1. Modelling and mapping of coastal inundation under future sea level rise. The report includes: • Hydrodynamic and model setup and results • Calculation of inundation layers 2. Incorporating Coastal Inundation and SLR into Local and Regional Planning Responses. The report includes: • Legislative and policy background • Context for the SCCG region • Future management improvements 3. Supporting Local Government to communicate coastal inundation. The report includes: • Understanding SLR and issues, government responses to SLR • Communicating SLR to the community • Framework for risk communication and community engagement • Case studies
Collaroy_Review of Coastline Hazard Lines for Collaroy-Narrabeen Beach and Fishermans Beach_2009	Collaroy-Narrabeen Bech and Fishermans Beach	Open Coast	Worley Parsons	Warringah Council (former)	2009	Appendices	Inventory of properties potentially affected by coastline hazards over next 100 years
CZMP_narrabeen-beach-fishermans-beach_Appendices_2014	Collaroy-Narrabeen Beach and Fishermans Beach	Open Coast	Royal HaskoningDHV	Warringah Council (former)	2014	Appendices	Appendices include: • Information on storm events of 945, 1967 and 1974 • Ecology of Collaroy-Narrabeen and Fishermans Beach • Private property risk and response categories • Risk assessment to define appropriate development setbacks and controls • Evaluation of CZMP management options
Dee-why-lagoon-estuary-management-plan-2004	Dee Why Lagoon	Open Coast	Lawson and Treloar Pty Ltd.	Warringah Council (former)	2004	Management Plan	Estuary management plan prepared for the former Warringah Council. The plan includes: • Study area issues (a) community involvement (b) water quality (c) tributaries and corridors (d) entrance managent (incl. flooding, illegal breakout, odour, meander of entrance lcoation, permits and approvals associated with SEPP35, links with prawn recruitment and recreational catches, protection of clay sill) (e) recreational uses (f) flora and fauna (incl. migratory bird habitat, threatened species, weed invasion, tree removal, fire, seagrass, saltmarsh, fisheries, introduced predators) (g) sediments • Action list, monitoring and performance indicatorss • Actions identified in the EMS but not incl. in the EMP
Dee Why Lagoon estuary management study 2004	Dee Why Lagoon	Open Coast	Lawson and Treloar Pty Ltd.	Warringah Council (former)	2004	Management Study	Estuary management study prepared for the former Warringah Council. The study includes: • Summary of processes, incl. catchment, hydrodynamic, ecological, entrance behaviour, sedimentary and water quality processes • Lagoon values, incl. conflicts between users • Management options/strategies, incl. existing actions, lagoon dredging and Dee Why Cree rehabilitation
Collaroy Narrabeen Beach Nourishment Investigations July 1993 - Patterson Britton and Partners	Collaroy-Narrabeen Beaches	Open Coast	Patterson Britton & Partners Pty Ltd	Warringah Council (former)	1993	Report	Beach nourishment investigation prepared for the former Warringah Council. The report includes: • Beach nourishment requirements • Native beach material and investigation • Massive beach nourishment and alternative management options, incl. precinct nourishment, and seawall upgrade combined with beach nourishment

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Dee Why Lagoon Data Compilation Study - 1997	Dee Why Lagoon	Open Coast	Manly Hydraulics Laboratory	Warringah Council (former)	1997	Report	Data compilation study prepared for the former Warringah Council. The report includes: • Climate • Geology and geomorphology • Lagoon water inflows and outflows • Entrance behaviour and management, incl. impacts of Lagoon Opening • Water quality • Ecology
Warringah Coastal-erosion-emergency-action-subplan 2015	Warringah Beaches	Open Coast	Worley Parsons	Warringah Council (former)	2015	Report	(amended from 2012) Coastal erosion emergency action subplan developed for the former Warringah Council. The report includes: • Approvals required for implementation of emergency protection works • Roles and responsibilities • Evaluation of emergency protection measures • Council actions before, during and after a storm
Collaroy narrabeen beaches coastal process hazard definition study - December 1987 - PWD	Collaroy-Narrabeen Beaches	Open Coast	Public Works Department	Warringah Council (former), Public Works Department	1987	Report	Hazard definition study prepared for the former Warringah Council and the Public Works Department. The study includes: • History of storm erosion 1880 to 1986 • Beach changes 1941 - 1986 • Coastal process hazards (a) wave set-up (b) major rip cells and strong longshore feeder currents (c) wave run-up (d) sand extraction from entrance (e) dune mining (f) wind blown losses (g) oceanic inundation
Coast Adapt Sediment Compartments north Sydney	Northern Sydney (North Head to South Head)	Open Coast	Coast Adapt		Unknown	Report	Sediment compartment and sensitivity rating report for the northern Sydney coastline. Sensitivity rating is a 4, limited supply of sand from offshore.
Northern Beaches Coast Action Plan	Northern Beaches	Open Coast	Northern Beaches Council		2021	Action Plan	The Action Plan sets the aspirations and commitments in relation to the coast in the Protect, Create, Live - Northern Beaches Environment and Climate Change Strategy 2040. It provides a list of actions to be implemented by Council over four years to address issues relating to the coast. This includes annual measuring, monitoring, and reporting, as well as review every four years.
Sea-level projections for Northern Beaches Council	Northern Beaches Open Coast	Open Coast	CSIRO	Northern Beaches Council	2023	Report	Report prepared by CSIRO for the Northern Beaches Council detailing the latest regionally specific projections for sea level rise out to 2120 under a range of emission scenarios, processes contributing to sea level rise and recent trends. Includes planning guidance and a sea level rise estimation tool.
BAREENA PARK - Balgowlah Heights - POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
BLIGH PARK - North Seaforth - POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Bower Street Reserve - Manly - POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Brimbecom Park - Balgowlah - POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Burnt Bridge Creek - POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Castle circuit Buushland Reserve POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Contarf park Sandy Bay Road POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Cutler Road POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Drainage Reserves LITTLE MANLY POINT, SEAFORTH CLONTARF 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Esplanade Park- Fairlight - POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Fisher Bay Area - Balgowlah -POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Forty Baskets Reserve - POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Geddes Street Bushland reserve POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Laura Street Reserve and Wharf - POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Manly Peace Park- POM 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Nareen Wetlands Plan of Management - 1993		Plans of Management	Northern Beaches Council		1993	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Irrawong POM 1996		Plans of Management	Northern Beaches Council		1996	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
North Harbour Reserve - POM 1997		Plans of Management	Northern Beaches Council		1997	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Sangrado Park POM 1997		Plans of Management	Northern Beaches Council		1997	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Stuart street Manly - POM 1997		Plans of Management	Northern Beaches Council		1997	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Careel Bay Wetland POM 1998		Plans of Management	Northern Beaches Council		1998	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Manly-scenic-walkway-july-1998		Plans of Management	Northern Beaches Council		1998	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Allenby park and heights plan of management 2000		Plans of Management	Northern Beaches Council		2000	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study

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Berry reserve masterplan Plan of Management 2000		Plans of Management	Northern Beaches Council		2000	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Berry reserve Plan of Management 2000		Plans of Management	Northern Beaches Council		2000	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Jamieson park POM 2000		Plans of Management	Northern Beaches Council		2000	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Dee Why Lagoon Park Plan of Management for Community Lands by Manly Council 2001		Plans of Management	Northern Beaches Council		2001	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
John fisher Park masterplan 2001		Plans of Management	Northern Beaches Council		2001	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
John fisher Park POM 2001		Plans of Management	Northern Beaches Council		2001	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Mackay Reserve POM 2001		Plans of Management	Northern Beaches Council		2001	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Angophora reserve 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Bangalley-head-pom-2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Bungan pom 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Careel Bay and Hitchcock Park plan of management 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Governor Phillip Masterplan 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Governor-phillip-park-pom- 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Manly-ocean-beach-pom-dec-2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Pittwater Park Draft POM August 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Turimetta Headland Reserve POM 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Warringah coastal-lands-plan-management planned works maps 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Warringah coastal-lands-plan-management-action plan 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Warringah coastal-lands-plan-management-location maps 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Apex Park Plan of Management 2003		Plans of Management	Northern Beaches Council		2003	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Avalon Golf Course POM May 2003		Plans of Management	Northern Beaches Council		2003	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Winnererremy Bay Plan of Management Sept 2003		Plans of Management	Northern Beaches Council		2003	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Keirle-park-plan-of-management 2004		Plans of Management	Northern Beaches Council		2004	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Little-manly-coastline-management-plan-2004		Plans of Management	Northern Beaches Council		2004	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
North Narrabeen Reserve POM Nov 2004		Plans of Management	Northern Beaches Council		2004	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Seaforth-oval-plan-of-management 2004		Plans of Management	Northern Beaches Council		2004	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Bilgola Ocean Beach management 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Bungan Beach POM Chapter 06 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Mona Vale POM Chapter 05 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Newport Beachs POM Chapter 07 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
North Narrabeen POM Chapter 02 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Pittwater ocean-beaches-POM-2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Public Wharves Bells POM 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Public Wharves Bennetts POM 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Public Wharves Bonnie Doon POM 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Public Wharves Cargo POM 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Public Wharves Carols POM 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Public Wharves Mackeral Beach POM 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Public Wharves POM Appendices 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Public Wharves Tennis Court POM 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study

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Turimetta POM Chapter 03 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Warriewood POM Chapter 04 2005		Plans of Management	Northern Beaches Council		2005	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Bible Garden Palm Beach Plan of Management 2006		Plans of Management	Northern Beaches Council		2006	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Snapperman Beach Reserve POM 2006		Plans of Management	Northern Beaches Council		2006	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Sandy Point Woorak Iluka PoM 2007		Plans of Management	Northern Beaches Council		2007	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Bayview Park Plan of Management 2008		Plans of Management	Northern Beaches Council		2008	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Bilarong Reserve Plan of Management 2008		Plans of Management	Northern Beaches Council		2008	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Church Point Plan of Management 2009		Plans of Management	Northern Beaches Council		2009	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Kitchener Park Plan of Management 2009		Plans of Management	Northern Beaches Council		2009	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Pittwater Natural Areas POM -2009		Plans of Management	Northern Beaches Council		2009	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Lake-park-oval-reserve-pom 2010		Plans of Management	Northern Beaches Council		2010	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Pittwater Natural Areas POM Part 2 2010		Plans of Management	Northern Beaches Council		2010	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Sydney Lakeside Caravan Park Plan of Management 2010		Plans of Management	Northern Beaches Council		2010	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Warriewood-wetlands-pom 2010		Plans of Management	Northern Beaches Council		2010	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Dunbar Park POM Adopted 6 June 2011		Plans of Management	Northern Beaches Council		2011	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Narrabeen-lagoon-pom 2011		Plans of Management	Northern Beaches Council		2011	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Avalon Beach PoM - Coastal Protection Management Plan 2013		Plans of Management	Northern Beaches Council		2013	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Manly-warringah-war-memorial-park-manly-dam-march-2014		Plans of Management	Northern Beaches Council		2014	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Pittwater Open Space and recreation strategy 2014		Plans of Management	Northern Beaches Council		2014	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Pittwater Public space and recreation strategy Appendices 2014		Plans of Management	Northern Beaches Council		2014	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
District Park Plan of Management 2015		Plans of Management	Northern Beaches Council		2015	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
District Park Landscape Concept Plan 2015		Plans of Management	Northern Beaches Council		2015	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Boondah-road-sports-courts-pom 2018		Plans of Management	Northern Beaches Council		2018	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Curl-curl-beach-landscape-masterplan-amended-2021		Plans of Management	Northern Beaches Council		2021	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Dee-why-lagoon-wildlife-refuge-pom-amended 2021		Plans of Management	Northern Beaches Council		2021	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Ivanhoe-park-plan-of-management-2022		Plans of Management	Northern Beaches Council		2022	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Landscape masterplan-ivanhoe-park 2022		Plans of Management	Northern Beaches Council		2022	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
North Narrabeen Headland Reserve 2022		Plans of Management	Northern Beaches Council		2022	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
Warringah coastal-master-plans 2002		Plans of Management	Northern Beaches Council		2002	Management Plan	Individual Plans of Management have not been reviewed for this Scoping Study
NBC Stormwater Management Study 2022	Northern Beaches	Storm Water	Alluvium	Northern Beaches Council	2022	Draft Report	Stormwater management and quality study prepared for the catchments of the Northern Beaches council. The report includes: • Background information (community values, water sensitive urban design, current stormwater management policy) • Catchment case studies (Oxford Creek, Carrol Creek, Dee Why Creek, Curl Curl Creek, Manly Beach, Careel Creek) • Estuary health risk • Stormwater management strategy and targets
NBC Stormwater-management-strategy-2015-2019	Pittwater Council (former)	Storm Water	Pittwater Council (former)	Pittwater Council (former)	2015	Report	The report includes: • Stormwater management strategy 2015 - 2019 • Managing local stormwater (incl. stormwater harvesting feasibility) • Water quality and quantity • Improving stormwater quality • Feasibility assessment
GSHCMP Stage 2 Study 1 Final Report Investigation into stormwater management	Greater Sydney Harbour	Storm Water	Civille	Sydney Coastal Councils Group	2022	CMP Stage 2	Report prepared as part of the Greater Sydney Harbour Coastal Management Program Stage 2. The study is aimed at enabling inter-agency collaborative management of urban stormwater and marine litter. The report includes: • Current governance, funding and collaborative arrangements • State of play in the public domain (incl. street sweeping, litter prevention, gross pollutant traps etc.) • State of play in the private domain (incl. local state and other policies, erosion and sediment management) • Statte of planning for sea level rise

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GSHCMP Stage 2 Study 2 Catchment management options study Final Report - Civile	Greater Sydney Harbour	Storm Water	Civille	Sydney Coastal Councils Group	2022	CMP Stage 2	Report prepared as part of the Greater Sydney Harbour CMP Stage 2 and has investigated catchment stormwater management options for the Greater Sydney Harbour. The report includes: • Community values • Priority threats (incl. urban stormwater discharge, marine debris, sewage discharge, climate change) • Aligning waterway health with community values • Planning for climate change • Features of an effective management framework • Recommendations



Appendix C

EXISTING MANAGEMENT ACTIONS AUDIT

Full Title	Category	Action	Implementation Status
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Biodiversity	The Fisheries Management (Aquatic Reserves) Amendment Regulation 2009 (see Appendix 1) will continue the ban on taking, or wilfully and recklessly damaging, fish and marine vegetation.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Biodiversity	DPIRD will work with other agencies to increase compliance efforts, and improve community awareness and understanding of the regulations applying to the reserve.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Biodiversity	DPIRD will work with others to undertake biodiversity monitoring and habitat mapping of fish and invertebrates to increase the likelihood of detecting non-indigenous species.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Biodiversity	DPIRD will review the results of research and monitoring to assess the effectiveness of management responses, and adapt them accordingly.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Biodiversity	DPIRD will work with Industry and Investment NSW to implement management strategies to deal with pest fish and marine vegetation should non-indigenous species be found within the reserve.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Biodiversity	DPIRD will include information about the impacts of non-indigenous species in educational material produced as part of this implementation strategy.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD will provide moorings for public use, to maintain opportunities for boating users to enjoy the reserve while removing the potential for environmental damage associated with boating use (see Figure 2 for proposed locations).	No Longer Relevant
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	Under the regulation vessels will be permitted to use moorings for a maximum of 24 hours. Vessels using the mooring closest to Shelly Beach (located 90 metres from the beach; see Figure 2) will be permitted to tie up for a maximum of 2 hours to allow for equity of use between those who want to travel ashore.	No Longer Relevant
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	Under the regulation it will be an offence to remove, damage or interfere with public moorings, marker buoys or signage within the reserve.	No Longer Relevant
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	NSW Maritime will implement a 4-knot speed limit within that area of the reserve landward of the two opposing headlands.	Complete
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	NSW Maritime will implement a seasonal restriction (closure) on the beaching of motorised vessels on Shelly Beach from the October long weekend to the following Easter. During this period motorised vessels will also be prohibited between the closest mooring buoy and the beach (within 90 metres from the beach).	Complete

Full Title	Category	Action	Implementation Status
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	NSW Maritime will implement regulatory action relating to boating safety issues to coincide with the implementation of the management plan regulation.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	Transport for NSW will consider introducing licences for commercial tour operators whose operations have the potential to impact on habitat, plants and animals. This consideration will be part a broader review of aquatic reserve management to be conducted later in 2010.	No Longer Relevant
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD and Manly Council will convene a workshop with commercial diving companies and community diving groups to consider developing a scuba divers' code of conduct, and to review access, with the intention of relieving pressure on the reserve.	Complete
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD and Manly Council recognise the amenity of the reserve for disabled divers and swimmers and will investigate funding to provide disabled (wheelchair) access to the waters of the reserve. For example, it has been suggested that upgrading the existing boat ramp at Shelly Beach could provide suitable wheelchair access.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD will cooperate with Manly Council on signage projects and will maintain and upgrade signs.	Complete
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD, Manly Council and NSW Maritime will install easily identifiable and environmentally appropriate signs. The locations of existing and proposed signs are shown in Figure 2. Proposed improvements include: • installing enforcement signs using internationally recognised symbols in appropriate locations • installing additional enforcement signs on the Shelly Beach rock platform and headland walkways • considering using the Manly Life Saving Club boat shed (located on Marine Parade, Manly) for high impact, large scale signs, and • upgrading existing interpretive signs to improve education and public awareness about marine conservation and the reserve's research values.	Complete
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD will install offshore marker buoys around the perimeter of the reserve to define the external boundary (see Figure 2).	No Longer Relevant
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD will produce updated public information (in brochure format) on the biodiversity conservation, education and research values of the reserve.	Complete
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD and NSW Maritime will prepare updated public information on prohibitions and regulations in relation to boating and the use of moorings.	Complete
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD will help Manly Council and the Manly Environment Centre to initiate a volunteer program to educate visitors about the biodiversity conservation and research objectives of the reserve.	Ongoing

Full Title	Category	Action	Implementation Status
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Recreation	DPIRD, Industry and Investment NSW and Manly Council will cooperate to provide training in aquatic reserve regulations for Manly Council rangers. This will help to enforce compliance with the regulations, improve community awareness and improve responses to reports of illegal fishing activities.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Planning	DPIRD will work with Manly Council and other relevant authorities to monitor infrastructure and outlets, and encourage cooperative projects to reduce stormwater volumes and improve the quality of stormwater discharged into the reserve.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Planning	DPIRD will ensure that relevant developments are assessed having regard to the objectives of the Fisheries Management Act 1994 and the Fisheries Management (Aquatic Reserves) Amendment Regulation 2009.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Research/Monitoring	DPIRD will encourage tertiary and other research institutions to undertake research that will assist in managing the reserve, particularly in determining the effectiveness of the actions undertaken as part of this implementation strategy.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Research/Monitoring	DPIRD will seek to establish partnership research projects to repeat previous studies which have provided baseline data for the reserve. The results of these studies will also help with reviewing the effectiveness of this strategy.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Research/Monitoring	DPIRD will continue to assess all permit requests for research activities within the reserve to ensure ecological sustainability and consistency with the objectives of the reserve.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Research/Monitoring	DPIRD, in partnership with others, will undertake research within the reserve that aims to better understand the impacts of climate change on the marine environment. DPIRD will undertake fish and invertebrate biodiversity monitoring and habitat mapping to support early detection of the impacts of climate change.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Research/Monitoring	DPIRD will support research initiatives that aim to investigate climate change impacts on the marine environment, within the scope of the research objectives outlined above.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Aboriginal Heritage	DPIRD will encourage research into the Aboriginal heritage values of the reserve with the Metropolitan Local Aboriginal Land Council.	Ongoing
Cabbage Tree Bay Aquatic Reserve Regulation 2009 and Implementation Strategy	Aboriginal Heritage	DPIRD and others will include relevant Aboriginal cultural information in education products produced as part of this implementation strategy.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Biodiversity	Support view of the Community and propose that Cabbage Tree Bay be a No Take Marine Sanctuary (passive use only, no extractive uses permissible)	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Public Participation	Implement an education program to inform the community that the area is a No Take Marine Sanctuary and to facilitate Inbvolvement in the conservation of the area.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Form a consultative group to participate in consultation. This should be the Implementation Management Committee.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Facilitate the designation of Cabbage Tree Bay as a No Take Marine Sanctuary to preserve and protect the natural environment.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Designation of Cabbage Tree Bay as a No Take Marine Sanctuary	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Implement an education program aimed at user groups concerning the No Take Marine Sanctuary.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Investigate feasibility of providing timed showers.	Complete

Full Title	Category	Action	Implementation Status
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Install diver corralling area on grassed areas near car park and at the end of Bower Lane.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Beach Saftey	Consult with surf life saving club regarding storage requirements.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Recreation	Ensure that commercial activities in study area comply with landholder policies and guidelines.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Community Education	Educate recreational vessel users regarding impacts of sewage pollution	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Catchments	Prepare and implement campaign informing public on relevant details to report pollution incidents to relevant authorities	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Enforce ammendments to personal watercraft operating guidelines	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Continue use of diluted chlorine cleaning method until more appropriate and effective measures identified.	No Longer Relevant
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Continue involvement in identifying and trialing pool cleaning methods.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Undertake structural maintenance on pool surface and walls.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Replace stairs and handrail to pool.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Building Assets	Developed a disabled drop off/pick up point and turnaround bay at Lower Shelly Beach.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Building Assets	Install disabled parking space in Bower Lane in accordance with Fairy Bower Precinct Community Forum recommendation.	Incomplete
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Install handrails at top of staircases in Bower Reserve and from carpark to Shelly Beach.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	regrade Marine Parade for improved wheelchair access.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Biodiversity	Ensure that Cabbage Tree Bay is managed within the contet of integrated management planning for the whole of North Head	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Biodiversity	Accurately map and describe and describe current terrestrial communities and habitats at Cabbage Tree Bay	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Biodiversity	Continue consultation and negotiation with NPWS Threatened Species Unit regarding draft reovery plans and implement recommendations of Long nosed Bandicoot and Little Penguin Recovery Plans in collaboration with NPWS, Manly Council, Manly Environment Centre and other signatories	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Biodiversity	Prepare bandicoot habitat management plan for Shelly Beach Headland which includes mosaic of vegetation types, ages and fire histories	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Amend landscape management plan (Ocean Beach Masterplan) for reserves with objectives to enhance plantings and fauna habitat reflecting bandicoot requirements.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Biodiversity	Define preferred fire management of vegetation communities, taking account of conservation and residential safety needs.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Prepare a database of weed clearance activities and methods used to be reviewed for effectiveness.	Ongoing

Full Title	Category	Action	Implementation Status
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Trial alternative, environmentally friendly weed management methods wehre practicable, to be implemented in stages.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Street planting and landscaping to use locally indigenous species and encourage residents to do similar.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Dogs and other domestic pets to be confined and establised paths to be kept on leash at all times.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Biodiversity	Prepare an introduced species eradication programme in consutlation with NPWS and integrate with any existing programmes for North Head.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Undertake drain stencilling of all stormwater drains flowing to Cabbage Tree Bay	Incomplete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Implement a water quality monitoring program complementary to existing Beachwatch programs	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Retrofit litter baskets into existing drainage inlet pits	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Catchments	Ensure that Cabbage Tree Bay catchment is included in LGA-wide hydrological and hydraulic investigations as a priority	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Building Assets	Increase pit maintenance (Sadiya) and street sweeping (Richard Li) to control pollution at source	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Council to review standard drainage and stormwater conditions for development approvals	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Investigate and install suitable pollutant reduction devices for stormwater pipes at eastern end of Shelly Beach and Marine Parade at Bower Lane	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Construct a first flush tank in Bower Reserve	Incomplete
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Install energy dissipater at outlet to watercourse above Le Kiosk	Incomplete
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Install an oil/grit separator in carpark on Shelly Beach headland	Incomplete
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Remove temporary barriers preventing sand migration	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Investigate potential to use other plantings and grass species in lower Shelly Beach, particuarly native species to stabilise sand and to maintatin existing bandicoot habitat components.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Undertake investigation into wave and current patterns in Cabbage Tree Bay to identify cause of sand migration and loss from Fairy Bower by using DSTO study as a baseline	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Increase presence of rangers, particuarly during peak visitation periods (daily during summer and on weekends) to enforce regulations.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Approach local police regarding increased policing of Shelly Beach Resrve during night.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Recreation	Prepare a design plan which considers the <i>design type</i> and location of bins, <i>segregated for recycling</i> . These should have regard to amenity, function and visual impact.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Recreation	Provide facilities for dog faeces disposal at entry and exit points.	Ongoing

Full Title	Category	Action	Implementation Status
Cabbage Tree Bay Management Plan 2000 Action Plan	Recreation	Implement recommendations for air quality as outlined in the Manly Conservation Strategy 1998.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Public Participation	Encourage involvement in community clean up activities	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Recreation	Implement recommendations for Waste Minimisation and Management as outlined in Council's Strategic Waste Plan.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Catchments	That potentially contaminated sites should be identified and confirmation provided that identified sites do not present a significant risk of harm to human health or some other aspect of the environment, e.g. water quality of Cabbage Tree Bay.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Continue participation in community consultation throughout REF preparaation and construction.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Participate in monitoring of sewerage pumping station performance.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Stormwater	Investigate potential for Marine Parade sewage outfall removal.	No Longer Relevant
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Continue Beachwatch/design monitoring programme to assess water quality improvements as a result of sewage pumping station upgrade.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Undertake a geotechnical assessment to determine the stability of the rock slope and make appropriate recommendations, if any stabilisation measures to be undertaken.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Undertake a weed/vegetation removal program consistent with maintenance of rock stabiltiy.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Undertake detailed investigations into potential for undermining of Marine Parade by wave action.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Council to discourage proposals for stairs from properties on cliff top directly to Marine Parade.	No Longer Relevant
Cabbage Tree Bay Management Plan 2000 Action Plan	Heritage	Compile comprehenseive inventory of non-indigenous heritage items and modifications including photographic record over time.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Heritage	Prepare a heritage management plan to identify detailed managmenet measures to ensure longevity of heritage items.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Undertake regular health checks on significant trees.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Heritage	Maintain fabric of heritage items in accordance with ICOMOS Burra Charter and Natural Heritage Charter.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Aboriginal Heritage	Any furture development behind Marine Parade should incorporate Aboriginal site investigations.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Aboriginal Heritage	Commision Aboriginal communitty to compile Indigenous history including anecdotal evidence. History to include any "non physical"elemnents, e.g. an oral history.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Catchments	Continue consultation with Sydney Water to determine potential use of sewage pumping station footprint for interpretative information centre.	Complete

Full Title	Category	Action	Implementation Status
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Undertake inventory of signs and review information for suitability.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Commission design and installation of new signs and plaques for use in study area.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Place regulatory signs at access points only. All signs within the study area should be informative and interpretative.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Parks	Incorporate braille information plaques on handrails along Marine Parade.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Develop and install interpretative signage of high quality finish and content which is sympathetic to the surrounds to be located on footpath edge capping along Marine Parade.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Stakeholders, including government authorities and public interest groups should sign Memorandum of Understanding / Statement of Intent or similar to adopt and implement this plan.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Establish Cabbage Tree Bay Implementation Management Committee.	No Longer Relevant
Cabbage Tree Bay Management Plan 2000 Action Plan	Planning	This plan should be reviewed and updated as required or annually.	Ongoing
Cabbage Tree Bay Management Plan 2000 Action Plan	Public Participation	Encourage community involvement in implementation through active participation and consultation.	Complete
Cabbage Tree Bay Management Plan 2000 Action Plan	Coast	Consult with EPA regarding Protection of the Environment Policies (PEPs) and their possible relevance to Cabbage Tree Bay.	Ongoing
Coastal Erosion Aboriginal Heritage Strategy AHO 2019	Aboriginal Heritage	Ongoing monitoring of the sites according to the model guidelines (appendix 1).	Ongoing
Coastal Erosion Aboriginal Heritage Strategy AHO 2019	Aboriginal Heritage	Follow management actions identified in the rock art and engraving report, such as graffiti removal, re-recording, monitoring, track works and so on.	Ongoing
Coastal Erosion Aboriginal Heritage Strategy AHO 2019	Aboriginal Heritage	Archaeological salvage. Look at options for developing partnerships between the Aboriginal community, local and state government, universities and archaeological consultants to carry out salvage in a cost-effective manner.	Ongoing
Coastal Erosion Aboriginal Heritage Strategy AHO 2019	Aboriginal Heritage	Ongoing monitoring. Continued monitoring of sites according to the model guidelines	Ongoing
Coastal Erosion Aboriginal Heritage Strategy AHO 2019	Aboriginal Heritage	Ongoing education and training program to educate the wider public and Council staff.	Ongoing
Coastal Erosion Aboriginal Heritage Strategy AHO 2019	Aboriginal Heritage	Discussion topics raised in rock art and engraving report (Part 2 Section 8) be investigated further and opportunities sought by all relevant parties to improve the way that heritage is currently managed	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Explore formal dinghy storage and low sea wall for sandy area. Southern sections -protect vegetation cover.	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Protect vegetation cover and minimise/formalise pedestrian access.	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Park asset could be suitable for a seawall	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Limited options for management.	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Park asset could be suitable for a seawall.	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Limited options for management. Protect vegetation cover (currently Bitou bush).	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Ongoing monitoring. Continued monitoring of sites according to the model guidelines.	Ongoing

Full Title	Category	Action	Implementation Status
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Identify and implement any specific management actions to protect, record, monitor or salvage site.	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Regional or Council wide foreshore Aboriginal heritage erosion management plan (identify priority sites for full recording, monitoring, risk assessments and management and salvage options). Plan to include estimate (where possible) of remaining archaeological deposit and period of time before total loss.	Complete
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Archaeological salvage. Look at options for developing partnerships between the Aboriginal community, local and state government, universities and archaeological consultants to carry out salvage in a cost-effective manner	Ongoing
CoastalErosion-report-AHO-FINAL_2015	Aboriginal Heritage	Ongoing monitoring. Continued monitoring of sites according to the model guidelines (above)	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Monitor performance of rehabilitation measures in terms of mitigating leachate inputs into lagoon.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Assess wetland types and their potential use within the Curl Curl catchment to minimise solid and dissolved contaminatn inputs into the lagoon.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Continue close liason with Sydney representatives regarding the improvements to the sewerage system in the Curl Curl Lagoon Catchment.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Inventory of stormwater outlets into waterways and development of management strategy.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Priority schedule of stormwater outlets requiring treatment in line with planned rehabilitation measures.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Undertake high priority treatment and upgrade measures as detailed in PB&P (1997)	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Completion of remaining treatment measures as detailed in PB&P (1997)	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Install gross pollutant trap in Greendale Creek immediately downstream of Brookvale Industrial Estate.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Increase hydraulic residence time to favour nutrient removal - Conduct selective minor widening and deepening of creek (stage 2)	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Increase hydraulic residence time to favour nutrient removal - Conduct selective minor widening and deepening of creek (stage 3)	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Increase hydraulic residence time to favour nutrient removal - Construct weir at Park Street footbridge (Stage 3)	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Coast	Provide plants for nutrient-uptake related benefits - Revegetate riparian and aquatic habitats (Stage 2)	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Coast	Provide plants for nutrient-uptake related benefits - Revegetate riparian and aquatic habitats (Stage 3)	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Increase detention in sewage pumping station (SPS) 286 (North Curl Curl) to eliminate overflows into the lagoon.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Conduct hydraulic modifications on SPS 127 (Park Street) to minimise potential for overflows into the lagoon.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Conduct sewer lining work in North Curl Curl carrier to prevent exfiltration and undesigned overflows into catchment.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Adjust weir heights to increase capacity for sewerage system.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Produce and maintain an inventory of sewerage overflow points within the system in conjunction with Sydney Water.	Ongoing

Full Title	Category	Action	Implementation Status
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Conduct an environmental audit in the Brookvale Industrial Estate.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Audits carried out by Catchment Liaison Officer and Silt and Sediment Control Officer.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Inventory of stormwater outlets into waterways and development of management strategy.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Priority schedule of stormwater outlets requiring treatment in line with planned rehabilitation measures.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Undertake high priority treatment and upgrade measures as detailed in PB&P (1997)	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Completion of remaining treatment measures as detailed in PB&P (1997)	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Monitor effects of leachate inputs into waterways with respect to ongoing and planned uses.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Produce and maintain an inventory of sewerage overflow points within the system in conjunction with Sydney Water.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Assess wetland types and their potential use within the Curl Curl catchment to minimise solid and dissolved contaminatn inputs into the lagoon.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Constuct mini-wetland at Surf Road.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Assess performance of Surf Road mini-wetland.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Complete the water quality review and ecological monitoring program study - currently being undertaken by AWT.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Develop a modular monitoring program including a <i>minimal requirements</i> module and other monitoring options for management.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Ensure that the ecological monitoring program is consistent with current state and national ecological monitoring guidelines.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Establish partnerships with other research organisations, government agencies and/or educational institutions.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Improve and increase the extent and type of habitats of the creek, so that diversity of fauna and flora of respective habitats is enhanced.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Biodiversity	Maintain established habitat diversity.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Undertake replacement with and re-establishment of native flora species - plant macrophytes in disturbed areas along creek.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Plant trees and shrubs along the alignment of Greendale Creek - plant macrophytes in disturbed areas along creek.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Enhance community awareness of importance of native vegetation - plant macrophytes in disturbed areas along creek.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Undertake replacement with and re-establishment of native flora species - plant macrophytes in disturbed areas around lagoon margin.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Remove and control exotic plant species in and around Greendale Creek - plant macrophytes in disturbed areas around lagoon margin.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Monitor flora and fauna communities pre and post rehabilitation measures.	Complete

Full Title	Category	Action	Implementation Status
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Improve and increase the extent and type of habitats of the creek, so that diversity of fauna and flora of respective habitats is enhanced.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Retain existing delta downstream of the footbridge and submerged islands for bird use.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Ensure that future rehabilitation works do not impact on the lagoon margins.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Undertake replacement and re-establishment of native flora species - Plant native trees and shrubs around the lagoon margin.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Undertake replacement and re-establishment of native flora species - Plant macrophytes in disturbed areas around the lagoon margin.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Undertake replacement and re-establishment of native flora species` - Extend vegetation margins of the reserve.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Biodiversity	Enhance community awareness of importance of native vegetation.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Remove and control exotic plant species in and around the lagoon and its tributaries.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Biodiversity	Maintain established habitat diversity.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Public Participation	Continue Council initiatives for community consultation.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Coordinate education program with other organisations involved in revegetation.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Re-establish a landscape character reflective of the original coastline - Emphasise the use of natives.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Re-establish a landscape character reflective of the original coastline - Use exotic feature trees where considered appropriate to maintain historical and cultural character of the Northern Beaches area.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Improve the range of opportunities available for informal recreation.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Improve vegetation around sport fields.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Maintain existing sporting facilities.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Assess future sporting and recreational developments' compliance to John Fisher Park Plan and this estuary management plan.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Provide a safe pedestrian connection to bike trails.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Remove potentially dangerous objects from surface of soil.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Improve the range of opportunities available for informal recreation - provide sufficient shade and wind protection.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Form an elevated ridge to provide wind protection for users of th eflatter areas adjact to the lagoon entrance	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Assess future sporting and recreational developments' compliance to Estuary Management Plan.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Public Participation	Organise Lagoon and John Fisher Park "Clean-up" days on a regular basis.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Review the effectiveness of existing community education programs about urban pollution reduction.	Ongoing

Full Title	Category	Action	Implementation Status
Curl Curl Lagoon Estuary Management Plan 2000	Coast	Reestablish a landscape character reflective of the original coastline.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Construct a dune and adopt stabilisation measures as detailed in PB&P (1994a)	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Investigate options for irrigation of the dune plantings.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Use exotic feature trees where considered appropriate to maintain historical and cultural character of the Northern Beaches area.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Create a permanent water body.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Coast	Adopt relevant modules of monitoring program to assess performance of rehabilitation measures (including impacts associated with dredging and placement of settling ponds.)	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Ensure revegetation actions are compliant with this objective.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Construct a dune as detailed in PB&P (1994a), the skyline of which would be lower than existing landforms.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Building Assets	Maintain existing parking facilities.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Building Assets	Identify new opportunitites for new formal parking areas.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Building Assets	Provide additional kerbside parking along Griffin Road.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Maintain existing sporting facilities.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Ensure that future land use is complimentary with existing uses.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Plant shrubs and trees around playgroundind for shelter and shade.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Plant trees along Abbott Road and Griffin Road.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Create vegetative buffer zone between property boundaries and southern edge of reserve.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Enhance amenity through construction/installation of recreational features.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Provide a safe pedestrian connection between the two parts of the reserve (across Griffin Rd) and safe bike trails.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Remove potentially dangerous objects from surface of soil.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Parks	Reduce steep and eroding slopes of breakout channel.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Stormwater	Remove rubbish that becomes exposed along the margins. Prevent rubbish from entering (and polluting) the channel.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Determine desireable breakout regime for the lagoon system through appropriate studies and monitoring.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Review the current management procedure for lagoon breakout.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Prevent opening of lagoon by unnatrual processes.	Ongoing

Full Title	Category	Action	Implementation Status
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Enhance community's understanding of impacts of breakout process.	Ongoing
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Give further consideration to Stage 4 options in view of completed rehabilitation measures.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Prepare appropriate management plans of (including maps for) acid sulphate soils and contaminated sediments.	Complete
Curl Curl Lagoon Estuary Management Plan 2000	Catchments	Adopt the relevant monitoring module for construction related activities.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Continue and review on-going water quality testing.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Design and implement additional water quality monitoring program where needed.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Produce water quality guidelines for the lagoon.	Complete
Manly Lagoon estuary management plan 1998	Stormwater	Produce an inventory of potential sewage overflow points around Manly Lagoon and its tributaries.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Undertake managemenbt program with Sydney Water.	No Longer Relevant
Manly Lagoon estuary management plan 1998	Catchments	Utilise water quality data collected by the EPA (Beachwatch), Sydney Water (Streamwatch & AWT), and J.H & E.S Laxton Environmental Consultants.	No Longer Relevant
Manly Lagoon estuary management plan 1998	Catchments	Complete current Manly Lagoon Entrance Low Flow Pipes Study - currently being undertaken by consulting engineers Patterson Britton and Partners to be competed by August 1997.	Complete
Manly Lagoon estuary management plan 1998	Stormwater	Construction of recommended management option as recommended in the "Low Flow Pipes Study".	Complete
Manly Lagoon estuary management plan 1998	Catchments	Implement water flow/flushing monitoring program at lagoon's entrance.	Complete
Manly Lagoon estuary management plan 1998	Stormwater	Review and implement revised Entrance Management Policy. (Recommended Stage 1 of Manly Lagoon Floodplain Management Plan)	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Implement recommendations outlined in the "Exotic Vegetation Management Strategy" through Council's works, contractors and volunteer labour. • Identification of vegetation and management zones. • Removal of specific weed species as outlined in the Exotic Vegetation Management Strategy. • Co-ordination of tree removal with weeding and planting. • Specific directions in regeneration. • Implement monitoring program to establish extent and success of exotic vegetation removal techniques.	Ongoing

Full Title	Category	Action	Implementation Status
Manly Lagoon estuary management plan 1998	Catchments	Undertake a Manly Lagoon Habitat Management Plan integrating the following: • Recommendation from the "Manly Lagoon Exotic Vegetation Management Strategy" • Fisheries advice on Sea Grass Habitat Protection • Identification of aquatic fauna (benthic, sessile and free swimming) and their associated habitats. • The design/implementation of appropriate constructed wetlands within the lagoon and its tributaries. • Identifying/conserving/establishing appropriate riparian buffer zones. • Eradication of feral species. • Encouraging protection of habitat within tributaries and streams. • Identifying and conserving areas of aquatic habitat. • Warringah Council's "Natural Area Survey" • Implement monitoring program to identify success of habitat protection/enhancement.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Implement recommendations from any future Manly Lagoon Habitat Management Study	Complete
Manly Lagoon estuary management plan 1998	Parks	Construction of walking tracks and multi-use access trails.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Construction of signage in recreational areas and production of brochures to raise awareness of recreational areas.	Complete
Manly Lagoon estuary management plan 1998	Parks	Construction of boat launching points (canoes and light motor boats only)	No Longer Relevant
Manly Lagoon estuary management plan 1998	Parks	Regulation of boat launching.	No Longer Relevant
Manly Lagoon estuary management plan 1998	Parks	Acquisition of green space.	No Longer Relevant
Manly Lagoon estuary management plan 1998	Parks	Conservation of green space.	Ongoing
Manly Lagoon estuary management plan 1998	Parks	Identify and formalise lagoon foreshore access points and fishing locations.	No Longer Relevant
Manly Lagoon estuary management plan 1998	Stormwater	Concrete lined trapezoidal section, eastern end of Nolans Reserve • Installation of trash racks and sediment traps, or other suitable devices where the drains empty into the lagoon. • Formalise maintenance, cleaning and pollutant monitoring program once the device has been installed. • De-engineering of concrete lined drains if feasible.	Ongoing
Manly Lagoon estuary management plan 1998	Stormwater	Concrete lined semi-circular drain near the intersection of Pittwater Road and Oliver Street. • Installation of trash racks and sediment traps, or other suitable devices where the drains empty into the lagoon. • Formalise maintenance, cleaning and pollutant monitoring program once the device has been installed. • De-engineering of concrete lined drains if feasible.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Open creek/drain between Keirle Park and Manly Golf Course • Mini-wetland constructed at the outlet of the twin pipes. • A boom is currently being trialed with regular monthly cleaning and monitoring. • Follow up maintenance, re-establishment of macrophytes and modify fencing along Keirle Park to facilitate access for ongoing maintenance. • Extend the wetland along the creek/drainage line.	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon estuary management plan 1998	Catchments	Community consultation and involvement in all stages of major open drain programs.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Increased community awareness of major open drains via media and community education programs.	Complete
Manly Lagoon estuary management plan 1998	Stormwater	Compile an inventory of the existing piped drains which enter the lagoon and its tributaries and apply information to a GIS layer, collecting the following information about each drain: • Location, • Diameter, • Invert level of outlet, • Grade, and • Catchment area.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Establish a priority implementation program once all the drains have been assessed, considering the most appropriate means of mitigating stormwater pollution entering the lagoon and its tributaries using the following devices: • Trash racks. • Booms, • Gross pollutant traps, and • Stormwater treatment zones, or • Any other appropriate device.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Installation of the most appropriate devices having consideration for: • Drainage flow regimes and drainage catchment, • Layout, area and access of the site, • Maintaining or improving the natural appearance of the sites, • Community consultation, and • Financial and time constraints.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Formalisation and implementation of maintenacne, cleaning and monitoring programs for new devices.	Complete
Manly Lagoon estuary management plan 1998	Stormwater	Community consultation and involvement in all stages of minor piped drain programs.	Ongoing
Manly Lagoon estuary management plan 1998	Stormwater	Increased community awareness of minor piped drains via media and community education programs.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Brookvale Creek: • Construction of a gross pollutant trap (GPT) at the northern end of the Warringah Golf Course in either two locations, (a) between Condamine Street and the confluence of the two streams leading from the culverts under Condamine street, or, (b) downstream of the confluence of the stream streams • In conjunction with any GPT construction and linear wetland will be created downstream of the GPT site.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Manly Creek: • No GPT measures are recommended at this time. The water quality in Manly Creek is to be reviewed periodically for possible need for GPT measures in the future.	No Longer Relevant
Manly Lagoon estuary management plan 1998	Catchments	Burnt Bridge Creek: • Boom is being trialed at Manly West Park, with regular monthly cleaning and monitoring of the pollutants trapped. • Review the performance of the boom in 1998. • Establish regular maintenance program with respect to removal of sediments in the vicinity of the energy dissipater at the outlet of the box culvert.	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon estuary management plan 1998	Catchments	Burnt Bridge Creek: • Boom is being trialed at Manly West Park, with regular monthly cleaning and monitoring of the pollutants trapped. • Review the performance of the boom in 1998. • Establish regular maintenance program with respect to removal of sediments in the vicinity of the energy dissipater at the outlet of the box culvert.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Increased community awareness major gross pollution control devices via media and community education programs.	Complete
Manly Lagoon estuary management plan 1998	Catchments	<i>[For following projects: Burnt Bridge Creek, Brookvale Creek linear wetland, Side Bay Upstream of the Footbridge at Nolan Reserve]</i> Preparation of brief asking for submissions of interest, generally considering: • Water quality flowing into the lagoon • Water circulation of side bay • Aquatic and terrestrial habitat • Pollution entering the area • Adjacent land requirements, and • High stream flows and flooding Project management and construction • Review and acceptance of the appropriate consultant by both councils, DLWC and the Manly Lagoon Joint Estuary / Floodplain Management Committee • Design approval by all parties involved • Appropriate government and council approval for works • Construction phase of project • Follow up and ongoing maintenance	Complete
Manly Lagoon estuary management plan 1998	Catchments	<i>Keirl Park Creek Line linear wetland</i> • Construction of linear wetland and bank stabilisation along the drainage line between the Keirle Park wetland and the lagoon according to existing consultant design	No Longer Relevant
Manly Lagoon estuary management plan 1998	Catchments	Keirl Park Creek Line linear wetland • Develop a program for follow up and ongoing maintenance for the site	No Longer Relevant
Manly Lagoon estuary management plan 1998	Catchments	Consultation with Golf Clubs and the community through all stages of constructed wetland projects.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Implementation of best management and risk management practices strategy. As part of any new strategy: • Installation and maintenance of sufficient litter receptacles. • Education of various sporting bodies which use playing fields. • Ensure grass clipping, litter, etc. is not stockpiled adjacent to waterways and disposed of effectively. • Education of Bowling Clubs and Golf Clubs within the catchment. • Support any open space maintenance carried out by residents. • Education of maintenance gangs. • Reduction in the use of fertilisers, herbicides, pesticides, etc. in open space areas.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Coordination of any maintenance practices with community groups working the area.	Ongoing
Manly Lagoon estuary management plan 1998	Parks	Education of sporting groups, bowling clubs, golf clubs by the appropriate Council Officers.	Ongoing
Manly Lagoon estuary management plan 1998	Parks	Council Maintenance Rangers encouraged to attend environmental education courses and appropriate Council Officers to inform them of environmental best practice.	Ongoing

Full Title	Category	Action	Implementation Status
Manly Lagoon estuary management plan 1998	Parks	Maintenance of open space by residents to be encourage and supported with collection service and education.	No Longer Relevant
Manly Lagoon estuary management plan 1998	Parks	Use of fertilisers, herbicides, pesticides reduced.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Installation and maintenance of sufficient litter receptacles.	Ongoing
Manly Lagoon estuary management plan 1998	Parks	Grass clipping, litter, etc. not stockpiled adjacent to waterways and disposed of effectively.	Ongoing
Manly Lagoon estuary management plan 1998	Stormwater	Formulate a community education program which can be included in any Stormwater Management Plan that may be developed. The program should include: Distribution of information pamphlets and education packages informing the community about: • How pollution is generated; • How pollution gets into waterways; • What effects pollution has on the waterways; and • What people can do to reduce the impacts on the waterways.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Installation of interpretative signage in parks and along pedestrian/cycle paths at significant locations, which highlight and inform the community about the environmental and cultural features of the lagoon and explain any works being carried out and the expected outcome.	Ongoing
Manly Lagoon estuary management plan 1998	Stormwater	Develop a program to renew and widen drain stencilling within the catchment.	Incomplete
Manly Lagoon estuary management plan 1998	Catchments	The community can become educated and actively involved in rehabilitation of the lagoon through Streamwatch, the Manly Environment Centre and other community based programs.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Community education and enviromental action should be encourage during all regeneration and revegetation programs of the rehabilitation of the lagoon.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Extension and follow up to current Industrial Audit Programs carried out by both Councils.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	The education suggested for residential areas is also relevant for the industrial/commercial area in the catchment, although the emphasis would be more on litter control, collection and treatment of washdown waters, minimisation of waste etc.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Development of a school education package aimed at the primary, secondary and tertiary levels.	Ongoing
Manly Lagoon estuary management plan 1998	Coast	Council Officers talking to students in class and during field trips.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Liasion between school and Council and Sydney Water Officers who coordinate Streamwatch.	Ongoing
Manly Lagoon estuary management plan 1998	Catchments	Carry out hydrographic survey program: • Prepare hydrographic survey brief • Commission consultant to carry out survey • Assess and implement any recommendations • Repeat on a 5 yearly basis	Complete
Manly Lagoon estuary management plan 1998	Catchments	All briefs for water pollution control and recreational/landscape works to address waterway hydrography as core component.	Ongoing

Full Title	Category	Action	Implementation Status
Manly Lagoon estuary management plan 1998	Catchments	Carry out an EIS or other appropriate environmental statement for deepening under Pittwater Road Bridge. - Prepare a brief - Commission a brief - Obtain appropriate development approvals - Assess and implement recommendations	No Longer Relevant
Manly Lagoon estuary management plan 1998	Stormwater	Undertake appropriate dredging and deepening works.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Carry out an EIS or other appropriate environmental statement for reformation of Hinkler Park. - Prepare a brief - Commission consultant	No Longer Relevant
Manly Lagoon estuary management plan 1998	Catchments	Undertake appropriate dredging and deepening works.	Complete
Manly Lagoon estuary management plan 1998	Catchments	Carry out lagoon coring program - Prepare coring program brief - Commission consultants to carry out survey	No Longer Relevant
Manly Lagoon estuary management plan 1998	Catchments	Prepare catchment wide strategy for silt and sediment controls, this strategy should include the following: - Community education - Targeting of key stakeholders	Complete
Manly Lagoon estuary management plan 1998	Catchments	Carry out an EIS or other appropriate environmental statement for selective dredging of the lagoon. - Prepare a brief - Commission consultant	Complete
Manly Lagoon estuary management plan 1998	Catchments	Undertake appropriate dredging and deepening works.	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Targeted water quality monitoring of pollution hotspots in <i>Manly Dam Catchment</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop and implement water quality monitoring program for WC. Goals: Assess status, determine trends, guide mgt activity, protect human health and aquatic ecosystems	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Install Water Quality Control Device - <i>Aquatic Drive Sportsfield</i>	No longer relevant
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Design and construct wetland (pond 2) - <i>Cootamundra Reserve Wetlands, Manly Dam Catchment</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Boom cleaning and maintenance, Manly Lagoon	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Targeted Education Program in <i>Manly Dam Catchment</i>	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Other ongoing Education Initiatives	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	WC - Sydney Water MOU for Manly Dam Catchment	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	WC/Sydney Water Partnership (possible extension of MC / Sydney Water Partnership Committee)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Environmental Mgt Plan - <i>Wakehurst Golf Course</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop and implement Creek Management Plan for <i>Curl Curl/Manly Creek</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Engage Asset Engineer to compile inventory of stomwater infrastructure in WC	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Modelling and prioritisation of all subcatchment in Manly and Warringah for pollutant load export	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Installation of automated and real time monitoring equipment on prioritised catchments	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Targeting of structural and non-structural interventions to address prioritised pollutants from prioritised catchments.	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Monitoring and evaluation of interventions to allow for adaptive management and continual improvement	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Verification of progress towards ecosystem health and primary contact of Manly Lagoon through real-time instream monitoring	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Identification and rectification of sewage exfiltration / overflow in Manly LGA through integrated monitoring and assessment program	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Coordination of sewage exfiltration action through the Sydney Water / Manly Council Partnership Committee	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Collection and on-use of stormwater for non-potable consumption (centralised and de-centralised)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Treatment and on-use of sewage for non-potable consumption	No longer relevant
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Undertake mapping of potential contaminated land (refer to planning documents)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Streamwatch Water Quality Monitoring throughout the Manly Lagoon Catchment	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Dredging under and adjacent to <i>Pittwater Rd Bridge, Manly Lagoon</i> (Site 3)	No Longer Relevant
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Installation of aeration device to increase pollutant yield during dredging	No Longer Relevant
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Reinstatement of <i>Hinkler Island Channel, Manly Lagoon</i> (Site 4) - timing funding dependent	No Longer Relevant
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Dredging upper reaches of <i>Manly Lagoon</i> (Site 1 and 2)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Maintenance dredging at <i>Manly Lagoon entrance</i> (Site 5)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Low flow pipes maintenance, install protection grate, remove rocks, <i>Manly Lagoon Entrance</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Kelp removal from <i>Lagoon entrance</i> , incl. rolling fisheries permit	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Hydrosurvey (depth) of <i>Manly Lagoon</i> (compare with existing data)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Flow Survey of <i>Manly Lagoon Catchment</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Treatment, collection and on-use of stormwater for non-potable consumption	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Identify base-flows for Creek zones in "good" condition (refer to 13a and 24)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Natural channel restoration adjacent and above to <i>Mermaid Pool</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Riparian zone bush regeneration - <i>Manly Dam Catchment</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Riparian zone vegetation maintenance (three-year contract) - <i>Brookvale Creek</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Bush Regeneration/Revegetation along the Manly Lagoon Catchment riparian zones	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Macro-invertebrate sampling with community and school children	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Restore creek banks to minimise extent of erosion - Burnt Bridge Cr	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Install rock sediment basins and rock armoured channels at end of outlets - <i>Burnt Bridge Cr</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Implement maintenance contract for sediment basins currently installed - <i>Burnt Bridge Cr</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Investigate opportunities for constructing off-line wetlands - <i>Burnt Bridge Cr</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Determine potential to increase flood storage and remediate creek bank within Warrinagh Golf Course	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Periodic removal sediment from BGC weir, and sedimentation basins at <i>Manly West Park</i> and MGC wetland	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Riparian zone bush regeneration within <i>Manly Dam sub-catchment</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Upgrade and formalise walking tracks within <i>Allenby Park sub-catchment</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Construct crushed sandstone walking track from <i>Fromelles St to Baringa Avenue</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Undertake a signage audit of existing signs in the vicinity of <i>Manly Lagoon</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Review management plans, PoM's, enviornmental operational procedures for sportfields and open spaces.	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Install interpretive signage along <i>Burnt Bridge Ck</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Exotic tree removal Catchment wide. Especially Coral Trees	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Lobby Department of Lands to incorporate bushland parcels as public reserve	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop Bushland Management Plans for area not covered by PoM's	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Brookvale Creek riparian zone vegetation maintenance (three-year contract)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Riparian zone bush regeneration within Manly Dam sub-catchment	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Upgrade and formalise walking tracks within Allenby Park sub-catchment	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Lobby Department of Lands to incorporate bushland parcels as public reserve	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop Bushland Management Plans for area not covered by PoM's	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Bush Regeneration/Revegetation along the Manly Lagoon Catchment corridors	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Bush Regeneration within Allenby Park sub-Catchment	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Urban Boundary Porgram within Allenby Park sub-Catchment	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Investigate incentive scheme for biodiversity preservation and native garden landscaping	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop standard "Consent Conditions" for development in riparian zones	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Further develop seed bank with species appropriate for restoration of Burnt Bridge Cr corridor	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Further review and update <i>Burnt Bridge Ck</i> action plan as works progress	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Environmental Management Plan - <i>Balgowlah Golf Club</i>	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Manly Dam Catchment Education campaign "Heritage and Values"	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Continue Environmental Education initiatives	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Standardise and enable access of information across Councils and relevant stakeholders, eg., monitoring data, GIS	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Ensure water quality monitoring program is consistent across Councils	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Who Cares' Community Survey	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Stakeholder Survey	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Modelling, monitoring, intervening and evaluation for adaptive management (integration of above programs)	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Coordination of actions from multiple organisation and disciplines through the Sydney Water / Manly Council Partnership Committee	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Re-evaluation of Manly Lagoon Flood Study following partial/full completion of the Manly Rehabilitation Works with the aim of identifying further management options	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Integration of Flood Study findings into planning controls for floodprone lands	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Pursue State and Federal subsidies (grants) for the implementation of management recommendation/actions	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Implement Manly Lagoon Flood Evacuation & Warning	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop Waterways Policy	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop a contaminated land policy	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Investigate possible amendments to LEP's and DCP's (either generic, eg., WSUD DCP or locality ,eg., Manly Lagoon Catchment) to mitigate impacts of new development on stormwater quality, volumes and velocities, flooding.	Complete

Full Title	Category	Action	Implementation Status
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop Flood Policy for the Manly Lagoon Catchment	Complete
Manly Lagoon Integrated Catchment Management Strategy 2004	Catchments	Develop Biodiversity Policy	Complete
Manly Ocean Beach Coastline Management Plan	Coast	Implement an Emergency Action Plan (EAP) to deal with the beach erosion hazard when it occurs and where it occurs along the beach	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Investigate structural measures to stabilise the toe of the seawall and allow removal of the existing rock apron, particularly in the section of beach between the former tourist office and Victoria Parade stairs	Complete
Manly Ocean Beach Coastline Management Plan	Coast	Should the impact of shoreline recession become unacceptable, consider nourishment of the overall embayment combined with ongoing implementation of the EAP, as required	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Consider raising coping levels of the seawall, or creating coping, in particular areas at a future time should the risk of overtopping be considered unacceptable	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Ensure that some sand from the excavation of the flood outlet channel is pushed towards the Queenscliff SLSC seawall to create a berm and reduce the risk of undermining of the seawall in flood flows	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Investigate changes in groundwater levels behind the beach in response to a rise in mean sea level	Incomplete
Manly Ocean Beach Coastline Management Plan	Coast	Ensure the impact of climate change on coastal processes continues to be monitored and sea level rise is considered during detailed hydraulic analysis for stormwater upgrading	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Formalise the existing rock scour protection at the Pacific St stormwater outlet	Complete
Manly Ocean Beach Coastline Management Plan	Catchments	Consider subsidising rainwater tanks in key catchments on Manly Flat	No Longer Relevant
Manly Ocean Beach Coastline Management Plan	Catchments	Consider a detention and infiltration system for Ivanhoe Park	No Longer Relevant
Manly Ocean Beach Coastline Management Plan	Catchments	Consider end of pipe storage and aquifer injection at Pine Street	No Longer Relevant
Manly Ocean Beach Coastline Management Plan	Stormwater	Consider stormwater detention and re-use at Kangaroo Lane	No Longer Relevant
Manly Ocean Beach Coastline Management Plan	Stormwater	Investigate the risk of blockage of the overflow structure at Pine Street outlet	Complete
Manly Ocean Beach Coastline Management Plan	Catchments	Continue the current management approach for the removal of marine sand that enters Manly Lagoon	Ongoing
Manly Ocean Beach Coastline Management Plan	Catchments	Ensure that practices that have the potential to cause accelerated infilling of the lagoon are monitored and revised where required	Ongoing

Full Title	Category	Action	Implementation Status
Manly Ocean Beach Coastline Management Plan	Catchments	Continue the current management approach to improve the quality of water entering the Lagoon through improving sewerage infrastructure, urban runoff and creeks	Ongoing
Manly Ocean Beach Coastline Management Plan	Catchments	Continue with initiatives including systematically targeting pollution “hotspot” catchments to improve the quality and reduce the volume of stormwater entering Manly Ocean Beach and Manly Lagoon	Ongoing
Manly Ocean Beach Coastline Management Plan	Building Assets	Construct a new access ramp at The Corso beach access steps for people with disabilities or mobility challenges.	Complete
Manly Ocean Beach Coastline Management Plan	Building Assets	Investigate the cost-benefit of upgrading the existing access ramps at Manly and North Steyne Surf Life Saving Clubs	Ongoing
Manly Ocean Beach Coastline Management Plan	Stormwater	Ensure that the flood outlet channel is located as close as practicable to the low flow channel to provide as large a useable berm area as possible for the public south of the channel	Ongoing
Manly Ocean Beach Coastline Management Plan	Beach Safety	Maintain adequate signage, visitor information and other educational efforts, as well as a comprehensive lifeguard/volunteer lifesaving service at key points along Manly Ocean Beach to ensure the safety of visitors and beach users	Ongoing
Manly Ocean Beach Coastline Management Plan	Building Assets	Investigate options for expanding the promenade and formal landscape area opposite and south of the seaward end of The Corso, to increase the capacity of this comparatively narrow and at times crowded high use area	Complete
Manly Ocean Beach Coastline Management Plan	Planning	Support and enhance the existing informal/self-regulating dispersal of differing uses and visitor groups along the beach and foreshore, largely through indirect design and management measures (such as the location of beach access points, special activity areas, picnic facilities, and so on)	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Continue the licensing process and special management arrangements for major events, commercial and organised usage of the beach and foreshore areas	Ongoing
Manly Ocean Beach Coastline Management Plan	Parks	Regularly review the approval processes and frequency/occupation levels for commercial or organised beach uses to ensure equitable visitor access and enjoyment of Manly Ocean Beach and avoid over-commercialisation, crowding, or reduction in the area’s visitor appeal	Ongoing
Manly Ocean Beach Coastline Management Plan	Recreation	Ensure that Manly Beach’s key surf breaks and reputation as a “quality surf spot” are considered in the identification of any beach management actions impacting the surf zone and are not unduly compromised	Ongoing
Manly Ocean Beach Coastline Management Plan	Building Assets	Continue to invest in the routine high quality maintenance and periodic refurbishment of the landscape works and visitor facilities along Manly Ocean Beach, in keeping with the proposed unifying Landscape Masterplan and avoiding incremental or maintenance-driven development/hardening of less formal beachfront areas	Ongoing
Manly Ocean Beach Coastline Management Plan	Planning	Continue to balance park use and visitor enjoyment of the beachfront with the amenity and views of local residents/neighbours in all future planning and management of the landscape of Manly Ocean Beach	Ongoing
Manly Ocean Beach Coastline Management Plan	Stormwater	Install warning signage at the Pine Street and Raglan Street Stormwater Outlets (now completed)	Complete
Manly Ocean Beach Coastline Management Plan	Coast	Monitor seawall to ensure visitor safety and consider upgrading to enhance safety as required	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Commission ecological studies to learn more about the aquatic ecology of Manly Ocean Beach and interconnected areas	Complete
Manly Ocean Beach Coastline Management Plan	Coast	Establish ecological indicators to monitor the condition of beach habitats	Complete

Full Title	Category	Action	Implementation Status
Manly Ocean Beach Coastline Management Plan	Coast	Establish and maintain a co-operative working relationship with the Metropolitan Local Aboriginal Land Council, and other Aboriginal people or groups as required, regarding the identification, appropriate management, and culturally appropriate presentation of Aboriginal heritage sites/values - both tangible and intangible - along Manly Ocean Beach	Ongoing
Manly Ocean Beach Coastline Management Plan	Aboriginal Heritage	Require Aboriginal heritage investigations to be carried out as part of the development planning and approval process for any major proposals located in the vicinity of previously known or suspected Aboriginal heritage sites along Manly Ocean Beach	Ongoing
Manly Ocean Beach Coastline Management Plan	Aboriginal Heritage	Incorporate “awareness, identification and response” provisions/protocols regarding unknown/unrecorded Aboriginal cultural sites in development/building approvals for major excavations works along Manly Ocean Beach	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Incorporate information regarding the Manly area’s Aboriginal history, heritage, sites and contemporary associations/significance in future interpretation measures - both on and off site - for Manly Ocean Beach	Ongoing
Manly Ocean Beach Coastline Management Plan	Aboriginal Heritage	Investigate the dual-naming of Manly Ocean Beach and the wider public use and recognition of the area’s traditional Aboriginal name	Incomplete
Manly Ocean Beach Coastline Management Plan	Parks	Acknowledge and actively maintain the iconic “bronzed Aussie”, surf culture and seaside recreation values of Manly Ocean Beach in all aspects of the area’s future planning and management in ways that ensure the protection but evolution of these values and cultural associations	Ongoing
Manly Ocean Beach Coastline Management Plan	Building Assets	Continue to manage Manly Ocean Beach consistent with its listing on the Register of the National Estate, recognising its nationally significant built and cultural heritage values in all aspects of the area’s future planning and management	Ongoing
Manly Ocean Beach Coastline Management Plan	Coast	Ensure appropriate recognition, consideration and protection of sites identified, and listed, as having historic heritage significance along Manly Ocean Beach and its curtilage in the development planning and approval process	Ongoing
Manly Ocean Beach Coastline Management Plan	Stormwater	Continue the current management regime for dealing with kelp build up in the low flow pipes	Ongoing
Manly Ocean Beach Coastline Management Plan	Stormwater	Ensure the flood outlet channel is not excavated so deep that it intercepts the groundwater table on the beach as this can create shallow stagnant pools of water within the berm area which also can be a trap for litter	Ongoing
Manly Ocean Beach Coastline Management Plan	Parks	Maintain and enhance the key visual elements of Manly Ocean Beach - specifically the Norfolk Island Pines, promenade, and long wide arc of largely uninterrupted sandy beach	Ongoing
Manly Ocean Beach Coastline Management Plan	Parks	Prepare and implement a revised landscape masterplan for Manly Ocean Beach to guide the character and presentation, visitor use and enjoyment, and maintenance of the area	Ongoing
Manly Ocean Beach Coastline Management Plan	Planning	Ensure appropriate recognition, consideration and protection of the visual qualities of Manly Ocean Beach in the development planning and approval process for major proposals likely to adversely impact the area’s appearance and the experiences of users	Ongoing
Manly Ocean Beach Coastline Management Plan	Planning	Liaise with Warringah Council regarding co-operative planning and development assessment/approvals across the south-side of Queenscliff Headland, to minimise the potential adverse impacts of development in this area on the visual quality of Manly Ocean Beach	Complete
Manly Ocean Beach Coastline Management Plan	Stormwater	Pacific St and Steinton St stormwater outlets - upgrade the stormwater systems.	Incomplete
Manly Ocean Beach Coastline Management Plan	Stormwater	Pine St and Raglan St stormwater outlets - upgrade the stormwater systems. In the case of Raglan Street outfall, consider a partnership approach with Sydney Water to assess options.	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Community Education	Coordinated preparation and distribution of education/information materials	Ongoing

Full Title	Category	Action	Implementation Status
Dee-why-lagoon-estuary-management-plan-2004	Community Education	Coordinated preparation and distribution of education/information materials	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Community Education	Coordinated preparation and distribution of education/information materials	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Community Education	Coordinated preparation and distribution of education/information materials	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Community Education	Coordinated preparation and distribution of education/information materials	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Community Education	Coordinated preparation and distribution of education/information materials	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Community Education	Coordinated preparation and distribution of education/information materials	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Community Education	General signage	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Rationalise signage and develop a consistent signage and interpretive/map system.	Complete
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Identify opportunities for interpretation of the local natural and cultural landscape evolution in a manner, which does not cause visual clutter.	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Parks	General signage	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Design, publicly exhibit and install an interpretation structure in the southern wetland remnant	No Longer Relevant
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Use of constructed wetlands (if feasible) as an educational tool. Access to the pathways surrounding the wetland to be encouraged with educational notices.	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Signage in southern foreshore areas regarding human waste disposal and control of gull populations.	Incomplete
Dee-why-lagoon-estuary-management-plan-2004	Parks	Trails and Linkages for Self-Guided Tours	Complete
Dee-why-lagoon-estuary-management-plan-2004	Public Participation	Prioritise areas for work and direct volunteers to those areas	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Sediment, Litter and Debris Control	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Fine Sediment and Nutrient Control	Ongoing

Full Title	Category	Action	Implementation Status
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Review and alter if required application of Fertilisers and mowing practices. Service level agreements for sporting field operations	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Incorporate more specific and frequent litter collection procedures and conditions into special event/reserve hire approvals.	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Develop Section 94 Levy upon developers to encourage minimisation of paving. Levy to be put in trust fund for Lagoon	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Sediment, Litter and Debris Control	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Stormwater	Review maintenance of stormwater outlets, increase monitoring/maintenance as required.	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Catchment Flora	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Prepare a programme of works which focuses on bush regeneration work to viable remnants of natural vegetation.	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Review all Council and Contractor maintenance practices in the study area and make necessary amendments or retrain staff. Matters to be addressed include: avoiding whipper snipper damage to trees; mulching areas around groups of trees to avoid mower damage; prevent encroachment of mowing into bush areas; increased frequency of mowing; and, retrain staff to avoid large quantities of clippings washing into the creeks	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Parks	Develop a programme of replacing mown access ways with paths and replanting locally indigenous plant species in order to reduce quantity of mowing required by and limiting lawn areas to parks.	Complete
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Creek Rehabilitation of Dee Why Creek	Incomplete
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Review of current zoning in riparian areas for potential rezoning of land to allow for inclusion of a riparian buffer zone corridor in the LEP	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Weed Control - Manage source of weed seeds (Ludwigia) from Dee Why wetlands	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Re-establish Indigenous Species and Habitats	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Biodiversity	Feral Animals - Continued control of Feral predators (including foxes, domestic dogs/cats)	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Review noxious weed list annually to amend "W4" weed listings	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Removal and Control of Exotic Species	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Prepare a programme of works which focuses on bush regeneration work to viable remnants of natural vegetation in riparian areas.	Ongoing

Full Title	Category	Action	Implementation Status
Dee-why-lagoon-estuary-management-plan-2004	Parks	Use paths as physical barrier between lawn and bushland areas.	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Parks	Maintenance	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Nest boxes for Chestnut Teal/other duck species	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Biodiversity	Fire Management - Policy	Complete
Dee-why-lagoon-estuary-management-plan-2004	Biodiversity	Streamline approval process with the Warringah-Pittwater district fire committee. Plan ecological burns to be no larger than 5000m2.	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Flora - Revegetation	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Flora - Maintenance	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Parks	Gradual movement of mowing barriers to reduce amount of turfed area along Clarence Avenue	Complete
Dee-why-lagoon-estuary-management-plan-2004	Coast	Flora - Bush Regeneration Contract Guidelines	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Flora - Revegetation	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Flora - Weed Control	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Removal of old piles of wood and other debris at the shoreline in the south east corner (not tank trap feature)	Complete
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Formalising of Temporal and Spatial Exclusion Zones (buoys in water, markers on land)	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Flora	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Shoreline Management	Ongoing

Full Title	Category	Action	Implementation Status
Dee-why-lagoon-estuary-management-plan-2004	Coast	Dune Management	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Inspect twice yearly for weed outbreaks	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Island Creation for Beach Nesting Birds	No Longer Relevant
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Review of potential for trial seagrass planting in permanent wet areas	No Longer Relevant
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Restoration/Maintenance of Saltmarsh	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Creation of an Aquatic Reserve or Similar Protection under Fisheries Management Act	No Longer Relevant
Dee-why-lagoon-estuary-management-plan-2004	Stormwater	Mechanical Opening/Closing	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Coast	Identify Kite Surfing Zones	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Planning	Policy and Planning	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Development of a Lagoon Health Index	Complete
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Waterbody - Water Quality	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Assist with funding of research into conservation and management requirements of floral communities	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Catchments	Continue Monitoring by Pittwater House School for Dee Why Creek @ Pittwater Road - Link Data to Council's Website	No Longer Relevant
Dee-why-lagoon-estuary-management-plan-2004	Coast	Trial a pile burn to see if the seed bank is stimulated by fire.	Complete
Dee-why-lagoon-estuary-management-plan-2004	Biodiversity	Flora and Fauna	Ongoing
Dee-why-lagoon-estuary-management-plan-2004	Biodiversity	Aquatic Flora	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	<i>Identify and protect key habitat areas, such as swan roosting grounds and seagrass beds</i>	Ongoing

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	• Conduct a field survey to identify areas of significant terrestrial, aquatic and riparian habitat	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	• Consider methods for habitat preservation of each individually identified habitat area	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	• Implement most appropriate means for habitat preservation, as necessary	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Generate maps showing designated habitats of significant value around Narrabeen Lagoon	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	• Incorporating habitat maps into appropriate planning instruments to ensure habitats are not adversely affected by future developments	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Consider excluding all powered watercraft from the western basin and tributaries, to enhance ecological integrity of this area, or at least impose (and enforce) slow speed limits	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Coast	• Install marker buoys around habitat protection areas of the lagoon (eg seagrass areas) to prevent damage by mooring, anchoring and powerboating (particularly in shallow areas)	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	<i>Regular maintenance and clean-out of existing SQIDs</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Confirmation of location of all existing SQIDs within Narrabeen Lagoon catchment and nominated responsibility for maintenance	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Develop a SQID Maintenance Plan that outlines when SQIDs will be cleaned, by whom, and methods in doing so	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Implement SQID Maintenance Plan	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Measure the mass / volume of material removed from each SQID during regular clean-outs, and comment on composition	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Document quantities of material removed from each SQID and cross-reference with rainfall since previous clean-out	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Prepare annual report on SQID maintenance, outlining total volumes removed, composition of the material, and the approximate relationship between rainfall and material collected	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Install more SQIDs within the Narrabeen Lagoon catchment</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Endorse implementation of Northern Beaches SWMP	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Seek funding for installation of new SQIDs	Ongoing

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Review effectiveness of new SQIDs outlined in SWMP given latest technology in pollutant reduction methodology and techniques	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Consider feasibility of other new SQID locations, if necessary	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Prioritise locations for new SQIDs	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	When funding becomes available, construct SQIDs in agreed priority order	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Investigate opportunities for treatment of existing development by new SQIDs to be constructed for future development within Narrabeen Lagoon catchment	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Develop and implement creek rehabilitation plans for Narrabeen Lagoon tributaries</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Identify the status of any current creek rehabilitation plans	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Prioritise the tributaries of Narrabeen Lagoon, based on the degree of degradation of physical and biological conditions	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Prepare Creek Rehabilitation Plans for tributaries, in priority order	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Implement Creek Rehabilitation Plans for tributaries, in priority order	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Plant reed beds in front of eroding foreshores</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Identify areas suitable for Phragmites planting, as characterised by eroding foreshores with shallow underwater slopes	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Select a trial planting area and erect wind wave barrier boom around site, if necessary	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Plant reed stock in trial area, using existing plants as stock, and monitor progress	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Parks	Erect signage in carparks outlining locations of designated small boat launching areas, with fines for undesignated launching	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Pending results of trial planting, establish wind wave barrier boom around other nominated sites and plant reed stock	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Remove wind wave barrier boom(s) when reeds have re-established and stabilised foreshore	No Longer Relevant

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Develop and implement major Restoration Projects within main tributaries of Lagoon</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Review previous Middle Creek Restoration Project EIS	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Identify suitable locations for major restoration works in tributaries of Narrabeen Lagoon, particularly Mullet Creek, and prioritise based on degree of degradation and potential benefits to lagoon: refer to Section 4.6 for preliminary prioritisation list.	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Prepare detailed design and environmental impact assessment for highest priority restoration project	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Prepare detailed design and environmental impact assessment for highest priority restoration project	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Once funding is secured, implement highest priority restoration project	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Prepare conceptual designs and EISs for other projects in priority order	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Seek additional funding for other similar projects, and implement when possible	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Infill deep dredge holes to a depth of about -2m AHD</i>	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Carry out a detailed feasibility assessment of infilling deep holes, based on environmental restraints, costs, sourcing of material and possible current planning restrictions	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	If considered feasible, conduct an EIS or similar in accordance with DUAP requirements, and seek consent / approvals from other government authorities, eg NSW Fisheries, DLWC	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Once EIS is prepared and approvals are given by consent authorities, seek tenders from suitably qualified contractors for completion of the works	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Review tenders and commission preferred contractor to carry out works (or part thereof depending in available funds)	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Conduct final bathymetric survey to assess final details and calculate quantities of fill placed in holes	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	<i>Create / enhance unbroken vegetation corridors between Narrabeen Lagoon and other key habitats</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	Confirm key terrestrial habitat areas in northern beaches environs, and opportunities to link habitats via vegetated corridors	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Parks	Once possible link(s) identified, prepare a generic Plan of Management for creation / enhancement of vegetation corridor, considering types of vegetation required, land ownership, and road crossing issues, and a specific Plan of Management for Billarong Reserve	Ongoing

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Estuary Management Plan final 2002	Parks	Implement Plan of Management for vegetation corridors	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	Where necessary, return land ownership to Council, or incorporate provisions for corridor as part of any future redevelopment application	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Coast	<i>Construct steep coarse sand beaches in front of eroding foreshores</i>	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Identify areas of significant bank erosion not fronted by shallow underwater slopes	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Coast	Conduct a ground survey and nearshore bed survey of areas to be protected	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Consult with landowners (where not publicly owners) and prepare detailed designs and appropriate environmental assessment report	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Select appropriate contractor and implement works in accordance to design specifications, which may involve removal of existing toppling trees and replacement with alternative vegetation, or recreational facilities, in accordance with other actions identified in this Plan	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	<i>Remove accumulated sediments from in front of stormwater outlets</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Identify areas where sediment has accumulated significantly in front of stormwater outlets	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Consider feasibility of disposing material to be dredged in deep dredge holes	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Obtain necessary approvals for removal of sediment, based on consideration of environmental consequences	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Select appropriate contractor an implement works to remove sediment from Lagoon, ensuring suitable materials handling	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	<i>Develop and implement community based education program on source control of pollutants</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Biodiversity	Review existing community education programs and literature developed by Warringah and Pittwater Councils	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Determine most appropriate means for delivery of educational material	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Prepare new material, if necessary, and deliver to community in most effective means possible	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Erect signage in western and central basin discouraging swimming due to possible poor water quality, and give alternative swimming locations	No Longer Relevant

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Provide incentives (financial or otherwise) to residents for adoption of pollution reduction practices	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Parks	<i>Develop eco-educational trails with interpretive signage and bird / fauna hides</i>	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Parks	• Identify opportunities for trail locations around Lagoon given existing habitats and areas of significant conservation need	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Parks	• Consider opportunities for amalgamating trails with existing projects, such as Deep Ck walkway, Greenlink project, and extending Pelican Path to the lagoon entrance and also to the top of the Ingleside escarpment (through Warriewood Wetlands)	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Parks	• Prepare conceptual designs and obtain approvals from relevant consent authorities	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Parks	• Prepare details design drawings, as necessary, and construct trails, boardwalks, bird hides etc, in accordance with plans and specifications	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Coast	<i>Promotion of NSW Fisheries pamphlets on recreational fishing, and other appropriate literature and signage</i>	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Review current recreational fishing signage around lagoon for condition and correctness	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Prepare and erect new signs outlining catch limits and the need for a fishing licence – locations to be in vicinity of most popular fishing areas and associated car parks	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Collate and review recreational fishing education pamphlets	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Community Education	• Hand-out pamphlets to recreational fishers during peak fishing periods and/or post to all fishing licence holders in northern beaches area	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Planning	<i>Use planning controls to prevent further construction of inappropriate foreshore structures</i>	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Planning	• Review all existing planning controls (both Warringah and Pittwater) for relevance to construction of structures along Narrabeen Lagoon foreshores	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Planning	• If possible, amend existing planning controls to ensure that inappropriate structures are not constructed along foreshore	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Planning	• If existing planning controls cannot be amended accordingly, prepare a new DCP addressing foreshore structures of Narrabeen Lagoon, applicable to both LGAs	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Planning	• Ensure compliance with amended / new planning controls when assessing DAs for foreshore properties	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	<i>Discuss with Sydney Water possibilities for reducing sewer overflow event</i>	Ongoing

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Review Sydney Water’s existing Sewer Overflow Abatement Program for recommended works in the Narrabeen Lagoon catchment	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Hold discussions with Sydney Water to explore possibilities of sewer overflow abatement and facilitate works	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Lobby appropriate political members and Sydney Water personnel to expedite sewer overflow abatement within the catchment	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	• Invite Sydney Water representatives to Committee meetings to report on update of sewer overflow abatement program	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Conduct a detailed nutrient source identification study of South Creek</i>	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Formulate a suitable water quality and flow monitoring program for South Creek and all its smaller tributaries	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Monitor flows and water quality within South Creek during low flow and high flow periods	Incomplete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Assess results of monitoring, calculating specific nutrient loads from individual subcatchment areas	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Conduct an audit of properties in areas with high nutrient export rates to localise inputs	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Formulate and implement strategies for addressing specific pollutant sources identified in South Creek, and similar sources in other tributaries	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Assess composition of algal populations in Lagoon</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Review existing data for correlations between chlorophyll-a concentrations and season, temperature, antecedent rainfall etc	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Design and implement an algal monitoring program to determine species and potential health implications	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Carry out opportunistic algal monitoring when chlorophyll-a concentrations in lagoon are elevated	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• If algal levels exceed recommended levels and/or algae species are found to be toxic to humans, close Lagoon to primary contact activities and follow protocols outlined in the Marine and Estuarine Algal Contingency Plan	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Determine limiting factors associated with seagrass growth</i>	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	• Map historical extents of seagrass within Narrabeen Lagoon based on air photos	Complete

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Conduct scientific investigations to determine the limiting factors of seagrass growth, eg light penetration, turbidity, water quality, etc	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Formulate and implement strategies that address the limiting factor(s) so that seagrass can re-establish in the Lagoon to former conditions	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	<i>Conduct audit of all unsewered properties within the catchment</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Review Council and Sydney Water records to identify areas that are not likely to be connected to sewerage system	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Conduct a door-to-door survey of properties in most likely areas to ascertain sewerage connections	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Discuss with Sydney Water possibilities and costs associated with connection of all unsewered properties to sewer mains	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	Consider cost-sharing arrangements / incentives for connection of unsewered properties to sewer mains between Sydney Water, Councils and property owners	Incomplete
Narrabeen Lagoon Estuary Management Plan final 2002	Stormwater	For properties that are not feasible to be connected to mains, conduct annual inspections for compliance and ensure no pollution of surface or groundwater	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Building Assets	<i>Discuss with owners repairs / amendments to degraded foreshore structures</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Building Assets	Locate and map all foreshore structures and determine ownership of structures	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Building Assets	Carry out a dilapidation survey of all foreshore structures by registered structural engineer and surveyor	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Building Assets	From surveys, identify those structures that are poorly constructed / dilapidated to a state of public hazard, and unauthorised structures that have been constructed beyond private property boundaries	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Building Assets	Hold discussions with owners of structures to either repair or remove structure	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Ecological monitoring</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Carry out scientific assessments of aquatic ecology within the Lagoon on a routine basis (every 5 yrs or so), allowing for seasonal variability	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Carry out scientific assessments of terrestrial ecology of foreshores and bushland surrounding the Lagoon on a routine basis (every 5 – 10 yrs or so), allowing for seasonal variability	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Compare results of surveys with previous monitoring results to determine trends in ecological community composition & health	Ongoing

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Water quality monitoring</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Continue to collect water quality data from 20 sites in Lagoon and tributaries (Warringah program), and from the Warriewood Valley (Pittwater program, currently undertaken by Lawson and Treloar)	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Maintain continuous water quality probe at Pittwater Road, but increase frequency of calibration to prevent fouling of probe	No Longer Relevant
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Expand weekly monitoring of bacteria (summer months only) to monitor immediately following all rainfall events, and then 2 – 3 days later if counts exceed guidelines	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Periodically integrate all water quality data from both Warringah and Pittwater programs, and review results to ascertain trends and correlations in data, and identify any gaps in data that may emerge	Complete
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Sedimentation monitoring</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Conduct periodic (approx every 10 yrs) bathymetric surveys of the Lagoon	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Compare survey with previous results to identify areas of sediment build-up and rates of accretion	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Develop and implement strategies for reducing sediment input to the lagoon if sources are different from those addressed by other Management Options	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Shoreline recession, monitoring</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Identify areas of foreshore that are currently eroding at notable rates	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Conduct periodic (approx every 3 – 5 yrs) ground surveys of eroding foreshores, capturing top and toe of bank, as well as photographic records of shoreline	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Compare surveys (and photos) with previous records to identify areas of active erosion and rates of recession. This information can be used to focus bank stabilisation works, as described in Table 5.2 (Options 23.1 and 23.2)	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	<i>Lagoon and foreshore usage monitoring</i>	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Conduct periodic (approx every 10 – 15 yrs) surveys of usage of the Lagoon and surrounding parklands by use of questionnaires, interviews, etc as per recommendations in Nelson Consulting (1999)	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Compare results with previous surveys to identify any notable changes in usage	Ongoing
Narrabeen Lagoon Estuary Management Plan final 2002	Catchments	Consider adjusting management strategies for the lagoon through amendment of the Estuary Management Plan, if usage changes notably	Ongoing

Full Title	Category	Action	Implementation Status
Narrabeen-lagoon-plan-management-2013	Catchments	- Investigate current litter management to determine effectiveness. - Investigate public education/enforcement campaigns to reduce littering. - Work with adjacent landowners and Council to maintain or improve litter management systems and procedures wherever possible.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Where necessary, investigate causes and ecological impacts of poor water quality. Work with adjacent land owners, Reserve Trusts, OEH, Sydney Water and Pittwater Council to minimise poor quality runoff discharging into the lagoon.	Ongoing
Narrabeen-lagoon-plan-management-2013	Stormwater	Work with catchment managers to investigate level and cause of sedimentation in the lagoon and tributaries, address identified issues with landholders and residents within the catchment. Implement Northern Beaches Stormwater Management Plan as appropriate.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Ensure satisfactory environmental assessments are undertaken for works and activities proposed within the bed of the lagoon. Such activities will only proceed if the negative impact on the environment is minimal or avoided and/or appropriate mitigation and offset measures are implemented.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Monitor and gather relevant information as it becomes available on the condition of key aquatic habitat to understand the status and condition of the lagoon as key fish habitat. Provide information to Council for use in determining DAs and other proposed activities.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	In consultation with relevant agencies, investigate current methods and best practice for the long term sustainability of seagrass beds and coastal saltmarsh. Operational sub plan to include saltmarsh and sea grass protection.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Where appropriate, change the water depth (e.g. by infilling or other method) in some areas of the lagoon's central or western sections to improve its environmental and habitat values.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Promote use of lagoon for educational purposes. Support community groups (especially schools) and other stakeholders in studying and learning about the lagoons environment. Link to existing programs with educational facilities	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	In conjunction with appropriate stakeholders, promote and manage effective improvements in protecting the environment of the lagoon and the catchment by all residents, volunteers and other interested groups. Development and distribution of appropriate media, including liaising with community groups.	Ongoing
Narrabeen-lagoon-plan-management-2013	Heritage	Manage heritage items in accordance with heritage listing under relevant legislation and policies.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Investigate condition and confirm classification of terrestrial vegetation within the Plan area (including island and foreshore vegetation) including endangered ecological communities (Saltmarsh and Swamp Oak Floodplain Forest). If appropriate undertake regeneration. Work with Councils, Friends of the Bush and other groups for rehabilitation works required.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Promote appropriate development and planning controls through liaison with adjacent land managers that ensures impacts on the environmental values of the lagoon are avoided or minimised.	Ongoing
Narrabeen-lagoon-plan-management-2013	Parks	Work with Warringah Council and relevant stakeholders to facilitate holistic approach to management of public recreation on the lagoon to allow use and enjoyment of the lagoon while avoiding/minimising environmental impacts. Specific management model for Narrabeen Lagoon to be developed as part of Warringah Council Recreation Strategy 2009 (Action 20).	Complete
Narrabeen-lagoon-plan-management-2013	Parks	Work with NSW Maritime to enforce restrictions on boating where safety and/or environmental issues need to be managed including increased surveillance and enforcement (if agreed upon all parties). Regular liaison between Reserve Trust Manager, NSW Maritime, DPI and Pittwater Council.	Ongoing
Narrabeen-lagoon-plan-management-2013	Parks	Investigate use of watercraft during peak periods and determine appropriate measures to adequately manage use of water craft.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Utilise existing water quality data from Beachwatch and Sydney Water and investigate adequacy of knowledge of current water quality within the lagoon. Obtain appropriate level of data on water quality for swimming.	Ongoing

Full Title	Category	Action	Implementation Status
Narrabeen-lagoon-plan-management-2013	Catchments	Where appropriate, change the water depth (e.g. by dredging or other method) in some areas of the lagoon's central or western sections to improve recreational access without significantly affecting its environmental values.	Ongoing
Narrabeen-lagoon-plan-management-2013	Parks	Appropriate and accessible facilities are provided to maintain sustainable recreation on the lagoon.	Ongoing
Narrabeen-lagoon-plan-management-2013	Parks	• Include protection of amenity and peace of area as important consideration during implementation of all other management strategies. • Specific management model for Narrabeen Lagoon (see PR1) to consider impacts of recreation on amenity and peace of area.	Ongoing
Narrabeen-lagoon-plan-management-2013	Community Education	• Work with stakeholders to educate the community on the sustainable use of the lagoon (e.g. fishing size limits and appropriate disposal of litter). Resources are made available to the community, relating to the sustainable use of the lagoon. • DPI to enforce license permits and fish catch size limits). Increased presence and enforcement by DPI as appropriate.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Use data and recommendations from adopted Floodplain Risk Management Plans for Narrabeen Lagoon to manage flood risk. Review actions of this Plan upon reviews of the Narrabeen Lagoon Flood Study, Flood Risk Management Strategy and Flood Risk Management Plan. Update where appropriate in response to findings of the study.	Complete
Narrabeen-lagoon-plan-management-2013	Stormwater	Assess entrance management regimes in conjunction with Warringah and Pittwater Councils and the community to ensure the most efficient and effective management of this area is maintained. Undertake review of effectiveness and impacts of entrance management procedures is undertaken, in consultation with Warringah and Pittwater Councils and the community.	Complete
Narrabeen-lagoon-plan-management-2013	Catchments	Management of flood risk to commercial operations and private property including provision of flood risk information to prospective commercial operators and the public and set plans in place.	Ongoing
Narrabeen-lagoon-plan-management-2013	Catchments	Annual report prepared for Narrabeen Lagoon and submitted to DPI. Report to be publicly available on Warringah Council website.	Ongoing
Narrabeen-lagoon-plan-management-2013	Coast	All areas of the lagoon to include 'Coastal Environmental Protection' as a reserve purpose under the CL Act.	Complete
Narrabeen-lagoon-plan-management-2013	Catchments	Investigate the merits of the amalgamation of Narrabeen Lagoon and one or more areas or surrounding Crown land reserves into a State Park.	Complete
Narrabeen-lagoon-plan-management-2013	Catchments	Investigate if it would be beneficial for the management of Narrabeen Lagoon for the Reserve Trust Manager to be authorised to grant leases and licenses by the Minister administering the CL Act.	Complete
Narrabeen-lagoon-plan-management-2013	Catchments	Develop a financial management model for implementation by the Reserve Trust Manager.	Complete
Narrabeen-lagoon-plan-management-2013	Catchments	Investigate undertaking redefinition surveys with respect to boundaries.	Complete
Narrabeen Lagoon Entrance Management Strategy 2022	Catchments	Develop a flexible set of trigger conditions to allow for openings to be undertaken in a wider range of conditions, including extenuating scenarios.	Complete
Narrabeen Lagoon Entrance Management Strategy 2022	Stormwater	Refine guidelines for where the pilot channel is to be excavated, locating it in a position that works more effectively with the natural configuration of the entrance but also considers minimising disruption to surf breaks. Review and update Council's OMS procedures and REF for lagoon openings.	Ongoing
Narrabeen Lagoon Entrance Management Strategy 2022	Stormwater	Enhance collection of data, including using remote data sensing equipment, and use this data to refine flood forecasting, improve the location of the entrance channel etc. and evaluation of the success of entrance openings.	Ongoing

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Entrance Management Strategy 2022	Stormwater	Enhance publicly available information on Council’s website and the MHL flood warning webpage to support understanding of how and why Council manages the Narrabeen Lagoon entrance. Information could include a decision matrix/tree, trigger levels for mechanical openings, and real-time updates on conditions.	Ongoing
Narrabeen Lagoon Entrance Management Strategy 2022	Stormwater	Review design and frequency of entrance clearance operations on an ongoing basis, with consideration for factors including beach rotation and climate change. Investigate more frequent, smaller scale, strategic removal of sand from the flood tide shoals. Consider trialling a focus on the western shoal or a regime tidal channel.	Ongoing
Narrabeen Lagoon Entrance Management Strategy 2022	Stormwater	Review mobile sand pumping if lower cost pricing is available from a contractor delivered scheme rather than Council purchasing pipes and pumps.	Ongoing
Narrabeen Lagoon Entrance Management Strategy 2022	Stormwater	Review payment methods and procurement strategy for contractor; and Review tracking method for excavation depths and extent during works.	Ongoing
Narrabeen Lagoon Entrance Management Strategy 2022	Parks	Reshape the denuded part of the dune, with relocation of sand away from western side and re-creation of the beach on the western side of the dune.	Ongoing
Narrabeen Lagoon Entrance Management Strategy 2022	Parks	Revegetate the denuded areas of the dune with low native groundcover and shrub species, to stabilise it and to limit windblown sand entering the lagoon. Extend the vegetation as far north as practicable, to reduce alongshore width of the lagoon entrance berm to reduce sand entering lagoon.	Ongoing
Narrabeen Lagoon Entrance Management Strategy 2022	Parks	Maintain the dune. Maintain the vegetation, monitor the profile of the dune and adjacent beaches and manage sand movement. Consider sand-catching fences.	Ongoing
Warringah coastal-lands-plan-management-action plan 2002	Parks	Continue to implement an ongoing bush regeneration and management program in accordance with: • <i>Management Plans for Coastal Headland Vegetation in the Warringah Council Area (Warringah Council, 1999)</i> . This is to be defined in a four-year program.	Ongoing
Warringah coastal-lands-plan-management-action plan 2002	Parks	Develop and implement a four-year program of dune maintenance with priority given to works identified in Concept Plans 8a & 8b and 11 and • Ensuring greater species diversity • Monitor and address destabilisation	Ongoing
Warringah coastal-lands-plan-management-action plan 2002	Parks	Continue to manage pest species including: • Targeting of key weed species such as Bitou Bush • Targeting of feral animals such as rabbits and foxes • Targeting of marine/aquatic species as required	Ongoing
Warringah coastal-lands-plan-management-action plan 2002	Catchments	Rehabilitate North Curl Curl dune area and Curl Curl Lagoon entrance and adjacent reserves (area to the east of Griffith Road) in accordance with the Curl Curl Lagoon Rehabilitation Study (1992) and associated documents.	Complete
Warringah coastal-lands-plan-management-action plan 2002	Catchments	Liaise with NSW Fisheries to effectively manage Warringah’s coast and lagoons in accordance with the NSW Fisheries Management Act and associated guidelines and policies. For example the management of marine protected areas, lagoon entrances and aquatic habitat.	Ongoing
Warringah coastal-lands-plan-management-action plan 2002	Catchments	All landscape improvement and maintenance programs are to use endemic native plants only. Maintenance & replacement of Norfolk Island Pines is permitted immediately adjacent Surf Life Saving Club Buildings and at other culturally important locations; for example the stand of Northfolk Island Pines at Collaroy Beach.	Complete
Warringah coastal-lands-plan-management-action plan 2002	Parks	Implement stabilisation of area near Dee Why Rock Pool as shown on Concept Plan 7.	Complete
Warringah coastal-lands-plan-management-action plan 2002	Coast	Monitor coastal stability/hazards, including: • rhangs at North Curl Curl Beach • An investigation of the sea wall stability in front of South Curl Curl SLSC building.	Ongoing
Warringah coastal-lands-plan-management-action plan 2002	Coast	In respect of the Collaroy Narrabeen Coastline Management Plan this plan specifically authorises: • any works required to implement any part of such Plans • the granting of any easements or the acquisition of easements in order to facilitate any works or the maintenance of any works under such plans • the imposition or acquisition or any Positive or Restrictive Covenants which may be necessary.	Ongoing

Full Title	Category	Action	Implementation Status
Warringah_coastal-lands-plan-management-action_plan_2002	Stormwater	Review Northern Beaches Storm Water Management Plan to determine if the priority for Freshwater Beach is accurate (This relates to a number of specific concerns raised by the community).	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Continue to monitor water quality in Warringah’s rock pools during swimming season.	No Longer Relevant
Warringah_coastal-lands-plan-management-action_plan_2002	Stormwater	Continue to liaise with Sydney Water to upgrade and improve the sewer system through Council’s estuary and coastal management committees.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Building Assets	All new development/redevelopment of buildings or reserves are to be in accordance with Council’s Physical Access Policy and consider Safety by Design principles. This includes any projects conducted through volunteer organisations.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Minimise exclusive use arrangements; encourage multi-use and equitable access to open space and community facilities.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Building Assets	Continue to liaise with surf life saving clubs to encourage increased and continuing broad community access to the buildings, and to undertake facility improvements and management practices which enable this. Any exclusive commercial use activities are to consider and incorporate this principle.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Develop and maintain the Coastal Walk in accordance with the Coastal Walk Plan (1988) and the revised cost estimates.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Building Assets	Maintain and where possible upgrade public change facilities. In particular: • Consider redeveloping the Dee Why Rock Pool Swimming Association’s Club House to incorporate improved public amenities. If this cannot be accommodated within the existing building consideration should be given to extending the building.	Complete
Warringah_coastal-lands-plan-management-action_plan_2002	Building Assets	All new development & significant re-development of buildings or reserves are to consider the conservation of water and energy in the design process. For example, consideration should be given to the use of rainwater tanks, flow restriction devices and solar hot water heating.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	For areas not specifically addressed in the concept plans provide limited additional minor passive recreational facilities, such as: • seating • barbeques • shade structures and • toilet facilities as required.	Ongoing

Full Title	Category	Action	Implementation Status
Warringah_coastal-lands-plan-management-action_plan_2002	Building Assets	Investigate and consider the extensions &/or modifications to • North Narrabeen Surf Life Saving Club as noted on Master Plan 1. • South Narrabeen Surf Life Saving Club as noted on Master Plan 1. • North Curl Curl Surf Life Saving Club as noted on Master Plan 4. • South Curl Curl Surf Life Saving Club as noted on Master Plan 4. The investigations and any recommendations are to include consultation with the Surf Club Liaison Committee & the Warringah Coastal Management Committee as part of the development assessment process for significant proposals. A significant proposal is generally one that involves expansion on public open space of buildings or operations and has the potential to impact on the heads of consideration listed below. In approving any extensions or modifications to the Surf Life Saving Club Buildings consideration must be given to: • Minimising the loss of open space • Principles of shared use (including appropriate placement of lifeguard facilities for Council’s operations eg areas for storage and first aid) • No net loss of general community facilities • Maintenance burden to Council & the community • Impact on neighbouring properties • Consider any threat from coastal/geological hazards (see Action 8 on South Curl Curl sea wall. It may be necessary to complete Action 8 prior to any works in this vicinity) • Council’s Policies on coastal hazards for Collaroy/Narrabeen Beach as appropriate, and • State Government legislation & policies	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Continue to implement the program of Rock Pool restoration and maintenance in line with the identified works schedules.	Complete
Warringah_coastal-lands-plan-management-action_plan_2002	Building Assets	Continue to implement the program of building restoration and maintenance in line with the identified works schedules.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Building Assets	Implement remaining improvement works at Dee Why Beach area in keeping with the ‘Dee Why Beach/The Strand Urban Design Study’. In particular investigate: • Future uses of the existing Council ‘IRB’ storage shed located in the southern corner of Dee Why Beach. Following the construction of the new storage facilities at Dee Why SLSC building, consideration should be given to this building’s use by Council as a locker-hire area, café or like recreational use.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Planning	Liaise with adjoining Councils on the concept of reciprocal parking rights.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Consider applications for the commercial use of open space in line with Council’s adopted policies, including Interim Policy of the Management of the Commercial Use of Beaches, Reserves and Buildings/Facilities, the restrictions outlined in Table 5 (Guide to Maximum Recommended Commercial Usage Levels) and Table 6 (on leasing and licensing).	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Embellish & maintain areas of open space acquired along Collaroy/Narrabeen Beach as shown in Concept Plans 1 to 4. • In relation to Concept Plan 3a & b for “The Garden”, consider the Open Air Beach Museum concepts outlined in Strategy 1 & 2 of the Cultural & Heritage Strategy and complete a heritage analysis of No. 57 Ocean Street in line with the recommendations of the associated heritage report as part of the detail design process.	Complete
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Rehabilitate & maintain the areas of open space at: Collaroy Beach shown in Concept Plan 5 • Fisherman’s Beach shown in Concept Plan 6 • South Curl Curl rock pool & car park as shown in Concept Plan 10 • McKillop Park as shown in Concept Plan 10	Complete
Warringah_coastal-lands-plan-management-action_plan_2002	Coast	Investigate the establishment of a single reserve trust for the management of all Crown coastal reserves. (This relates to management trusts that are established under the Crown Lands Act.)	Ongoing

Full Title	Category	Action	Implementation Status
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Incorporate public art into improvements projects in accordance with Council’s Cultural & Art in Public Places Policy, the Cultural & Heritage Strategy and the Environmental Strategy. In particular this relates to recognising surfing and surf life saving heritage at: • The proposed improvements at Ocean Street, Narrabeen (‘The Garden’) shown in Concept Plan 3a & b • Birdwood Park Reserve adjacent to North Narrabeen Surf Life Saving Club • Freshwater Surf Life Saving Club	Complete
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Investigate the opportunities to provide heritage/cultural interpretive information at key coastal locations, such as the rock pools and surf clubs.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Planning	In addition to the LEP requirements ensure that any development proposal for land on, or adjacent, lands covered by this Plan consider the open space values expressed in this Plan. In particular adjoining development should avoid excessive overshadowing of open space.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Restore items of heritage significance, in particular: • The fountain at Collaroy Beach • The Roll of Honour at Dee Why Beach • The Wishing Well memorial at Dee Why Beach	Complete
Warringah_coastal-lands-plan-management-action_plan_2002	Recreation	Maintain and where appropriate provide additional recycling facilities at key locations.	Ongoing
Warringah_coastal-lands-plan-management-action_plan_2002	Parks	Ensure there are well maintained and appropriate regulatory and information signs provided at key locations. In particular this relates to matters including: • Dog exercise areas and restricted areas • Dune protection areas • Litter • General reserve use	Ongoing
Pittwater_ocean-beaches-POM-2005	Coast	Prepare master plans for each beach in accordance with the objectives of this plan	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Ensure appropriate development of the beach reserves in accordance with the community land categories (Refer Section 3.3.3) and Crown reserve public purpose	Ongoing
Pittwater_ocean-beaches-POM-2005			Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Restoration of Pittwater’s Ocean Beach dune systems, monitoring and evaluation of dune stabilisation through use of reference points and mapping with periodic walk through assessments	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Re-grading of remnant dunes and berm using available beach sand to form new dune profile	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Installing timber post and wire protective fencing around dune areas	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Re-align existing board and chain track/fencing over dune to avoid ‘blow-outs’	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Stabilising of new fore dune profile with indigenous pioneer vegetation	Ongoing
Pittwater_ocean-beaches-POM-2005	Stormwater	Identify points of discharge into the beach and surrounds and undertake the necessary actions needed to reduce the impact of urban run-off and stormwater	Ongoing

Full Title	Category	Action	Implementation Status
Pittwater_ocean-beaches-POM-2005	Parks	Undertake appropriate control measures for weeds declared as Noxious within Pittwater, in accordance with the Noxious Weeds Act, 1993	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Encourage and support local volunteer groups through education days and recruitment	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Promote an education program aimed at local residents to encourage the planting of locally indigenous species in gardens and private bushland	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Ongoing management of the open space areas surrounding the club	Ongoing
Pittwater_ocean-beaches-POM-2005			Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Progressively upgrade recreational facilities such as seating/tables, outdoor shower/tap, shelter, litter bins and improve frequency of rubbish collection to cater for seasonal facilities	Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Upgrade change-rooms and toilet amenities blocks in beach reserves to provide easy access and use by people with disabilities	Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Provide an improved level of cleanliness, repair and maintenance of amenities and pool area	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Investigate opportunities for improved picnic/seating areas with appropriate shade planting and litter bins	Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Investigate opportunities to upgrade kiosk facilities to incorporate outdoor seating	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Create different play opportunities and activities, to allow the experience at each beach to unique. Avoid duplicating specific play equipment and activities	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Integrate playground facilities with other park facilities	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Continue to monitor the health of mature trees, particularly the mature Norfolk Island Pines and ensure vehicular compaction and erosion are minimised	Ongoing

Full Title	Category	Action	Implementation Status
Pittwater_ocean-beaches-POM-2005	Coast	Rehabilitate /regenerate and manage disturbed remnant coastal vegetation whilst not creating loss of amenity or visual disturbance to residents	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Plant shade trees e.g. Cabbage Palms, Tuckeroos, or Banksia integrifolia and ensure all plants have appropriate pest certification to prevent the spread of Pandanus Leafhopper	Complete
Pittwater_ocean-beaches-POM-2005	Stormwater	Council's Management Strategy to investigate the condition of the outlets and recommend appropriate measures for any necessary improvements, which may include re-locating the existing outlet to an offshore facility	Ongoing
Pittwater_ocean-beaches-POM-2005			Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Investigate other rock pools in Pittwater where a ramp for people with disabilities could be installed (such as at south Palm Beach)	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Continue to upgrade and maintain ocean rock pools to a safe standard	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Continue existing rock pool cleaning program	Ongoing
Pittwater_ocean-beaches-POM-2005			Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Liase with Surf Lifesaving Clubs to encourage increased and continuing broad community access to buildings	Complete
Pittwater_ocean-beaches-POM-2005	Building Assets	Council to continue to act as facilitator to assist the Surf Life Saving Clubs in seeking grant funding for maintenance of surf club and facilities	Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Council to provide clear definition of responsibilities for surf clubs	Complete
Pittwater_ocean-beaches-POM-2005	Parks	Ongoing management of the open space areas surrounding the clubs	Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Identify an appropriate colour theme for all Surf Club buildings and associated amenities, and re-paint to this theme, when applicable Refurbish amenities blocks as necessary, including rendering walls, redesign of the roof, and associated perimeter landscaping	Ongoing
Pittwater_ocean-beaches-POM-2005			Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Provide and maintain easy, clearly marked, visually interesting pedestrian access to all beaches and beach reserves, wherever practicable, functional and safe	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Continue to identify and upgrade to a high standard those paths, steps, ramps and dune access tracks on beach reserves, which are in disrepair	Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Investigate options for improving pedestrian safety at the roundabout bus stop (Bilgola Beach), such as the provision of a pedestrian crossing to link with public accessway	Ongoing

Full Title	Category	Action	Implementation Status
Pittwater_ocean-beaches-POM-2005	Building Assets	Provide appropriately designed and integrated directional and interpretive signage for pedestrian and vehicular traffic, improving linkages	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Provide regular clearance of accumulated sand over access path to pool	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Investigate lighting along pedestrian pathways	Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Conduct an access and facilities audit for people with disabilities at each of the beach reserves. Subject to this audit, paved pathways should be appropriately upgraded and maintained to major beach facilities, such as rock pools and other amenities	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Investigate opportunities for improved linkages to the Bicentennial Coastal Walk and the beach	Ongoing
Pittwater_ocean-beaches-POM-2005			Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Investigate opportunities to increase the areas covered by 'Pay and Display' ticketed parking to assist in maintenance and upkeep of the beach reserves e.g. maximise ticketed parking spaces with line marking	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Review 'Pay and Display' rates on a regular basis, having regard to the rates of other Sydney beach areas	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Introduce a 'Pay and Display' fee to cater for short stays in the beaches car parks	Complete
Pittwater_ocean-beaches-POM-2005	Parks	Council continues to monitor and address traffic and parking issues in the vicinity of the beach reserves in consultation with the Pittwater Traffic Committee	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Assess car parking at each beach reserve and potential sites located for overflow car parking Provide integrated system of identification, directional and interpretive signage for access and parking, including permanent interchangeable "Car Parking Full" signs for summer period traffic management On-going liaison with Council's Traffic Committee in relation to management of car parking	Ongoing
Pittwater_ocean-beaches-POM-2005	Building Assets	Designate disabled parking bays, and construct gutter ramps, where appropriate	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Provide appropriate landscaping to car park area along the verges. Create bays within the car park to screen amenities blocks, addressing issues such as visual quality, glare, shade, pedestrian safety and circulation	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Rationalise signage and develop a consistent signage and interpretive/map system at each beach. Signs to be of high graphic quality	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Develop multi lingual advisory signage to cater for the most common non English languages spoken by beach users/visitors	Ongoing

Full Title	Category	Action	Implementation Status
Pittwater_ocean-beaches-POM-2005	Parks	Conduct a signage audit on beaches and coastal reserves, and identify opportunities to integrate directional, safety and interpretive signage	Complete
Pittwater_ocean-beaches-POM-2005	Beach Saftey	Ensure continued provision of Beach Life Guard Patrol and Surf Rescue Service during the seven month swimming season	Ongoing
Pittwater_ocean-beaches-POM-2005	Beach Saftey	Review the length of the patrol season, investigate the options & feasibility of extending the season & improving service flexibility	Ongoing
Pittwater_ocean-beaches-POM-2005			Ongoing
Pittwater_ocean-beaches-POM-2005	Beach Saftey	Formulate and implement a regular inspection checklist to identify potential safety issues	Ongoing
Pittwater_ocean-beaches-POM-2005	Beach Saftey	Refine current maintenance practices to meet risk management requirements and relevant standards	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Continue to upgrade and maintain ocean rock pools to a safe standard	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Carry out a regular maintenance audit of play equipment at ocean beach reserves	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Provide soft-fall and upgraded equipment in children’s playgrounds in ocean beach reserves.	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Provision of perimeter security fencing to playgrounds at ocean beach reserves, especially those near busy roads	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Provide shade structures over regional/ district playgrounds, wherever mature shade trees are absent	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Review current work practices and procedures for maintenance operations through bench marking and adoption of industry best standards	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Investigate the maintenance regime for the beach reserves and make recommendations for improvements where necessary	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Prepare an annual maintenance schedule outlining routine maintenance procedures for all elements of the beach reserves	Ongoing
Pittwater_ocean-beaches-POM-2005			Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Improve and maintain ocean beach reserves to cater for increased bookings during the summer season	Ongoing
Pittwater_ocean-beaches-POM-2005	Parks	Continue to promote Pittwater’s diverse range of ocean beach settings and opportunities for film and television crews, organisation of sporting, corporate and social functions, as well as tour operators	Ongoing

Full Title	Category	Action	Implementation Status
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	The following considerations should be met when artificially opening the lagoon entrance:	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Tide changing from springs to neaps, to maximise head difference between lagoon and ocean (and thus maximise time for lagoon outflow). The A range of trigger water levels between 1.0 – 1.3 m AHD is to be adopted, rather than a single trigger value. If the lagoon has been closed for an extended period of time (months) at a level between 1.0 – 1.3m AHD and inundation and death of foreshore vegetation is occurring, then an artificial opening may be undertaken.	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	To achieve an artificial opening at the lower level of this range there may need to be an ongoing mechanism to help keep the entrance open, for as long as needed to mitigate possible flooding. Some examples may include:	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	The entrance should not be opened during king tides or large spring tides. The larger flood tides will promote the movement of sand back into the entrance channel before the entrance can develop a stable outflow channel. This is increasingly important the lower the lagoon level is at the time of breakout (i.e. for breakouts less than 1.3m AHD).	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Delay the opening until water levels exceed 2.2m AHD.	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Induce breakout very early in flood hydrograph. This should allow for maximum lagoon benefit during non-flood times.	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Establish and maintain a low berm at the maximum desirable water level (ie RL 2.2m AHD), so than any increase in lagoon level associated with early stages of a catchment runoff event will naturally break open the entrance and lower lagoon level before onset of major catchment runoff and potential for flooding upstream of the Pittwater Road culvert. The low berm should be initiated when water levels reach 2.0m AHD and rising.	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Council crew to be on escalating level of alert with increasing water levels, and to commence artificial opening at first sign of major rain (or predicted, esp. overnight).	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Actively discourage the unauthorised premature opening of the lagoon at levels lower than the desirable breakout range.	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	The focus of longer term management options should be placed on floodplain management of areas upstream of Pittwater Road culverts	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Catchments	A further consideration would be to improve water quality by reducing pollutant runoff from the catchment (source control).	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Try to let lagoon open naturally, as often as possible, even if it tends towards opening at lower levels. There appears to be no significant ecological advantage in promoting higher water levels before an opening event. This would allow progressively higher water breakout levels in future in response to sea level rise.	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Artificially close the lagoon, soon after breakout, to prevent influx of marine sand, and hence make it easier for the next natural breakout (this may also make it easier for successful unauthorised breakouts, which should be actively discouraged).	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	To facilitate more natural breakouts, the berm may require periodic maintenance, to ensure that it remains relatively low (ie at a level of around 2.2m AHD). Periodic maintenance of the berm (ie keeping it within a desirable range for natural breakout) may offset the existing resource demands for construction of an artificial channel once the trigger water level is reached (but eliminate the need for ‘emergency response’ actions if the trigger is	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Berm maintenance may be incorporated into regular beach grading / raking (depending on the feasibility and suitability of equipment).	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Maintain low flow pipes to try to maximise oxygenation of waters during dry weather periods, but close when water level no longer demonstrate a tidal signature (ie there is no inflowing ocean waters through the pipes) and levels reaches RL 1.0m AHD. Closure of the pipes during a flood event is not recommended (due to feasibility, safety and OHS challenges), but rather, closure prior to the onset of flooding, when lagoons waters are slowly reaching	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	Upon closure of the gates, immediately prepare for discharge through the entrance channel once levels reach RL 1.4m AHD by ‘trimming’ the entrance berm to this level, thus promoting a natural breakout. Further mechanical assistance may be required by excavation of a small pilot channel once the lagoon level has reached 1.4m AHD.	Ongoing

Full Title	Category	Action	Implementation Status
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	If water levels don't reach RL 1.4m AHD within 1 week after closure of the gates, then open the entrance at a reduced level (between RL 1.2 and 1.4 m AHD). If water levels don't reach 1.2m AHD within 1 week after closure of the gates, or subside below 1.0m AHD, and no further water level increases are predicted (ie significant rainfall expected within the next day or so), then reopen the gates to allow drainage and re-establish tidal flushing.	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	More frequent discharge (or 'purging') through the entrance channel will help to prevent build-up of pollutants within the lagoon and especially the sediments.	Ongoing
Warringah Coastal Lagoons Entrance Management Review 2009	Stormwater	RL 1.4m AHD gives scope for climate change (as floor levels are much higher), but need to minimise time that water levels are high (ie no more than 1 week).	Ongoing
Warringah Council Creek Management Study 2004	Planning	Adopts the Creek Management Study as Council policy;	Complete
Warringah Council Creek Management Study 2004	Planning	adopts the creek management principles set out in section 7.1;	Complete
Warringah Council Creek Management Study 2004	Planning	amends the LEP and design guidelines as set out in chapter 8;	Complete
Warringah Council Creek Management Study 2004	Planning	requests Planning NSW (formerly the Department of Urban Affairs and Planning) to declare riparian zones and	Complete
Warringah Council Creek Management Study 2004	Planning	prepares a Warringah creek policy in accordance with section 9.1;	Complete
Warringah Council Creek Management Study 2004	Planning	prepares creek management plans according to the priorities set out in Table 7.1; and	Ongoing
Warringah Council Creek Management Study 2004	Planning	modifies the water quality monitoring program to cover upland creeks and to develop a set of water quality objectives based on knowledge of local aquatic ecosystems.	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan consistent with the Dundundra Falls Reserve plan of management	Incomplete
Warringah Council Creek Management Study 2004	Stormwater	Negotiate with SWC to supply sewage reticulation to the Myora road area	Incomplete
Warringah Council Creek Management Study 2004	Stormwater	Incentive scheme to progressively replace septic tanks with aerobic sand filtration systems	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Conduct a risk assessment of stormwater runoff from different land uses	Complete
Warringah Council Creek Management Study 2004	Catchments	Consider the proposed LEP amendments in evaluating development proposals in the upper reaches	Complete
Warringah Council Creek Management Study 2004	Public Participation	Work with rural and commercial landholders (e.g. with incentive schemes, education, regulation, audit) to improve site management practices	Incomplete
Warringah Council Creek Management Study 2004	Stormwater	Incentives for upgrading on-site wastewater systems to effect nutrient removal	Ongoing

Full Title	Category	Action	Implementation Status
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan, with particular reference to stormwater management and water sensitive design	Incomplete
Warringah Council Creek Management Study 2004	Stormwater	Incentive scheme to progressively replace septic tanks with aerobic sand filtration systems	Ongoing
Warringah Council Creek Management Study 2004	Stormwater	Consider the proposed LEP amendments in evaluating development proposals in the upper reaches	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Incentives for upgrading on-site wastewater systems to effect nutrient removal	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Consider the proposed LEP amendments in evaluating development proposals in the upper reaches	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Limit further development (including impervious surfaces) within the riparian zone	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Investigate the costs and benefits of options to intercept and/or treat landfill leachate entering the creek.	Complete
Warringah Council Creek Management Study 2004	Catchments	Repair erosion around the concrete creek invert by stabilising the soil and revegetating with groundcover	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Continue revegetating riparian areas	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Investigate potential pollution from Cromer industrial estate (also applicable to South Creek)	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Investigate the construction of an artificial wetland habitat adjacent to the creek	Ongoing
Warringah Council Creek Management Study 2004	Parks	Control weeds in Allenby Park and educate landholders about garden waste management	Ongoing
Warringah Council Creek Management Study 2004	Parks	Continue weed management in the reaches below Warringah mall	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan	Complete
Warringah Council Creek Management Study 2004	Catchments	Revegetate riparian zone and buffers	Ongoing
Warringah Council Creek Management Study 2004	Stormwater	Investigate the performance of exiting stormwater quality controls and augment if necessary	Ongoing
Warringah Council Creek Management Study 2004	Parks	Continue weed management	Ongoing

Full Title	Category	Action	Implementation Status
Warringah Council Creek Management Study 2004	Catchments	Stabilise banks and revegetate	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Continue implementation of erosion control and revegetation works	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Investigate the costs and benefits of an in stream wetland	Incomplete
Warringah Council Creek Management Study 2004	Parks	Improve the recreational and access trail network	Complete
Warringah Council Creek Management Study 2004	Catchments	Undertake weed management in riparian zone	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Educate residents about plant selection and garden waste management	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Investigate sediment trapping opportunities	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Enforce sediment and erosion control measures for new construction	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Undertake weed management in riparian zone	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Educate residents about plant selection and garden waste management	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Investigate sediment trapping opportunities	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan with particular attention to retrofitting WSUD and stormwater quality control devices	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Undertake weed management in riparian zone	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Educate residents about plant selection and garden waste management	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Require WSUD principles in all new development	Complete
Warringah Council Creek Management Study 2004	Catchments	Investigate retrofit of WSUD in existing development	Ongoing

Full Title	Category	Action	Implementation Status
Warringah Council Creek Management Study 2004	Catchments	Install additional stormwater quality control devices	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Undertake weed management in riparian zone	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Educate residents about plant selection and garden waste management	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Require WSUD principles in all new development	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Investigate retrofit of WSUD in existing development	Ongoing
Warringah Council Creek Management Study 2004	Stormwater	Install additional stormwater quality control devices	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan	Incomplete
Warringah Council Creek Management Study 2004	Parks	Progressively eliminate weed sources from the upper catchment to the National Park boundary	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Restrict access to vehicle and riding trails within riparian buffers	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Investigate causes of elevated nutrient concentrations downstream of Kimbriki Recycling and Waste Disposal Centre	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan (as above)	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Continue revegetation around the reserve	Ongoing
Warringah Council Creek Management Study 2004	Stormwater	Encourage Pittwater Council to continue the program of development controls and stormwater infrastructure	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Limit catchment development on undeveloped tributaries	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Require WSUD in new development	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan (in conjunction with Snake and Oxford creeks)	Incomplete
Warringah Council Creek Management Study 2004	Parks	Recreational trail in public land from Narrabeen Lagoon to Oxford Falls	Incomplete

Full Title	Category	Action	Implementation Status
Warringah Council Creek Management Study 2004	Catchments	Commence riparian revegetation in upper reaches (including removal and replacement of the engineered channel running through the Australian Tennis Academy with stream stabilisation measures).	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Educate residents about plant selection and garden waste management	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Riparian revegetation and weed removal in middle and lower reaches	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Limit catchment development	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Require WSUD in new development	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan (in conjunction with Middle Creek)	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Educate residents about plant selection and garden waste management	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Riparian revegetation and weed removal	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan	Complete
Warringah Council Creek Management Study 2004	Catchments	Progressively revegetate riparian zone (upper reaches)	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Stablise eroding banks in upper reaches	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Stabilise eroding banks in upper reaches	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Construct a wetland at the wheeler creek confluence	Complete
Warringah Council Creek Management Study 2004	Catchments	Introduce at source controls (retro-fit WSUD etc) to reduce peak flows	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Educate residential, commercial and industrial stakeholders about at-source stormwater management	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Educate residents about plant selection and garden waste management	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Progressively revegetate riparian zone and stabilise eroding banks (middle and lower reaches)	Ongoing

Full Title	Category	Action	Implementation Status
Warringah Council Creek Management Study 2004	Parks	Recreational trail in public land from Narrabeen Lagoon to Beacon Hill	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Continue retro-fit of WSUD in catchment	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Strictly limit catchment development	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Prepare a Creek Management Plan	Incomplete
Warringah Council Creek Management Study 2004	Catchments	Negotiate with property owners to revegetate disturbed riparian zones	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Remove weeds and sediment in lower channel near South Creek confluence	Ongoing
Warringah Council Creek Management Study 2004	Catchments	Install a wetland, fishway and erosion controls at South Creek confluence	Incomplete
Warringah Council Creek Management Study 2004	Public Participation	Will also be subject to the LEP changes and continuing management by the local community groups with support from Council and the state/federal governments.	Ongoing
Warringah Lagoons Entrance Management Operational Management Standard_2012			Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Modify Warringah Council Local Environment Plan (LEP) and Development Control Plan (DCP)	Complete
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Warringah Local Environment Plan 2011 Update Section 149(2) certificates • update to reflect modification of planning instruments and properties affected	Complete
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Develop policy for development in areas impacted by coastal hazards Policy to include (but not limited to): • specification for new and upgraded protection works south of Devitt Street at Collaroy-Narrabeen Beach (such as design standard, alignment and minimum performance criteria for development located landward) and integrate into planning controls • preparation of an impact assessment of proposed design and alignment for coastal protection works • preparation of a Benefit Distribution Analysis of the proposed coastal protection works	Complete
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Clarify permissibility of exempt development in areas impacted by coastal processes • liaise with the NSW Department of Planning and Environment to resolve issues associated with exempt development being permissible in areas impacted by coastal processes as a result of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008	Complete
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Parks	Funding to restore beach amenity • investigate funding mechanisms to contribute to restoration of beach amenity adjacent to protection works after storms	Ongoing

Full Title	Category	Action	Implementation Status
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Integrate the management of assets impacted by coastal processes into Council's Assets Management Planning Framework - management actions required for assets impacted by coastal processes integrated into the appropriate asset management plans for buildings, roads, stormwater and natural area assets - identify and prioritise works to minimise the impacts of stormwater on beaches within the Stormwater Asset Management Plan	Complete
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Develop and deliver actions to communicate CZMP outcomes	Complete
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Assess Management of Birdwood Park and Narrabeen Lagoon Entrance - investigate opportunities to combine any dune lowering works at North Narrabeen SLSC and Birdwood Park (undertaken in accordance with the adopted Masterplan, and ensuring impacts on coastline hazards are considered) with Narrabeen Lagoon Entrance Clearance operations. - investigate alternative strategies for placing sand from Narrabeen Lagoon Entrance onto Collaroy-Narrabeen Beach.	Complete
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Parks	Develop Dune Management Plan for all beaches Plan to include: - ongoing management actions including weed control and replacement/replenishment planting, monitoring and maintenance of vegetation structure and species diversity for small bird habitat as well as maintenance of sight lines to assist Councils lifeguards and Surf Life Savers - actions to manage threatened species including known populations of Sand spurge - stabilise blow-outs with dune vegetation (in particular north of Waterloo Street; north of Wellington Street; south of Albemarle Street and at Birdwood Park) - increase the coverage of dune vegetation along Fishermans Beach where possible - identify activities to assist residents with dune management activities	Ongoing
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Stormwater	Liaise with asset authorities - encourage Sydney Water to undertake further investigations to assess the risk to sewerage infrastructure from coastal erosion - encourage other asset authorities to accurately define plan location and elevation of other assets (electricity, water, communication, gas) so risk of damage can be assessed - provide advice to assist and encourage asset authorities to consider either protection or relocation of these assets, particularly as long term hazards are realised	Ongoing
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Work with other Councils and organisations working on sand sources for beach nourishment - liaise with and lobby NSW Government to modify Offshore Minerals Act 1999 and secure funding to undertake beach nourishment to maintain beach amenity in future (and investigate other funding sources) - liaise with other coastal Councils to ensure coordination and prevent duplication of effort	Ongoing
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Beach nourishment to maintain beach amenity - undertake investigations to define sand source, extraction method and beach nourishment profile and volumes - complete environmental assessment	Ongoing
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Monitoring beach conditions and forecasts in partnership with research organisations maintain activities to monitor beach conditions and forecasts for storms	Ongoing
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Reporting on CZMP progress Through reporting on the delivery of the Council Community Strategic Plan report on progress in implementation of CZMP	Ongoing
CZMP_collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Community consultation develop and deliver actions to communicate CZMP outcomes to beachfront landowners and the wider community	Ongoing

Full Title	Category	Action	Implementation Status
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Education of residents ongoing education of residents on coaslinel hazards, risk to development, risk to public safety and other relevant issues	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Stormwater	Deliver Northern Beaches Flood and Coastal Storms Education Strategy in coordination with the State Emergency Service deliver actions identified in the Northern Beaches Flood and Coastal Storms Education Strategy to keep affected communities informed before and during a coastal erosion emergency	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Beach scraping consents, approvals, licences and permits ensure that any necessary consents, approvals, licences and permits are maintained for beach scraping works	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Stormwater	Narrabeen Lagoon entrance clearence remove sand from entrance and place on Collaroy-Narrabeen Beach as “beach sediment recycling”	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Update CZMP to take account of new data, updated coastline hazards understanding, revised climate change information, changes to legislation, etc.	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Implement actions identified in Coastal Erosion Emergency Action Subplan for Beaches in Warringah relating to public safety. Including: - ensure sufficient warning signage and barricades are available for use - implement signage and barricades as required to close off damaged and potentially dangerous public beach access points after storm erosion	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Monitoring and reporting on storm conditions - monitor beach erosion and weather, wave and water level conditions and forecasts during storms - within Council’s Natural Areas Asset Management Plan report beach condition after each significant storm (describing the storm, extent of erosion/inundation etc., including photographs)	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Monioring unauthoried coastal protection works monitor to detect installation of unauthorised works and order removal of works if required Beach amenity	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Continue opportunistic beach nourishment when clean sand excavated from building sites becomes available	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Continue the implementation of dune maintenance works including repair of fencing and walkways, ongoing targeted Bitou Bush control and effective rabbit control	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Stormwater	Planning for restoration and sediment recycling activities - minimise disturbance to shorebirds foraging or roosting on the Long Reef rock platform and intertidal areas on the beach and Narrabeen Lagoon entrance by ensuring major works are timed outside the migratory shorebird visitation period - ensure that this advice is distributed to relevant Council staff	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Beach Saftey	Continue to provide lifeguard patrols at Collaroy-Narrabeen Beach	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Parks	Mechanically regrade steep and high erosion escarpments where required, to reduce risks to public safety from collapsing sand dunes	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Beach Saftey	Restricting proximity to exposed protections works implement signage and barricades as required to restrict public from areas near exposed protection works after storm erosion	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Undertake beach scraping after storms to accelerate beach recovery where resources allow, in particular to accelerate the burial of exposed historical protection works and restoration of beach	Ongoing

Full Title	Category	Action	Implementation Status
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Continue raking of Collaroy-Narrabeen Beach in accordance with Council's procedures	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Coast	Remove debris and other inappropriate materials off the beach as required (where feasible), particularly after storms	Ongoing
CZMP collaroy-narrabeenbeachandfishermansbeach_2016	Parks	Continue cleaning of Collaroy Rock Pool during swimming and non-swimming seasons accordance with Council's procedures	Ongoing
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Stormwater	New levee located upstream of Warringah Mall near Clearview Place to prevent mainstream flooding. Levee set to 22.3 mAHD	No Longer Relevant
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	Further investigation into optimising the airspace in Manly Dam whilst satisfying all stakeholders is recommended	Ongoing
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	Future development of commercial properties within FPA should incorporate flood proofing up to the FPL	Ongoing
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	Changes to land use zoning should consider flood compatibility using outcomes from this report	Ongoing
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	Update FPL based on the 1% AEP + 0.5m as defined in the 2013 Manly Lagoon Flood Study	Complete
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	Flood Planning Area	Complete
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	As defined in the 2013 Manly Lagoon Flood Study	
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	DCP updated with FPL and FPA as discussed above	Complete
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	Provide flooding information on Council's website, include up to date flooding information on future s10.7 (2) and (5) certificates requested	Complete
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Stormwater	Development of Local Flood Plan	Ongoing
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Stormwater	Add new stream gauges on each of the three creeks, continuation of Northern Beaches Flash Flooding Warning	No Longer Relevant
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Stormwater	Road closures, early notifications	Ongoing
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	Add list of affected roads to Local Flood Plan, install depth indicators where noted.	
Manly Lagoon Floodplain Risk Management Study and Plan 2018	Catchments	Community engagement to prepare an ongoing flood education program (and appropriate evaluation system)	Ongoing
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Catchments	Extraction of entrance shoals upstream and downstream of Ocean Street Bridge	Ongoing
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Stormwater	Waroon Road Levee	No Longer Relevant

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Stormwater	Wabash Avenue Levee	No Longer Relevant
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Stormwater	Alkira Circuit Drainage Upgrade	Incomplete
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Stormwater	Ponderosa Parade Drainage Upgrade	Ongoing
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Stormwater	Tatiara By-pass Overland Flowpath	Incomplete
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Catchments	Local evacuation measures: Using detailed local procedures to improve emergency response at a local scale for four high risk areas within the floodplain.	Ongoing
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Catchments	Public awareness and education: A program of flood awareness for the entire LGA is recommended as well as the implementation of more targeted and detailed education strategies for flood warning systems.	Complete
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Catchments	School education programs: Improving the flood awareness of school children by educating them on flood risk in Narrabeen Lagoon.	Incomplete
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Stormwater	Evacuation route mapping and implementation of flood warning signs at critical locations to assist evacuees and to reduce time required for evacuation.	Ongoing
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Stormwater	Flood warning systems: Using water level gauges to trigger evacuation provides more certainty of imminent flooding than rainfall gauges, and provides a faster warning time, improving the time available for evacuation.	Ongoing
Narrabeen Lagoon Floodplain Risk Management Plan 2019	Stormwater	Flood planning level revision	Complete
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Howell Close Retarding Basin	No Longer Relevant
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Neptune Road Flood Bypass or Bypass Tunnel (Howell Close to Newport Headland) – subject to further investigation	Incomplete
Newport Floodplain Risk Management Plan Report 2004	Catchments	Regrading and Split Flows Howell Close	Ongoing
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Foamcrest Avenue Pit Inlet Capacity Upgrade in driveway of unit block	Complete
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Flowpaths between Units to Barrenjoey Road	Incomplete
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Channel maintenance	Ongoing
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Investigate Overland Flood Bypass Foamcrest Avenue to Coles Parade	Incomplete

Full Title	Category	Action	Implementation Status
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Investigate Overland Flood Bypass Ross Street to ocean outfall	Incomplete
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Overland Flooding and Flow Assessment for Newport Catchment	Complete
Newport Floodplain Risk Management Plan Report 2004	Stormwater	DCP 30 be applied to development within the floodplain	Complete
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Pittwater 21 incorporate specific development controls for flood prone land	Complete
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Flood Planning Level of 1% AEP + 0.5m be applied to flood prone land	Ongoing
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Council continue to pursue exemption from SEPP 5 within the LGA	No Longer Relevant
Newport Floodplain Risk Management Plan Report 2004	Catchments	Council retain the current wording of S149 Certificates and revise the Notation as required	Ongoing
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Implementation of a Voluntary House Raising Program	No Longer Relevant
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Property owners to contact insurance companies to determine the limits on flood cover of their insurance policies	Ongoing
Newport Floodplain Risk Management Plan Report 2004	Stormwater	Develop Community Flood Awareness and Preparedness Program	Ongoing
Newport Floodplain Risk Management Plan Report 2004	Emergency Management	Provide SES with updated 'Flood Intelligence' for Newport Beach based on the latest flood information	Complete
Newport Floodplain Risk Management Plan Report 2004	Planning	Consult with other Councils and SES regarding a Peninsula-wide Flood Plan	Complete
CZMP Bilgolabasin certified 2016	Coast	Modify LEP with local planning clause liaise with Department of Planning and Environment to create a local planning clause to enable modification of Pittwater LEP 2014 (to ensure new CZMP setbacks, coastal hazard mapping and other appropriate controls are stipulated in LEP)	Complete
CZMP Bilgolabasin certified 2016	Coast	Assess existing use rights undertake legal/planning investigations to assess suitability of alternative LEP clauses to prevent existing use rights being generated through setback prohibitions, that may provide benefits for control of alterations and intensification of existing development	Complete
CZMP Bilgolabasin certified 2016	Coast	Investigate how coastal protection works could be permitted use Modify LEP to be consistent with SEPP Infrastructure	Complete
CZMP Bilgolabasin certified 2016	Coast	Investigate exempt development assess suitability of alternative LEP clauses to restrict exempt development, if warranted	Complete

Full Title	Category	Action	Implementation Status
CZMP Bilgolabasin certified 2016	Coast	Update Section 149(2) certificates • update to reflect modification of planning instruments and properties affected	Complete
CZMP Bilgolabasin certified 2016	Coast	Modify DCP • modify DCP to be consistent with CZMP, and in particular modify Coastline Risk Management Policy for Development in Pittwater	Complete
CZMP Bilgolabasin certified 2016	Coast	Prepar protection works policy • Modify Coastline Risk Management Policy for Development in Pittwater to include advice on design standard and alignment for protection works, and required setback of development from protection works	Complete
CZMP Bilgolabasin certified 2016	Coast	Prepare foundation requirements • Modify Coastline Risk Management Policy for Development in Pittwater to include details on foundation requirements for development seaward of the “setback line for development on conventional foundations”	Complete
CZMP Bilgolabasin certified 2016	Coast	Develop controls for coastal inundation • create additional inundation controls in Coastline Risk Management Policy for Development in Pittwater	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Investigate funding from landowners to restore beach amenity • investigate funding mechanisms for landowners to contribute to restoration of beach amenity adjacent to protection works after storms	Incomplete
CZMP Bilgolabasin certified 2016	Coast	Develop trigger conditions • develop guidance on appropriate trigger conditions for new development	Incomplete
CZMP Bilgolabasin certified 2016	Coast	Obtain beach scraping consents, approvals, licences and permits • ensure that any necessary consents, approvals, licences and permits are in place for beach scraping works	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Develop community engagement strategy • decide how CZMP outcomes will be communicated within Council, to beachfront landowners and to the wider community (this is expected to include a fact sheet summarising the key outcomes)	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Develop communications strategy for emergencies • to keep affected communities informed during a coastal erosion emergency	Incomplete
CZMP Bilgolabasin certified 2016	Stormwater	Undertake drainage study • assessment of flooding and drainage in the study area considering backwater effects due to oceanic inundation	Complete
CZMP Bilgolabasin certified 2016	Coast	Undertake South Bilgola Headland geotechnical investigations • establish regular monitoring program at South Bilgola Headland following an investigation into an appropriate frequency and a monitoring protocol	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Undertake Bilgola Head geotechnical investigations • establish regular monitoring program at Bilgola Head following an investigation into an appropriate frequency and a monitoring protocol • install specific signage to discourage entry to the area landward of the boulder rock barrier	Ongoing

Full Title	Category	Action	Implementation Status
CZMP Bilgolabasin certified 2016	Coast	Prepare private accessway policy • develop appropriate management provisions in relevant plans of management or the DCP for access from adjoining private properties to public beach areas in consultation with all affected stakeholders and land owners	Incomplete
CZMP Bilgolabasin certified 2016	Catchments	Investigate scour protection at Bilgola Creek • consider removal and/or replacement of existing scour protection	Incomplete
CZMP Bilgolabasin certified 2016	Stormwater	Remove scattered rocks at Bilgola Kiosk channel • removal of the rocks from the beach where scattered over the beach area, or relocation to provide scour protection at a more appropriate localised area	Ongoing
CZMP Bilgolabasin certified 2016	Stormwater	Decide if and how Council assets would be protected • assess level of risk to Council assets in detail • complete a cost:benefit assessment of the value of emergency or long term protection of assets • assess insurance implications • complete an environmental assessment (REF) and designs for intended protection works (if any)	Ongoing
CZMP Bilgolabasin certified 2016	Building Assets	Establish appropriate tenure over Crown Land at Bilgola Beach and Basin Beach • Liaise with Department of Industry – Lands to formalise management arrangements, as necessary, over Crown Land that accommodates infrastructure currently managed by Council at Bilgola Beach and Basin Beach	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Implement ecological management recommendations • implement recommendations on page 9 of Appendix B	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Lobby the NSW Government to support a program of beach nourishment • liaise with and lobby NSW Government to develop a policy (or modify legislation if required) such that offshore sand sources could be accessed, and to secure NSW Government funding (and investigate other funding sources) to undertake beach nourishment to maintain beach amenity in future	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Liaise with asset authorities • work collaboratively with asset owners as required to encourage them to assess the location and elevation of their assets in relation to coastline hazards so that the risk of damage can be determined and managed by these owners consistently with the CZMP	Ongoing
CZMP Bilgolabasin certified 2016	Stormwater	Investigate Bilgola Kiosk channel outlet • consider construction of a formalised headwall and scour protection for the Bilgola Kiosk channel outlet	Ongoing
CZMP Bilgolabasin certified 2016	Parks	Investigate runoff over Bilgola car park seawall • consider formalised drainage at showers, construction of a kerb on the eastern side of the car park and elevating the seawal	Ongoing
CZMP Bilgolabasin certified 2016	Stormwater	Investigate Bilgola SLSC outlet • consider removing smaller rocks and relocating larger rocks to form a more formalised scour protection	Incomplete
CZMP Bilgolabasin certified 2016	Coast	Investigate measures to reduce inundation at Bilgola SLSC and car park • consider elevated seawall and reorientating ramp	Ongoing

Full Title	Category	Action	Implementation Status
CZMP Bilgolabasin certified 2016	Coast	Undertake beach nourishment to maintain beach amenity • undertake investigations to define sand source, extraction method and beach nourishment profile and volumes • complete environmental assessment • secure all necessary approvals and permits • engage dredging contractor to undertake beach nourishment works • all of the above tasks are likely to be undertaken in conjunction with the NSW and Federal Governments as well as other NSW coastal councils	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Monitor beach conditions and forecasts	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Report progress on implementation of CZMP through the integrated planning and reporting framework	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Ongoing education of residents on coastal hazards, risk to development, risk to public safety and other relevant issues	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Liaise with NSW Marine Estate Management Authority • continue to liaise with the NSW Marine Estate Management Authority (particularly during the preparation of the Hawkesbury Shelf Marine Bioregion Assessment) to enhance marine biodiversity conservation, by all appropriate means, along the Northern Beaches coastline	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Update CZMP to take account of new data, updated coastline hazards understanding, revised climate change information, changes to legislation, etc.	Ongoing
CZMP Bilgolabasin certified 2016	Beach Safety	Continue to provide lifeguard patrols and volunteer surf lifesaving at Bilgola Beach and Mona Vale Beach	Ongoing
CZMP Bilgolabasin certified 2016	Recreation	Continue raking of Bilgola Beach weekly in swimming season	Ongoing
CZMP Bilgolabasin certified 2016	Parks	Continue cleaning of Bilgola and Mona Vale rock pools weekly in swimming season and fortnightly in non-swimming season	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Manage geotechnical risks to development under separate policy • Continue to consider risk to development at rocky cliff/bluff areas as part of the Geotechnical Risk Management Policy for Pittwater (no development affected by this policy is in study area)	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Monitor and report on storm conditions • monitor beach erosion and weather, wave and water level conditions and forecasts during storms	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Monitor the study area to detect installation of unauthorised works and order removal of works if required	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Implement trigger conditions • in consultation with the Department of Planning and Environment and if appropriate, implement trigger conditions with approvals for new beachfront development to ensure that increasing risks over time can be managed (also see Action H11)	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Continue the implementation of dune maintenance works including repair of fencing and walkways, restoration of blow-outs and weed eradication and revegetation works as necessary	Ongoing
CZMP Bilgolabasin certified 2016	Parks	Ensure sufficient warning signage and barricades are available for use (after severe storms) as required	Ongoing

Full Title	Category	Action	Implementation Status
CZMP Bilgolabasin certified 2016	Parks	Implement signage and barricades as required to close off damaged and potentially dangerous public beach access points after storm erosion	Ongoing
CZMP Bilgolabasin certified 2016	Parks	Mechanically regrade steep and high erosion escarpments where required, to reduce risks to public safety from collapsing sand dunes	Ongoing
CZMP Bilgolabasin certified 2016	Parks	Implement signage and barricades as required to restrict public from areas near exposed protection works or scour protection after storm erosion	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Undertake beach scraping after storms to accelerate beach recovery where resources allow, in particular to accelerate the burial of exposed rock and restoration of beach accessways	Ongoing
CZMP Bilgolabasin certified 2016	Coast	Remove debris and other inappropriate materials off beaches in study area as required (where feasible), particularly after storms	Ongoing
South-creek-bank-management-plan-2008			Ongoing
South-creek-bank-management-plan-2008	Coast	Technique 7 – Rock rip-rap. Site is subjected to high hydraulic forces therefore soft engineering techniques unlikely to provide a long term solution. Alternatives: Technique 8 (Gabions). Would work but broken wire can be hazardous. Technique 3 (Cellular reinforced earth wall if filled with stone.) Technique 8 (Bio-reinforced wall) Would only be useful on the banks when well clear of the weir.	Ongoing
South-creek-bank-management-plan-2008	Coast	Erosion on the left bank undercutting the bridge structure and services crossing the creek. Due to threat to infrastructure the erosion should be stabilised using rock rip rap (Technique 7) or a gabion wall (Technique 8).	Ongoing
South-creek-bank-management-plan-2008	Stormwater	A small drop (approx. 300mm) in the creek bed appears to be migrating upstream unless it encounters bedrock. Upstream migration of the drop will increase bank instability further adding to the potential for erosion and sediment being transported to the lower reaches. The potential for sediment generation is far greater than the apparent significance of the drop based on size. Stabilise drop using a rock chute or log weir. (Technique 10 – Minor Grade Control). Regular monitoring will still be required to check stability and effectiveness of weir.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	When inspected the right bank had been stripped of vegetation but no replacement planting or revegetation commenced. Revegetation of creek banks should always be staged and interim protection provided while waiting replanting. Technique 2 (Reinforced Vegetation). Bio-degradable matting could be used on the upper bank providing the mature vegetation community will still admit sufficient sunlight to maintain a dense healthy groundcover	Ongoing
South-creek-bank-management-plan-2008	Stormwater	Bank has been undercut on outside bend and tree is adding to bank instability due to surcharge load. Support tree by re-placing soil and protecting reinstated bank with large rocks (Technique 7 – Rip Rap Armouring). Alternatively use cellular reinforced earth wall (Technique 3 – Cellular Reinforced Earth). Gabions (Technique 8 – Gabion Retaining Wall) would work structurally but are not favoured.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Bank appears to be slowly but steadily retreating. Battering the bank would result in loss of the trees therefore techniques that can provide a steep but stable bank face (Techniques 3 – Reinforced Earth or 5 – Bio Reinforced Earth) are preferred. Waterway area should be maintained.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Creek bed needs to be dredged and a control program implemented to eradicate or at least limit the extent of Typha growing in the creek bed. Technique 9 - Dredging.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Staged removal and replanting. Use biodegradable matting to assist the re-establishment of native species.	Ongoing
South-creek-bank-management-plan-2008	Stormwater	Technique 2 – reinforced vegetation. Permanent matting reinforcement, recommended as area is light limited which will make it difficult to establish and maintain dense ground cover.	Incomplete

Full Title	Category	Action	Implementation Status
South-creek-bank-management-plan-2008	Stormwater	Local stormwater pipe is discharging to an unlined channel with a deep sandy bed. Intermittent flows would permit a cellular confinement mat to be used to stabilize the channel (Technique 4 – Cellular Reinforced Earth Slope). Moderate priority due to small area.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Large diameter pipe discharges onto an apron that has been undermined and partially collapsed. Repair apron and stabilise with rock rip-rap (Technique 7).	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Extent of dredging (Technique 9) will be partly dependent on flood risk and instability of the silt deposits and the creek banks. Any dredging and vegetation removal / replacement should be done in a carefully staged manner to reduce the risk of de-stabilisation of the creek and sediment slugs moving downstream during high flows.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Staged removal and replanting. Use biodegradable matting to assist the re-establishment of native species where there will be sufficient sunlight to maintain a dense ground cover when vegetation matures. Otherwise use permanent matting to reinforce new vegetation.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Backfill and re-vegetate.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Technique 7 Rock rip-rap.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Replace / repair broken pip, cover and re-vegetate area.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Monitor. Stabilise using reinforced vegetation (Technique 2) as required. Avoid use of biodegradable matting if area is light limited.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Bank condition could not be assessed due to steep slope and thick vegetation. Monitor for rock falls. Clear rock and vegetation debris from outlet area as necessary.	Incomplete
South-creek-bank-management-plan-2008	Catchments	Bank appears overly steep. Depth of soil/vegetation cover unknown. Monitor regular and stabilise using Techniques 2 (Reinforced Vegetation) or 3 (Cellular Reinforced Earth Retaining Wall) if necessary.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Staged removal and replanting. Use biodegradable matting to assist the re-establishment of native species where there will be sufficient sunlight to maintain a dense ground cover when vegetation matures. Otherwise use permanent matting to reinforce new vegetation.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Remove and or stabilize deposits using reinforced vegetation reinforced with permanent matting (Technique 2 – Reinforced Vegetation). Bio-degradable matting will disintegrate too quickly and is considered unlikely to provide long term assistance especially under high flow conditions.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Staged removal and replanting. Use biodegradable matting to assist the re-establishment of native species where there will be sufficient sunlight to maintain a dense ground cover when vegetation matures. Otherwise use permanent matting to reinforce new vegetation.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	This reach of the creek passes across a wide flat floodplain. Creek flow is sluggish and in general vegetation lines the low banks. The does not appear to be the need for significant structural works or bank repair along this reach. The primary management control required is to monitor the general condition of the creek including stability of, and public safety at the weir, and implement staged removal of weeds and replant as necessary. The need to reinforce any new vegetation planting along this reach is not regarded as important except in the areas close to Toronto Avenue where higher velocity flows and relatively steeper and higher banks exist.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Monitor. Stabilise using Technique 2 (Reinforced Vegetation) or Technique 7 (Rip Rap Armouring) as appropriate if and when required.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Monitor. If instability worsens consider using cellular mat backfilled with cobbles. (Variation of Technique 4).	Incomplete

Full Title	Category	Action	Implementation Status
South-creek-bank-management-plan-2008	Stormwater	Monitor and implement staged removal and replanting as necessary	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Bank height is less than 1m with expected high velocity flow over bedrock. When inspected the reach appeared stable but should be checked after significant high flows.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Monitor and implement staged removal and replanting as necessary.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Monitor for undercutting at base of wall.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Monitor for signs of undercutting at base of wall. In long term consider replacing with Techniques 3 (Cellular Reinforced Earth Retaining Wall) or 5 (Bio Reinforced Earth) to provide a more natural bank environment free of discontinuities.	Incomplete
South-creek-bank-management-plan-2008	Stormwater	Monitor and impleent staged removal and re-planting as necessary	Incomplete
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Stormwater	Catalpa Reserve detention basin	No Longer Relevant
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Stormwater	Toongarri Reserve detention basin	No Longer Relevant
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Stormwater	Prepare a scoping study including floor level survey, consultation and site inspections to further assess feasibility of establishing a small voluntary house redevelopment/flood proofing scheme	Ongoing
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Stormwater	Amend Council's Flood Compatible Building Guidelines as suggested; prepare a one-page, graphic summary of the Guidelines	No Longer Relevant
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Stormwater	Review and adopt the revised flood risk management provisions of Pittwater 21 DCP including freeboards for the study area	No Longer Relevant
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Stormwater	Improve flood warning system: • Continue to promote the Northern Beaches Flood Information Network website; • Alarm the Avalon Golf Course rain gauge so that it issues email/SMS when rain triggers are reached; • Consider installing a second real-time rain gauge in the vicinity of Bilgola Plateau Public School; • Include Avalon Palm Beach Business Chamber Inc. on the recipient list for alerts when rainfall triggers reached; • Transition towards a system where people living or working in the floodplain can opt in for receiving emails/SMS; • Devise appropriate messages to accompany the rainfall alerts	Ongoing
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Emergency Management	Improve emergency response planning: • Complete the Manly-Warringah-Pittwater EMPLAN in view of the flood risk information in the Avalon to Palm Beach FRMS&P; • Prepare Pittwater Local Flood Sub-Plan; • Encourage and assist key floodplain exposures to prepare and update their own flood emergency plans	Complete

Full Title	Category	Action	Implementation Status
Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017	Stormwater	Build upon the Northern Beaches Flood and Coastal Storm Education Strategy 2012–16: • Develop a library or mobile display using historical flood photos, modelled flood extents and appropriate messaging; • Develop an accessible flood emergency plan template suitable for use by Avalon Beach businesses, in conjunction with Avalon Palm Beach Business Chamber Inc.; • Hold a Business FloodSafe Breakfast in conjunction with Avalon Palm Beach Business Chamber Inc.; • Conduct ‘meet-the-street’ type events for residents at Pittwater Palms retirement village and at south Elaine Ave/east Central Road; • Engage with students at Barrenjoey High School to help them understand flood behaviour near the school and to promote safe responses; • Install signage indicating entrances to evacuation shelters in Avalon commercial district; • Install signage in flood prone carparks in Avalon commercial centre and Bilgola Beach; • Install flood depth indicators at ~4 low-points on Barrenjoey Road; • Install signage in any detention basins where flooding could pond	Ongoing
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Plan 2005	Stormwater	Implement recommended development controls based on <i>draft Local Flood Policy</i>. • Control development in floodplain as summarised in <i>draft Local Flood Policy (Appendix D of Volume 2)</i>. • Flood controls for different land uses based on design 1% AEP flood plus 500 mm freeboard. • Controls for essential services and SEPP 5 development based on PMF plus 300 mm freeboard. • Controls to be applied for all new development in the floodplain (i.e. land inundated by PMF). • Prepare more detailed flood mapping with levels and velocity data to assist with Council’s evaluation of development proposals. • Flood advice to be shown on S.149 Certificates.	Ongoing
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Plan 2005	Stormwater	Include BOM's Prediction and Monitoring of heavy rainfall into Entrance Monitoring Policy for each Lagoon. • The reliability of Council’s decision to open the lagoons could be strengthened by linking the procedure to the prediction and monitoring of rainfall by the BOM.	Complete
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Plan 2005	Stormwater	Mechanical opening of the lagoon entrance. • Openings to be carried out in consultation with BOM and in accordance with Council's Entrance Management Policy.	Ongoing
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Plan 2005	Stormwater	Ensure flood data in this Floodplain Risk Management Study and Plan is available to SES for inclusion in flood emergency response procedures. • Local Flood Plans to be reviewed by SES using information on flood prone development incorporated in Floodplain Risk Management Study and Plan and shown in Figures 2.1 and 2.2 herein.	Complete
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Plan 2005	Stormwater	Implement flood awareness and education program. • Consider installation of flood markers. • Distribute flood information booklet with rate notices.	Ongoing
Dee Why and Curl Curl Lagoons Flood Plain Risk Management Plan 2005	Stormwater	Flood data collection • Collect further data after each flood	Ongoing
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Stormwater	Increase drainage capacity in Oaks Avenue • A large diameter pipe is proposed to run the length of Oaks Avenue, connecting into the main box culvert opposite 33 Oaks Avenue.	Complete
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Stormwater	Underground storage tank/s at Redman Road • Tank/s would be located along the main overland flow path in Redman Rd and would require large underground pits to intercept flow upstream of the tank. Design and construction challenges could significantly increase the estimated capital cost.	Ongoing
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Planning	Planning instrument amendments • Amend Part E11 of the Warringah Development Control Plan to include separate classifications and development controls for mainstream flooding and overland flow	Ongoing
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Stormwater	Flood proofing guidelines • Seek funding assistance from the NSW Office of Environment and Heritage to prepare flood proofing guidelines. Amend the DCP to create a statutory requirement for existing premises undergoing interior development.	Ongoing

Full Title	Category	Action	Implementation Status
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Stormwater	Public awareness and education • Review Northern Beaches Flood and Coastal Storms Education Strategy at the end of the current Strategy period (2012-2017)	Ongoing
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Stormwater	Flood Warning System • At the end of the current contract (2017) review potential actions: - Live webcam streaming of lagoon entrances for entrance management	Ongoing
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Emergency Management	Information transfer to the SES • Quarterly meetings to be held between Northern Beaches Councils and NSW SES Sydney Northern region to transfer data obtained through the floodplain risk management process.	Ongoing
Dee-why-south-catchment-floodplain-risk-management-plan-2015	Stormwater	Event Data Collection • Routine data collection following a flood event	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	Continuation of actions listed in the Manly Ocean Beach Emergency Action Plan for Coastal Erosion (PBP/WP 2008(c)) with the following recommended additions: • Council to monitor conditions and warnings, and advise businesses at Bower Lane, “The Pantry” seaward of The Corso, and SLSCs of impending storm	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Emergency Management	• SLSCs and businesses to be encouraged to prepare/ update their own emergency action plans.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Catchments	Community education relating to: • Risks and adherence to temporary signage and safety barricades and fencing.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Emergency Management	• Promotion of alternative access and walking routes, such as the temporary ‘Hop, Skip and Jump’ bus route between South Steyne and Shelly Beach when Marine Parade was closed. Also promotion of alternative walking routes in unaffected areas, e.g. within Sydney Harbour National Park.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Planning	• Review of the Manly LEP 2013 Landslide Risk Map and Foreshore Building Line around Cabbage Tree Bay to include the entire cliff face and private properties along Bower Street. Some minor amendments to the LEP may also be required for clarity.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	• Further advice for development located in areas at risk of seawall overtopping to be included in the Manly DCP 2013.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Planning	• Manly DCP 2013 Schedule 1 – Map C - Potential Geotechnical Hazard Landslip Areas to be amended to include properties with frontage to Marine Parade, and currently mapped as Area G2, as G1, so that geotechnical assessments are mandatory in this area.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	• Minimum floor levels to be reviewed taking into account coastal inundation extents as identified by WRL (2012a) and pending results of the Manly LGA Flood Study (Cardno in preparation).	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	• Monitoring by Council on an annual basis and after any significant high tide/ coastal storm events in order to assess any indications of deterioration of existing conditions.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Parks	• Visual assessment of the effectiveness of drainage behind seawalls.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	• Where further deterioration of seawalls is evident, Council’s monitoring reports to be forwarded to coastal/ geotechnical engineers to assess remedial measures.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Building Assets	• Rock toe protection is recommended to be progressively undertaken, when necessary, to prevent/ address localised seawall slumping/ failure due to erosion. Installation of rock protection in the medium term (nominally 1 to 20 years), is recommended at the locations identified below.	Ongoing

Full Title	Category	Action	Implementation Status
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Building Assets	Priority for upgrade/ replacement within the short term (1 year) to address overtopping for the Marine Parade seawall at Fairy Bower Beach .	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Building Assets	Installation of wave return parapets along most of the Manly Ocean Beach. Apart from the seawall at Bower Lane, where the installation of wave return parapets or raising the seawall crest levels is not recommended unless this is required in the future as an adaptive measure in response to sea level rise.	Incomplete
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Building Assets	Although the heritage listed, the North Steyne SLSC building (supported on piles) has survived several major storms, in the event that it suffered extensive damage, it is recommended that: consideration be given to rationalising SLSC facilities along Manly Beach,	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Parks	North Steyen SLSC • rebuilding the seawall in this location further seaward so that the wall would form the foundations of the new structure (recognising that this would locally reduce the width of the beach).	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Building Assets	Similarly, if ‘The Pantry’, sustained major damage, reconstruction would not be recommended, and alternative site for the incorporated public toilets found within the Manly CBD to increase The Promenade area in this location and maintain views to the beach	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Building Assets	In the event that SLSC storage located on the rock shelf adjacent to Marine Parade is destroyed in a future storm event, consultation with the SLSC on an alternative location is recommended.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Catchments	2 to 5 yearly dry weather testing of running stormwater pipes/ outlets for ammonia to identify potential connection of sewer pipes or sewer leaks into the stormwater system, with repairs carried out as necessary.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Stormwater	Ongoing regular inspection of underground pipelines carrying water (stormwater, sewer) in geotechnical risk areas at no more than five yearly intervals and repair of any leaks.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Stormwater	Repair of concrete stormwater pipe along Marine Parade sewall near Manly SLSC	Complete
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Stormwater	Review/investigate options recommended in PBP/WP (2008b) to reduce the volume of stormwater discharging onto Manly Ocean Beach during storm events, improve the quality of stormwater flowing to the beach and improve safety and beach amenity, and, inclusion of water sensitive urban design to improve water quality during low flows.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	Monitoring of cliff lines and retaining walls should be undertaken on an annual basis, and after periods of prolonged or heavy rainfall (event based triggers to be set), in order to assess existing conditions and any indications of deterioration such as debris/boulders on the coastal path, reserve surface, beach or wave cut platform, damage to pathways etc.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Stormwater	Inspection of underground pipelines carrying water (stormwater, sewer) is also recommended at no more than five yearly intervals to repair any leaks that could contribute to slope instability.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	The results of any changes or incidents observed during visual monitoring should be formally reported by Council and forwarded to experienced coastal and geotechnical engineers to assess the need for additional site specific stabilisation measures.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Parks	Vegetation clearance and a more detailed geotechnical assessment of the cliff face below the northern side of No. 134 Bower Street is undertaken using abseil rope techniques.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Parks	Signs warning of potential rockfalls are recommend to be erected along Marine Parade, particularly the section below the northern side of No. 132-134 Bower Street.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Parks	The condition of educational and regulatory signage at Shelly Beach should be monitored for deterioration and legibility, and replaced as necessary.	Ongoing

Full Title	Category	Action	Implementation Status
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	Investigation of beach nourishment at Manly Ocean Beach in the longer term as part of a Sydney-wide project covering: • characterisation of the native and potential borrow site sediments for compatibility	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	• assessment of deposition patterns in response to local coastal processes and likely environmental impacts (e.g. on the Cabbage Tree Bay rocky habitats).	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	In addition to compliance with the activities banned at the Cabbage Tree Aquatic Reserve, additional activities and actions are suggested to increase awareness and protect the reserve's environmental values, such as: • Further education on the negative impacts of harvesting intertidal organism and follow up surveys of intertidal habitats to evaluate the effectiveness of educational initiatives as part of the RLS initiative.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Community Education	• Continued education on the impacts of litter (particularly plastics) on marine organisms, encouraging beach users to take their rubbish home to prevent rubbish blowing into the water if reserve bins are full.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	• Liaison with DPI Fisheries and RMS on measures that could be taken to prevent damage of seagrasses from boat anchoring.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Coast	• Repeat of Reef Life surveys on a regular basis and analysis and public dissemination of changes to species diversity and abundance	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Parks	In addition to continued weed control for bushland vegetation on Shelly Beach Headland and the small area of rainforest within Bower Street Reserve (between Bower Street and Marine Parade): • Ongoing monitoring and revegetation of any informal access tracks that develop at Shelly Beach Park and Headland and reinstatement of degraded grassed areas.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Stormwater	• Monitoring of stormwater discharges from private properties and inspection after major rainfall events to stabilise any erosion of the creekline and replant as necessary with locally endemic rainforest species.	Ongoing
Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 - OPTIONS ASSESSMENT	Catchments	Continued management of Manly Lagoon Entrance in accordance with the Joint Management of Routine Maintenance Operations at Manly Lagoon which includes actions for litter reduction, kelp management and flood mitigation (Manly and Warringah Councils 2013), and other relevant plans such as the Manly Lagoon Integrated Catchment Management Strategy (2004) and Estuary Management Plan (1998).	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Biodiversity	Implement a weed management plan and undertake regular weed control programs	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Biodiversity	Encourage planting of locally indigenous vegetation in residential gardens, particularly in beachfront properties	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Biodiversity	Monitor condition and coverage of trees along beachfront and backing onto dunes.	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Biodiversity	Rehabilitate/regenerate disturbed remnant coastal vegetation	Ongoing

Full Title	Category	Action	Implementation Status
Northern Beaches Coastal Dune Management Strategy 2020	Biodiversity	Plant shade trees in public open spaces adjacent to dunes	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Planning	Installation of timber and wire protective fencing around dune bays	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Coast	Re-grading of remnant dunes and berm using available beach sand to form new dune profiles	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Coast	Re-align and repair existing board and chain track/fencing over dune to avoid further blowouts	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Biodiversity	Stabilise new foredune profile with native vegetation	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Stormwater	Implement appropriate control measures at identified discharge points for urban and storm water runoff (may include relocation or redesign of outlets)	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Recreation	Upgrade outdoor showers/taps	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Planning	Provide and/or maintain sustainable, minimal impact pedestrian access to beaches and beach reserves through or around dune bays	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Planning	Maintain regular clearance of accumulated sand across pedestrian access paths to beaches to ensure continued use	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Planning	Investigate opportunities to construct new carparks and/or relocate unpaved or grassed parking areas away from the rear of dune bays	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Community Education	Develop community education and awareness programs to promote volunteer recruitment	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Recreation	Progressively upgrade recreational facilities (tables, seating, and rubbish bins) to encourage public use, with access away from dune systems	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Recreation	Upgrade amenities blocks to improve access and manage traffic away from dune systems	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Coast	Ongoing management of open space areas around surf clubs	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Planning	Investigate reduction of vehicle access and parking in rear of dune bays	Ongoing

Full Title	Category	Action	Implementation Status
Northern Beaches Coastal Dune Management Strategy 2020	Planning	Maintain and/or upgrade access ways	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Building Assets	Continue ongoing good relationships with surf clubs to facilitate maintenance and upgrades of clubs and the surrounding areas	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Coast	Continue to provide clear indication of responsibilities of surf clubs to maintain facilities and open space areas associated with them	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Planning	Provide clear wayfinding signage clearly showing public access ways and protected dune management areas	Ongoing
Northern Beaches Coastal Dune Management Strategy 2020	Planning	Rationalise signage across all beaches to provide uniform instruction and clarity at all beaches	Ongoing
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Method 2 would be employed where there are fringing trees, while Method 3 could be used as alternative in other areas where land-take was acceptable. This is also a suitable site for trial plantings (Method 1). The aim is to create continuous benches of macrophytes (where they are currently fragmented) in specific areas that will not detract from recreational usage. Plant additional Casuarina glauca landward of existing stands. Exclude mowing near foreshore vegetation. Control or remove weed growth (Figure 26 and Figure 27).	Complete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Method 2 would be employed where there are fringing trees, while Method 3 could be used as alternative in other areas where land-take was acceptable. This is also a suitable site for trial plantings (Method 1). The aim is to create continuous benches of macrophytes (where they are currently fragmented) in specific areas that will not detract from recreational usage. Plant additional Casuarina glauca landward of existing stands. Exclude mowing near foreshore vegetation. Control or remove weed growth (Figure 26 and Figure 27).	Complete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Focus access to area stabilised by Method 4 or 6 at end of current road, with additional optional platforms or boardwalk. If macrophytes were planted, this would restrict pedestrian access, and terrestrial fencing would potentially be required to enforce the limited access. Fence to prevent vehicle access off road, and provide small carpark. Plant additional Casuarina glauca landward of existing stands and generally increase overstorey and understorey vegetation density in park. Exclude mowing near foreshore vegetation (Figure 28).	Incomplete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	There is potential to replicate planting methods following trials at other sites to determine the best method for establishment of Phragmites if necessary. Discourage recreational boating landing and access to the island, eg with signage (Figure 28).	Complete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	There is potential to replicate Phragmites planting methods following trials at other sites if required. Discourage recreational boating landing and access to the island, eg with signage (Figure 29).	Complete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Plant macrophytes where absent. Area of exposed soil and roots replaced with platform, delineated with terrestrial and foreshore vegetation. Also monitor second smaller access area (Figure 29).	Incomplete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Plant macrophytes where absent. Area of exposed soil and roots at southern end of seawall replaced with optional platform (delineated with terrestrial and foreshore vegetation), or the grouted stone wall could be extended, or macrophytes planted (Figure 29).	Complete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Maintain existing beach near Tramshed, with back-beach berm wall (Method 5). Provide ramp/skid for foreshore access (Method 4) at Kayak Club. Plant macrophytes between access areas. Constrain market stalls and vehicles. Divert runoff and control sheet erosion near Narrabeen St. Plant additional Casuarina glauca landward of existing stands. Exclude mowing near foreshore vegetation. Control or remove weed growth (Figure 28).	Complete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Maintain existing beaches to allow foreshore access in high use areas, with macrophytes planted in between. Investigate integrity of treated pine seawall near the Boatshed. Enhance saltmarsh vegetation and delineate access (eg with woody habitat) at Scout Hall. Plant additional Casuarina glauca landward of existing stands. Exclude mowing near foreshore vegetation. Control or remove weed growth (Figure 28 and Figure 30).	Complete

Full Title	Category	Action	Implementation Status
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Maintain access to existing sandy beaches. Minor macrophyte planting may be undertaken (Method 1 or 2). Construct back-beach berm wall (Method 5) or regrade westernmost beach. Investigate substrate quality. Plant terrestrial trees and control weeds. There is potential to replicate planting methods following trials at other sites to determine the best method for establishment of Phragmites if necessary. (Figure 31).	Incomplete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	There is potential to replicate Phragmites planting methods following trials at other sites if required.	No longer relevant
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	There is potential to replicate Phragmites planting methods following trials at other sites if required.	No longer relevant
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	There is potential to replicate Phragmites planting methods following trials at other sites if required.	No longer relevant
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Construct back-beach berm wall in heavily accessed area in Middle Creek with vegetation planted in surrounds. Undertake bush regeneration and increase density of terrestrial vegetation, including planting Casuarina glauca on bare riparian fringes. Reinstate damaged bollard in car park (Figure 32).	Incomplete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Maintain sandy beach for recreational access. Undertake bush regeneration. There is potential to replicate planting methods following trials at other sites to determine the best method for establishment of Phragmites if necessary, where they will not interfere with recreational access (Figure 32).	Ongoing
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	There is potential to replicate Phragmites planting methods following trials at other sites if required.	No longer relevant
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Employ Method 1 to increase macrophyte density at small exposed beach. Continue bush regeneration. Do not expand access within sanctuary or to surrounding bushland (Figure 27).	No longer relevant
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Plant macrophytes on bench or construct platform as option in heavily accessed area at tip of Middle Creek with vegetation defining the approach. Undertake bush regeneration and increase density of terrestrial vegetation, including planting Casuarina glauca on bare riparian fringes. There is potential to replicate planting methods following trials at other sites to determine the best method for establishment of Phragmites if necessary;	Incomplete
Narrabeen Lagoon Foreshore Rehabilitation Plan 2003	Catchments	Sand nourishment should be used to retain the current beach character. Foreshore aquatic vegetation could be planted as an option in isolated pockets if desired. Groynes could be installed to hold beach sediment, but were not considered to be as economical as periodic renourishment (Figure 33).	Ongoing



Appendix D

STAKEHOLDER WORKSHOP SUMMARIES



NBC Open Coast & Lagoon CMP Scoping Study

Workshop 1 – What We Heard

Introduction

Rhelm facilitated two targeted workshops aimed at refining the scope and direction of the Open Coast and Lagoon Coastal Management Program (CMP) Scoping Study. These workshops were conducted with two distinct groups:

- external State government agency representatives
- key council staff

This ‘What We Heard’ report provides an overview and summary of the discussions at these two workshops, providing at a glance a high-level synthesis of information that will guide development of the Scoping Study and therefore the eventual CMP.

The first workshop engaged representatives from various State government agencies, bringing together a wide range of expertise to inform the study with a broader governmental perspective. The second workshop focused on internal council staff who are directly involved with the management and operational aspects of the coastal regions under discussion. This method captured both the broad, regulatory and policy perspectives as well as the detailed, daily operational insights.

Workshop Overview

The primary purpose of these workshops was to gather information about the key values and issues affecting the region’s coastal and lagoon environments. Both workshops were facilitated with similar agendas, with the differentiating factor being the content of the interactive discussions. Attendees were first provided with audience appropriate context, describing the CMP process and Scoping Study.

The workshop attendees were then provided a link to an interactive MIRO board – a screenshot is provided in **Figure 1**. MIRO allows attendees to roam freely around the board and place notes relating to the displayed content. Sections of the board included guiding text, pictures and maps. A facilitated discussion guided attendees through the MIRO board, soliciting comments and input at each section.

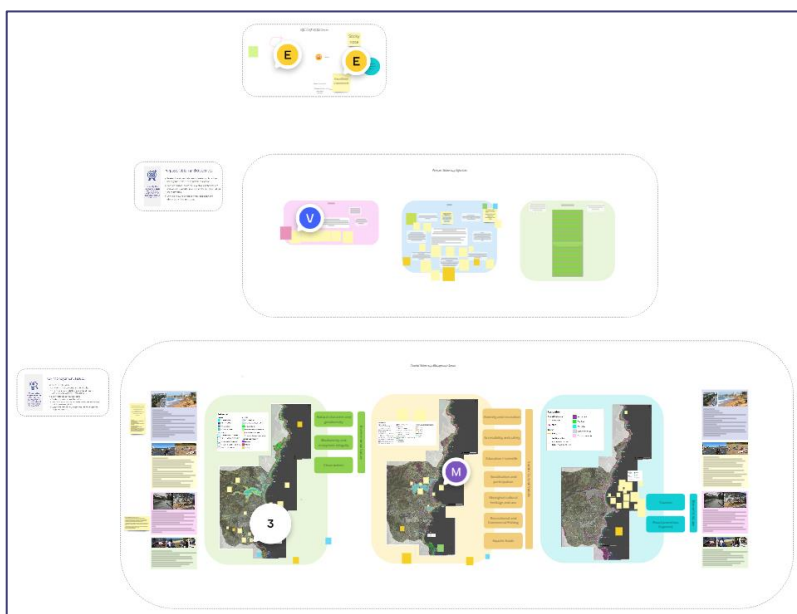


Figure 1 Screenshot of interactive MIRO board used during both workshop

Purpose, Vision, and Objectives

The CMP scoping study provides an initial opportunity to shape the purpose, vision and objectives of the CMP. This was the focus of the first interactive section of both workshops. An overview of comments received is shown in **Figure 2**.

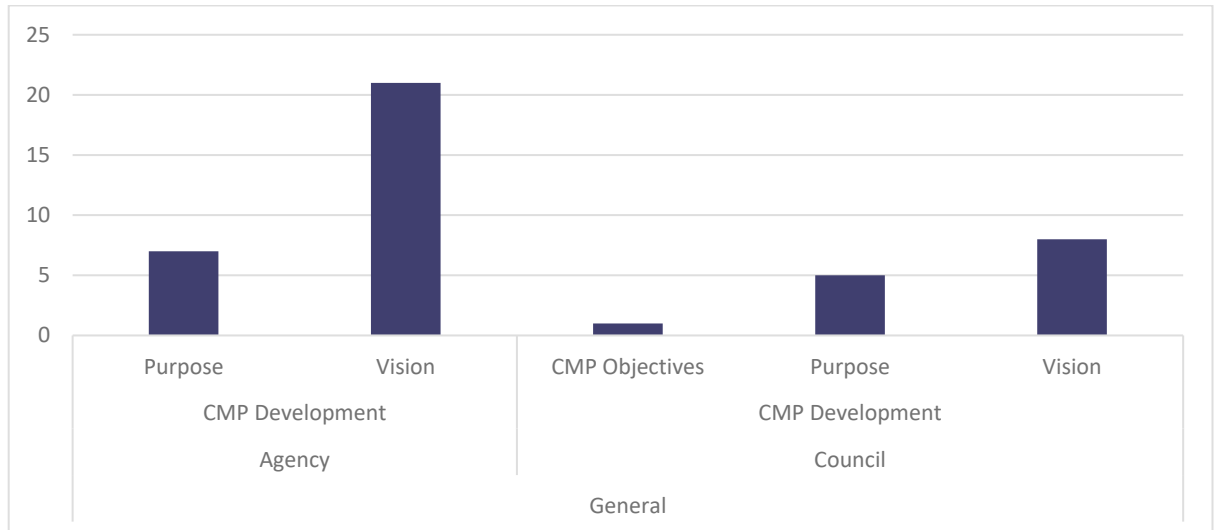


Figure 2 Count of workshop comments relating to Purpose, Vision and Objectives

What We Heard

Purpose

- Continue the effective work in coastal management.
- Ensure long-term risks are well understood, communicated, and aligned with current and future planning strategies.
- Recognise that land includes assets and structures on it.
- Establish clear links between present conditions and future adaptation to changing hazards.
- Emphasise coordination in the purpose to clarify roles and encourage collaboration for optimal outcomes.
- Understand the four Coastal Management Areas: Coastal Wetlands and Littoral Rainforest Area (CWLRA), Coastal Vulnerability Area, Coastal Environment Area (CEA), and Coastal Use Area.
- Encourage responsible and sustainable infrastructure development in the Coastal Zone.
- Recognise that CWLRA buffer zones are part of the coastal zone, which generally extends to the tidal limit.
- Funding is only available for actions within the coastal zone, unless the impact on the coastal zone is significant.
- Understand that 'land' encompasses both land and waters.
- Use Planning Proposals to adjust Coastal Management Areas (e.g., expanding the CEA to include the full lagoon).

Vision

- Resilience and Adaptation
 - Strengthen the focus on resilience and adaptation strategies.
 - Include the Resilience Strategy and align with Crown Lands 2031.

- Reference Documents and Alignment
 - Reference the Council vision, while developing a specific vision for this CMP.
 - Align with each agency's vision statements, particularly the Crown Land Management objectives for Aboriginal involvement.
 - Ensure consistency with existing documents like the Local Strategic Planning Statement (LSPS) and the Greater Sydney Waterways Strategy (GSWS).
 - Check alignment with NSW Marine Estate Management Strategy, Coastal Design Guidelines, Sydney Water, and NSW EPA visions.
- Goals and Objectives
 - Emphasise ecological health and function as key aspects of resilience to climate change beyond human use.
 - Consider the goals of other council strategies like Goal 9 and Goal 12 in the Environmental and Climate Change Strategy.
 - Highlight critical objectives from the Coastal Management Act and provide guidance on compromise solutions.
 - Integrate reciprocity, fostering the well-being of both the community and the environment.
- Community Empowerment
 - Encourage community contributions to management ownership and custodianship positively.
 - Ensure empowerment is handled with care, focusing on regenerative leadership and management.
 - Embrace adaptive management approaches, integrating traditional and modern knowledge.

Objectives

The Act does not prioritise objectives, lacking a clear hierarchy. This makes it crucial to determine which objectives are most important for the community and effective risk management, which may vary by location. The Coastal Management Program (CMP) can help define and justify these priorities.

Coastal Management Values and Issues

Identifying the multiple and various coastal values and management issues for the Northern Beaches open coast and lagoons area is a critical element of scoping the CMP. These values and issues vary throughout the study area. The CMP will integrate these values and issues into effective management actions, seeking to enhance them and address them, respectively.

In order to summarise what was discussed in the workshops, each comment received was classified into primary and secondary themes. These themes are listed in **Table 1**. A count of comments classified under each theme provides a rough indication on the distribution and weight of each, and is shown in **Figure 3**. It is important to note that the workshop discussion, though broad and wide-ranging, do not represent a comprehensive coverage of all important values and issues. A more comprehensive discussion is provided in the Scoping Study report.

Table 1 Primary and Secondary Themes for Workshop Comments.

Primary Theme	Secondary Theme
Community and Recreation	Community Engagement and Education
	Heritage
	Public Access and Amenities
	Public Safety
	Recreational Usage and Conflicts
Environmental Protection	Biodiversity and Habitat Conservation
	Coastal Vegetation and Dune Management
	Pollution and Water Quality
Governance and Policy	CMP Development
	Regulatory Compliance and Land Management
	Stakeholder and Inter-agency Collaboration
	Strategic Planning and Policy Development
Infrastructure and Development	Infrastructure Maintenance and Renewal
	Land Use Changes and Development Pressures
	Utility Management
Risk and Hazard Management	Climate Adaptation and Resilience
	Coastal Erosion and Flooding
	Geotechnical Stability and Landslide Risks

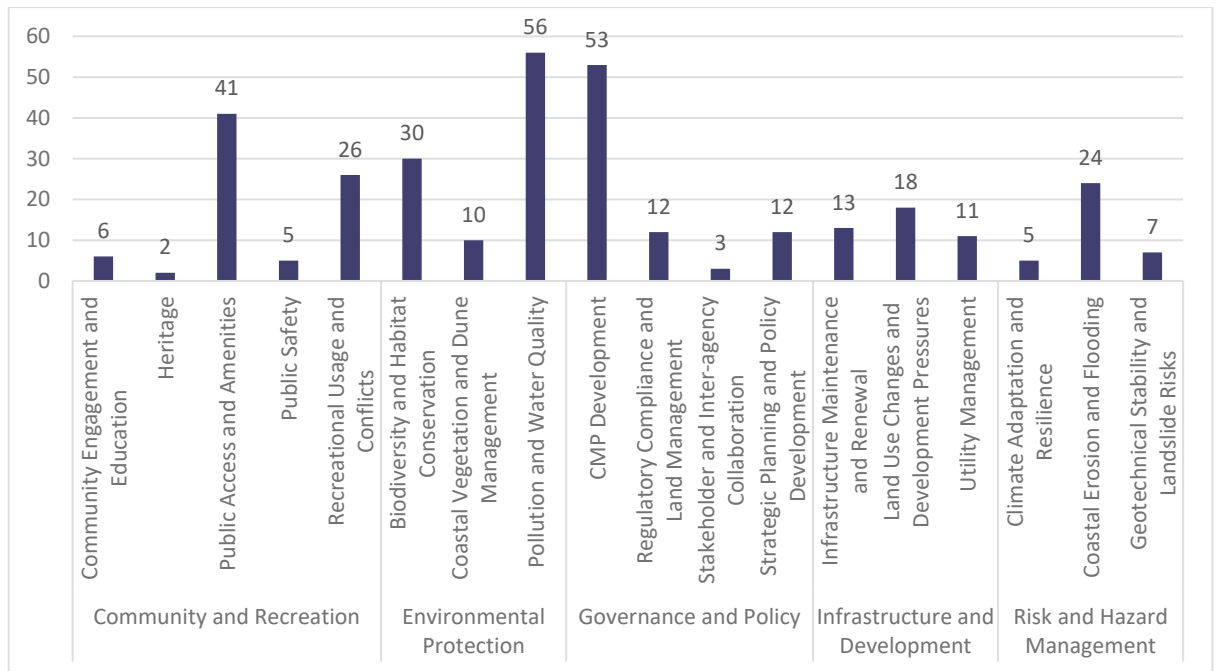


Figure 3 Count of workshop comments relating to values and issues classified by primary and secondary theme

What We Heard

Community and Recreation

- Volunteers monitor bird populations at Manly, Curl Curl, and Dee Why lagoons to track ecosystem health.
- It's crucial to clearly communicate with the public to distinguish natural processes from those that can be managed or amended.
- There is a need to encourage and support citizen science initiatives wherever possible to foster greater community involvement.
- There are well-established community groups actively engaged in protecting and managing all of the lagoons.
- Important Heritage items include the fishing huts at Fisherman's Beach.
- Access to Surf Life Saving Clubs and public toilets is essential for recreational activities.
- Upgrades or new buildings are planned or have been completed at various locations (e.g., Manly, Newport, North Steyne, Freshwater, Mona Vale).
- Erosion in exposed beach locations affects safe access (e.g., Collaroy Beach - South).
- Adaptations are needed to reclaim space for recreational use and ensure coastal walkways remain accessible.
- Lagoon entrances are increasingly used for family recreation, creating pressure to manage recreational use (e.g., Curl Curl, Dee Why, Manly).
- Sedimentation and shallowing of lagoons impact access and require attention (e.g., Curl Curl, Dee Why, Manly Lagoon).
- Hotspots like Collaroy-Narrabeen attract significant use, highlighting the importance of adequate facilities and access.
- Formal recreational areas (e.g., beach volleyball) need prompt restoration after storm events (Manly Beach).

- Improved recreational facilities at Freshwater, Mona Vale, and Bilarong Reserve include community halls and changing facilities.
- Walking tracks near lagoons contribute to physical and mental health.
- Limited access to playfields and other recreational facilities impacts well-being.
- Encouraging citizen science initiatives can foster community education and monitoring efforts.
- Sand and weed buildup in rockpools impact safety and hinder cleaning and maintenance.
- Current signage for public safety is present, but may require an update to improve clarity and safety awareness.
- Effective shark management is vital for public safety, and it falls under the jurisdiction of the Department of Primary Industries (DPI).
- The council is responsible for handling deceased animals that wash up on the beach to maintain public health and safety.
- Safety issues around more isolated rock shelf attractions, such as the blowholes and caves need to be addressed.
- Activities such as kitesurfing and dog-walking in conservation areas lead to conflicts due to potential impacts on local wildlife and habitats.
- Issues with stormwater management and informal paths affect recreational use and accessibility. Problems with ponding and erosion are noted, impacting both safety and enjoyment.
- Conflicts between recreational and conservation needs, particularly where dogs and recreational activities overlap with environmentally sensitive areas.
- Fishermen and other recreational users often clash over the use of water bodies and coastal areas, reflecting broader issues in managing shared spaces.
- The encroachment of recreational spaces into residential areas causes parking and access issues, influencing local resident satisfaction.
- Community pressures to manage access points and recreational spaces effectively, often with the need to balance recreational freedom with environmental preservation.
- Potential regulation or caps on recreational business activities to manage overuse and ensure sustainable practices.
- Proposals for new recreational facilities or changes, such as off-leash dog areas, require careful consideration of community responses and environmental impacts.

Environmental Protection

- Opportunities exist for habitat enhancement through floating wetlands, grey-green infrastructure, and naturalisation of creeks and wetlands.
- Rejuvenation efforts should focus on wetland ecosystems, saltmarshes, and rocky intertidal areas, balancing water quality improvements and habitat creation.
- Threats to wildlife and biodiversity include invasive species, habitat fragmentation, and recreational activities.
- Monitoring is essential for understanding the presence of threatened species, bird habitats, and seahorse breeding areas.

- Various agencies like the Department of Primary Industries (DPI) and the National Parks and Wildlife Service (NPWS) handle marine mammal entanglements and need comprehensive data on migratory birds and other wildlife.
- Collaboration between agencies is crucial to managing wildlife refuges and reserves effectively.
- Potential management actions must consider environmental values, particularly in sensitive areas like Marine Protected Areas.
- Trade-offs will be needed between environmental protection and other land use activities.
- The creation of green corridors can connect isolated wetlands, promoting biodiversity while improving water quality and conservation.
- Ecosystem adaptation strategies should be guided by research and monitoring, focusing on climate change impacts and sustainable land use changes.
- Coastal dunes harbour unique and threatened flora, making their conservation vital.
- Degradation due to invasive species and high visitor traffic affects dune vegetation.
- Dune maintenance to prevent blowouts and retain sand can lead to steep beaches with accessibility challenges.
- Scraping practices to encourage sand accretion need to balance vegetation preservation and beach usability.
- Heavy visitor traffic, including off-leash dog areas, contributes to vegetation loss and impacts wildlife habitats.
- Access management must consider stakeholder needs while protecting dune environments.
- Private ownership of coastal frontage can complicate vegetation management and restoration efforts.
- Stakeholder concerns over dune height and sand sourcing require careful balancing of interests.
- Adaptive management strategies should account for changing formations and evolving user priorities.
- Effective dune care involves council collaboration, ensuring sustainable access management and conservation practices.
- Industrial pollutants and contaminants from upstream industry, landfills, and urban development pose risks to water quality.
- Landfills and contaminated land contribute to pollution through stormwater runoff, soil erosion, and leaching of hazardous materials.
- Untreated stormwater discharge, sewage overflows, and ocean outfalls affect beaches and aquatic reserves, leading to poor water quality and environmental health risks.
- Stormwater quality improvement strategies include upgrading gross pollutant traps (GPTs) and other mitigation measures.
- Coastal receiving waters and heavily urbanised catchments experience degradation due to fertiliser use, sedimentation, erosion, and upstream contaminants.
- Development pressures lead to increased pollution, impacting water quality in coastal lagoons and wetlands.
- Water quality monitoring programs provide valuable data but reveal that many systems are impaired or unstable.

- Community engagement through programs like Beachwatch can help monitor and address known problem areas.
- Poor water quality, blue-green algae, and nutrient overloading affect recreational amenity and ecosystem health.
- Golf courses and other recreational activities can pose additional environmental challenges due to fertilisers and runoff.
- Implementing water-sensitive urban design (WSUD), offline embayments, and collaboration between stakeholders can improve water quality.
- Maintenance of in-ground sensors and GPTs will be crucial for proactive water quality management.

Governance and Policy

- CMP actions are limited to Coastal Management Areas (CMAs) and require careful planning across public and private properties.
- Landowner consent is crucial, especially on Crown land or areas where council is not the manager.
- Buffer zones are often overlooked but are essential parts of the coastal zone.
- Coastal infrastructure requires responsible and sustainable development to ensure resilience and adaptation.
- A planning proposal can adjust CMAs and align land use with coastal values and ecosystem health.
- The vision for the CMP should look beyond human use and include ecological health and climate resilience.
- Incorporate goals that promote creative, sporting, and recreational opportunities while considering environmental protection.
- Community empowerment should be approached carefully to ensure positive management and custodianship.
- Encourage adaptive management approaches that integrate traditional knowledge with modern science.
- Adaptive management should iteratively adapt to changing hazards while aligning with traditional guidelines and knowledge.
- Collaboration between agencies helps achieve shared visions and objectives.
- The link between community well-being and environmental health should underpin CMP governance and policy.
- Environmental grants have been well received but will eventually require ongoing maintenance funded by local councils.
- Environmental Management Plans (EMPs) guide the management of contaminated sites.
- Coastal Crown Land Guidelines must be followed to obtain landowner consent and manage Crown land effectively.
- Commercial fishing licenses, Aboriginal Cultural Fishing allowance, are important natural resource management tools
- Comprehensive plans, like Plans of Management (PoMs) and Masterplans, should be developed for key areas, aligning with upcoming regulatory frameworks.

- Transport resilience plans and disaster adaptation plans should address gaps in existing knowledge to improve infrastructure.
- Align CMPs with customer priorities, focusing on clean waterways, pollution reduction, and resilient infrastructure.
- Consider various adaptation approaches based on community appetite and other influencing factors.
- Coordination between marine policy teams, councils, and regulatory agencies ensures effective review and protection of Marine Protected Areas.
- Beachwatch and water quality monitoring require sustained collaboration with agencies and community stakeholders.
- Engaging multiple agencies fosters a long-term view on capital planning and disaster recovery.

Infrastructure and Development

- Water infrastructure requires upgrades to ensure reliable wastewater treatment, stormwater management, and safe access.
- Ocean outfall tunnels and wastewater treatment plants need desilting, re-lining, and technological upgrades to improve environmental protection.
- Wastewater recycling facilities are vital for sustainable resource management and require long-term renewal plans.
- Seawalls adjacent to coastal structures need repairs to address unstable conditions and public safety risks.
- Storm damage to bridges and other structures warrants relocation or renewal to enhance resilience.
- Surf life-saving clubs, community amenities, and sailing clubs require alterations and rebuilding for accessibility and fire safety.
- Car parking near beaches needs improved planning to prevent overflow into surrounding streets and to accommodate high weekend demand.
- Important bridge crossings and other coastal assets need monitoring and stability assessments.
- Asset management plans should align with regulatory requirements to maintain safe and accessible facilities.
- Historic and active landfills can impact recreational spaces. Historic landfill sites require ongoing monitoring to ensure environmental protection.
- Major development plans need consideration due to the large number of new residential homes being built.
- Increases in residential and urban expansion can lead have cumulative effects, encroaching on natural areas.
- Affordable housing policies result in downstream environmental impacts due to reduced pervious surfaces.
- Synthetic playing fields can have impacts on stormwater infiltration and water quality.
- Identifying and rehabilitating contaminated sites provides opportunities for activating spaces.
- Significant redevelopment of public spaces is proposed, which requires careful planning.

- Patterns of development must be consistent across local government areas to manage coastal hazard risks effectively.
- Existing stormwater infrastructure within active wave zones or prone to erosion needs gradual relocation or reinforcement for safety and efficiency.
- New devices and improvements to stormwater infrastructure are being proposed and investigated for various locations.
- Older-style stormwater culverts are causing erosion and require modernisation.
- Managing low-flow pipes and stormwater volume are ongoing challenges in lagoon and creek environments.
- Maintaining and upgrading stormwater assets to enhance safety and stability remains crucial.
- Certain areas' topography and lack of proper drainage infrastructure complicate stormwater management and require creative solutions.

Risk and Hazard Management

- Climate change and sea-level rise threaten coastal infrastructure, rockpools, wetlands, and reserves, affecting biodiversity and recreational use.
- Storm damage and other coastal hazards impact transport infrastructure, requiring sustainable solutions.
- Coastal and lagoon foreshore erosion, entrance management, and flooding affect private property, public spaces, and golf courses.
- Coastal cliffs, headlands, and escarpments face geotechnical stability risks due to landslides and require ongoing monitoring.
- Flood gates, emergency lagoon openings, upstream mitigation works, and entrance clearance are crucial to flood control.
- Erosion, rock wall integrity, and bank stability require ongoing assessments and coastal protection structure asset management planning.

NBC Open Coast & Lagoon CMP Scoping Study

Workshop 2 – What We Heard

Introduction

Rhelm facilitated two targeted workshops aimed at confirming high risk threats in identified locations with an understanding of the current management practices and recognise any knowledge gaps for the Open Coast and Lagoon Coastal Management Program (CMP) Scoping Study. These workshops were designed to build on the previous round of workshops which focused on the values and issues associated with the Northern Beaches coastal zone, and further clarify the strategic direction of Council's CMPs. These workshops were conducted with two distinct groups:

- External State government agency representatives
- Key council staff

This 'What We Heard' report provides an overview and summary of the discussions at these two workshops, providing at a glance a high-level synthesis of information that will guide development of the Scoping Study and therefore the eventual CMP.

The first workshop engaged representatives from various State government agencies, bringing together a wide range of expertise to inform the study with a broader governmental perspective. The second workshop focused on internal council staff who are directly involved with the management and operational aspects of the coastal regions under discussion. This method captured both the broad, regulatory and policy perspectives as well as the detailed, daily operational insights.

Workshop Overview

The primary purpose of these workshops was to gather more detailed information about the high-risk threats and identify any information gaps affecting the region's coastal and lagoon environments. This was underpinned by a draft first pass risk assessment undertaken by the project team that identified risk ratings for key threats, both present day and into the future. Both workshops were facilitated with similar agendas, with the differentiating factor being the content of the interactive discussions.

Before the workshop, attendees were provided with the draft first pass risk assessment spreadsheet and a detailed workshop agenda to better prepare for the group discussion. An overview of the work thus far in the project was provided to the audience, providing appropriate context for the group discussion.

The workshop attendees were then provided a link to an interactive MIRO board – a screenshot is provided in **Figure 1**Error! Reference source not found.. MIRO allows attendees to roam freely around the board and place notes relating to the displayed content. Sections of the board included guiding text, pictures and maps. A facilitated discussion guided attendees through the MIRO board, soliciting comments and input at each section.

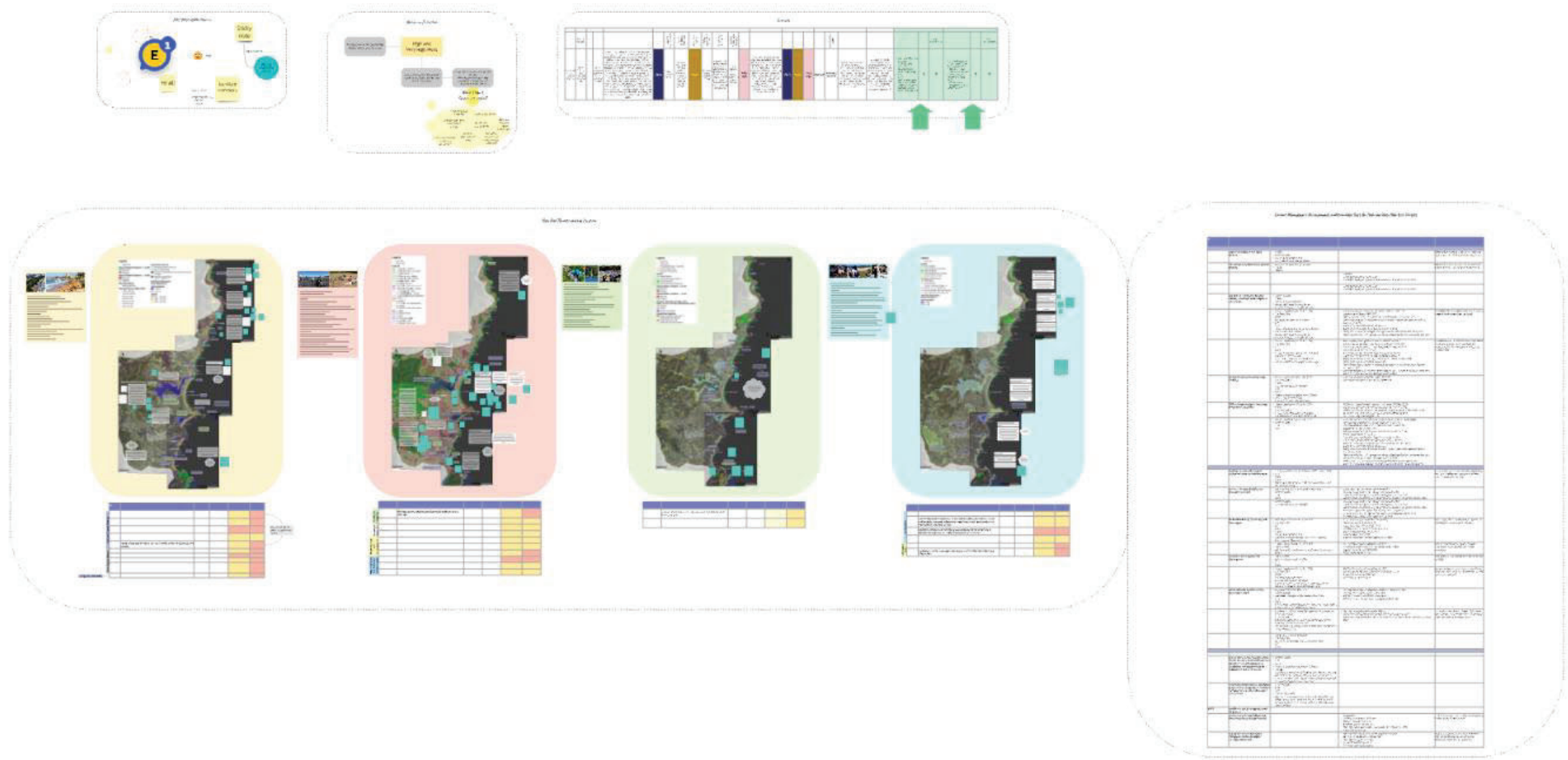


Figure 1 Screenshot of interactive Miro board used during both workshop

Values, Stressors and Risk Framework

The CMP scoping study provides an opportunity for the attendees to aid in identifying high risk threat areas and recognise any information gaps to shape the first pass risk assessment and knowledge gaps of the CMP. Key values were previously identified and explored in first workshop series as part of the CMP Scoping Study, this was presented to both the groups and are outlined in **Table 1**.

Table 1 Outline of Key Values Identified in Workshop Series 1.

Geodiversity and Landscape Amenity	Flora, Fauna and Biodiversity	Water Quality	Cultural Heritage	Social and Economic Use
Habitat diversity, Visual amenity, Landscape enabled recreation, & Educational value	Intergenerational value, Ecosystem services, Visual amenity, Wildlife related recreation, & Educational value	Aquatic ecosystem health, Primary contact recreation, Secondary contact recreation, Visual amenity, & Suitability of growing aquatic foods	Historical significance, Cultural practices, Archaeological sites, Community identity, & Architectural heritage	Recreational opportunities, Socialisation and participation, Tourism, Cultural significance, & Economic contribution
				

Attendees were provided with an overview of threats and stressors that have been identified prior to the workshop series 2 commencing, these were compiled into four primary categories, which were also used as themes in the group discussion activities:

- Coastal and Estuarine Hazards
- Urbanisation and Land Use Impacts
- Water way and Resource Conflict
- Planning and Governance

These threats were further categorised into secondary themes and individual stressors. The secondary themes under each of the four primary categories is provided in **Table 2**.

Table 2 Overview of Threats and Stressors explored throughout the workshop

Primary Theme	Secondary Theme
Coastal and Estuarine Hazards	Climate Change
	Event Based Hazards
	Long Term Hazards
Waterway Use and Resource Conflict	Commercial Activities
	Access and Availability
	Public Health and Safety
	Recreational Activities
Urbanisation and Land Use Impacts	Ecological Impacts
	Hydrologic Modifications
	Infrastructure and Development
	Water Pollution and Sediment Contamination
Planning and Governance	Governance
	Information Gaps

A CMP requires councils to follow a risk-based approach throughout the planning and management strategies required for the local area. This was the focus for the duration of both workshops with conversations centred around the four primary threat categories. A breakdown of comments received under each category is shown in Error! Not a valid bookmark self-reference.. This figure also shows which stakeholder group provided the comments. A more detailed overview of comments received is provided in the following sections.

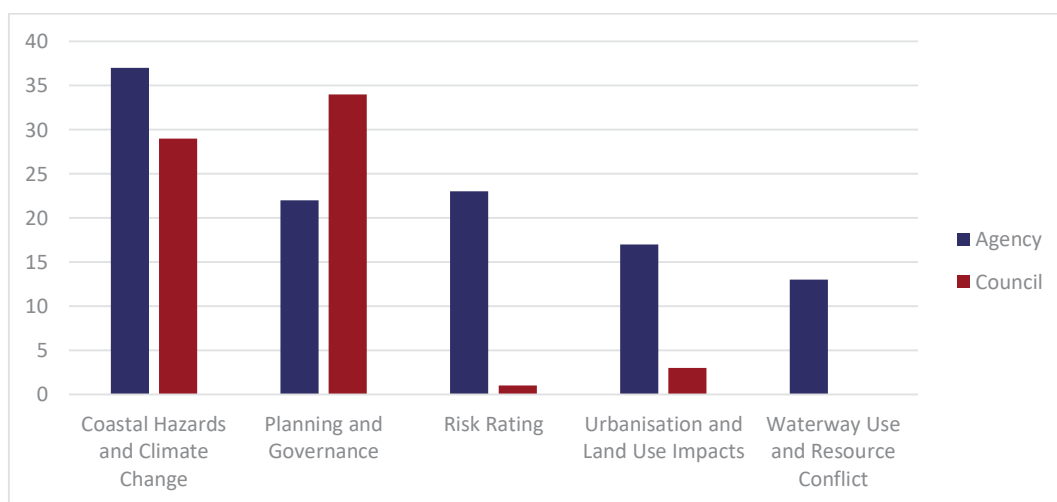


Figure 2 Count of workshop comments relating to Coastal Hazards and Climate change, Planning and Governance, Risk Rating, Urbanisation and Land Use Impacts, and Waterway Use and Resource Conflict.

What We Heard

Coastal and Estuarine Hazards

- Coastal Erosion & Flooding
 - Increasing erosion due to climate change, rising sea levels, and changing hydrology.
 - Erosion impacts public infrastructure, habitats, and recreational access.
 - The need for better flood modelling and coastal design guidelines was also highlighted, with increasing storm events, impacts to sediment transport and the loss of seagrass and recreational access.
 - The economic impacts of tidal inundation replacing coastal erosion as a major concern.
- Sea Level Rise (SLR) & Climate Change
 - Many discussions centred on the growing impacts of sea level rise on coastal infrastructure (e.g., wastewater assets, sewer systems) and habitats (e.g., salt marshes, estuarine environments).
 - Specific concerns were raised around saltwater ingress, ecosystem shifts, and the need for land use planning to facilitate habitat migration, especially for marine vegetation.
 - Explore long-term solutions like retreating salt marshes and marine vegetation and supporting the role of fisheries in facilitating these changes.
- Coastal Protection Measures
 - Traditional solutions like seawalls may not be the best for long-term management.
 - Offshore artificial reefs or groynes were proposed as alternative solutions, though these might trigger approvals under the Fisheries Management Act.
 - Concerns about the sustainability of beach nourishment, with questions about frequency and how this could impact entrance management and dune dynamics.
 - The role of sand pumping as a long-term solution for entrance management.
- Public Risk & Access
 - The safety of public access, particularly around unstable cliffs with a focus on impacts to emergency access transport routes, and ongoing maintenance of coastal assets.
 - The need for community involvement in risk assessment, including determining community expectations and risk appetite.
- Water Quality & Ecosystem Health
 - The increased frequency and intensity of storms contributing to organic matter loading, water quality declines.
 - the impact of stormwater overflows on water quality, particularly at lagoons and beaches.
 - Increased turbidity and sedimentation from storm events highlighted as threats to seagrass health, with potential long-term impacts on biodiversity.
- Marine & Estuarine Habitat
 - Fisheries are looking for opportunities to facilitate estuarine habitat migration due to sea level rise, with programs in place to model ecosystem shifts caused by climate effects.
- Infrastructure Resilience
 - Vulnerability of key infrastructure, such as wastewater assets and low-flow pipes, to storm events and saltwater ingress.

- The need for upgrades to infrastructure to withstand future environmental conditions was emphasised.
- Policy & Future Planning
 - Several participants highlighted the need for stronger climate change policy, including the role of CMPs in addressing flood and coastal inundation risks.
 - The role of an Estuary Planning Levels (EPL) and Flood Planning Levels (FPL) in managing flooding and sea level rise risks.
- Local Hazards & Specific Site Risks
 - Ongoing cliff instability at North Head and rockfalls at other locations were noted as a significant hazard, especially to public safety.
 - The dynamic nature of lagoon systems was discussed, with calls for more detailed management strategies tailored to each unique system.

Waterway Use and Resource Conflict

- Boating & Waterway Use
 - Increased boat renting and competition for waterway space, boating activities at Narrabeen Lagoon were highlighted with concerns about impacts to the seagrass.
- Entrance Clearing & Lagoon Management
 - Increasing frequency of entrance clearing activities, particularly at Narrabeen Lagoon, and whether this should be considered under the Marine Estate Management Act or Fisheries Management Act.
 - There is growing community pressure to open lagoons when they close, especially in areas like Narrabeen Lagoon. Community needs to be informed about the reasoning of the entrance management.
 - DPIRD Fisheries interested in collaborating with Northern Beaches Council (NBC) and Crown Lands on future entrance clearing activities, minimising potential impacts on the adjacent Aquatic Reserve at Narrabeen Headland.
- Environmental Impact & Sensitive Ecological Areas
 - Potential environmental impacts of water-based recreational activities, such as boating and water parks, on sensitive areas like seagrass beds
 - DPIRD Fisheries interested in improving the management of recreational activities and general visitation to sensitive ecological areas.
 - Entanglement risks for marine mammals, particularly in relation to coastal infrastructure and human activities.
- Collaboration & Policy Considerations
 - Need for better collaboration between to ensure that recreational activities are managed in a way that reduces environmental impacts.

Urbanisation and Land Use Impacts

- Coastal Access & Environmental Impact
 - Significant challenge of increasing public access to coastal areas while managing environmental impacts.
 - Trampling and visitation impacts at sensitive areas like Cabbage Tree Bay Aquatic Reserve .
 - Issues such as user conflicts were mentioned, particularly in areas like Cabbage Tree Bay, where boating and dogs on the rock platform are causing disturbances.
 - The disturbance of shorebirds, from domestic dogs, was a specific concern.

- There is a need to address issues related to dog owners and their activity in sensitive coastal habitats like dunes and saltmarsh areas.
- Disability access to beaches with affordable solutions.
- Urban Development & Coastal Protection
 - The proximity of development to the coast is a concern, particularly in areas where coastal hazards (erosion or flooding) are increasing due to urban development.
 - Traditional coastal protection works might not always be feasible.
 - Discussions with residents about natural solutions and future options were recommended.
- Entrance & Navigation Management
 - There were concerns about changing entrance conditions due to increased storm frequencies, with a need to reassess entrance management regimes and maintenance strategies.
 - Response to storm events and how such conditions could impact maintenance efforts.
 - How boating and waterway use is managed in Narrabeen Lagoon
- Wastewater & Water Quality
 - The Sydney Water source control project was mentioned as an important initiative aimed at addressing wastewater quality issues.
 - Coastal water quality at NBC beaches has been good, with Beachwatch results showing only temporary impacts after heavy rains.
- Community Engagement & Education
 - The importance of understanding community concerns about coastal access, environmental values, and the acceptability of coastal management actions.
 - A gap in education about appropriate behaviour by dog owners in coastal dunes and saltmarsh areas was noted, with a need for greater awareness and action.
- Private Property & Vegetation Clearing
 - There was mention of the risk of private property owners clearing vegetation for improved views.
- Penguin Habitat
 - Improving the penguin habitat on the foreshore area
- Legislation & Management Approaches
 - Whether current management approaches (including existing legislation) are adequate to address the increased likelihood of clearing and environmental degradation as urban development expands along the coast.

Planning and Governance

- Coastal Management & Planning
 - Coastal Design Guidelines being useful for informing both planning proposals and broader development in the coastal zone, ensuring that future development considers coastal hazards and environmental protection.
- Community Engagement & Education
 - Importance of community education around coastal issues there is currently limited public awareness about the marine estate and coastal hazards in the area regardless to signage.
 - Educating the community about the impacts of coastal development, dog management, and other activities on the environment is critical.

- Improve public outreach, including more engaging communication campaigns and better signage.
- There is a concern that the public perception of some activities, like entrance management, is skewed, with people viewing it as an aesthetic measure rather than for flood mitigation.
- It's suggested that Council may need to introduce more management measures, like restrictions on dog access.
- Citizen Science & Community Engagement
 - Suggestions to engage the community in citizen science programs, particularly around volunteer bird watching to understand migrating birds' impacts on habitat and biodiversity.
 - Better communication with local communities is required, especially in understanding the impacts of sea level rise, climate change, and coastal hazards.
 - It was also noted that as the risks increase, clear and accessible data should be provided to potential property buyers in the area.
- Environmental Protection & Habitat Management
 - There were several comments on habitat squeeze, which refers to the loss of natural habitats due to the rising sea level and urban development.
 - Habitat squeeze is not currently being considered in planning for climate change adaptation, and suggested it should be a key focus moving forward.
 - Concerns were raised about the potential impacts of human activity on sensitive coastal areas, including penguin habitat, marine mammal entanglement, and shorebirds.
- Stormwater & Water Quality
 - Need for better stormwater management strategies, particularly concerning water quality.
 - Concerns about how stormwater outlets and drainage systems are managed, especially in relation to water quality in areas like Manly Lagoon and Cabbage Tree Bay.
 - Push to ensure water quality monitoring systems are implemented and upgraded to address future challenges.
 - Sydney Water is focusing on wastewater source control, which is part of a larger 10-year program aimed at improving water quality.
 - Need for a coordinated approach to managing pollution from point and diffuse sources, particularly in areas with significant historic development.
- Coastal Hazards & Risk Management
 - The increased frequency of entrance clearing, and coastal hazards were noted as emerging concerns.
 - Questions about how these activities trigger legislative action under the Fisheries Management Act and how future cumulative impacts need to be better accounted for in the CMP.
 - There was concern that current management approaches might not sufficiently address emerging trends or long-term risks.
 - Discussions included the need to prioritise management measures based on coastal hazard assessments, including an understanding of how different natural hazards (e.g., bushfires, coastal erosion) compare in terms of community impact.

- Policy approaches should consider how to balance the management of different types of hazards, particularly in light of long-term trends like climate change.
- Aboriginal Cultural Heritage & Engagement
 - The Caring for Country initiative, alongside efforts to integrate Aboriginal cultural heritage and values into coastal management, were highlighted as important to consider for sustainable management.
 - The importance of engaging with First Nations communities in coastal management planning.
 - Key individuals involved in Aboriginal cultural heritage and water management, noting that the Aboriginal Water Strategy should be integrated into the planning process.
 - The Cumberland Plain Conservation Plan and the need to consider Aboriginal outcomes in the broader context of coastal management.
- Planning, Policy, & Development Challenges
 - Whether the CMP could serve as a mechanism to influence planning, particularly through the Local Environmental Plans.
 - How the CMP could align with broader urban design recommendations and land use planning to ensure that future development takes coastal hazards and environmental preservation into account.
 - Discussions about Crown Land included the fact that certain areas (like Dee Why) have historic Crown Land licences for managing ICOLL entrances.
 - Need to clarify whether Narrabeen or other areas require new licences for managing entrances, particularly in light of coastal hazard risks.
- Coastal Asset Management & Funding
 - Questions raised about whether coastal hazards are considered in asset management plans, particularly for public and private assets.
 - Concerns were raised about the potential affordability of insurance premiums and the risk of stranded assets if coastal hazards like erosion and storm damage worsen over time.
 - Concern about the funding required to address these risks, particularly given the lack of funding for some of the necessary climate change considerations.
- Water Quality Monitoring & Innovation
 - Calls for innovations in monitoring water quality in the region, particularly in light of pollution management and stormwater issues.
 - Concerns about legacy pollution in urban catchments and the need to explore new technologies or treatment options that could help mitigate future risks.

Knowledge and Information Gaps

Identifying potential knowledge gaps is a critical element in the Stage 1 Scoping Study of a CMP. It assists in the planning phase of stage 2 for required additional studies and research to be undertaken through stage 2 of the CMP. These knowledge gaps can highlight areas where further data is needed to ensure effective management practices are in place for the given CMP area. This was a focus of the workshop discussions.

In order to summarise what was discussed in the workshops, comments received relating to knowledge and information gaps were classified into primary and secondary themes as shown in **Table 2**. A count of comments classified under each theme provides a rough indication on the distribution and weight, and is shown in

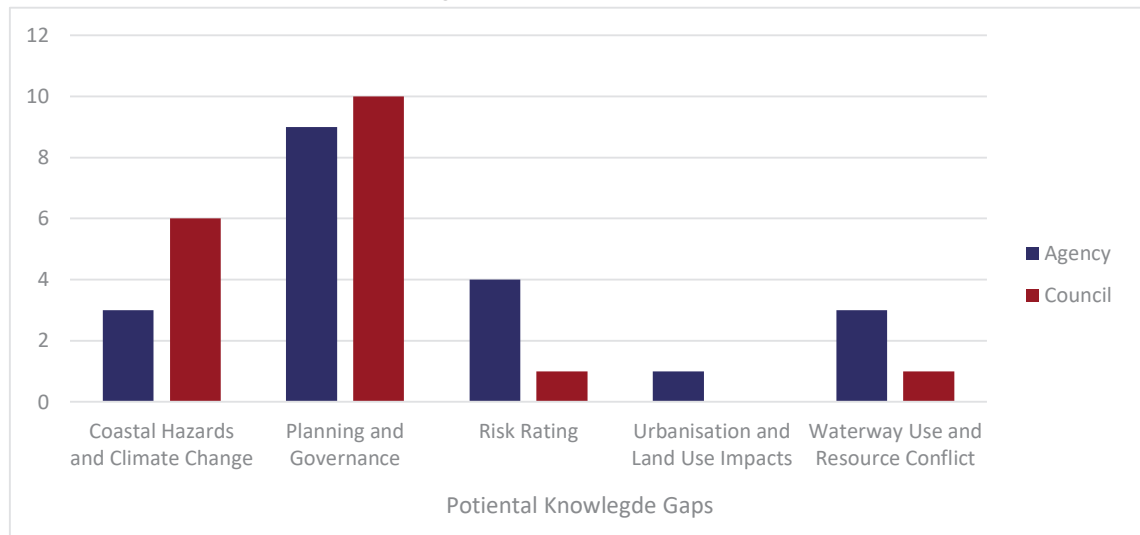


Figure 3. This highlights the areas of knowledge gaps and potential further studies. It is important to note that the workshop discussion, though broad and wide-ranging, does not represent a comprehensive coverage of all important values and issues. A more comprehensive discussion is provided in the Scoping Study report.

What We Heard

Information Gaps

- Beach Rotation and Sedimentation Patterns:
 - There is a knowledge gap in understanding how beach rotation and sedimentation occur, particularly in relation to El Niño periods. This is crucial for managing coastal erosion, beach nourishment, and ensuring that interventions like dredging or sand replenishment are effective. Without a clear understanding of these natural processes, it's difficult to predict how coastal dynamics will change over time and what interventions might be required to maintain coastal stability.
 - There was also a question raised about the sustainability of dredging cycles for entrance management, specifically whether dredging every four years is sufficient or if it should be conducted annually. The impact of different dredging frequencies on coastal habitats, water quality, and sediment transport needs to be better understood.
- Tidal Extent and Water Movement:
 - Tidal extent is a key factor in assessing the impact of sea level rise, coastal erosion, and habitat shifts. However, there was a suggestion that existing mapping may not reflect the local reality or the full extent of tidal changes in specific areas. This creates a need for more accurate, site-specific data that can help predict how coastal areas might evolve under future climate scenarios.
 - Understanding how tidal movement affects both shoreline habitats and human infrastructure is important for planning coastal protection and adaptation strategies, but current data may not fully capture these dynamics in the context of ongoing climate change.
- Effectiveness of Coastal Protection Measures:
 - There was a concern about the effectiveness of existing coastal protection measures, such as seawalls, groynes, and sand pumping, in the face of increasing storm frequency and sea level rise. This points to a need for more comprehensive data on how these interventions perform over time, especially in changing environmental conditions. For example, are current coastal protections sufficient to withstand more frequent or intense storms, or will these structures need to be redesigned or supplemented with additional measures?
- Cumulative Impacts of Coastal Entrance Clearing:
 - The issue of coastal entrance clearing (e.g., at Narrabeen Lagoon) is another area with data gaps. While the practice of clearing entrances to maintain water flow and prevent flooding has been common, there is concern about the cumulative environmental impacts of frequent entrance openings. Data is needed to assess how repeated interventions affect water quality, aquatic ecosystems, and nearby habitats like Aquatic Reserves.
 - Understanding the long-term effects of entrance management is important, particularly as climate change may alter storm frequency and intensity, leading to more frequent or prolonged interventions.
- Stormwater and Pollution Management:
 - There is also a gap in data around stormwater management and its impact on water quality in coastal environments. For example, stormwater overflows and pollution from urban runoff are known to cause temporary declines in water quality, but there

is a lack of detailed data on the frequency, intensity, and geographic scope of these pollution events. Additionally, the long-term impacts of these events on marine habitats, such as seagrass beds, are not fully understood.

- New technologies or treatment options for managing point-source and diffuse pollution need to be explored to better address these issues. There is also concern about the legacy pollution in developed catchments that may be affecting water quality but is not always accounted for in management plans.
- Habitat Squeeze and Coastal Development:
 - The concept of habitat squeeze, where coastal ecosystems are pushed out due to both sea level rise and urban development, was highlighted as another area lacking sufficient data. Current planning efforts may not fully consider how habitat loss could impact biodiversity, particularly for sensitive species like shorebirds, marine mammals, and seagrass. Understanding the rate at which habitats are being lost or shifted due to climate change and urbanisation is vital for guiding long-term planning and conservation efforts.
 - There is also a need for more data on species migration patterns and how they might be impacted by coastal protection works or changes in the availability of suitable habitats as sea levels rise.
- Community Perceptions and Risk Tolerance:
 - A key data gap identified was the lack of understanding of community perceptions regarding coastal hazards, particularly among property owners and local residents. There is little data on how aware the community is of the risks associated with living near the coast, such as coastal erosion, flooding, or storm surges, and how they perceive the potential impacts of these hazards on their property. This gap can hinder effective community engagement and risk communication, especially when new developments or hazard mitigation strategies are proposed.
 - It was suggested that the CMP could serve as a vehicle for better understanding community expectations and risk appetite, helping to tailor communication strategies and decision-making to reflect local needs and concerns.
- Climate Change and Biodiversity Data:
 - As climate change continues to accelerate, there are growing concerns about how increasing temperatures and sea level rise will impact local biodiversity. While state government agencies are producing reports on the broader impacts of climate change on biodiversity, there is a lack of localised data to assess how these changes will specifically affect coastal ecosystems.
 - More detailed information is needed to understand how different species and ecosystems are likely to respond to temperature increases, changes in water salinity, or shifts in oceanic conditions. This data is critical for developing effective management plans that prioritise the protection of vulnerable species and habitats.
- Efficacy of Current Management Tools:
 - There was also a call to assess the effectiveness of current management tools, such as Intertidal Protected Areas and Aquatic Reserves. While these tools are designed to protect sensitive areas, there is uncertainty about their actual effectiveness in the face of increasing coastal pressures. This uncertainty highlights the need for better data to track the performance of existing management strategies and identify areas where improvements or adjustments might be needed.



Appendix E

FIRST PASS RISK ASSESSMENT RESULTS

Threat	Stressor Category	ID	Stressor	Detailed Stressor Description	Current Risk				Future Risk			Confidence Rating	Current Management Arrangements			Available Information and Data					
					Likelihood	Relevant Likelihood Scale	Current Likelihood - Description	Consequence Rating	Primary Consequence Category	Consequence - Description	Secondary Consequence Categories		Risk	Likelihood	Consequence	100 year Risk	Included in:	Adequacy	Gaps / Improvements	Key References:	Adequacy
Coastal and Estuarine Hazards	Event Based Hazards	EBH1	Coastal inundation	Coastal inundation from temporarily elevated ocean levels occurs through distinct mechanisms depending on the coastal environment. On open coast beaches, wave overtopping occurs when high-energy waves exceed the level of the beach berm or dune system, flooding inland areas with seawater. This can be exacerbated due to elevated ocean water levels that allow waves to reach the shoreline with increased energy. This process poses a threat to public safety, can damage infrastructure, and alter beach profiles. The coastal lagoons experience coastal inundation primarily through storm surges, where elevated ocean levels push seawater into lower-lying areas that are not typically inundated, often overwhelming natural or built drainage systems and impacting on assets.	Possible	Single events	Less likely than not but still appreciable - Probability less than 50% but still quite high	Major	Public safety	Isolated instances of serious injuries or loss of lives	Environment and cultural heritage, Local Economy and Growth, Community and Lifestyle	High	Likely	Major	Very high	High	* Coastal Legislation (CM Act, RH SEPP) * CZMPs & CMPs * FRMPs * Entrance Management Strategies * LEPs * DCPs * Coastal Erosion Emergency Action Subplans * NBC Coastal Erosion Policy * Manly LGA Climate Change Actions * Manly SLR Coastal Hazard Risk Report * NSW Coastal Design Guidelines 2023	Adequate	* Collaroy-Narrabeen Beach and Fishermans Beach CZMP 2016 * Bilgola & Basin Beach CZMP 2016 * Sydney Coastal Councils Mapping & Responding to Coastal Inundation 2012 * Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 * Manly SLR Coastal Hazard Risk Report 2012 * Manly Ocean Beach Coastline Management Plan 2008 * Manly Ocean Beach & Cabbage Tree Bay Coastline Hazard Definition Study 2003 * Manly Identification of Properties Potentially at Risk from Erosion and Inundation 2013	Moderately Adequate	Coastal inundation assessments do not cover all areas of the Northern Beaches Coast
Coastal and Estuarine Hazards	Event Based Hazards	EBH2	Coastal storm (beach) erosion	Coastal storm (beach) erosion occurs when high-energy wave events cause significant loss of beach and dune systems, primarily impacting open coast beaches. The intense wave action, combined with elevated water levels, erodes the shoreline, often removing large volumes of sand and reshaping coastal profiles. On rocky headlands and cliffs, storm waves can undercut rock formations, leading to cliff instability and long-term recession. This process can lead to the loss of coastal land and habitats and increase the vulnerability of coastal infrastructure to future storms by reducing the protective buffer provided by natural systems.	Likely	Single events	As likely as not - 50/50 chance	Major	Community and lifestyle	Severe and widespread decline in services, quality of life, and recreational opportunities. Significant risk to a moderate number of properties and permanent loss of coastal access in key areas. Strong negative impacts on social cohesion and community well-being.	Environment and cultural heritage, Local Economy and Growth, Public Safety	Very high	Likely	Major	Very high	High	* Coastal Legislation (CM Act, RH SEPP) * CZMPs & CMPs * LEPs * DCPs * Coastal Erosion Emergency Action Subplans * NBC Coastal Erosion Policy * Manly SLR Coastal Hazard Risk Report * NBCs Coastal Dunes Management Strategy * NSW Coastal Design Guidelines 2023	Adequate	* NBC Scoping Study Significant Open Coastal Hazards 2021 * Collaroy-Narrabeen Beach and Fishermans Beach CZMP 2016 * Collaroy-Narrabeen Beach Coastal Protection Assessment 2016 * NBC Coastal Erosion Policy 2016 * Coastal Erosion Aboriginal Heritage Strategy 2015 & 2019 * Warringah Coastal Erosion Emergency Action subplan 2015 * Manly Ocean Beach Emergency Action Plan for Coastal Erosion 2008 * Manly SLR Coastal Hazard Risk Report 2012 * Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 * Manly Identification of Properties Potentially at Risk from Erosion and Inundation 2013 * Manly Ocean Beach Coastline Management Plan 2008	Moderately Adequate	Coastal storm erosion information adequate for significant open coastal hazard locations, inadequate for remaining Northern Beaches Coastal areas
Coastal and Estuarine Hazards	Event Based Hazards	EBH3	Combined coastal and catchment flooding	Combined coastal and catchment flooding occurs when elevated ocean levels from storm surges or high tides coincide with heavy rainfall and runoff from the catchment, resulting in compounded flooding impacts. This is particularly relevant to lagoons where high ocean levels impede the drainage of floodwaters from upstream catchments. On open coast beaches, this interaction can lead to severe beach erosion and scour, as stormwater drainage infrastructure can convey concentrated flows to discharge onto beaches. These concentrated stormwater outflows accelerate erosion, scouring beach profiles and destabilising dune systems. The combined forces of catchment flooding and coastal inundation increase risks particularly to infrastructure and human communities. Effective management requires integrating coastal and catchment flood planning, with particular attention to stormwater drainage infrastructure and erosion control.	Possible	Single events	Less likely than not but still appreciable - Probability less than 50% but still quite high	Major	Community and lifestyle	Severe and widespread decline in services, quality of life, and recreational opportunities. Significant risk to a moderate number of properties and permanent loss of coastal access in key areas. Strong negative impacts on social cohesion and community well-being.	Environment and cultural heritage, Local Economy and Growth, Public Safety	High	Likely	Major	Very high	Medium	* Coastal Legislation (CM Act, RH SEPP) * CZMPs & CMPs * FRMPs * Entrance Management Strategies * LEPs * DCPs * Coastal Erosion Emergency Action Subplans * NBC Coastal Erosion Policy * Manly LGA Climate Change Actions	Adequate	* NSW Flood Emergency Sub Plan 2021 (EMPLAN) * NSW Storm Emergency Sub Plan 2023 (EMPLAN)	Moderately Adequate	
Coastal and Estuarine Hazards	Event Based Hazards	EBH4	Cliff and slope instability (including beach berm instability)	Cliff and slope instability primarily affect rocky cliffs and headlands but can also impact beach berms on open coast beaches. Instability is often triggered by heavy rainfall, wave action, or erosion at the base of cliffs, leading to landslides, rockfalls, or slope failure. Over time, this process can result in significant loss of land and threaten infrastructure and public safety. On beaches, berm instability can occur due to undercutting from wave action, which can cause sections of the dune or berm to collapse. These hazards are particularly concerning in areas where development is close to the coast.	Possible	Single events	Less likely than not but still appreciable - Probability less than 50% but still quite high	Major	Public safety	Isolated instances of serious injuries or loss of lives	Local economy and growth, Community and lifestyle	High	Likely	Major	Very high	High	* Coastal Legislation (CM Act, RH SEPP) * POMs * CZMPs & CMPs * Coastal Dunes Management Strategies * NBC Geotechnical Risk Management Policy * NSW Coastal Design Guidelines 2023	Adequate	* NBC Annual Geotechnical Inspections of Coastal Cliff Sites, 2023 * NBC Annual Geotechnical Inspections of Coastal Cliff Sites, 2022 * Stability of Cliff Face - Marine Parade Between Fairy Bower and Shelly Beach 1984 * Geotechnical Feasibility Assessment, Bicentennial Walkway 2001 * NBC Annual Inspection Regime 2021	Adequate	
Coastal and Estuarine Hazards	Event Based Hazards	EBH5	Estuary entrance instability	Estuary entrance instability primarily impacts infrastructure near the entrance channel, as the movement of the entrance can lead to erosion, sediment deposition, and changes in water flow patterns. When an estuary entrance shifts, it can increase the risk of flooding for adjacent properties, damage roads, bridges, and other structures near the shoreline, and undermine the stability of built assets due to altered erosion patterns. The four lagoons in the study area each have different entrance dynamics, with varying levels of risk depending on factors such as catchment size and nearby infrastructure. This means the risk profiles for entrance instability differ.	Possible	Single events	Less likely than not but still appreciable - Probability less than 50% but still quite high	Minor	Local economy and growth	Individually significant but isolated areas of reduction in local economic performance. Minor disruptions to tourism and local businesses could occur but would be short-term.	Public safety, Environment and cultural heritage	Low	Likely	Minor	Moderate	High	* CZMPs & CMPs * Entrance Management Strategies * NSW Coastal Design Guidelines 2023	Adequate	* Curl Curl Lagoon Estuary Management Plan 2000 * Manly Lagoon Estuary Management Plan 1998 * Manly Lagoon Estuary Management Study 1995 * Manly Lagoon Integrated Catchment Management Strategy 2004 * Narrabeen Lagoon Entrance Management Strategy 2022 * Narrabeen Lagoon Estuary Processes Study 2000 * Narrabeen Lagoon Plan Management 2013 * Narrabeen Lagoon Estuary Management Plan 2002 * Narrabeen Lagoon Estuary Process Study 2001 * Warringah Coastal Lagoons Entrance Management Review 2009	Adequate	
Coastal and Estuarine Hazards	Event Based Hazards	EBH6	Tsunami	A tsunami poses significant threat to open coast beaches, coastal lagoons, and rocky cliffs. On beaches, powerful waves can cause extensive erosion, damage to infrastructure, and flooding of low-lying areas, leading to saltwater intrusion and habitat loss. Coastal lagoons may experience breaches, rapid water level changes and altered salinity, disrupting ecosystems and causing long-term morphological changes. Rocky cliffs could suffer from undercutting and increased instability, leading to landslides or rockfalls. However, the likelihood of a tsunami impacting the study area is relatively low, as New South Wales is distant from major tectonic boundaries. While the probability is low, the potential severity justifies tsunami preparedness within coastal hazard planning.	Rare	Single events	Negligible - Probability very small, close to zero	Major	Public safety	Isolated instances of serious injuries or loss of lives	Environment and cultural heritage, Local Economy and Growth, Community and Lifestyle	Moderate	Rare	Major	Moderate	High	* NSW State Tsunami Plan	Adequate	* NSW Tsunami Emergency Sub Plan 2023 (EMPLAN)	Adequate	
Coastal and Estuarine Hazards	Event Based Hazards	EBH7	Bushfire	Bushfires, as an event-based hazard, are most relevant to coastal areas with adjacent forested or vegetated zones, including coastal lagoons, wetlands, and their catchments. These fires can cause direct damage to habitats, leading to loss of biodiversity and significant changes in vegetation cover. Following bushfires, increased erosion and sediment runoff can affect water quality in coastal lagoons, altering ecosystem dynamics. Additionally, bushfires can pose a threat to coastal infrastructure, with the potential for damage to properties and disruption to coastal communities. The aftermath of fires can exacerbate foreshore erosion, particularly when stabilising vegetation is compromised.	Possible	Single events	Less likely than not but still appreciable - Probability less than 50% but still quite high	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Public Safety, Community and Lifestyle, Local Economy and Growth	Moderate	Likely	Moderate	High	High	* LEPs * DCPs * Fire Regime Management Plans * NBC Bush Fire Management Policy * NSW Coastal Design Guidelines 2023	Adequate	* Northern Beaches Bush Fire Prone Land Map 2020 * IPCC AR6 Impacts, Adaptation and Vulnerability, Chapter 11 - Australasia * NARCIIM * NSW Bushfire Emergency Sub Plan 2023 (EMPLAN)	Adequate	

Threat	Stressor Category	ID	Stressor	Detailed Stressor Description	Likelihood	Relevant Likelihood Scale	Current Likelihood - Description	Current Risk			Secondary Consequence Categories	Risk	Future Risk			Confidence Rating	Current Management Arrangements			Available Information and Data		
								Consequence Rating	Primary Consequence Category	Consequence - Description			Likelihood	Consequence	100 year Risk		Included in:	Adequacy	Gaps / Improvements	Key References:	Adequacy	Gaps / Improvements
Coastal and Estuarine Hazards	Event Based Hazards	EBH8	Dam breach / break	Whilst a dam breach/break is expected to be a very low probability event, a dam breach or break at Manly Dam would have significant implications for the downstream areas, particularly Manly Creek and Manly Lagoon. In the event of a breach, large volumes of water would rapidly flow downstream, overwhelming Manly Creek's capacity and causing severe flooding in residential areas, the Warringah Golf Course, and eventually Manly Lagoon. The sudden increase in water flow would lead to substantial erosion along the creek's banks and bed, destabilising sediments and potentially causing scouring in Manly Lagoon. The influx of fresh water could alter the salinity and water quality in Manly Lagoon, disrupting the existing lagoon ecosystem and affecting its connection to the open coast. The breach could also damage infrastructure along the creek and lagoon, including bridges, culverts, and stormwater systems, and would require a coordinated emergency response to mitigate risks to human safety and property. Given the current operation of the dam for safety control and flood mitigation, a failure event would pose significant environmental, social, and economic challenges, necessitating both pre-emptive safety measures and a comprehensive emergency management plan. It is important to note that Manly Dam is a regulated dam under the NSW Dam Safety Act, 2015 and emergency management and safety requirements are stipulated under the Act and associated regulation.	Unlikely	Single events	Unlikely but not negligible - Probability low but noticeably greater than zero	Major	Public safety	Isolated instances of serious injuries or loss of lives	Environment and cultural heritage, Local Economy and Growth, Community and Lifestyle	Moderate	Unlikely	Major	Moderate	High		Adequate		* Manly Lagoon Floodplain Risk Management Study and Plan 2018 * Manly Lagoon Flood Study 2013	Moderately Adequate	Is there a dam breach/break assessment?
Coastal and Estuarine Hazards	Long Term Hazards	LTH1	Estuary foreshore and bank erosion	Estuary foreshore and bank erosion is a long-term hazard affecting coastal lagoons, where gradual loss of land occurs along the water's edge due to wave action, tidal flows, and runoff. Over time, this erosion can lead to the destabilisation of natural banks and adjacent infrastructure, including roads, walkways, and residential properties. Increased water movement, often exacerbated by human activity or changes in lagoon entrance dynamics, can accelerate this process. Erosion reduces the width of the foreshore, impacting habitats and the overall health of the lagoon ecosystem. Managing this hazard requires stabilisation measures, such as vegetation planting, bank reinforcement, or, in some cases, the construction of protective structures to mitigate ongoing erosion and its effects on infrastructure and environmental values.	Possible	Recurrent risks	May arise once in ten years	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Local economy and growth, Community and lifestyle	Moderate	Likely	Moderate	High	Medium	* CZMPs & CMPs * FRMPs * LEPs * DCPs * NBC Waterways and Riparian Land Policies	Moderately Adequate		* Narrabeen Lagoon Catchment Pilot Application 2021 * Narrabeen Lagoon Estuary Management Study and Plan 2002 * Narrabeen Lagoon Floodplain Risk Management Study 2019 * Narrabeen Lagoon Foreshore Rehabilitation Plan	Inadequate	Inadequate information on the bed and bank stability/erosion of Manly, Curl Curl and Dee Why Lagoons, their catchments and feeder creeks
Coastal and Estuarine Hazards	Long Term Hazards	LTH2	Shoreline recession	Shoreline recession is a long-term hazard affecting open coast beaches, where gradual landward movement of the shoreline occurs due to ongoing erosion, sea-level rise, and reduced sediment supply. Over time, this process can lead to the loss of beach width, threatening coastal infrastructure, such as roads, seawalls, and beachfront properties. As beaches recede, the natural buffer they provide against storms and waves diminishes, increasing the vulnerability of coastal areas to storm surges and flooding. Shoreline recession also impacts beach ecosystems, reducing habitat for species and altering the geomorphology of the coast.	Possible	Recurrent risks	May arise once in ten years	Major	Community and lifestyle	Severe and widespread decline in services, quality of life, and recreational opportunities. Significant risk to a moderate number of properties and permanent loss of coastal access in key areas. Strong negative impacts on social cohesion and community well-being.	Environment and cultural heritage, Local economy and growth	High	Almost certain	Major	Very high	High	* Coastal Legislation (CM Act, RH SEPP) * CZMPs & CMPs * LEPs * DCPs * NSW Coastal Design Guidelines 2023	Moderately Adequate		* IPCC AR6 Impacts, Adaptation and Vulnerability, Chapter 11 - Australasia * NBC Scoping Study Significant Open Coastal Hazards 2021 * Collaroy-Narrabeen Beach and Fishermans Beach CZMP 2016 * Biggelo & Basin Beach CZMP 2016 * Collaroy-Narrabeen Beach Coastal Protection Assessment 2016 * NBC Coastal Erosion Policy 2016 * Coastal Erosion Aboriginal Heritage Strategy 2015 & 2019 * Warringah Coastal Erosion Emergency Action Subplan 2015 * Manly Ocean Beach Emergency Action Plan fo Coastal Erosion 2015 * Manly SLR Coastal Hazard Risk Report 2012 * Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 * Manly Identification of Properties Potentially at Risk from Erosion and Inundation 2013 * Manly Ocean Beach Coastline Management Plan 2008 * Sydney Coastal Councils Mapping & Responding to Coastal Inundation 2012 * Manly Ocean Beach & Cabbage Tree Bay Coastline Hazard Definiton Study 2003	Adequate	
Coastal and Estuarine Hazards	Long Term Hazards	LTH3	Tidal inundation (with SLR)	Tidal inundation, exacerbated by sea level rise (SLR), is a long-term hazard affecting low-lying coastal areas, particularly coastal lagoons. As sea levels rise, the frequency and extent of tidal inundation increase, leading to more frequent flooding of coastal infrastructure, such as roads, buildings, and stormwater systems. This persistent inundation can damage property, disrupt community access, and degrade coastal ecosystems by increasing salinity and altering sediment dynamics.	Unlikely	Recurrent risks	May arise once in ten years to 25 years	Major	Community and lifestyle	Severe and widespread decline in services, quality of life, and recreational opportunities. Significant risk to a moderate number of properties and permanent loss of coastal access in key areas. Strong negative impacts on social cohesion and community well-being.	Environment and cultural heritage, Local economy and growth	Moderate	Likely	Major	Very high	High	* Coastal Legislation (CM Act, RH SEPP) * CZMPs & CMPs * Entrance Management Strategies * LEPs * DCPs * Coastal Erosion Emergency Action Subplans * NBC Coastal Erosion Policy * NSW Coastal Design Guidelines 2023	Moderately Adequate		* Narrabeen Lagoon Flood Study 2013 * Biggelo & Basin Beach CZMP 2016 * NSW Estuary Tidal Inundation Exposure Assessment (2018)	Moderately Adequate	Tidal inundation studies are not consistent with the latest IPCC reports. Local spatial data is available but exposure and risk assessment is outdated and/or is not available at an LGA scale. NSW Estuary Tidal Inundation Exposure Assessment was done at regional scale, the study area is encompassed into Metropolitan Sydney.
Coastal and Estuarine Hazards	Climate Change	CC1	Altered hydrological and flood regimes	Altered hydrological and flood regimes associated with climate change are most relevant to coastal lagoons, where changes in precipitation patterns can impact lagoon dynamics, water quality, and surrounding ecosystems. These changes can disrupt sediment dynamics, exacerbate erosion, and impact coastal ecosystems and infrastructure. The increased unpredictability of flood events places stress on both natural and built environments, leading to potential habitat loss, damage to property, and challenges for flood management systems.	Possible	Recurrent risks	May arise once in ten years	Major	Environment and cultural heritage	Severe loss of environmental amenity and/or cultural heritage, significant loss of biodiversity and habitat. There is a risk of ongoing degradation of cultural sites and ecosystems.	Public Safety, Community and Lifestyle	High	Likely	Major	Very high	Medium	* FRMPs * CZMPs & CMPs * Estuary Management Plans * Manly LGA Climate Change Actions * NSW Coastal Design Guidelines 2023	Adequate	Adequacy continually changing with a changing climate	* IPCC AR6 Impacts, Adaptation and Vulnerability, Chapter 11 - Australasia	Moderately Adequate	Existing 'future' models need to be compared against the latest IPCC models and projections
Coastal and Estuarine Hazards	Climate Change	CC2	Altered storm frequency and severity	Altered storm frequency and severity associated with climate change are relevant to all coastal environments, with the greatest impacts felt on open coast beaches and rocky headlands. More frequent and intense storms can drive significant beach erosion, damage to built infrastructure, and loss of natural habitats.	Possible	Recurrent risks	May arise once in ten years	Major	Community and lifestyle	Severe and widespread decline in services, quality of life, and recreational opportunities. Significant risk to a moderate number of properties and permanent loss of coastal access in key areas. Strong negative impacts on social cohesion and community well-being.	Environment and cultural heritage, Local Economy and Growth, Public Safety	High	Likely	Major	Very high	Medium	* Manly LGA Climate Change Actions * FRMPs * CZEAS * NSW Coastal Design Guidelines 2023	Adequate	Adequacy continually changing with a changing climate	* IPCC AR6 Impacts, Adaptation and Vulnerability, Chapter 11 - Australasia	Moderately Adequate	Existing 'future' models need to be compared against the latest IPCC models and projections
Coastal and Estuarine Hazards	Climate Change	CC3	Temperature increase	Increased air and sea temperatures associated with climate change are relevant to all coastal environments, with particular impacts on coastal ecosystems and biodiversity. Warmer temperatures can alter species distributions, disrupt breeding cycles, and lead to shifts in habitat ranges. Coastal lagoons and estuarine environments may experience changes in water temperature, affecting fish populations, water quality, and algal blooms. Additionally, higher air temperatures can exacerbate heat stress on human infrastructure and increase the frequency of heatwaves, further stressing both natural and built environments.	Likely	Recurrent risks	May arise about once per year	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Public Safety, Community and Lifestyle	High	Almost certain	Major	Very high	High	* Manly LGA Climate Change Actions * NSW Coastal Design Guidelines 2023	Inadequate		* NARCIIM * Australia State of the Environment * IPCC AR6 Impacts, Adaptation and Vulnerability, Chapter 11 - Australasia	Adequate	
Coastal and Estuarine Hazards	Climate Change	CC4	Ocean acidification	Ocean acidification associated with climate change is most relevant to open coast beaches and estuarine environments where marine ecosystems are vulnerable to changes in water chemistry. Increased carbon dioxide absorption lowers ocean pH levels, which can impact the ability for shell-producing organisms to access dissolved carbonate, reducing shell making capabilities with complex biological and ecological implications. Estuaries and coastal lagoons may experience changes in ecosystem dynamics due to acidification, impacting fisheries and biodiversity. This stressor poses risks to marine life, coastal industries reliant on healthy ecosystems, and the long-term resilience of biodiversity in affected areas.	Likely	Recurrent risks	May arise about once per year	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.		High	Almost certain	Moderate	High	High	* Manly LGA Climate Change Actions	Inadequate		* Australia State of the Environment * IPCC AR6 Impacts, Adaptation and Vulnerability, Chapter 11 - Australasia	Adequate	DPIRD Fisheries has a program to model/predict ecosystem shifts from these types of climate effects What are the potential impacts to marine structures (particularly concrete) What are the impacts on calcareous beach sediment content and shorelines recession?
Coastal and Estuarine Hazards	Climate Change	CC5	Sea level rise (SLR) and shoreline retreat, including habitat migration and squeeze	Sea level rise (SLR) and shoreline retreat associated with climate change are relevant to all coastal environments, with pronounced impacts on open coast beaches, and coastal lagoons. As sea levels rise, shorelines retreat, leading to erosion, loss of land, and the disruption of coastal habitats. Habitat migration can be constrained by physical barriers such as infrastructure, leading to habitat squeeze, where ecosystems have no space to shift inland. This dynamic affects biodiversity, exacerbates coastal flooding, and threatens infrastructure and communities located near the coast. The long-term consequences include the loss of coastal wetlands, changes in ecosystem services, and increased vulnerability of coastal areas to storm surges and erosion.	Possible	Recurrent risks	May arise once in ten years	Major	Environment and cultural heritage	Severe loss of environmental amenity and/or cultural heritage, significant loss of biodiversity and habitat. There is a risk of ongoing degradation of cultural sites and ecosystems.	Public Safety, Community and Lifestyle, Local Economy and Growth	High	Almost certain	Major	Very high	High	* CZMPs & CMPs * FRMPs * Estuary Management Plans * Manly LGA Climate Change Actions * Manly SLR Coastal Hazard Risk Report * NSW Coastal Design Guidelines 2023	Adequate		* IPCC AR6 Impacts, Adaptation and Vulnerability, Chapter 11 - Australasia	Adequate	DPIRD Fisheries investigating opportunities for retreat of marine vegetation with SLR

Threat	Stressor Category	ID	Stressor	Detailed Stressor Description	Current Risk					Future Risk			Confidence Rating	Current Management Arrangements			Key References:		Available Information and Data			
					Likelihood	Relevant Likelihood Scale	Current Likelihood - Description	Consequence Rating	Primary Consequence Category	Consequence - Description	Secondary Consequence Categories	Risk		Likelihood	Consequence	100 year Risk	Included in:	Adequacy	Gaps / Improvements	Adequacy	Gaps / Improvements	
Urbanisation and Land Use Impacts	Ecological Impacts	ECO1	Clearing riparian and adjacent habitat including wetland drainage	Riparian zones and wetlands serve as critical buffers that protect water quality, support biodiversity, and regulate hydrological processes. The removal of vegetation in these areas can lead to increased erosion, sedimentation, and nutrient runoff into nearby water bodies, which degrades aquatic ecosystems and disrupts the balance of coastal lagoons.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Major	Environment and cultural heritage	Severe loss of environmental amenity and/or cultural heritage, significant loss of biodiversity and habitat. There is a risk of ongoing degradation of cultural sites and ecosystems.	Local economy and growth, Community and lifestyle, Public administration	High	Likely	Major	Very high	Medium	* Legislation (FM Act, BC Act, EP&A Act, PoEO Act, TI SEPP) * LEPs * DCPs * POMs * NBC Policies (Waterways and Riparian Land Policies, Tree Preservation Policy) * NSW Coastal Design Guidelines 2023	Adequate	Are current management practices adequate when considering possible increase in likelihood with increased urban development and population growth?	Inadequate	No local records of vegetation clearing. Perhaps indicative of effective management, perhaps not valued as record-worthy	
Urbanisation and Land Use Impacts	Ecological Impacts	ECO2	Invasive species, pests and diseases	The expansion of urban areas often introduces invasive species, pests, and diseases and creates conditions that favour their spread. Human activities, such as landscaping with non-native plants, improper disposal of garden waste, and altered hydrological flows, can provide pathways for invasive species to enter and establish in coastal environments. Urbanisation also fragments natural habitats, making ecosystems more vulnerable to invasion by creating disturbed areas where invasive species can outcompete native plants and animals. Additionally, increased movement of people and goods in urban areas raises the risk of pests and diseases being introduced to previously unaffected coastal ecosystems.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Community and lifestyle, Public administration	Moderate	Almost certain	Minor	High	Medium	* Legislation (Biosecurity Act, FM Act, TI SEPP) * LEPs * Weed Management Plans * Local Land Services - Regional Strategic Pest Animal Management Plans * NSW Invasive Species Plan 2023 - 2028 * NSW Coastal Design Guidelines 2023	Moderately Adequate		* NBC Local Priority Weed Management Plan 2021 * BioNet Atlas * Protected Matters Search Tool * SEED Vegetation Map - Sydney Metro Area V3.1 2016 E-VIS 4489 * Atlas of Living Australia * NBC Weed Profiles * NBC Non-native animals * The Australian Priority Marine Pest List * DCEEW Marine Pests Webpage	Adequate	While these datasets are useful and adequate, it is always best to ground truth
Urbanisation and Land Use Impacts	Ecological Impacts	ECO3	Predation by house pets	Predation by house pets, especially cats and dogs, poses a significant threat to coastal wildlife in urbanised areas, particularly ground-nesting, shorebirds and small mammals. As urbanisation brings residential areas closer to natural habitats, pets have easier access to sensitive ecosystems such as wetlands and rock platforms, where they can prey on native species and disturb wildlife through chasing or presence. This can lead to population declines and disruption of local ecosystems.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Community and lifestyle, Public administration	Moderate	Likely	Minor	Moderate	High	* Legislation (NSW Companion Animals Act)	Moderately Adequate		Inadequate	No record of house-pet-kills. Difficult to report	
Urbanisation and Land Use Impacts	Ecological Impacts	ECO4	Entrance clearing, dredging and excavation activities	Clearing, dredging, and excavation activities around coastal entrances, when not managed appropriately, have the potential to cause ecological impacts. In urbanised areas, these activities are often necessary to maintain navigation channels or reduce flood risks. Well-managed dredging programs can minimise impacts on sediment dynamics, water flow, and important habitats such as fish nurseries and bird nesting areas. However, without careful planning and management, there is a risk of releasing contaminants trapped in sediments, which could affect water quality and aquatic life. Context-specific environmental assessments and adherence to best practice guidelines are crucial to ensuring these activities are carried out sustainably.	Almost certain	Socio economic threats	Very likely. A very large certainty that this will occur in this situation within the timeframe; a history of regular occurrence (>90%).	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Local economy and growth, Community and lifestyle, Public administration	High	Almost certain	Moderate	High	High	* Legislation (BC Act, EP&A Act, PoEO Act, TI SEPP) * CZMPs & CMPs * LEPs * DCPs * NSW Coastal Design Guidelines 2023	Adequate		* Narrabeen Lagoon Entrance Clearance Works * Narrabeen Lagoon Entrance Management Strategy 2022 * Warringah Coastal Lagoons Entrance Management Review 2009 * Warringah Lagoons Entrance Management Operational Management Standard 2012	Adequate	
Urbanisation and Land Use Impacts	Ecological Impacts	ECO5	Wildlife disturbance (turtles, whales, etc.) and impacts to ecological health	Wildlife disturbance caused by marine vessels, significantly impacts species like turtles, whales, and other marine wildlife. These disturbances can disrupt natural behaviours, including feeding, breeding, and migration. Marine vessels may strike animals, leading to injury or death, while noise pollution from engines can interfere with communication and navigation for species like whales and dolphins.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Local economy and growth, Community and lifestyle	Moderate	Likely	Minor	Moderate	Medium	* Legislation (BC Act, Marine Estate Management Act, PoEO Act) * CZMPs & CMPs * LEPs * DCPs	Moderately Adequate		Inadequate	Difficult to record, no local records of wildlife disturbance	
Urbanisation and Land Use Impacts	Ecological Impacts	ECO6	Wildlife entanglement	Wildlife entanglement is a significant ecological impact, particularly in coastal and marine environments, where animals such as turtles, whales, and seabirds can become trapped in fishing gear, discarded nets, and marine debris. Shark nets, installed as part of public safety programs, also often entangle non-target species. Entanglement can cause severe injuries, impair mobility, and lead to drowning, starvation, or death. This issue is exacerbated by urbanisation and increasing human activities in coastal areas, which contribute to marine pollution and debris, and drive the installation of shark nets to provide safety benefit.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.		Low	Possible	Minor	Low	Medium	* Legislation (BC Act, Marine Estate Management Act) * Marine Wildlife Management Manual 2021 * CZMPs & CMPs	Moderately Adequate		Inadequate	No official records of wildlife entanglement frequency and entangled mortality rates	
Urbanisation and Land Use Impacts	Ecological Impacts	ECO7	Ecological vandalism	Ecological vandalism, the deliberate destruction or degradation of natural environments, poses a significant threat to coastal ecosystems. Acts such as illegal vegetation clearing, damage to dunes, or harm to wildlife disrupt the ecological balance and undermine conservation efforts. These actions not only degrade habitat quality but also contribute to erosion, loss of biodiversity, and weakened natural defences against coastal hazards. In urbanised coastal areas, ecological vandalism can further strain already vulnerable ecosystems, reducing their resilience to climate change and human impacts.	Unlikely	Socio economic threats	Uncommon, but has been known to occur elsewhere. Expected to occur here only in specific circumstances within the timeframe (5-30%).	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Local economy and growth, Community and lifestyle, Public administration	Low	Unlikely	Moderate	Low	High	* Legislation (BC Act, PoEO Act, NP&W Act) * LEPs * DCPs	Adequate		Newspaper articles	Moderately Adequate	Records in local Newspaper articles reporting ecological vandalism
Urbanisation and Land Use Impacts	Hydrologic Modifications	HM1	Artificial estuary entrance opening	Artificial estuary entrance opening is commonly used to manage water levels in the coastal lagoons within the study area, often to reduce flooding in nearby urban areas or improve water quality by facilitating tidal exchange. However, these interventions can disrupt natural processes leading to long-term ecological impacts. Frequent artificial openings can cause changes in salinity levels, affecting the health of aquatic habitats and species adapted to specific water conditions.	Likely	Recurrent risks	May arise about once per year	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Local economy and growth, Public administration	High	Likely	Moderate	High	High	* CZMPs & CMPs * Entrance Management Strategies * NSW Coastal Design Guidelines 2023	Adequate		* Narrabeen Lagoon Entrance Management Strategy 2022 * Warringah Coastal Lagoons Entrance Management Review 2009 * Warringah Lagoons Entrance Management Operational Management Standard 2012 * Narrabeen Lagoon Floodplain Risk Management Study 2019 * Dee Why and Curl Curl Lagoons Floodplain Risk Management Study 2005 * Dee Why Lagoon Estuary Management Plan 2004	Adequate	
Urbanisation and Land Use Impacts	Hydrologic Modifications	HM2	Modified hydrology, hydraulics and flood regime	Urbanisation leads to hydrologic modifications by replacing natural landscapes with impervious surfaces like roads and buildings, reducing the land's capacity to absorb rainfall and increasing stormwater runoff. These changes can degrade the ecological health of waterways and heighten flood risks by increasing the volume and speed of runoff entering waterways, causing erosion, sedimentation, and the alteration of natural water flow patterns.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Local economy and growth, Public safety	High	Likely	Moderate	High	Medium	* NSW Flood risk management manual * CZMPs & CMPs * LEPs * DCPs * FRMPs * Estuary Management Plans * NBC Policies (Water Management for Development, Waterways and Riparian Land) * NSW Coastal Design Guidelines 2023	Adequate		* Dee Why South Catchment Flood Study 2013 * Manly Lagoon Flood Study 2013 * Narrabeen Lagoon Flood Study 2013 * Dee Why South Catchment Flood Study 2013 * Manly to Seaforth Flood Study 2019 * Newport Flood Study 2019 * Newport Floodplain Risk Management Plan 2004	Moderately Adequate	Data largely >10 years old, however catchment unlikely to have considerably changed
Urbanisation and Land Use Impacts	Infrastructure and Development	ID1	Foreshore development and encroachments	Coastal protection works, whether well-sited and engineered or ad hoc, and inappropriately designed and/or located foreshore development can have significant impacts for coastal environments and amenity. Poorly planned or ad hoc protection structures may destabilise adjacent shorelines, create hazardous conditions, obstruct natural processes like dune formation, and reduce the natural aesthetic and ecological value of the coastline, impacting public access and biodiversity. Similarly, inappropriately designed and/or located development often encroach on the foreshore, which can disrupt coastal processes and block or limit public access to the coast, reducing the recreational and aesthetic value of these areas. These interventions frequently prioritise the protection of private infrastructure while limiting the coastal experience for the public.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Major	Community and lifestyle	Severe and widespread decline in services, quality of life, and recreational opportunities. Significant risk to a moderate number of properties and permanent loss of coastal access in key areas. Strong negative impacts on social cohesion and community well-being.	Local economy and growth, Public administration, Environment and cultural heritage	Very high	Possible	Major	High	High	* CZMPs & CMPs * Fisheries Management Act 1994 * LEPs * DCPs * NSW Coastal Design Guidelines 2023	Adequate		Moderately Adequate	Lack of data could indicate compliance with LEC and DCP	
Urbanisation and Land Use Impacts	Infrastructure and Development	ID2	Inadequate protection measures	Inadequate protection measures can leave coastal areas and infrastructure vulnerable to erosion, flooding, and other hazards. When protective structures like seawalls or dune stabilisation efforts are insufficiently designed, maintained, or implemented, they may fail to provide the necessary defence against extreme weather events or gradual processes such as sea level rise. This can result in damage to private properties, public assets, and natural habitats, increasing long-term costs for repairs and restoration. Additionally, inadequate protection measures may offer only short-term solutions, shifting the problem elsewhere or exacerbating it over time.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Major	Local economy and growth	Local stagnation such that businesses, particularly in tourism and real estate, are unable to thrive, and employment does not keep pace with local demand. Tourism local, businesses and property values suffer significant losses.	Environment and cultural heritage	High	Likely	Major	Very high	High	* Coastal Legislation (CM Act, RH SEPP) * CZMPs & CMPs * FRMPs * Estuary Management Plans * Entrance Management Strategies * NBC Policies (Coastal Erosion, Water Management for Development, Waterways and Riparian Land)	Moderately Adequate		* NBC Significant Open Coastal Hazards 2021 * Collaroy-Narrabeen Beach and Fishermans Beach CZMP * Bilgola & Basin Beach CZMP 2016 * NBC Coastal Erosion Policy	Moderately Adequate	Adequacy of protection measures at significant hazard locations understood. Remaining coastal area not understood
Urbanisation and Land Use Impacts	Infrastructure and Development	ID3	Service infrastructure - pipes, cables trenching and boring (in estuaries)	The installation of service infrastructure such as pipes and cables, including trenching and boring in estuaries, can have ecological and physical impacts. These activities often disturb sensitive estuarine environments, disrupting sediment dynamics and potentially releasing contaminants into the water. Trenching and boring can damage important habitats, such as seagrass beds and saltmarshes, which provide ecological services (including habitat). The infrastructure itself can alter water flow patterns and contribute to erosion or sedimentation, affecting both the natural processes of the estuary and the stability of adjacent shorelines.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Local economy and growth, Public administration	Moderate	Likely	Minor	Moderate	Medium	* Legislation (CM Act, FM Act, EP&A Act) * Environmental assessments (REF, EIS) * NBC Waterways & Riparian Land Policy	Moderately Adequate		* Environmental Impact Assessments (REFs, EIS) * NBC Waterways & Riparian Land Policy	Moderately Adequate	Difficult to find information on the impact of service infrastructure in estuaries

Threat	Stressor Category	ID	Stressor	Detailed Stressor Description	Likelihood	Relevant Likelihood Scale	Current Likelihood - Description	Current Risk			Secondary Consequence Categories	Risk	Future Risk			Confidence Rating	Current Management Arrangements			Available Information and Data		
								Consequence Rating	Primary Consequence Category	Consequence - Description			Likelihood	Consequence	100 year Risk		Included in:	Adequacy	Gaps / Improvements	Key References:	Adequacy	Gaps / Improvements
Urbanisation and Land Use Impacts	Water Pollution and Sediment Contamination	WQ1	Water pollution from urban stormwater runoff	Water pollution by urban stormwater runoff can degrade coastal ecosystems and impact social values tied to water quality and environmental health. Pollutants such as oils, heavy metals, nutrients, sediments, and litter from urban surfaces are carried into waterways, reducing water quality and leading to ecological consequences like algal blooms, decreased oxygen levels, and habitat degradation. This pollution can affect recreational activities like swimming, fishing, and boating, diminishing the enjoyment of coastal areas for residents and visitors. It can also affect local economies that depend on tourism and marine resources, as polluted waters deter visitors. Additionally, associated visual impact (floating materials, films, etc) diminishes the aesthetic value of these environments, reducing the sense of well-being and connection that communities have with their coastal areas.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Major	Environment and cultural heritage	Severe loss of environmental amenity and/or cultural heritage, significant loss of biodiversity and habitat. There is a risk of ongoing degradation of cultural sites and ecosystems.	Local economy and growth, Community and lifestyle	Very high	Likely	Major	Very high	Medium	* Legislation (PoEO Act, EP&A Act) * CZMPs & CMPs * NBC Water Management for Development Policy * LEPs * DCPs * Marine water quality objectives for NSW ocean waters (Sydney Metropolitan and Hawkesbury-Nepean) * NSW Coastal Design Guidelines 2023	Adequate		* NBC Significant Open Coastal Hazards CMP Scoping Study 2021 * Cabbage Tree Bay Management Plan 2000 * NBC Stormwater Management Study 2022 * NBC Stormwater Management Strategy 2015-2019, 2015	Adequate	
Urbanisation and Land Use Impacts	Water Pollution and Sediment Contamination	WQ2	Groundwater contamination	Groundwater contamination can result from various urban and industrial sources, including leachate from historic landfills, leaking tanks, and septic systems. Once contaminated, groundwater can migrate to coastal environments, degrading water quality in coastal lagoons. This pollution harms aquatic ecosystems, leading to issues like algal blooms, biodiversity loss, and habitat degradation. Socially, contaminated water poses health risks, reduces recreational opportunities such as swimming and fishing, and diminishes the aesthetic and economic value of coastal areas.	Possible	Single events	Less likely than not but still appreciable - Probability less than 50% but still quite high	Major	Environment and cultural heritage	Severe loss of environmental amenity and/or cultural heritage, significant loss of biodiversity and habitat. There is a risk of ongoing degradation of cultural sites and ecosystems.	Local economy and growth, Community and lifestyle	High	Possible	Major	High	Medium	* Legislation (PoEO Act, Water Management Act, Coastal Land Management Act) * CZMPs & CMPs * EPA Guidelines for the assessment and management of groundwater contamination 2007 * EPA consultant reporting on contaminated land: contaminated land guidelines 2020 * NSW Coastal Design Guidelines 2023	Inadequate		* EPA Contaminated Land Record of Notices * Manly Ocean Beach Seawall Study Wall Stability Assessment 2003 * Manly Ocean Beach Seawall and Beach Amenity Risk Assessment and Remedial Options 2003	Inadequate	Information limited and >20 years old. Known groundwater contamination from old landfill at Curl Curl Lagoon and Manly Lagoon
Urbanisation and Land Use Impacts	Water Pollution and Sediment Contamination	WQ3	Industrial discharges	Industrial discharges can introduce a range of pollutants, including heavy metals, and chemicals, which degrade water quality and harm aquatic ecosystems. These pollutants can have long-lasting and complex implications for flora and fauna and food web interactions. The effects are more pronounced in an enclosed lagoon. From a social perspective, industrial discharges can restrict recreational activities such as swimming and fishing, and diminish the aesthetic value of coastal areas, affecting tourism and local economies.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Major	Environment and cultural heritage	Severe loss of environmental amenity and/or cultural heritage, significant loss of biodiversity and habitat. There is a risk of ongoing degradation of cultural sites and ecosystems.	Local economy and growth, Community and lifestyle	High	Possible	Major	High	Medium	* Legislation (PoEO Act, EP&A Act) * CZMPs & CMPs * NBC Water Management for Development Policy * LEPs * DCPs * NSW Coastal Design Guidelines 2023	Adequate		* EPA Contaminated Land Records of Notices	Adequate	
Urbanisation and Land Use Impacts	Water Pollution and Sediment Contamination	WQ4	Litter, solid waste, marine debris and microplastics	Litter, solid waste, marine debris, and microplastics in coastal environments pose significant threats to both ecosystems and social values. These pollutants can entangle or be ingested by marine wildlife, leading to injury or death, and degrade habitats such as beaches and estuaries. Microplastics can accumulate in the food chain, impacting both aquatic species and humans. From a social perspective, debris in coastal areas diminishes the aesthetic appeal of beaches, reduces the quality of recreational activities, and can impact tourism.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Local economy and growth, Community and lifestyle	Moderate	Almost certain	Minor	High	Medium	* Legislation (PoEO Act, EP&A Act, Waste Avoidance and Resource Recovery Act) * CZMPs & CMPs * Beachwatch * NBC Water Management for Development Policy * NSW Coastal Design Guidelines 2023	Moderately Adequate			Inadequate	Difficult to record amount of/local impact of plastics/pollutants, particularly on open coast
Urbanisation and Land Use Impacts	Water Pollution and Sediment Contamination	WQ5	Sediment contamination	Sediment contamination in coastal and estuarine environments arises from pollutants like heavy metals, nutrients, and hydrocarbons accumulating in sediments due to urban runoff, industrial discharges, and improper waste disposal. Contaminated sediments can degrade water quality and harm aquatic life, impacting ecosystem health by introducing toxins into the food chain. Contaminated sediments can pose risks to public health and reduce the aesthetic and recreational value of coastal areas. The costs and environmental risk associated with sediment clean-up or remediation can also be significant.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Local economy and growth, Community and lifestyle	Moderate	Likely	Minor	Moderate	Medium	* Coastal legislation (RH SEPP) * CZMPs & CMPs * CMPs * EPA consultant reporting on contaminated land: contaminated land guidelines 2020 * ANZECC & ARMCANZ guidelines for Fresh and Marine Water Quality * Marine water quality objectives for NSW ocean waters (Sydney Metropolitan and Hawkesbury-Nepean)	Moderately Adequate			Inadequate	No records of contaminant testing
Urbanisation and Land Use Impacts	Water Pollution and Sediment Contamination	WQ6	Runoff from unsewered areas, point source pollution and sewage overflows (such as outfalls, sewage treatment plants, etc)	Runoff from unsewered areas (including areas where septic systems are still in place), point source pollution (licensed and unlicensed), sewage overflows and licenced outfalls from sewage treatment plants can introduce high levels of nutrients, pathogens, and other contaminants into coastal and lagoon waters. These pollutants can degrade water quality, leading to algal blooms, eutrophication, and the decline of aquatic habitats. Additionally, certain types of contamination pose health risks to the public (e.g. faecal contamination), reducing the recreational and aesthetic value of the water bodies.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Local economy and growth, Community and lifestyle	Moderate	Possible	Moderate	Moderate	Medium	* Legislation (PoEO Act, Local Government Act) * CZMPs & CMPs * NBC Water Management for Development Policy * Marine water quality objectives for NSW ocean waters (Sydney Metropolitan and Hawkesbury-Nepean) * NSW Coastal Design Guidelines 2023	Adequate		* Manly Lagoon Estuary Management Study 1995 * Cabbage Tree Bay Management Plan 2000	Inadequate	Sydney Water focusing on waste water source control in current 10 year program
Waterway Use and Resource Conflict	Commercial Activities	CA1	Commercial fishing	Whilst the open coast portion of the study area permits commercial fishing for certain species (excepting aquatic reserves), commercial fishing activity within the study area is relatively minimal, reducing the overall impact on local marine ecosystems compared to more active regions. However, where it does occur, it can still pose potential risks to fish populations, seabed habitats, and other marine species through bycatch or habitat disturbance. Additionally, there may be occasional conflicts with recreational fishers or conservation efforts, though these are likely to be limited given the low levels of commercial fishing. Socially, the minimal presence of commercial fishing also means fewer economic contributions from this industry to the local area. However, with no land-based facilities to land commercial catches (these are located south in Sydney Harbour and north in the Hawkesbury) the opportunity for economic uplift is minimal.	Unlikely	Socio economic threats	Uncommon, but has been known to occur elsewhere. Expected to occur here only in specific circumstances within the timeframe (5-30%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Local economy and growth, Community and lifestyle	Low	Unlikely	Minor	Low	Low	* Legislation (FM Act, Marine Estate Management Act)	Adequate				
Waterway Use and Resource Conflict	Commercial Activities	CA2	Small commercial vessels in coastal and marine waters (charter boats, commercial fishing, whale watching etc.)	The presence of small commercial vessels such as scuba boats, charter boats, and whale-watching tours in coastal and marine waters can contribute to a range of impacts. These include disturbance to wildlife, such as marine mammals and seabirds, from noise and proximity, as well as potential conflicts with other water users like recreational boaters and fishers. Additionally, increased vessel traffic can elevate the risk of marine pollution, either through accidental spills or routine discharge, and cause physical damage to sensitive marine habitats through anchor use or wake action.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.		Low	Possible	Minor	Low	High	* Legislation (FM Act, Marine Pollution Act, Marine Estate Management Act, Ports and Maritime Administration Regulation) * TNSW manages the movement of vessels in NSW waters	Adequate				
Waterway Use and Resource Conflict	Access and Availability	AA1	Beach nourishment and scraping	Beach nourishment and scraping can be employed to restore or maintain the recreational quality of beaches, particularly in areas where erosion threatens infrastructure or public access (nourishment and scraping). While these activities can improve beach amenity and protect properties, they may also disrupt natural sediment processes and ecosystems, particularly by altering habitats for local fauna. The removal of wrack during grooming, for example, can impact nutrient cycling and habitats for shorebirds and other species. Introducing significant sand from outside the natural system can potentially impact on lagoon entrance dynamics.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Local economy and growth, Community and lifestyle	Low	Likely	Minor	Moderate	High	* Coastal Legislation (CM Act, RH SEPP) * CZMPs & CMPs * NBC Coastal Erosion Policy * NSW Coastal Design Guidelines 2023	Adequate		* Collaroy-Narrabeen Beach and Fishermans Beach CZMP 2016 * Bilgola & Basin Beach CZMP 2016 * NBC Coastal Erosion Policy * Narrabeen Lagoon Foreshore Rehabilitation Plan 2003 * Beach Sand Nourishment Scoping Study 2010 * Collaroy Narrabeen Beach Nourishment Investigations 1993	Adequate	
Waterway Use and Resource Conflict	Access and Availability	AA2	Limited, lack of or loss of access (by erosion or development) to the marine estate	Loss of access to the marine estate (i.e. the beach and seaward), whether caused by beach erosion or development, can significantly affect public enjoyment of coastal areas. Erosion may lead to the degradation of pathways, beaches, and foreshore reserves, limiting recreational opportunities. Additionally, development along the foreshore can create physical barriers to access, concentrating usage in fewer areas, which may exacerbate environmental degradation in those locations. This loss of access reduces the social and economic benefits the marine estate provides to communities and can negatively impact tourism, local businesses, and the broader community's connection to the coastline.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Moderate	Community and lifestyle	General appreciable decline in services, loss of access to several key coastal properties or public spaces, and degradation of recreational opportunities like swimming or fishing. Some reduction in social and community engagement as a result of reduced amenity.	Local economy and growth, Environment and cultural heritage	Moderate	Likely	Moderate	High	Medium	* Coastal legislation (CM Act, RH SEPP) * Legislation (CLM Act) * CZMPs & CMPs * LEPs * DCPs * NBC Coastal Dunes Management Strategy * NBC Policies (Coastal erosion, Waterways and riparian land) * NSW Coastal Design Guidelines 2023	Adequate		* Aerial/satellite imagery * NBC Policies (Coastal erosion, Waterways and riparian land)	Adequate	
Waterway Use and Resource Conflict	Access and Availability	AA3	Overcrowding / congestion	Overcrowding and congestion in coastal areas (people and vehicles) can diminish the quality of user experiences and strain available resources. As more people seek to access popular beaches, lagoons, or recreational spots, crowding can lead to environmental degradation, with increased pressure on facilities, parking, and infrastructure. This often results in increased litter, habitat disturbance, and damage to sensitive coastal ecosystems. Additionally, overcrowding can heighten user conflicts, particularly between different recreational activities, reducing enjoyment and leading to potential safety concerns.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Minor	Community and lifestyle	Isolated but noticeable examples of decline in services, temporary loss of access to one or two properties, or degradation of small recreational areas. Minor impacts on social engagement and recreational use of local amenities.	Local economy and growth, Community and lifestyle	Low	Likely	Minor	Moderate	Medium		Inadequate		* Literature	Moderately Adequate	Information on impact of overcrowding/ congestion on coastal beaches but no locally specific information

Threat	Stressor Category	ID	Stressor	Detailed Stressor Description	Likelihood	Relevant Likelihood Scale	Current Likelihood - Description	Current Risk				Secondary Consequence Categories	Risk	Future Risk			Confidence Rating	Current Management Arrangements			Available Information and Data		
								Consequence Rating	Primary Consequence Category	Consequence - Description	Likelihood			Consequence	100 year Risk	Included in:		Adequacy	Gaps / Improvements	Key References:	Adequacy	Gaps / Improvements	
Waterway Use and Resource Conflict	Access and Availability	AA4	Spread of informal pathways over dune systems and estuary foreshores due to foot traffic	The spread of informal pathways across dune systems and estuary foreshores, caused by increased foot traffic, can significantly degrade these sensitive environments. Unregulated access through such pathways can lead to trampling of native vegetation, destabilisation of dunes, increased erosion, and damage to important wildlife habitats. These informal paths often form in response to insufficient access infrastructure, like designated walkways, leading to long-term ecological impacts and increased maintenance costs for management.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.		Moderate	Likely	Minor	Moderate	Medium	* CZMPs & CMPs * Estuary Management Plans * NBC Coastal Dunes Management Strategy	Moderately Adequate		* NBC Dunes Condition Technical Report 2018	Moderately Adequate	Reporting on overall dune condition, no specific reference to the spread of informal paths	
Waterway Use and Resource Conflict	Public Health and Safety	PHS1	Seafood contamination	Seafood contamination arises where pollution such as heavy metals, pesticides, and pathogens can accumulate in marine species caught for personal consumption. This poses risks primarily to recreational fishers in the study area, who may be exposed to health risks if pollutants enter the coastal waters through urban runoff, industrial discharges, or sewage overflows. This can diminish the recreational fishing experience, affect local fish populations, and raise concerns about food safety for those who rely on self-caught seafood.	Unlikely	Socio economic threats	Uncommon, but has been known to occur elsewhere. Expected to occur here only in specific circumstances within the timeframe (5-30%).	Minor	Public safety	Serious near misses or minor injuries	Community and lifestyle	Low	Unlikely	Minor	Low	High	* CZMPs & CMPs * ANZECC & ARMCANZ guidelines for Fresh and Marine Water Quality * Marine water quality objectives for NSW ocean waters (Sydney Metropolitan and Hawkesbury-Nepean)	Adequate		* DAFF National Residue Survey 2022-23	Moderately Adequate	Adequate data for commercial fisheries. Inadequate data on condition of local seafood caught recreationally, including microplastics content	
Waterway Use and Resource Conflict	Public Health and Safety	PHS2	Adverse wildlife interaction	Adverse wildlife interactions, such as encounters with sharks, jellyfish, or other potentially dangerous marine animals, pose a safety risk to both recreational users and those engaging in water-based activities. While these interactions are generally rare, they can result in injury or create public fear, leading to reduced recreational use of beaches, lagoons, or marine areas.	Rare	Socio economic threats	Never reported for this situation, but still plausible within the timeframe (< 5%).	Major	Public safety	Isolated instances of serious injuries or loss of lives	Community and lifestyle	Moderate	Rare	Major	Moderate	Medium	* Legislation (BC Act) * Marine Wildlife Management Manual * NSW people and wildlife policy	Moderately Adequate		* Newspaper articles	Moderately Adequate	No records of adverse wildlife interactions beyond newspaper articles	
Waterway Use and Resource Conflict	Public Health and Safety	PHS3	Anti-social behaviour and unsafe practices	Anti-social behaviour and unsafe practices, such as vandalism, littering, alcohol misuse, and reckless activities in coastal and marine areas, pose significant risks to both public safety and environmental health. These behaviours can lead to accidents, injuries, or altercations among users and degrade the overall experience for the community. Additionally, such activities can contribute to environmental pollution and habitat damage.	Unlikely	Socio economic threats	Uncommon, but has been known to occur elsewhere. Expected to occur here only in specific circumstances within the timeframe (5-30%).	Minor	Public safety	Serious near misses or minor injuries	Community and lifestyle, Environment and cultural heritage	Low	Unlikely	Minor	Low	Medium		Adequate		* Newspaper articles	Moderately Adequate	No publicly available records of adverse wildlife interactions beyond newspaper articles	
Waterway Use and Resource Conflict	Recreational Activities	REC1	Cultural fishing	Cultural fishing holds significant social, spiritual, and economic value for Aboriginal communities, providing a connection to land, heritage, and traditional practices. However, conflicts can arise between cultural fishing and recreational or commercial fishing activities, particularly regarding access to specific fishing areas and fish stock management.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Insignificant	Environment and cultural heritage	No environmental or cultural heritage damage. Short-term or negligible impacts on local ecosystems or cultural sites.	Community and lifestyle, Public administration	Very low	Possible	Insignificant	Very low	High	* Legislation (FM Act, NP&W Act) * NSW fishing rules and regulations * NSW Coastal Design Guidelines 2023	Inadequate			Inadequate	Understanding of contemporary Aboriginal cultural practices, including cultural fishing, in the Northern Beaches represents a significant data gap	
Waterway Use and Resource Conflict	Recreational Activities	REC2	Excessive or illegal extraction	Excessive or illegal extraction of marine resources, such as fish or invertebrates, can have significant ecological and social impacts. It reduces fish stocks, undermines ecosystem health, and can contribute to the depletion of species that are important for both recreational and cultural fishing. Additionally, illegal activities erode trust within communities and between user groups, creating tensions between those adhering to regulations and those who do not.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Community and lifestyle, Public administration	Moderate	Likely	Moderate	High	High	* Legislation (PoEO Act)	Adequate		* Fisheries Research & Development Corporation * Greater Sydney Region Marine Estate Community Survey	Moderately Adequate	Available information on the presence or absence of excessive or illegal extraction is anecdotal or a state/nationwide assessment, local information not available.	
Waterway Use and Resource Conflict	Recreational Activities	REC3	Passive recreational use	Passive recreational use, such as walking, birdwatching, or simply enjoying the coastal environment, can provide significant social and mental health benefits. However, conflicts can arise when passive users encounter more active or intrusive recreational activities, leading to reduced enjoyment or the degradation of natural areas.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Minor	Community and lifestyle	Isolated but noticeable examples of decline in services, temporary loss of access to one or two properties, or degradation of small recreational areas. Minor impacts on social engagement and recreational use of local amenities.	Environment and cultural heritage, Public administration	Low	Likely	Minor	Moderate	Medium	* CZMPs & CMPs * Council lifeguards * Surf Life Saving Clubs * Signage * Beachwatch (water safety) * NBC manages bookings for rockpools, beaches and parks	Moderately Adequate		* Literature	Moderately Adequate	No local information found on impacts of recreation/human presence on the coastal environment, including biodiversity. Only academic information available	
Waterway Use and Resource Conflict	Recreational Activities	REC4	Active recreational use	Active recreational use encompasses a wide range of water- and land-based activities, such as surfing, swimming (in surf zones and ocean pools), kite-surfing, canoeing, kayaking, and stand-up paddleboarding. On beaches, activities like surf lifesaving events (e.g., Nippers, surf carnivals, and patrols) and off-leash dog swimming are also common. These activities provide significant social, cultural, and health benefits, promoting physical activity and community connection. However, they can lead to conflicts among user groups, particularly in high-demand areas. For example, competition for space between surfers, swimmers, and kite-surfers can cause safety concerns, while surf lifesaving activities and dog-friendly areas may require careful management to balance user needs.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Moderate	Community and lifestyle	General appreciable decline in services, loss of access to several key coastal properties or public spaces, and degradation of recreational opportunities like swimming or fishing. Some reduction in social and community engagement as a result of reduced amenity.	Environment and cultural heritage, Local Public administration	Moderate	Likely	Moderate	High	Medium	* CZMPs & CMPs * Council lifeguards * Surf Life Saving Clubs * Signage * Beachwatch (water safety) * NBC manages bookings for rockpools, beaches and parks			* Literature	Moderately Adequate	No local information found on impacts of recreation/human presence on the coastal environment, including biodiversity. Only academic information available	
Waterway Use and Resource Conflict	Recreational Activities	REC5	Recreational infrastructure	Recreational infrastructure, such as boat ramps, jetties, and picnic areas, supports public access and enjoyment of coastal areas. However, poorly designed or located infrastructure can lead to environmental degradation, including habitat loss, erosion, and water quality issues. In addition, conflicts can arise when infrastructure is insufficient or improperly managed, causing congestion or user dissatisfaction.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Community and lifestyle, Public administration	Moderate	Likely	Minor	Moderate	High	* Legislation (CM Act, PoEO Act, TI SEPP) * CZMPs & CMPs * LEPs * DCPs	Adequate		* REFs * EIS'	Adequate		
Waterway Use and Resource Conflict	Recreational Activities	REC6	Recreational fishing - boat and shoreline-based	Recreational fishing, both boat- and shoreline-based, is a popular activity in coastal areas, contributing to social and economic values. However, this can lead to conflicts with other users, such as swimmers and conservation efforts, particularly when overfishing or illegal extraction occurs. Additionally, high levels of fishing activity may impact fish populations and aquatic habitats, especially in sensitive areas like aquatic reserves and coastal lagoons.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Minor	Environment and cultural heritage	Minor instances of environmental and/or cultural heritage damage, such as temporary loss of biodiversity or visual amenity, that could be reversed with targeted efforts.	Community and lifestyle, Local economy and growth	Moderate	Likely	Minor	Moderate	Medium	* Legislation (FM Act) * CZMPs & CMPs * Estuary Management Plans * Marine wildlife management manual * Sydney harbour and northern beaches recreational fishing guide * NSW fishing rules and regulations	Adequate		* DPI Sydney Harbour and Northern Beaches Recreational Fishing Guide	Moderately Adequate	Detailed information on catch limits and catch requirements. No data on recreational catches and haul	
Planning and Governance	Governance	GOV1	Insufficient funding	Insufficient funding is a critical governance challenge that can hinder the effective management of coastal hazards and long-term adaptation strategies. Limited financial resources can delay or prevent the implementation of necessary projects, such as infrastructure upgrades, erosion control measures, and ecosystem restoration. Additionally, insufficient funding affects the ability to conduct essential monitoring and maintenance activities, leading to increased vulnerability of coastal environments to hazards like erosion, flooding, and tidal inundation. It also constrains community engagement and education efforts, which are vital for building local resilience.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Moderate	Public administration	Public administration would be under severe pressure on several fronts due to recurring coastal management challenges, requiring increased resources to manage access and environmental health.	Environment and cultural heritage, Local Economy and Growth, Community and Lifestyle	High	Likely	Moderate	High	High							
Planning and Governance	Governance	GOV2	Inadequate, inefficient regulation, over-regulation, over-regulation (agencies)	Inadequate, inefficient, or over-regulation by agencies can create significant barriers to effective coastal management. When regulations are unclear or overly complex, it can delay decision-making processes, hinder project approvals, and lead to inconsistencies in enforcement. Over-regulation may stifle innovative solutions or create unnecessary administrative burdens, while inadequate regulation can leave coastal environments vulnerable to unchecked development or poor management practices. Inefficient coordination between agencies can further exacerbate these issues, leading to fragmented management approaches and duplication of efforts.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Moderate	Public administration	Public administration would be under severe pressure on several fronts due to recurring coastal management challenges, requiring increased resources to manage access and environmental health.	Environment and cultural heritage, Local Economy and Growth, Community and Lifestyle	Moderate	Possible	Moderate	Moderate	High							
Planning and Governance	Governance	GOV3	Lack of community awareness of the marine estate, associated threats and benefits, economic information, regulations and opportunities for engagement and	A lack of community awareness regarding the marine estate and its associated threats, benefits, regulations, and opportunities for engagement poses a significant governance challenge. When the public is not adequately informed about coastal and marine environments, there is less support for conservation initiatives, sustainable management practices, and regulatory compliance. This gap in awareness can lead to the undervaluing of the economic and ecological importance of these areas, increasing the risk of degradation. Additionally, without knowledge of opportunities for engagement and participation, communities may feel disconnected from decision-making processes, reducing their involvement in coastal management efforts.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Community and lifestyle, Public administration	High	Likely	Moderate	High	Medium	* CZMPs & CMPs * LEPs * DCPs * Coastal Erosion Emergency Action Subplans * Signage * Significant changes in Yrs 3-12 syllabus in NSW are improving general environmental awareness of future generations * Council runs community education programs and undertakes community engagement on this matter	Adequate		* Northern Beaches community education programs and community engagement	Adequate		
Planning and Governance	Governance	GOV4	Lack of compliance with regulations (by users) or lack of compliance effort (by agencies)	Lack of compliance with regulations, either by users or due to insufficient enforcement by agencies, can undermine coastal management efforts and lead to environmental degradation. When regulations are not followed by the public, it can result in overextraction of resources, illegal activities such as unapproved developments, and damage to sensitive habitats (i.e. due to increased sedimentation from unchecked works sites). On the other hand, if agencies do not put enough effort into monitoring and enforcement, non-compliance goes unchecked, reducing the effectiveness of coastal management strategies. This issue can erode public trust in the regulatory system and make it harder to achieve sustainable outcomes.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Moderate	Public administration	Public administration would be under severe pressure on several fronts due to recurring coastal management challenges, requiring increased resources to manage access and environmental health.	Environment and cultural heritage, Local Economy and Growth, Community and Lifestyle	Moderate	Possible	Moderate	Moderate	Medium	* CZMPs & CMPs * LEPs * DCPs * Rangers * Actions currently being implemented under the Marine Estate Management Strategy including installing signs	Adequate			Moderately Adequate	No publicly available records of (any) lack of compliance	

Threat	Stressor Category	ID	Stressor	Detailed Stressor Description	Likelihood	Relevant Likelihood Scale	Current Likelihood - Description	Current Risk			Secondary Consequence Categories	Risk	Future Risk			Confidence Rating	Current Management Arrangements			Available Information and Data		
								Consequence Rating	Primary Consequence Category	Consequence - Description			Likelihood	Consequence	100 year Risk		Included in:	Adequacy	Gaps / Improvements	Key References:	Adequacy	Gaps / Improvements
Planning and Governance	Governance	GOV5	Lack of effective partnership with First Nations People in the management of cultural heritage and use within the coastal environment	Insufficient involvement of Aboriginal people in the management of cultural heritage and use within the coastal environment is a significant governance challenge. Aboriginal communities have deep connections to coastal lands and waters, with rich cultural heritage that includes knowledge of sustainable land use and environmental stewardship. When Aboriginal people are not adequately included in decision-making processes, there is a risk of overlooking or mismanaging culturally significant sites and practices. This lack of involvement can lead to the degradation of cultural heritage and prevent the integration of traditional knowledge into coastal management strategies.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Community and lifestyle, Public administration	High	Likely	Moderate	High	Medium	* CZMPs & CMPs * LEPs * DCPs * LALC arrangements * NBC has a strong relationship with the Aboriginal Heritage Office. Council is also working with the RFS and Aboriginal community to do cultural burns within the LGA (have done several to date) * NSW Coastal Design Guidelines 2023	Inadequate				
Planning and Governance	Governance	GOV6	Lack of collaboration between private foreshore property owners on management of coastal hazards	Private property owners face risks such as erosion, flooding, and storm damage, yet without coordinated action, efforts to mitigate these hazards may be fragmented or ineffective. Inconsistent or uncoordinated approaches on private property can lead to unequal protection of properties, with some owners investing in defensive measures that may exacerbate hazards for neighbouring properties. Collaboration is essential to ensure that hazard management strategies are cohesive, sustainable, and beneficial for all stakeholders. Effective engagement between property owners and relevant authorities can lead to shared solutions, such as dune restoration or coordinated seawall construction, that protect the broader coastal area and reduce long-term risks for all involved.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Moderate	Community and lifestyle	General appreciable decline in services, loss of access to several key coastal properties or public spaces, and degradation of recreational opportunities like swimming or fishing. Some reduction in social and community engagement as a result of reduced amenity.	Environment and cultural heritage, Local economy and growth, Public administration	Moderate	Possible	Moderate	Moderate	Medium	* CZMPs & CMPs * LEPs * DCPs * Extensive collaboration work by NBC with property owners and a grants program * NSW Coastal Design Guidelines 2023	Adequate				
Planning and Governance	Governance	GOV7	Insufficient asset management and adaptation	Insufficient asset management and adaptation is a critical governance issue that can leave coastal infrastructure vulnerable to hazards such as erosion, flooding, and sea level rise. Without proactive asset management, key infrastructure such as seawalls, roads, stormwater systems, and public facilities may degrade, becoming less effective in mitigating coastal risks. Additionally, failure to implement adaptive strategies can result in assets becoming unsustainable in the face of long-term environmental changes.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Major	Public administration	Public administration would struggle to remain effective under growing pressure from increased environmental hazards and community dissatisfaction. It would be seen to be in danger of failing completely.	Environment and cultural heritage, Local economy and growth, Community and lifestyle, Public safety	High	Possible	Major	High	Medium						
Planning and Governance	Information Gaps	INFO1	Incomplete coastal and estuary process information (including climate change impacts and hydrodynamics)	Without comprehensive data on coastal and estuarine processes such as sediment transport, water flow, erosion rates, and the effects of rising sea levels, it becomes difficult to accurately predict and plan for future coastal changes. These information gaps can lead to poorly informed decisions about infrastructure placement, ecosystem protection, and hazard mitigation. Additionally, incomplete knowledge about how climate change will alter hydrodynamic processes makes it challenging to implement adaptive strategies that can withstand future conditions.	Unlikely	Socio economic threats	Uncommon, but has been known to occur elsewhere. Expected to occur here only in specific circumstances within the timeframe (5-30%).	Major	Public administration	Public administration would struggle to remain effective under growing pressure from increased environmental hazards and community dissatisfaction. It would be seen to be in danger of failing completely.	Environment and cultural heritage, Local economy and growth, Community and lifestyle, Public safety	Moderate	Unlikely	Major	Moderate	High	* Coastal Legislation (CM Act, RH SEPP) * CZMPs & CMPs	Adequate	* Narrabeen Lagoon Entrance Management Strategy 2022 * Collaroy-Narrabeen Beach and Fishermans Beach CZMP * Bilgola & Basin Beach CZMP 2016 * Collaroy-Narrabeen Beach Coastal Protection Assessment 2016 * Manly Ocean Beach Coastal Hazards and Ecosystem Health Management Options Assessment 2016 * Dee Why Lagoon Estuary Management Study 2004 * Manly Ocean Beach & Cabbage Tree Bay Coastline Hazard Definon Study 2003 * Narrabeen Lagoon Estuary Management Plan 2002 * Narrabeen Lagoon Estuary Process Study 2001	Moderately Adequate	Limited coastal and estuary process information spatially. Many coastal areas not studied	
Planning and Governance	Information Gaps	INFO2	Incomplete ecological information (including climate change impacts)	Gaps in knowledge about ecological information such as species distribution, habitat connectivity, and ecosystem resilience make it difficult to develop effective conservation strategies. Without detailed ecological data, it is harder to assess the vulnerability of coastal habitats to rising temperatures, ocean acidification, changing precipitation patterns, and sea level rise. Additionally, incomplete understanding of how species and ecosystems will respond to these changes limits the ability to implement adaptive management approaches.	Possible	Socio economic threats	There is clear evidence to suggest this is possible in this situation within the timeframe (30-50%).	Major	Environment and cultural heritage	Severe loss of environmental amenity and/or cultural heritage, significant loss of biodiversity and habitat. There is a risk of ongoing degradation of cultural sites and ecosystems.	Local economy and growth, Community and lifestyle, Public administration	High	Likely	Major	Very high	High	* CZMPs & CMPs	Adequate	* BioNet Atlas * DPI Estuarine Habitat Dashboard * Fisheries Spatial Data Portal * Protected Matters Search Tool * SEED Vegetation Map - Sydney Metro Area V3.1 2016 E-VIS 4489 * Atlas of Living Australia	Adequate	While these datasets are useful and adequate, it is always best to ground truth	
Planning and Governance	Information Gaps	INFO3	Inadequate and/or incomplete Aboriginal and Non-Aboriginal Heritage information	Inadequate or incomplete Aboriginal and non-Aboriginal heritage information poses a significant challenge to the management of culturally important coastal areas. Without comprehensive data on the location, significance, and condition of heritage sites, there is a risk of inadvertently damaging or neglecting these areas. Gaps in heritage information can also hinder the inclusion of traditional knowledge in planning processes and limit opportunities for collaboration with Aboriginal communities.	Likely	Socio economic threats	Expected to occur in this situation within the timeframe. There is a history of frequent occurrence (50-90%).	Moderate	Environment and cultural heritage	Isolated but significant instances of environmental and/or cultural heritage damage, with loss of key habitats like dunes, lagoons, or rocky reefs, that might be reversed with intensive efforts.	Community and lifestyle, Public administration	High	Likely	Major	Very high	High	* Heritage Council of NSW	Moderately Adequate	* Aboriginal Heritage Information Management System * Aboriginal Sites Decision Support Tool * Heritage Management System * Protected Matters Search Tool * Australian Heritage Database	Moderately Adequate	Known Aboriginal occupancy in the Northern Beaches pre and post European arrival. Unexpected finds always a possibility <i>Learnings from proposed SW Riverbank Restorations Program, identifying culturally significant places and area of high interest for local First Nations Community</i>	
Planning and Governance	Information Gaps	INFO4	Inadequate social and economic information	Inadequate social and economic information creates challenges for understanding the broader impacts of coastal hazards and management strategies on communities. Without detailed data on population demographics, land use, economic activities, and social vulnerabilities, it becomes difficult to assess how coastal risks and adaptation measures will affect different groups. This gap can lead to inequitable decision-making, where certain communities or sectors may face disproportionate risks or benefits. Additionally, lacking economic data on the value of coastal resources and infrastructure can hinder efforts to prioritise investments in coastal protection or restoration.	Unlikely	Socio economic threats	Uncommon, but has been known to occur elsewhere. Expected to occur here only in specific circumstances within the timeframe (5-30%).	Moderate	Local economy and growth	Significant general reduction in local economic performance relative to current forecasts. Temporary declines in tourism and local businesses due to environmental degradation or beach closures would be evident.	Community and lifestyle, Public administration	Low	Possible	Moderate	Moderate	High	* Legislation (EP&A Act) * CZMPs & CMPs * NSW Climate Change Policy Framework	Adequate	How does Council share social and economic information for projects?			



Appendix F

COMMUNITY AND STAKEHOLDER ENGAGEMENT STRATEGY

Stage 1 Engagement Strategy

CMP Stage 1 - Identify the Scope of the CMP

Community and Stakeholders

Bring key stakeholders together to share information and ideas.

Provide the community with information about the CMP objectives and process and provide an opportunity for gathering community concerns and ideas for coastal management.

Level of Engagement

Inform, consult, involve

Level of Influence

Stakeholders input gathered on key issues and available data to inform risk assessment and need for Stage 2 assessments.

Outcomes Sought

- stakeholders / community understand how to be involved
- establish working relationships built on trust / respect
- understand community goals, aspirations, values & priorities
- understand community motivations to participate in planning and implementation
- help community understand dynamic nature of coastal processes & the need to set long-term objectives
- increase community understanding of the new legislative and planning framework
- determine the engagement activities for next CMP stages

Target Audience

Consult / Involve:

- Council staff
- NSW government agencies / authorities

Inform / Consult:

- Relevant Federal agencies
- Business and industry stakeholders
- Research and education organisations
- Aboriginal community representatives / organisations
- Community organisations, interest and user groups
- Residents and other community users of the coastal zone

CMP Engagement Methods

- Project webpage
- Online feedback
- Risk assessment workshops
- Internal project team meetings

Planning Proposal Engagement

Internal (Council and DCCEW) stakeholders to discuss & determine need for coastal management area amendment(s) to CM SEPP

Stage 2 Engagement Strategy

CMP Stage 2 - Understand Risks, Vulnerabilities, and Opportunities

Community and Stakeholders

Bring key stakeholders together to share information and ideas.

Empower community and stakeholders with knowledge to contribute to decisions in subsequent stages.

Level of Engagement

Inform, consult

Level of Influence

Council retains decision-making. Community and stakeholders may contribute to detailed studies on issues of concern

Outcomes Sought

- a shared understanding of risks and opportunities over different timeframes, and the range of actions that could address different risks
- a shared understanding of the varied perspectives about coastal management within the community
- council understands community's 'attitude to risk'
- community and stakeholders understand vulnerabilities, risk and opportunity studies (including technical aspects such as scenarios for sea level rise, hazards and impacts)
- community and users of the coastal zone provide inputs to relevant stage 2 studies to fill gaps in knowledge identified in Stage 1
- increased community trust of technical information based on their involvement and understanding of

Target Audience

- Council staff
- NSW government agencies / authorities
- Relevant Federal agencies
- Business and industry stakeholders
- Research and education organisations
- Aboriginal community representatives / organisations
- Community organisations, interest and user groups
- Residents and other community users of the coastal zone

CMP Engagement Methods

- Project webpage
- Online feedback
- Detailed risk assessment workshops
- Internal project team meetings
- Presentations of outcomes

Planning Proposal Engagement

- No engagement requirement at this CMP stage.
- Good to highlight technical background for coastal management areas update to council and community, based on outcomes of Stage 2 studies (e.g. Stage 2 presentation, Council webpage)

Stage 3 Engagement Strategy

CMP Stage 3 - Identify, Evaluate Options

Community and Stakeholders

Provide opportunities for the community to suggest issues to be addressed and management actions for consideration.

Level of Engagement

Inform, consult, involve

Level of Influence

Council, stakeholders and community collaborate to identify the full range of potential responses to manage coastal

Outcomes Sought

- strong working partnerships
- managers within Council aware of coastal hazards, threats, risks and vulnerabilities, opportunities and actions relevant to their responsibilities and potential conflicts with other Council priorities
- public authorities contribute to identification and evaluation of management options, area aware of responsibilities and accept the adaptive nature of the CMP
- Council understands stakeholder views about cost benefit distribution, willingness to pay and potential trade-offs

Target Audience

- Council staff
- NSW government agencies / authorities
- Relevant Federal agencies
- Business and industry stakeholders
- Aboriginal community representatives / organisations
- Community organisations, interest and user groups
- Residents and other community users of the coastal zone

CMP Engagement Methods

- Project webpage
- Online feedback
- Internal project team meetings
- management options stakeholder workshops and meetings
- community drop-in sessions
- online survey (management options)
- Presentations of outcomes

Planning Proposal Engagement

- Prepare planning proposal
- Seek advice from Department of Planning, Housing and Infrastructure

Stage 4 Engagement Strategy

CMP Stsge 4 - Exhibit, Finalise, Certify CMP

Community and Stakeholders

Gain community confidence and support for decisions that are in the documented CMP.
High involvement stakeholders participate in the detailed process of finalising the CMP.

Level of Engagement

Inform, consult, involve

Level of Influence

Council retains decision-making about the CMP. Community involvement and feedback refine actions in the CMP to address risks considered unacceptable by the community

Outcomes Sought

- community and stakeholder support for actions and priorities in the CMP
- increased awareness about funding options and how CMP implementation will be integrated with Council's Resourcing Strategy and Delivery Program under IP&R
- public authorities accept roles and responsibilities in the CMP

Target Audience

- all project partners (internal council stakeholders, public authorities, businesses)
- all external stakeholder groups and catchment communities

CMP Engagement Methods

- Project webpage
- Online feedback, survey maps
- Internal project team meetings
- implementation and operations stakeholder workshop and meetings
- public exhibition of CMP
- community drop-in sessions
- Council adoption of CMP (Council meeting and briefing)
- CMP submission to the Minister for Certification
- media release (CMP certification notification)

Planning Proposal Engagement

- consult with community during exhibition period
- consult internally with council, where updates required
- submit to Department of Planning, Housing and Infrastructure for approval

Stakeholder	Stakeholder Type	Level of Interest	Level of Influence	Stage 1		Stage 2		Stage 3		Stage 4	
				Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods
Elected Council		High	High	Empower	Briefings and Council Meetings	Empower	Briefings and Council Meetings	Empower	Briefings and Council Meetings	Empower	Briefings and Council Meetings
Council Staff	Local Government	High	High	Empower / Collaborate	Meetings, risk workshops, report review	Empower / Collaborate	Meetings, workshops, report review	Empower / Collaborate	Meetings, workshops, report review	Empower / Collaborate	Meetings, workshops, report review
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	State Government	High	High	Empower / Collaborate	Meetings, risk workshops, report review	Empower / Collaborate	Meetings, workshops, report review	Empower / Collaborate	Meetings, workshops, report review	Empower / Collaborate	Meetings, workshops, report review
Department of Primary Industries - Fisheries	State Government	High	High	Involve	Meetings, risk workshops	Involve	Meetings, workshops, feedback and involvement in the recreational use impact study (aquatic reserves) and lagoon habitat and foreshore condition mapping	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
National Parks and Wildlife Service	State Government	Medium	Medium	Involve	Meetings, risk workshops	Inform	Access to Stage 2 studies once complete	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
Transport for NSW	State Government	Medium	Medium	Involve	Meetings, risk workshops	Inform	Access to Stage 2 studies once complete	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
Sydney Water	State Government	Medium	Medium	Involve	Meetings, risk workshops	Inform	Access to Stage 2 studies once complete	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
Crown Lands	State Government	High	High	Involve	Meetings, risk workshops	Inform	Access to Stage 2 studies once complete	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
Department of Primary Industries - Lands	State Government	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Inform	Access to Stage 2 studies once complete	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
State Emergency Services	State Government	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Involve	Meetings, workshops, and involvement in the hazards assessment	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
Marine Estate Management Authority	State Government	High	High	Involve	Meetings, risk workshops	Involve	Meetings, workshops, feedback and involvement in the recreational use impact study (aquatic reserves)	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
Metro LALC	Aboriginal Organisation	Medium	Medium	Involve	Meetings	Collaborate	Involved in the Aboriginal Partnership Strategy	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, review of draft and final CMP, obtain letter of support (if required)
Aboriginal Heritage Office	Aboriginal Organisation	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Collaborate	Involved in the Aboriginal Partnership Strategy	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, review of draft and final CMP, obtain letter of support (if required)
Local Land Services	State Government	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Inform	Access to Stage 2 studies once complete	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)
NSW Environment and Heritage	State Government	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Inform	Access to Stage 2 studies once complete	Collaborate	Meetings, options workshops, review of relevant actions	Collaborate	Meetings, workshops, review of draft and final CMP, obtain letter of support (if required)

Stakeholder	Stakeholder Type	Level of Interest	Level of Influence	Stage 1		Stage 2		Stage 3		Stage 4	
				Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods
Surfrider Foundation	Community Group	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Consult	Inputs to relevant Stage 2 studies: online surveys, working groups (as relevant), direct email invites to participate	Involve	Webpage (upload stage 2 studies and support materials, e.g. fact sheets). Online survey for input to options (paper option to be considered). Drop in sessions Direct emails to invite inputs to engagement activities	Consult	Public exhibition Webpage Draft CMP Drop in sessions
SLSCs	Community Group	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Consult	Inputs to relevant Stage 2 studies: online surveys, working groups (as relevant), direct email invites to participate	Involve	Webpage (upload stage 2 studies and support materials, e.g. fact sheets). Online survey for input to options (paper option to be considered). Drop in sessions Direct emails to invite inputs to engagement activities	Consult	Public exhibition Webpage Draft CMP Drop in sessions
Boardriders Clubs	Community Group	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Consult	Inputs to relevant Stage 2 studies: online surveys, working groups (as relevant), direct email invites to participate	Involve	Webpage (upload stage 2 studies and support materials, e.g. fact sheets). Online survey for input to options (paper option to be considered). Drop in sessions Direct emails to invite inputs to engagement activities	Consult	Public exhibition Webpage Draft CMP Drop in sessions
Fishing Clubs	Community Group	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Consult	Inputs to relevant Stage 2 studies: online surveys, working groups (as relevant), direct email invites to participate	Involve	Webpage (upload stage 2 studies and support materials, e.g. fact sheets). Online survey for input to options (paper option to be considered). Drop in sessions Direct emails to invite inputs to engagement activities	Consult	Public exhibition Webpage Draft CMP Drop in sessions
Ocean Swimming Clubs	Community Group	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Consult	Inputs to relevant Stage 2 studies: online surveys, working groups (as relevant), direct email invites to participate	Involve	Webpage (upload stage 2 studies and support materials, e.g. fact sheets). Online survey for input to options (paper option to be considered). Drop in sessions Direct emails to invite inputs to engagement activities	Consult	Public exhibition Webpage Draft CMP Drop in sessions

Stakeholder	Stakeholder Type	Level of Interest	Level of Influence	Stage 1		Stage 2		Stage 3		Stage 4	
				Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods	Level of Engagement	Engagement Methods
Community Organisations, Interest and User Groups	Community Group	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Consult	Inputs to relevant Stage 2 studies: online surveys, working groups (as relevant), direct email invites to participate	Involve	Webpage (upload stage 2 studies and support materials, e.g. fact sheets). Online survey for input to options (paper option to be considered). Drop in sessions Direct emails to invite inputs to engagement activities	Consult	Public exhibition Webpage Draft CMP Drop in sessions
Local community	Community	Medium	Medium	Inform	Webpage (upload completed Scoping Study, provide CMP context information)	Consult	Inputs to relevant Stage 2 studies: online surveys	Involve	Webpage (upload stage 2 studies and support materials, e.g. fact sheets). Online survey for input to options (paper option to be considered). Drop in sessions	Consult	Public exhibition Webpage Draft CMP Drop in sessions

IAP2 Spectrum of Public Participation

IAP2's Spectrum of Public Participation was designed to assist with the selection of the level of participation that defines the public's role in any public participation process. The Spectrum is used internationally, and it is found in public participation plans around the world.

INCREASING IMPACT ON THE DECISION					
	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

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