



North Harbour Coastline Management Plan



Final Report

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March 2010



NORTH HARBOUR COASTLINE MANAGEMENT PLAN

Harbour Foreshores & Coastline Management Committee

After the Local Government election in September 2008, Manly Council established the Manly Harbour Foreshores & Coastline Management Committee in early 2009 to guide the preparation of a number of plans including the North Harbour Coastline Management Plan. The first meeting of the Committee was held on 14 April 2009. Members of the Committee are:

Group	Representing Organisation	Name
Councillors	Manly Council	Dr. Peter Macdonald (Chair)
	Manly Council	Adele Heasman
	Manly Council	Jean Hay, AM (Mayor)
Community		Katie Harris
		Sylvia Bell
		Lyn Green
		Ross Thymin
		Richard Hewitt
		Ray Mathieson
Surf Clubs		Carlo Bongarzone
	Queenscliff SLSC	David Piper
	North Steyne SLSC	Damien O'Shannassy
	Manly SLSC	Robbie Williams
State Government	Dept of Environment, Climate Change & Water	Mark Moratti
	Dept of Environment, Climate Change & Water	Daniel Wiecek
	Dept of Environment, Climate Change & Water	Tracey Macdonald
	Industry & Investment NSW	Paul Schuettrumpf
	NSW Maritime	Nicholas Richards
Council Staff	Manly Council	Rafiqul Islam

Coastal Focus Group

In order to support the Committee and to obtain expert contribution in the formulation of the CMP, an informal in-house Coastal Focus Group consisting of relevant key staff was also formed. Members of this Group are:

Name	Position	Name	Position
Eduard McPeake	Manager, Community & Environmental Partnership Branch	Judy Reizes	Community Projects Officer, Manly Environmental Centre
Ted Williams	Manager, Civic Services	Zoran Popovic	Heritage Planner
Terry Jones	Manager, Ranger Services	Anna Nikolov	Social Planner
Tony Goninon	Manager, Urban Services	Nilushi Disanayake	Waste Minimization & Education Officer
Tony Pavlovic	Manager Environmental Health	Dalene Amm	Team Leader, Sustainability
Jennie Minifie	Manager, Planning & Strategy	Lee Lau	Water Cycle Management Team Leader
Fenton Beatty	Parks Coordinator	Michael Galloway	Catchments Project Officer
Chris Kraus	Bushland Management Coordinator	Monique Needham	Environmental Planner
Paul Christmas	Planning & Strategy Coordinator	Rafiqul Islam	Estuary Management Officer
Michael Biddulph	Architect		

Lead Contributors: Rafiqul Islam and Tim Macdonald

Contributions of the Harbour Foreshore and Coastline Management Committee and internal 'Coastal Focus Group' are highly acknowledged. Acknowledgements are also due to Mr. Simon Vaughn, a North Harbour resident for contribution and/or review of this CMP.

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i. EXECUTIVE SUMMARY

The North Harbour Coastline Management Plan (CMP) was adopted by the Council at its Planning & Strategy Committee meeting on 1 March 2010. Prior to this, public exhibition of the Plan occurred during 21 September to 20 November 2009 and a final endorsement of the Plan by the Harbour Foreshores & Coastline Management Committee on 8 December 2009.

Supporting documents related to the draft CMP include:

- North Harbour Coastline Management Study, Manly Council, February 2009
- Davis Marina to Manly Point Coastline Hazard Definition Study, Patterson, Britton & Partners, 2004
- Natural Environment Assessment and Recommendations for the Coastline Management Plan: North Harbour, GIS Environmental Consultants, March 2004

About the Plan

This Plan is prepared through the process outlined in the NSW Coastline Management Manual. Extensive community consultation was conducted through mechanisms including, display panels, information sharing through Precinct newsletters and Council's webpage, formal questionnaire surveys and community Field Days.

This Plan addresses the northern portion of the North Harbour (part of Port Jackson / Sydney Harbour) and foreshore that lies within the Manly Local Government Area boundary. North Harbour study area extends both seaward and landward from the shoreline between Federation Point and Wellings Reserve. The study area covers approximately 180 hectares and takes in the suburbs of Fairlight, Balgowlah and Balgowlah Heights including Precinct Community Forum areas of Fairlight, North Harbour and Balgowlah Heights. The entire study area is covered within the Sydney Harbour Foreshores and Waterways Area and also within the Sydney Metropolitan Catchment Area.

The Plan has been developed in response to legislative requirements and community issues in accordance with current best practices for the management of estuaries and its catchment. The development of this Coastline Management Plan is identified in Manly Plan 2009-2012 and Sustainability Strategy 2006.

Preparation of this EMP is an action C1.3.1 (*develop and implement comprehensive Coastline Management Plans (CMPs) for all areas of foreshore in Manly*) of the Manly Sustainability Strategy 2006 (MC 2006). It supports strategy 'E2.1: Improve health of waterways, coasts and estuaries' of the draft North East Subregional Strategy (DoP 2007).

The Plan addresses the following six broad based key issues, derived from community consultations:

- Aquatic/intertidal habitat conservation & management,
- Bushland/terrestrial habitat conservation & management,
- Upgrading of Public Facilities,
- North Harbour Reserve Improvement
- Hazards & climate change, and
- Heritage conservation & management

This Coastline Management Plan is a strategic plan with a long-term time frame of 15- 20 years and firmed up implementation program of 5 years. This plan will be reviewed and revised every 5 years and a new implementation program will be adopted in line with priorities of the period.

This Coastline Management Plan has evolved through incorporation of strategic directions from a number of Council's management documents and land use planning instruments. In order to embed coastline management as part of Council's core business, the adopted Plan will link into documents such as: Manly Plan, Manly Sustainability Strategy, Coastline & Estuary Management Plans, Manly Local Environmental Plan, Development Control Plans (DCPs), and Plans of Management.

Strategic Framework & Management Strategy

A series of goals and objectives for the future management of the North Harbour area were developed on the basis of information received through community and stakeholder consultation. For each management issue a goal has been defined, along with a range of management objectives that have been further translated into management options. The Plan follows the four basic principles of Ecologically Sustainable Development (ESD) and also considers the State Plan, state-wide targets set by the Natural Resources Commission and regional targets set by the Sydney Metropolitan Catchment Management Authority (SMCMA).

This Plan sets six Goals and 21 Objectives to be addressed through 48 Management Options (**Table A**). Only 30 of these are new activities. Of these 30, three management options are proposed for immediate implementation, 20 within 2 years, six within 3-4 years and only 1 at later years. Overall, 17 management options have been rated to have high priority, 30 as medium priority and only one as low priority.

Strategic Management Options

Strategic management options cover a wide range of structural and non-structural solutions. These are briefly summarised here addressing each of the six key management issues.

Options addressing Aquatic/Intertidal Habitat Conservation & Management

A total of 10 management options are proposed (Table A and detailed in Section 4.1) to address four objectives: expansion of North Harbour Aquatic Reserve, protection of areas of ecological significance, preservation of seagrass and kelp beds and ensuring that water quality is suitable for healthy natural habitat conservation.

Of these, eight management options have been rated as of high priority and relate to extension of the boundary of North Harbour Aquatic Reserve, assisting DECCW with preparation and implementation of North Harbour Aquatic Reserve Management Plan, managing Wildlife Protected Area at Federation Point, assessing marine biodiversity, protection of soldier crab colony, supporting conservation of seagrass and kelp beds, investigate feasibility of Stormwater Quality Improvement Devices (SQIDs) and place screens on minor stormwater outfalls. Further two management options have medium priority.

Three management options are already on-going activities. None has been proposed for immediate implementation.

Options addressing Bushland/Terrestrial Habitat Conservation & Management

A total of eight management options are proposed (Table A and detailed in Section 4.2) to address three objectives: continuation of Council's bushland management program, reduction of weed cover and encouraging community participation.

Of these, one has been rated as of high priority and relate to Community Bush Care Volunteers program. However, six management options have medium priority. Three of the management options are on-going activities. One option that has been proposed for immediate implementation relates to obtain SEPP 19 status for Heathcliff Reserve.

Options addressing Upgrading & Enhancement of Public Facilities

A total of 10 management options are proposed (Table A and detailed in Section 4.3) to address four objectives: improvements to general amenities, safe accessibility to public places, facilitating dog walking and sustainable recreational fishing.

Of these, three management options have been rated as of high priority and relate to continuation of ban on commercial fishing, monitor Dioxin levels in Sydney Harbour waters and facilitate recreational fishing. Seven management options have medium priority.

Six of the management options are on-going activities.

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Options addressing North Harbour Reserve Improvement

A total of six management options are proposed (Table A and detailed in Section 4.4) to address four objectives: health safety issues, masterplan for the Reserve, assessing irrigation options and improved disabled access.

Of these, one has been rated as of high priority, four as medium and the remaining one as low priority management options. The only high management option relates to preparation of Landscape Masterplan for North Harbour Reserve.

None of the management options are on-going activities. Two options proposed for immediate implementation relate to investigations to ascertain any health risk in soil and preparation of landscape masterplan for North Harbour Reserve.

Options addressing Hazards & Climate Change

A total of 12 management options are proposed (Table A and detailed in Section 4.5) to address four objectives: risk reduction to slope and cliff instability, risk reduction from beach erosion and shoreline recession, impacts of sea level rise adaptation and mitigation measures in relation to climate change impacts.

Two high priority management options relate to continuation of climate change mitigation and adaptation measures and information to community regarding known impacts of climate change. Ten management options are categorised in medium priority.

Four of the management options are on-going activity. None has been proposed for immediate implementation.

It should be mentioned that many of the proposed management options and related actions will eventually be guided by Council's proposed *Climate Change Risk Assessment and Adaptation Action Plan* (being drafted) and the Council's proposed Carbon Neutral Plan (yet to be drafted).

Options addressing Heritage Conservation & Management

A total of two management options are proposed (Table A and detailed in Section 4.6) to address two objectives: protection of all sites of Aboriginal heritage significance and sites of natural and cultural heritage.

Both two of the management options are on-going activities of Council and rated as of having high priority.

Table A: Summary of Proposed Management Options

Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital (\$)	Operational (\$)	Total			
(AH) AQUATIC/INTERTIDAL HABITAT CONSERVATION & MANAGEMENT									
Goal: Restore and maintain a healthy and diverse mix of aquatic and intertidal habitats.									
AH 1 Establish structured and community led management for an expanded North Harbour Aquatic Reserve.									
AH1.1. Pursue a submitted proposal to extend the boundary of North Harbour Aquatic Reserve.		MC (NR)	Aquatic reserve expanded	-	-	Staff time	On-going	High	
AH1.2. Assist DECCW with preparation and implementation of North Harbour Aquatic Reserve Management Plan.		NSW DECCW, MC (NR) and I&I NSW	Management Plan prepared and implemented	-	-	Staff time	Within 2 years	High	
AH 2 Ensure all areas of ecological significance are properly protected and conserved.									
AH2.1. Pursue & process to declare inter-tidal areas of North Harbour as 'Intertidal Protected Area' under the <i>Fisheries Management Act</i> .		MC (NR) and I&I NSW	Proposed intertidal areas declared as IPA	-	-	Staff time	Within 2 years	Medium	<i>if proposal for extension is not successful</i>
AH2.2. Continue managing Wildlife Protected Area at Federation Point.		MC (NR) and Precincts	WPA maintained and continued	-	-	Staff & Warden time	On-going	High	
AH2.3 Assess marine biodiversity of North Harbour including Aquatic Reserve.		MC (NR) and NSW DECCW	Investigation completed	-	20,000	20,000	Within 2 years	High	
AH2.4. Locate soldier crab colony at the far west end of North Harbour and undertake protection measures		MC (NR)	Soldier crab colony located	-	-	Staff time	Within 3-4 years	High	
AH 3 Preserve existing seagrass and kelp beds.									
AH3.1. Continue to encourage I&I NSW to support conservation of seagrass and kelp beds.		I&I NSW, MC (NR), NSW Maritime & SMCMA	Seagrass and kelp beds conserved	-	-	Staff time	On-going	High	
AH3.2. Work with NSW Maritime and I&I NSW to introduce seagrass friendly moorings		NSW Maritime, I&I NSW, SMCMA and MC (NR).	Moorings introduced	-	-	Staff time	Within 3-4 years	Medium	
AH 4 Ensure that water quality is suitable for healthy natural habitat conservation									
AH4.1. Investigate feasibility of Stormwater Quality Improvement Devices (SQIDs) on major stormwater outlets that discharge into North Harbour to ensure healthy aquatic habitat.		MC (NR and US)	SQIDs installed	50,000	40,000	90,000	Within 2 years	High	
AH4.2. Place screens on minor stormwater outfalls to improve water quality and aquatic health		MC (NR and US) and Sydney Water	Screen/gully pit devices installed	-	50,000	50,000	Within 3-4 years	High	
(TH) BUSHLAND/TERRESTRIAL HABITAT CONSERVATION & MANAGEMENT									
Goal: Protect and enhance urban bush land and native vegetation areas									
TH 1 Continue to manage Council's bushland management program.									
TH1.1. To structure systematic and continued bushland management, prepare a comprehensive management plan (in conjunction with Precincts) and develop a staged implementation programme.		MC (P & R)	Management Plan prepared	-	40,000	40,000	Within 3-4 years	Medium	
TH1.2. Prepare site specific management plans for Nolan Bush and West Esplanade Park, the two SEPP 19 bushland, to fulfill statutory requirement.		MC (P & R)	Site specific Management Plan prepared	-	20,000	20,000	Within 2 years	Medium	
TH1.3. Initiate processes to obtain SEPP 19 status for Heathcliff Reserve.		MC (P & R)	SEPP 19 status obtained	-	-	Staff time	Immediate	Medium	



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Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital (\$)	Operational (\$)	Total			
TH1.4 Prepare and implement Walkway Landscape Masterplan – Federation Point to Lauderdale Ave.		MC (P & R)	Masterplan prepared	-	20,000	20,000	Within 2 years	Medium	
TH 2 Undertake systematic program to reduce weed cover in open spaces, reserves and bushland									
TH2.1. Continue enhanced weeding program at high weed density areas on a priority basis.		MC (P & R)	Weed density lowered	-	10,000 per year	10,000 per year	On-going	Medium	
TH2.2. Investigate sources of nutrient-rich discharges at stormwater outlets located in bushland and implement appropriate control measures.		MC (P & R and NR)	Control measures implemented	-	40,000	40,000	Within 3-4 years	Medium	
TH 3 Continue to encourage community participation in bush regeneration program and in native plants on public and private lands									
TH3.1. Continue Community Bush Care Volunteers program in the study area.		MC (P & R)	Program supported & continued	-	10,000 per year	10,000 per year	On-going	High	
TH3.2. Continue Council's Street Tree Planting Programme within the study area and initiate assessment of the programme.		MC (P & R)	Recommend list prepared & program continued	-	10,000 per year	10,000 per year	On-going	Medium	
(PF) PUBLIC FACILITIES									
Goal: Public facilities are upgraded and maintained to facilitate improved social amenity									
PF 1 Facilitate improvements to general amenities, traffic and safety within foreshore areas, public reserves and beaches									
PF1.1. Enhance general amenities for public use		MC (US)	Facilities enhanced	50,000	25,000	75,000	On-going	Medium	
PF1.2 Improve and facilitate traffic management around public reserves and beaches		MC (US), RTA & Risk Manager	Improved traffic management	-	15,000	15,000	On-going	Medium	
PF1.3 Audit and remove unused watercrafts stored on foreshores within the study area with provision of dinghy and kayak storage facility in future.		MC (US and Design Group)	Foreshore cleared of unused boats	11,000	-	11,000	Within 2 years	Medium	
PF1.4 Organise facilities for Scuba divers near Fairlight pool.		MC (US and Design Group)	Table installed	8,000	-	8,000	Within 2 years	Medium	
PF2 Ensure safe accessibility to public places including provision of disabled access									
PF2.1 Construct paved footpath on Lower Beach Street from Condamine Street towards the shore		MC (Engineering & construction)	Footpath designed & constructed	80,000	-	80,000	Within 5 th year	Medium	
PF2.2 Audit disability access of all parks and bays within the study area.		MC (P & S)	Audit completed	-	-	Staff time	Within 2 years	Medium	
PF3 Facilitate dog walking with better provisions									
PF3.1 Install adequate dog faeces bins, water bowl and bag dispensers		MC (Waste)	Facilities established	-	20,000	20,000	On-going	Medium	
PF4 Support sustainable recreational fishing									
PF4.1 Support continuation of ban on commercial fishing		MC (NR), I&I NSW, SCCG and SMCMA	Ban maintained	-	-	Staff time	On-going	High	
PF4.2 Encourage relevant agencies to continue to monitor Dioxin levels in Sydney Harbour waters.		NSW DECCW, Department of Food Authority, I&I NSW, NSW	Dioxin level monitored	-	-	Staff time	On-going	High	



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Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital (\$)	Operational (\$)	Total			
		Health and SMCMA							
PF4.3	Facilitate recreational fishing and work with I&I NSW to educate community about rules and regulations applying to recreational fisher (bag limits, size limits and species types) through NSW Fishcare Program.	I&I NSW and MC (CEP)	Education program implemented	-	-	Staff time	On-going	High	
(NR) NORTH HARBOUR RESERVE IMPROVEMENT									
Goal: Enhance safe public use of North Harbour Reserve (NHR) while preserving natural environment and beauty of the Reserve									
NR 1 Ascertain health safety issues from landfill and soil of NHR									
NR1.1.	Carry out necessary investigations to ascertain any health risk in soil and sediments at North Harbour Reserve.	MC (NR)	Health risk assessed	-	5,000	5,000	Immediate	Medium	
NR 2 Initiate and implement a Masterplan for North Harbour Reserve									
NR2.1	Prepare and implement a Landscape Masterplan for North Harbour Reserve, in consultation with Precincts and community.	MC (NR)	Masterplan prepared, adopted and implemented	-	20,000	20,000	Immediate	High	
NR3 Assess irrigation options for North Harbour Reserve									
NR3.1	Assess recycling of stormwater to irrigate North Harbour Reserve.	MC (NR, P&R and US)	Stormwater recycled	-	-	20,000	Within 2 years	Medium	
NR4 Improve (including disable) access in and out of NHR									
NR4.1	Widen and upgrade access paths leading to and within North Harbour Reserve.	MC (NR and US)	Access path widened	70,000	10,000	80,000	Within 2 years	Medium	
NR4.2	Locate and investigate suitability of graded wheel chair access	MC (NR and US)	Wheel chair access assessed	-	-	Staff time	Within 2 years	Medium	
NR4.3	Investigate provision of improved parking facility at North Harbour Reserve.	MC (US)	Improved parking facility	-	-	Staff time	Within 2 years	Low	
(HR) HAZARDS & CLIMATE CHANGE									
Goal: Assess, minimize and mitigate risks from coastal hazards and climate change									
HR 1 Reduce to an acceptable level, the risk to property and risk to life as a result of slope and cliff instability identified in the Coastline Hazard Definition Study.									
HR1.1.	For hazards that are located on private property, owners are contacted, reminded of the identified hazards and recommended to undertake inspections and stabilization works where required.	Property owners	Stabilization works completed	-	-	Staff time	On-going	Medium	
HR 2 Reduce to an acceptable level, the risk of damage as a result of beach erosion and shoreline recession									
HR2.1.	Monitor shoreline changes of Fairlight Beach and damage, if any, of foreshore structures	MC (NR)	Monitoring program initiated	-	-	Staff time	Within 2 years	Medium	
HR2.2.	Ensure future development of Fairlight Beach is compatible with erosion and recession hazards including impacts of climate change	MC	Erosion, recession hazards taken into account prior to any	-	-	Staff Time	Within 3-4 years	Medium	



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Objectives	Management Options	Responsible Agency (ies)	Performance target	Estimated Cost			Time Frame	Priority	Remarks
				Capital (\$)	Operational (\$)	Total			
			works						
HR2.3. Ensure any protective works minimise impact on beach amenity and access, and where practical improve existing amenity and access		MC (Engineering & Construction)	Designs made	-	-	Staff time	On-going	Medium	
HR2.4. Encourage DECCW to carry out photogrammetric analysis periodically or after major storm events		DECCW, MC (GIS)	Photographic images collected	-	-	Staff time	As needed	Medium	
HR3. Protect properties and assets from the impacts of sea level rise									
HR3.1 Assess specific impacts of sea level rise on North Harbour Reserve and devise adaptive measures.		MC (NR)	Mitigation & adaptation measures identified	-	30,000	30,000	Within 2 years	Medium	
HR3.2 Assess impact of climate change on areas of ecological significance and devise adaptive measures.		MC (NR and GIS), SCCG and SMCMA	Ecological impact maps	-	10,000	10,000	Within 2 years	Medium	
HR3.3 Work with Sydney Coastal Councils Group to develop regional/ local level climate change model considering protection provided by existing seawalls and rocky foreshores.		SCCG, DECCW & MC (NR)	Model results and impact reports	-	-	Staff time	On-going	Medium	
HR3.4 Promote environmentally- friendly sea walls while upgrading existing seawalls or constructing new seawalls.		MC (US, Design & NR) and SMCMA	Completion of innovative designs	-	-	Staff time	Within 2 years	Medium	
HR4. In consultation with Community Precinct Forums, undertake adaptation and mitigation measures in relation to climate change impacts									
HR4.1 Continue with on-going climate change mitigation and adaptation measures		MC (CPS)	Positive measurable impacts achieved	-	70,000	70,000	On-going	High	
HR4.2 Collect and collate new information and knowledge on climate change impacts relevant to the study area/ Manly LGA.		MC (CEP)	Strategic documents & e-book	-	-	Staff Time	Within 2 years	Medium	
HR4.3 Inform and involve community through Precincts about known impacts of climate change on the study area.		MC (CEP)	Booklet published & distributed	-	15,000	15,000	Within 2 years	High	
(HC) HERITAGE CONSERVATION									
Goal: Ensure that all Aboriginal & European (cultural & natural) and heritage sites in the study area are preserved and protected.									
HC 1 Ensure that sites of Aboriginal heritage are protected under relevant legislations and appropriately and regularly maintained.									
HC1.1. Review Aboriginal Site Management Report for Manly Council (2006) and associated reports to prioritise management needs and develop a plan of implementation.		MC (P&S) and AHO	Prioritisation done	-	-	Staff time	On-going	Medium	
HC2 Ensure that all sites of non-indigenous heritage are protected under relevant legislations and in Council planning instruments.									
HC2.1. Ensure physical protection and maintenance of all heritage listed items.		MC (Urban Services)	Maintained & cleaned	-	20,000	Staff time	On-going	Medium	

Funding Requirements

The total cost of implementing (including 1-5 years of operation and maintenance) the 48 management options addressing six key management issues is \$889,000 (**Table B**).

Table B: Summary of estimated cost

Management Issues	Number of Management Options	Estimated Cost (\$)			
		High priority	Medium Priority	Low priority	Total
Aquatic Habitat	10	160,000	0	0	160,000
Terrestrial Habitat	8	50,000	220,000	0	270,000
Enhancement of Facilities	10	11,000	198,000	0	209,000
North Harbour Reserve	6	0	120,000	5,000	125,000
Hazards & Climate Change	12	85,000	40,000	0	125,000
Heritage Conservation	2	0	0	0	0
	48	306,000	578,000	5,000	889,000

Some actions require an on-going commitment from existing staff rather than the outlay of expenditure and this is noted as 'Time'. Some recommended actions require significant capital costs, especially where large-scale works are involved such as widening & upgrading of access road, installation of SQIDs, construction of paved footpaths.

As indicated elsewhere, implementation responsibility of all proposed management options rests with a number of agencies including Manly Council. Hence, adoption of this CMP does not commit Council to allocate immediate funding. Funding from different alternative sources will be pursued (**Appendix B**). These include but are not limited to:

- Council's Environment Levy (subject to a budget bid process);
- Council's General Revenue Budget (subject to a budget bid process);
- State Government's Coastal Management Program (50% subsidy funding subject to a submission process);
- NSW Coastal Catchments Initiative; and
- Other Commonwealth and State Government funded programs such as SSHAP, MIP, Greenspace, CMA Funding etc etc.

Implementation Plan

Agencies involved: Manly Council (MC) is the principal implementation/management agency of the North Harbour Coastline Management Plan. Responsibility for implementing the options is spread across local government (planning, management and works staff), state government agencies and volunteer community groups. The following agencies will likely be involved in implementation of one or more relevant management options either in the main or supporting roles.

- NSW Department of Environment, Climate Change & Water (NSW DECCW);
- NSW Maritime;
- Industry & Investment NSW (I&I NSW);
- Sydney Water;
- Sydney Metropolitan Catchment Management Authority (SMCMA);
- Sydney Coastal Councils Group (SCCG); and
- Aboriginal Heritage Office (AHO);

Implementation Time frame: Of 48 management options proposed in this CMP, 18 options are on-going activities of the Council and/or other agencies. Among newly proposed 30 options, three have been proposed for immediate implementation, 19 within two years, seven within 3-4 years and only one on 5th or later years.



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Mainstreamed into the Council's Management Plan: The management options proposed in this Coastline Management Plan will gradually be mainstreamed in to the rolling three year Manly Plan. The Manly Plan is the key planning document driving the operations of Council. Efforts will be made to incorporate priority options in to the next Manly Plan 2010 – 2013 and subsequent Plans.

Collaborative Partnership with other agencies and neighbouring Councils: Manly Council, as being the main implementor of the CMP, plans to conclude collaborative partnership agreements with other relevant agencies and neighbouring Councils either specifically for this CMP or for overall LGA.

Manly Harbour Foreshores & Coastline Management Committee to coordinate: Manly Harbour Foreshores & Coastline Management Committee will co-ordinate implementation of the CMP. The Committee, will be serviced by the Coastal Management Team of Council

Opportunities for community involvement: Many of the management strategies adopted for North Harbour area offer opportunities for community involvement particularly activities such as bush regeneration projects, participatory monitoring programs and environmental education, as well as general monitoring of plan implementation and effectiveness.

Reporting through four mechanisms: Reporting on implementation of the CMP will be achieved through four mechanisms: internal Council reporting process, Annual Reports to the community, Council website and regular Harbour Foreshore Committee meetings.

CMP to be reviewed every 5 years: The Coastline Management Plan will be reviewed every 5 years to accommodate priorities of the period, requirements of new/amended legislations and Council's policies and guidelines. During the process, there will be a mechanism to identify new issues and conflicts concerning the coastline management and ensure their incorporation into a revised plan. A program for the following 5 years will be developed by designating priority to any new actions and reassigning priority to the remaining actions. These programs should be fed back into and form the revised CMP for the next 5 years.

Monitoring, Evaluation & Reporting

Monitoring & evaluation is a key component of any coastline/estuary management plan. At present, Council has no structured & written monitoring plan to assess environmental health of coast & estuary. However, the SHOROC State of the Environment Report, prepared annually in collaboration with other regional Councils, provides numerical data on a comprehensive range of indicators. Long-term water quality monitoring data is, however, available at present from the 'Harbour Watch Program' and 'Beach Watch Program' of the Department of Environment, Climate Change and Water (DECCW). The National NRM Monitoring and Evaluation Framework (NM&EF) has identified a total of 19 nationally agreed indicators to measure the effect of the stressors on ecosystem condition (physical/chemical and biological) and habitat extent. Based on this, 25 indicators have been proposed to monitor Manly's Estuarine, Coastal & Marine Habitat Integrity.

ii. ABBREVIATIONS

ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
AHO	Aboriginal Heritage Office
CAP	Catchment Action Plan
CCM	Care, Control & Management
CCP	Cities for Climate Protection
CMA	Catchment Management Authority
CMP	Coastline Management Plan
CSIRO	Australia's Commonwealth Scientific and Industrial Research Organisation
DCP	Development Control Plan
DECCW	NSW Department of Environment and Climate Change and Water
DLWC	The former NSW Department of Land & Water Conservation
DNR	The former NSW Department of Natural Resources (at present, DECC)
DPI	NSW Department of Primary Industries (at present I&I NSW)
DWE	NSW Department of Water & Energy
EPA	Environmental Protection Agency (at present, DECC)
EPBC	Environment Protection & Biodiversity Conservation (Act)
EPI	Environmental Planning Instrument (includes LEP, REP and SEPP)
ESD	Ecologically Sustainable Development
GIS	Geographic Information System
GPT	Gross pollution Trap
GSE	Graduate School of Environment, Macquarie University
ICZM	Integrated Coastal Zone Management
I&I	Industry & Investment NSW
IPA	Intertidal Protected Area
IPCC	Inter-Governmental Panel for Climate Change
LEP	Local Environmental Plan
LG	Local Government
LGA	Local Government Area
MC	Manly Council
MEC	Manly Environment Centre
MIP	Marine Infrastucture Projects
MLALC	Metropolitan Local Aboriginal Land Council
MSL	Mean Sea Level
MSW	Manly Scenic Walkway
MSS	Manly Sustainability Strategy
NH	North Harbour
NHR	North Harbour Reserve
NRC	Natural Resources Commission
NSW	New South Wales
PoM	Plan of Management
REP	Regional Environmental Plan
SAP	Scientific Advisory Panel (of the Manly Council)
SCCG	Sydney Coastal Council Group
SEPP	State Environmental Planning Policy
SES	State Emergency Services
SHOROC	Shore Regional Organisation of Councils
SMCMA	Sydney Metropolitan Catchment Management Authority
SREP	Sydney Regional Environmental Plan
SSHAP	Sharing Sydney Harbour Access Program
TSC	Threatened Species Conservation (Act)
UWS	University of Western Sydney
WPA	Wetland Protection Area

iii. LIST OF TABLES

Table A	Summary of proposed management options
Table B	Summary of estimated cost
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Table 1.9a	Outline of key Council documents with relationship to North Harbour CMP
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Figure 1.3	Elements of the Coastline Management System
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Figure 5.1	Cost allocations to address key issues

1. ABOUT THE PLAN

1.1 TITLE

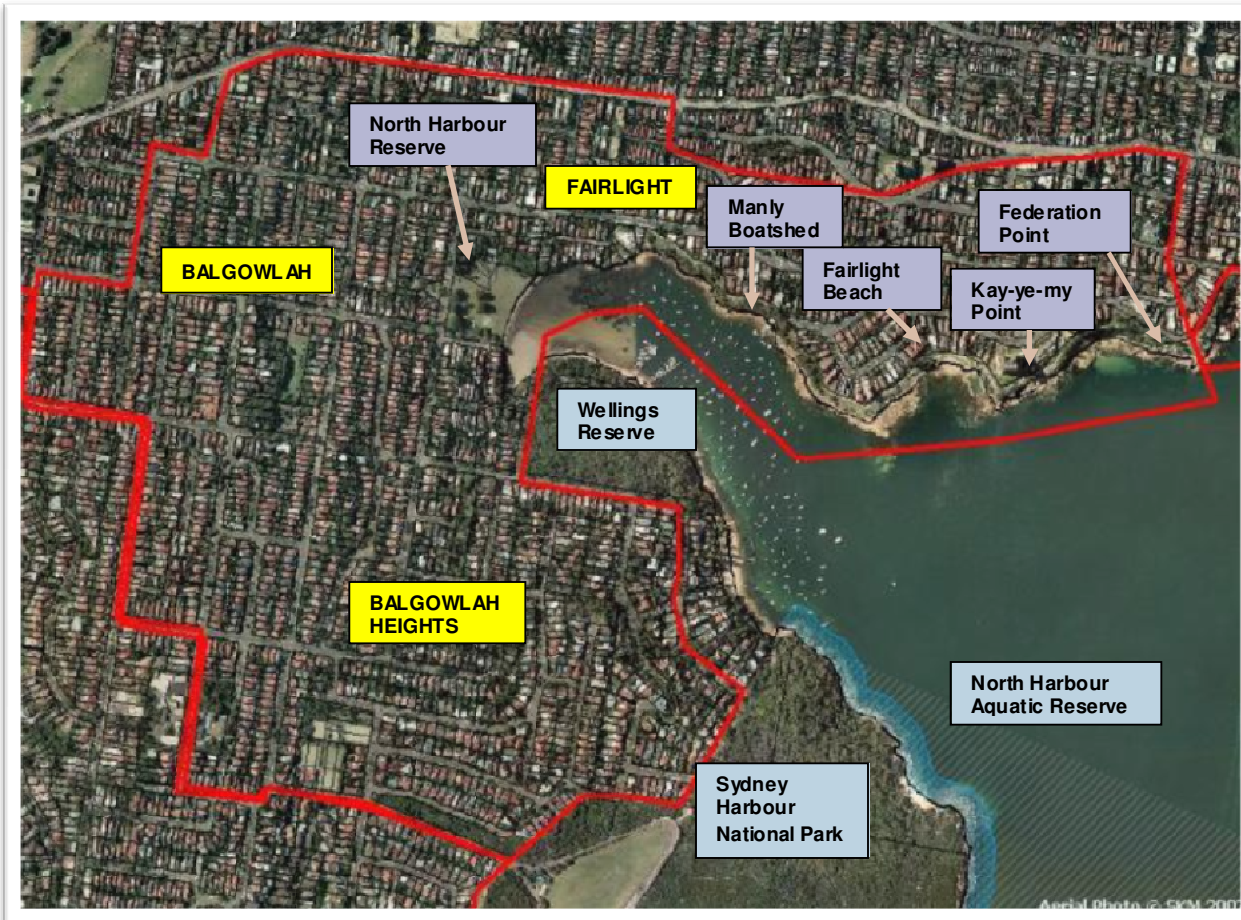
This plan is the *North Harbour Coastline Management Plan*.

1.2 MANAGEMENT AREA

North Harbour study area extends both seaward and landward from the shoreline between Federation Point and Wellings Reserve (**Fig. 1.2**).

The study area covers approximately 180 hectares and takes in the suburbs of Fairlight, Balgowlah and Balgowlah Heights and also the local Precinct Community Forum areas of Fairlight, North Harbour and Balgowlah Heights.

Figure 1.2 Aerial view of the North Harbour study area



The study area covers two water management catchments, North Harbour (with 2 sub-catchments) and Fairlight (with 7 sub-catchments).

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North Harbour Aquatic Reserve lies very close to the study area. A recent proposal to extend the North Harbour Aquatic Reserve to include entire water side of the study area was submitted by Council to the Department of Environment & Climate Change for consideration and approval.

The study area is adjacent to areas covered by the Council adopted Forty Baskets Coastline Management Plan & currently under development, Manly Cove Coastline Management Plan.

North Harbour is a popular location for both visitors and locals alike. The Manly Scenic Walkway, a 10km scenic harbour walking track extending from the Spit Bridge to Manly, directs large numbers of walkers along the length of the study area.

1.3 PLANNING FRAMEWORK & PURPOSE OF PLAN

Department of Environment, Climate Change & Water (DECCW) works closely with Catchment Management Authorities (CMAs), local councils and communities to reduce threats from coastal hazards and flooding, and ensure the long term protection, conservation and restoration of coastal and estuarine environments.

DECCW manages the NSW Government's Coastal Management Program, which aims to reduce the impact of coastal hazards while accommodating population growth and protecting the coastal environment. Under the program, the NSW Government provides a 50% subsidy, on a dollar-for dollar-basis, to local councils for:

- preparing coastal studies and coastal zone management plans for long-term management of the coastline
- measures to conserve or improve beaches
- investigating, designing and implementing measures to reduce the risk of damage from coastal hazards

During 2007–08, 36 grants totalling \$2.89 million were approved under the Coastal Management Program in 17 local government areas for projects such as hazard mitigation works, dune restoration and enhancement of coastal facilities (DECCW 2008a).

DECC provides strategic guidance (**Figure 1.3**) for the development of Coastline Management Plans in NSW, through its 'Coastline Management Manual'.

1.3.1 Manly Harbour Foreshores & Coastline Management Committee

The Manly Harbour Foreshores & Coastline Management Committee, under the stewardship of Manly Council was established in early 2009 to guide the preparation of a number of plans including the North Harbour Coastline Management Plan.

The Committee has representations from Manly Council, Community Precincts, State Government Agencies and community. The relevant government departments include:

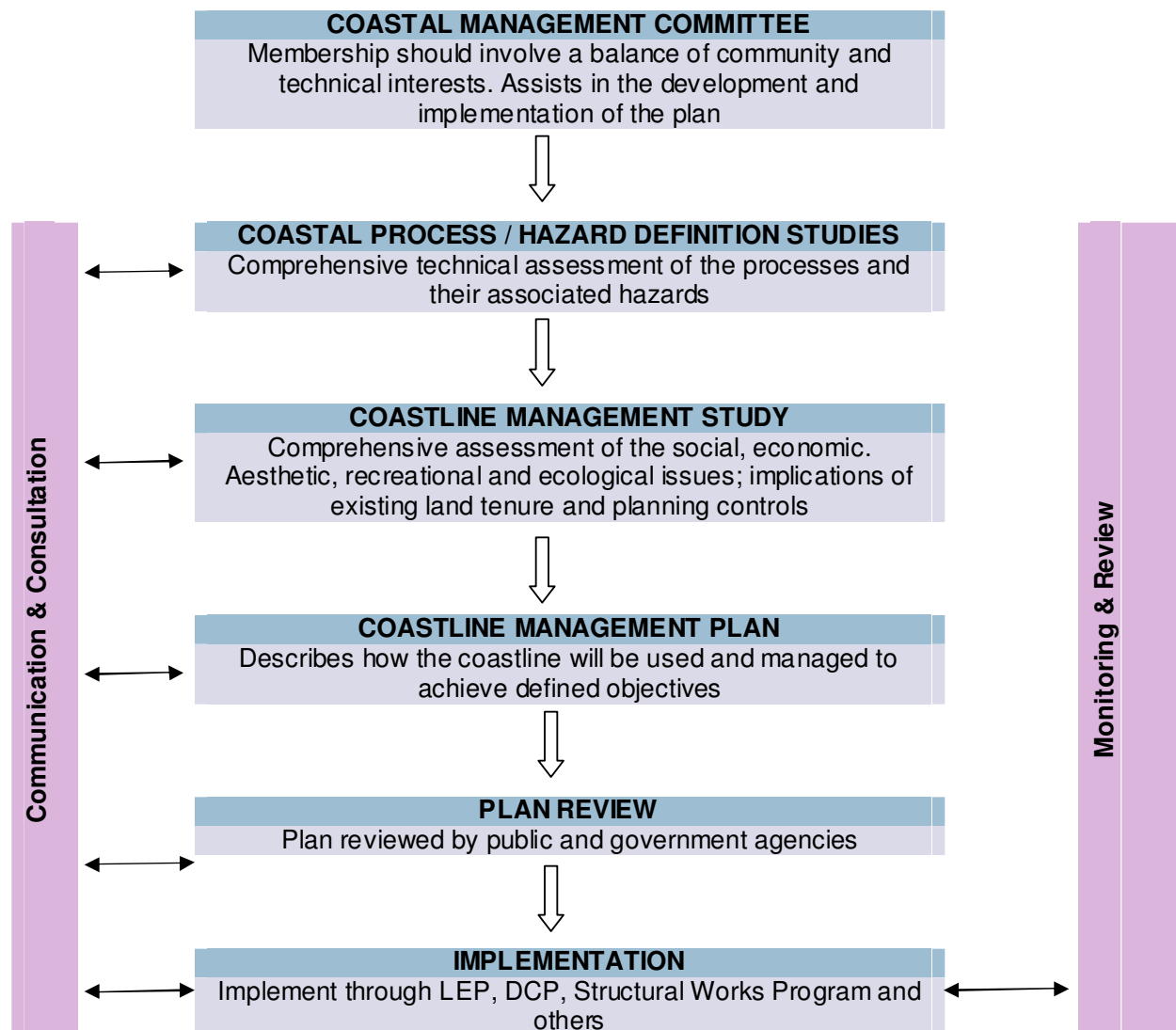
- Department of Environment, Climate Change & Water (DECCW);
- NSW Maritime; and
- Industry & Investment NSW (I&I).

The first meeting of the Committee was held on 14 April 2009. The Committee meets on a bi-monthly basis.

In order to support the Committee and to obtain expert contribution in the CMP, an internal 'Coastal Focus group' consisting of 20 key staff members from a range of fields was also formed (details on page 2). The Group formally met two times but individuals were extensively consulted throughout the CMP development process.

A previous committee called the 'Manly Harbour Foreshore Management Committee' was active during initial formulation of this plan. The Committee was dissolved in August 2008 before the Local Government election.

Figure 1.3 Elements of the Coastline Management System



1.3.2 Community Consultation

A vital part in the coastline management planning process is community involvement and action. Hence, an extensive promotional and consultation campaign was undertaken through the development of the North Harbour Coastline Management Plan.

Advertisements: were placed within in the Manly Daily to seek community submissions on the 8 October 2005 and temporary display set up in the library foyer explaining the CMP process and encouraging community feedback.

Webpage: A webpage, created on Manly Council's website (<http://www.manly.nsw.gov.au/North-Harbour.html>) allowed easy access to information relevant to the plan.

Precinct Newsletters: Articles were regularly sent to Precincts for inclusion in monthly newsletters.

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Survey: Structured survey forms were prepared and distributed to obtain community responses on importance, key issues and specific suggestions for inclusion in the Coastline Management Plan. The survey forms were distributed through various means, and also emailed or posted to people upon request. A total of 167 survey forms were returned. Among them, 152 were from Manly residents who visit the North Harbour area regularly.

Field Days: Three community consultation field days were held within the study area –North Harbour Reserve (19 February 2006 and 4 March 2007) and Fairlight Pool (4 March 2007).

1.3.3 Coastline Hazard Definition Study

External consulting engineers Patterson Britton & Partners (2004) were commissioned by Council to complete a Coastline Hazard Definition Study for all foreshore areas within the section of shoreline from the Davis Marina to Manly Point including North Harbour Reserve, Fairlight Beach, Delwood Beach and Manly Cove. This study provides an indepth understanding of the coastal processes and their associated hazards.

The report includes assessment of beach erosion, shoreline recession, sand drift, coastal inundation, stormwater erosion, slope and cliff instability, climate change and determines the stability of the existing seawalls. This study identifies specific hazards threatening the area and quantified these by applying a risk management approach which determined the level of risk based upon the likelihood and consequence of it occurring.

1.3.4 Coastline Management Study

The Coastline Management Study, completed in February 2009, builds upon the information provided in the Coastline Hazard Definition Study along with information sourced from available data and study results. The purpose of a coastline management study, according to the Coastline Management Manual (NSW 1990), is to identify options relevant to the environmental planning and management of the coastal area. In addition, the study should comprehensively assess the social, economic, aesthetic, recreational and ecological issues associated with land use along the coastline, including implications of existing land tenure and planning controls, the creation of new jobs, the preservation of areas of aesthetic or ecological significance, the protection or enhancement of recreational amenity, exploitation and management of tourism opportunities.

The Study has:

- identified the planning framework detailing institutional and policy environment;
- assessed land use, tenure and management;
- identified coastal processes and coastline hazards;
- assessed climate change impacts, ecological and socio-economic environment;
- recorded community perceptions
- developed and evaluated management goals and objectives; and
- developed and evaluated management options that will achieve the objectives.

1.3.5 Coastline Management Plan

The Hazard Definition and Management studies provided the factual basis for the formulation of this Coastline Management Plan considering information contributed during community and stakeholder consultation. The Plan has considered and incorporated advice of the Harbour Foreshores & Coastline Management Committee. The Committee contributed in prioritisation of management options.

The Preliminary Draft

The first draft was prepared and circulated to members of the internal 'Coastal Focus Group'. The report was discussed at the Group meeting on 09 January 2009 and again on 27 May 2009.

Based on discussions and further written comments, a preliminary draft was prepared and circulated to members of the 'Harbour Foreshore and Coastline Management Committee'. The report was discussed at the Committee meeting on 09 June 2009.

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Members of the Committee were requested to fill in 'Endorsement and Prioritisation Form' scrutinizing each management options individually. On the basis of received responses, all management options were modified and prioritised.

Review of the Final Draft

The final draft, accommodating Committee's comments and prioritisation, was distributed to members of the Committee, for review as an attachment with the agenda of the meeting.

The 'Harbour Foreshores & Coastline Management Committee', at its meeting on 11 August 2009, endorsed the Final Draft and recommended to Council for public exhibition.

Public Exhibition: The Final draft of the Coastline Management Plan was placed on public exhibition from 21 September to 20 November 2009. The community was also invited to attend a community information day on 24 October 2009 to facilitate stakeholder and community input and comment on the EMP.

A total of 27 submissions were received. Submissions contained statements on the overall acceptance of the EMP. Of all submissions, 13 submissions dealt with multiple issues and 13 on single issues, for example, North Harbour Reserve improvement, board walk, dinghy racks, café/kiosk and public wharf.

The 'Harbour Foreshores & Coastline Management Committee', at its meeting on 8 December 2009, has reviewed all submissions, endorsed and recommended the Final Draft to Council for adoption.

Adoption: This final Coastline Management Plan was presented to the Council for consideration. The report was formally adopted at the Council's Planning & Strategy meeting on 1 March 2010.

1.3.6 Purpose of the Plan

In many ways, formulation of the plan is the most important part of the coastline planning process because it translates the understanding developed in previous stages into practical actions directed squarely at improving the wellbeing of the coastline. It is clear from the simple aim specified in the Coastline Management Manual (NSW 1990) "...a coastline management plan describes how the coastline will be used and managed to achieve defined objectives. The primary objectives are to ensure compatibility with hazards, to reduce the impact of hazards on individual owners and occupiers, to reduce private and public losses from hazard damage, to protect and enhance the recreational amenity of beaches, and to ensure an appropriate long term balance in the utilisation and conservation of the coastline". A coastline management plan should have the knowledge and support of the whole community.

1.4 STATUS OF PLAN

Development of the North Harbour Coastline Management Plan (CMP) has been undertaken in line with the NSW Coastal Policy 1997, ongoing advances in coastal management and amendments made in 2002 to the *Coastal Protection Act 1979*. This is an integrated planning approach that incorporates the management of coastal hazards and risk with social economic, aesthetic, recreational and ecological factors.

The North Harbour Coastline Management Plan has been prepared under the NSW Government's Coastal Management Program. The Program is designed to fulfil the requirements of the NSW Coastal Policy 1997. However, as the North Harbour study area comes under the purview of Sydney Harbour catchment, the most important guiding document is the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 under the *Environmental Planning & Assessment Act 1979*.

Development of the North Harbour Coastline Management Plan (CMP) fulfills a number of commitment provided in different documents. Key initiatives for 2009-12 identified in Council's Manly Management Plan 2009-2012 (MC 2009b) include:

- Develop Management Plan and Landscape Plan for LM Graham Reserve, North Harbour Reserve and Manly Cove.

NORTH HARBOUR COASTLINE MANAGEMENT PLAN

- Coastline and Estuary Management Planning for Manly LGA complete with significant implementation underway.

It is action C1.3.1 (develop and implement comprehensive Coastline Management Plans (CMPs) for all areas of foreshore in Manly) of the Manly Sustainability Strategy 2006 (MC 2006). It supports strategy 'E2.1: Improve health of waterways, coasts and estuaries' of the draft North East Subregional Strategy (DoP 2007).

Development of the North Harbour Coastline Management Plan (CMP) also complements an action under Sydney Metropolitan Catchment Management Action Plan to contribute to management target, MTECMC 2.5: By 2016 the Sydney Coastline is covered by a Coastline Management Plan.

1.5 STRATEGIC VISION

Visioning is an important element in any planning process. Setting the future vision ensures strategic long term thinking and avoids focus on daily issues.

Wider community participation in this vision development is not only important but crucial. Manly Council has, as a matter of process, for the last two decades, involved community in setting vision through programs like myManly, Futures Forum and Surfing the Future. Surfing the Future provides a direction to aim towards for the year 2025 for Manly Local Government Area. It establishes a 'road map' and identifies major themes. The Manly Sustainability Strategy 2006 as well as short-term strategy documents, are developed based on themes established under Surfing the Future. The following vision statement has been adopted for 'Surfing the Future':

"A thriving community where residents and visitors enjoy a clean, safe and unique natural environment enhanced by heritage and lifestyle"

The same vision statement has been adopted in preparation of this North Harbour Coastline Management Planning process. The vision is a general statement about the future desired state of the study area. This vision statement, from the onset, establishes importance of visitors, heritage and living in harmony with natural environment and influences setting up of management objectives.

In setting this vision, the State Plan, state-wide targets by the Natural Resources Commission and the vision of the Sydney Metropolitan Catchment Management Authority (SMCMA) have been considered.

1.6 KEY MANAGEMENT ISSUES & GOALS

A long list of management issues was identified through completed community survey forms and during three community consultation field days. These issues were presented and discussed at the Manly Harbour Foreshore Management Committee meeting on 24th June 2008 and are summarised under six key broad based management issues (with 2-letter code shown within bracket). These headings have been retained throughout this report. For each management issue, a goal has been set (**Table 1.6**).

Table 1.6: Key management issues and goals set

Key Management Issues	Goals
Aquatic/Intertidal Habitat Conservation & Management (AH)	1.0 Restore and maintain a healthy and diverse mix of aquatic and intertidal habitats
Bushland/Terrestrial Habitat Conservation & Management (TH)	2.0 Protect and enhance urban bushland and native vegetation areas
Upgrading & enhancement of public facilities (PF)	3.0 Public facilities are upgraded and maintained to facilitate improved social amenity
North Harbour Reserve Improvement	4.0 Enhance safe public use of the North Harbour Reserve (NHR)

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Key Management Issues	Goals
(RI)	while preserving natural environment and beauty of the Reserve
Hazards and climate change (HR)	5.0 Assess, minimize and mitigate risks from coastline hazards and climate change
Heritage Conservation (HC)	6.0 Ensure that all Aboriginal and European (cultural and natural) heritage areas in the study area are preserved and protected.

In general, set goals and objectives relate to the general goal of the NSW Coastal Policy 1997, *Coastal Protection Act 1979*, *Water Management Act 2000* and management principles described in relevant regional plans (Sydney Regional Environmental Plan – Sydney Harbour Catchment 2005, Draft Subregional Strategy: North East Subregion, July 2007), Sydney Metropolitan Catchment Management Action Plan 2008 and also Manly Local Environmental Plans and different strategy documents.

1.7 DURATION OF PLAN

The Coastline Management Plan is a strategic plan with a visionary long-term time frame of 15- 20 years with firmed up implementation program of 5 years. The plan will be reviewed and revised every 5 years and a new implementation program will be adopted in line with priorities of the period.

1.8 MANAGEMENT AGENCIES

Manly Council (MC) is the principal management agency of this plan. Council has for many years undertaken remedial and maintenance works to enhance the coastal environment. In recent years the emphasis has been on understanding the functioning of the coastal and estuary catchments as an integrated ecosystem. The completion of the coastline management study was a significant step in the move towards holistic management.

The following agencies/organisations have been will be involved in the North Harbour Coastline Management Plan. Agencies have been identified against each management option.

- NSW Department of Environment, Climate Change and Water (DECCW);
- NSW Maritime;
- Industry & Investment NSW (I&I);
- Sydney Water;
- NSW Department of Water & Energy;
- Sydney Coastal Councils Group (SCCG);
- Sydney Metropolitan Catchment Management Authority (SMCMA);
- Aboriginal Heritage Office (AHO);

Further description of these agencies are presented in **Appendix A**.

1.9 RELATIONSHIP TO OTHER PLANS

This Coastline Management Plan has evolved through incorporation of strategic directions from a number of Council's management documents and land use planning instruments (**Table 1.9a**). The adopted Coastline Management Plan will eventually be mainstreamed in to these documents in order to embed coastline management as part of Council's core business.

Table 1.9a Outline of key Council documents with relationship to North Harbour CMP

Management Documents	Relationship to the document
Manly Plan 2009-2012	The Manly Plan is the key planning document driving the operations of Council. It is

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Management Documents	Relationship to the document																																
	a rolling three year plan that identifies a range of objectives and strategies that Council will implement in providing programs, services and facilities. Substantial commitment to coastal management should be identified here.																																
Manly Social Plan 2004-2009	<p>The Manly Social Plan 2004-2009 was adopted by Council in November 2004. The Social Plan was developed on the basis of consultation with the community and service providers, to identify issues affecting the wellbeing of the people in Manly. This consultation generated a series of priority issues. Action plans to address the priority issues are being implemented as on-going across Manly Council divisions and in collaboration with external agencies such as the Manly Community Centre, and state level government.</p> <p>Manly Council's strategic directions, including a focus on social and environmental sustainability provide the context for the Manly Social Plan. The North Harbour Coastline Management Plan considers issues and actions addressed in the plan.</p> <p>A 10-year integrated Community Strategic Program will replace this and other related plans.</p>																																
Manly Sustainability Strategy 2006	<p>It is a 10 year strategy and addresses the vision through the six principles and 10 broad programs. The North Harbour Coastline Management Plan (CMP) contributes to the MSS program: Coastline and Estuary Management Program to achieve the principle C: A Natural and Sustainable Manly'. The objective of the Coastline and Estuary Management Program is to manage the terrestrial and marine environment interface to balance environmental conservation and the enjoyment of the area by user groups and ensure that Manly's coastlines are recognised for their important natural and cultural heritage.</p> <p>Preparation of this CMP relates to Action C1.3.1 of Manly Sustainability Strategy 2006. Further, this CMP addresses following actions of Manly Sustainability Strategy:</p> <table border="1"> <tbody> <tr> <td>B1.4.2 (walking trails in open space)</td><td>C1.3.5 (prioritised actions)</td></tr> <tr> <td>B1.4.4 (access to all recreational facilities)</td><td>C1.3.8 (incorporate CC information)</td></tr> <tr> <td>B1.4.8 (playgrounds for the needs of children and carer)</td><td>C1.3.10 (monitor identified coastal hazards)</td></tr> <tr> <td>B1.6.4 (implement Sea Change for Sustainable Tourism)</td><td>C1.3.11 (interpretive signage)</td></tr> <tr> <td>B1.7.3 (responsible pet ownership)</td><td>C1.3.12 (participate with SCCG)</td></tr> <tr> <td>C1.1.6 (water quality monitoring)</td><td>C1.3.13 (work closely with SMCMA)</td></tr> <tr> <td>C1.2.1 (map aquatic flora & fauna)</td><td>C1.3.16 (promote community involvement)</td></tr> <tr> <td>C1.2.3 (Review CMPs)</td><td>C1.3.18 (cyclic evaluation of CMPs)</td></tr> <tr> <td>C1.2.5 (implement Starboard R & G program)</td><td>C1.5.6 (Recommendations of Flora & Fauna Study)</td></tr> <tr> <td>C1.2.6 (Involvement of local residents)</td><td>C1.6.11 (Little Penguin monitoring)</td></tr> <tr> <td>C1.2.8 (conserve marine resources)</td><td>C1.7.4 (linking habitat corridors)</td></tr> <tr> <td>C1.2.10 (control of <i>Caulerpa taxifolia</i>)</td><td>C1.7.12 (protection of threatened species)</td></tr> <tr> <td>C1.2.14 (extend boundary of NH Aquatic Reserve)</td><td>C2.4.1 (risk management through CMPs)</td></tr> <tr> <td>C1.2.15 (eco-friendly mooring buoys)</td><td>C2.4.3 (understanding of natural hazards)</td></tr> <tr> <td>C1.3.2 (seawall stability)</td><td>D2.2.5 (management plan for Aboriginal heritage)</td></tr> <tr> <td>C1.3.3 (hazard information)</td><td>D2.2.9 (Increased community awareness)</td></tr> </tbody> </table>	B1.4.2 (walking trails in open space)	C1.3.5 (prioritised actions)	B1.4.4 (access to all recreational facilities)	C1.3.8 (incorporate CC information)	B1.4.8 (playgrounds for the needs of children and carer)	C1.3.10 (monitor identified coastal hazards)	B1.6.4 (implement Sea Change for Sustainable Tourism)	C1.3.11 (interpretive signage)	B1.7.3 (responsible pet ownership)	C1.3.12 (participate with SCCG)	C1.1.6 (water quality monitoring)	C1.3.13 (work closely with SMCMA)	C1.2.1 (map aquatic flora & fauna)	C1.3.16 (promote community involvement)	C1.2.3 (Review CMPs)	C1.3.18 (cyclic evaluation of CMPs)	C1.2.5 (implement Starboard R & G program)	C1.5.6 (Recommendations of Flora & Fauna Study)	C1.2.6 (Involvement of local residents)	C1.6.11 (Little Penguin monitoring)	C1.2.8 (conserve marine resources)	C1.7.4 (linking habitat corridors)	C1.2.10 (control of <i>Caulerpa taxifolia</i>)	C1.7.12 (protection of threatened species)	C1.2.14 (extend boundary of NH Aquatic Reserve)	C2.4.1 (risk management through CMPs)	C1.2.15 (eco-friendly mooring buoys)	C2.4.3 (understanding of natural hazards)	C1.3.2 (seawall stability)	D2.2.5 (management plan for Aboriginal heritage)	C1.3.3 (hazard information)	D2.2.9 (Increased community awareness)
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Council Policies	Policies should be updated or where necessary, created to reflect Council's position																																

NORTH HARBOUR COASTLINE MANAGEMENT PLAN

Management Documents	Relationship to the document
	on important coastal and catchment management issues. This makes the position explicit and more likely to be reflected in how the whole of Council operates.
Coastline & Estuary Management Plans	<p>The North Harbour Management Plan considers issues and actions addressed in the following plans:</p> <ul style="list-style-type: none"> • Manly Lagoon Estuary Management Plan • Cabbage Tree Bay Management Plan • Forty Baskets Coastline Management Plan • Little Manly Coastline Management Plan • Manly Ocean Beach Coastline Management Plan • Clontarf/ Bantry Bay Estuary Management Plan
Manly Local Environmental Plan 1988 (under revision)	<p>The Manly Local Environment Plan (LEP) details the zoning of land within the Manly Council area.</p> <p>The LEP also identifies Items of Environmental Heritage, Environmentally Sensitive Areas, Foreshore Scenic Protection Areas and Potential Acid Sulphate Soils and provides planning controls for the on-going appropriate management of each of these items and areas.</p> <p>This LEP is now being reviewed and updated in accordance with the NSW Planning Reforms and amended Planning legislation.</p> <p>The adopted Coastline Management Plan will eventually be mainstreamed in to the Manly LEP in order to embed coastline management as part of Council's core business.</p>
Development Control Plans (DCP) (under revision)	<p>DCP's are plans that control development activity in the Council. Engineering Guidelines for development and Water Sensitive Urban Design are both examples of Guidelines that have been turned into DCP's. Where robust management of development is required to protect the coastline, Council's Coastal Management Team should work with planners to revise/modify DCP's that aid the long-term management of the coastlines & foreshores.</p>
Plans of Management	<p>Individual plans of management are very useful for describing Council's vision for managing public land. These are used to manage significant catchment habitats, recreation on the estuary and general foreshore management. This North Harbour Coastline Management Plan has been developed to address all requirements for community land management under the <i>NSW Local Government Act 1993</i> and <i>NSW Crown Lands Act 1989</i> and acts as a Plan of Management for community lands of the study area.</p>
Climate Change Risk Assessment and Adaptation Action Plan (being prepared)	<p>This will provide a strategic approach to climate change risk management and adaptation for Manly Council and the community that will be integrated into Council's ongoing risk management process. It will build on elements of previous Climate Change initiatives undertaken by Council, such as the report titled '<i>Climate Change Actions for Manly LGA 2008 > 2038</i>' prepared in April 2008 by Cardno and also build upon knowledge and outcomes of the Sydney Coastal Council Group's '<i>Systems Approach to Regional Climate Change Adaptation Strategies in Metropolises</i>' (2008).</p>
Carbon Neutral Plan	<p>Manly Council resolved to become Carbon Neutral by 2010 at its meeting of 21 July</p>

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Management Documents	Relationship to the document
(to be formulated)	2008. Staff are currently establishing a project for Council to become carbon neutral in its operations and service delivery by not later than December 2010, with carbon neutrality being achieved through a combination of reduced demand for energy and products, energy efficiency, increased use of renewable energy and offsetting of emissions that cannot otherwise be avoided. This project also involves setting a program for a longer term sustainable approach to being carbon neutral each year for the next 5-10 years, identifying Council's current carbon footprint and establishing a robust, cost-effective and practical ongoing data capture, measuring, monitoring and reporting program. Staff are also establishing a project to develop a similar community carbon footprint, monitoring and action component whereby the community contribute to the overall Manly Climate Change response.

This Coastline Management Plan has evolved through incorporation of strategic directions from a number of documents of external stakeholders (**Table 1.9b**). Consideration should be given to linking these documents to ensure that coastline management responsibilities are carried through to their core business as well.

Table 1.9b Outline of key external documents with relationship to North Harbour CMP

Management Documents	Relationship to the document
Sydney Metropolitan Catchment Action Plan 2008	<p>The Sydney Metropolitan Catchment Management Authority (SMCMA) has drafted a Catchment Action Plan (CAP) in August 2006. The Natural Resources Commission (NRC) has revised the draft CAP and recommended its approval to the NSW Government (June 2008).</p> <p>The plan applies to a catchment area of 1860 square sq. km. (the area extends offshore to include state waters to the three nautical mile limit) accommodating 39 Local Government Areas including Manly. The catchment is divided into eight sub-catchments. The study area belongs to sub-catchment 'Middle Harbour'. Activities of catchment management relates to 4 themes including 'Water & Coast'.</p> <p>The catchment target for the 'Water & Coast' sub-theme, among others, is <i>'By 2016, there is improvement in the condition of coastal and marine ecosystems'</i>.</p> <p>This target has further been translated into management targets as:</p> <ul style="list-style-type: none"> • MTECMC 2.2: By 2016 institutional and technical processes are in place to achieve environmentally sustainable management of beach environs. • MTECMC 2.3: By 2016 active management will protect or improve key estuarine and marine habitat areas in partnership with relevant authorities and user groups. • MTECMC 2.4: By 2016 there is an increase in the extent of Marine Protected areas. • MTECMC 2.5: By 2016, the Sydney coastline is covered by a Coastline Management Plan.
Sydney Regional Environmental Plan - Sydney Harbour Catchments 2005: the Harbour REP	<p>The Harbour REP covers the entire area of Sydney Harbour including North Harbour. This is the most important planning document relevant for the North Harbour CMP study area. It establishes planning principles for land within the Foreshores and Waterways Area area as follows:</p>

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Management Documents	Relationship to the document
	<p>(a) development should protect, maintain and enhance the natural assets and unique environmental qualities of Sydney Harbour and its islands and foreshores,</p> <p>(b) public access to and along the foreshore should be increased, maintained and improved, while minimising its impact on watercourses, wetlands, riparian lands and remnant vegetation,</p> <p>(c) access to and from the waterways should be increased, maintained and improved for public recreational purposes (such as swimming, fishing and boating), while minimising its impact on watercourses, wetlands, riparian lands and remnant vegetation,</p> <p>(d) development along the foreshore and waterways should maintain, protect and enhance the unique visual qualities of Sydney Harbour and its islands and foreshores,</p> <p>(e) adequate provision should be made for the retention of foreshore land to meet existing and future demand for working harbour uses,</p> <p>(f) public access along foreshore land should be provided on land used for industrial or commercial maritime purposes where such access does not interfere with the use of the land for those purposes,</p> <p>(g) the use of foreshore land adjacent to land used for industrial or commercial maritime purposes should be compatible with those purposes,</p> <p>(h) water-based public transport (such as ferries) should be encouraged to link with land-based public transport (such as buses and trains) at appropriate public spaces along the waterfront,</p> <p>(i) the provision and use of public boating facilities along the waterfront should be encouraged.</p> <p>The study area is located totally in W2 (Environment Protection) zone, one of the nine zones covered in Harbour REP.</p> <p>The objectives of this zone are as follows:</p> <p>(a) to protect the natural and cultural values of waters in this zone,</p> <p>(b) to prevent damage or the possibility of longer term detrimental impacts to the natural and cultural values of waters in this zone and adjoining foreshores,</p> <p>(c) to give preference to enhancing and rehabilitating the natural and cultural values of waters in this zone and adjoining foreshores,</p> <p>(d) to provide for the long-term management of the natural and cultural values of waters in this zone and adjoining foreshores.</p>
<p>Sydney Harbour Foreshores and Waterways Area – Development Control Plan 2005</p>	<p>This document compliments the Harbour Regional Environmental Plan. The DCP provides detailed design guidelines for development and criteria for natural resource protection for the locations identified as Foreshores and Waterways Area.</p> <p>In this DCP, different landscape character types in and around Sydney Harbour are recognised. These landscape character types provide a statement of character and intent and sets out performance criteria that are to meet for development within each landscape character types. Landscape character type 6 exists in North Harbour CMP study area.</p> <p>Further, and as part of the DCP of this Harbour REP, Department of Environment & Climate Change has mapped Ecological Communities and Landscape Characteristics. Within the foreshores and waterways area boundary a number of aquatic and terrestrial ecological communities have been identified within North Harbour CMP study area including seagrass beds, mixed rocky intertidal and sand, urban development with scattered trees, grass bed and sandy beaches.</p>

NORTH HARBOUR COASTLINE MANAGEMENT PLAN

Management Documents	Relationship to the document
<p>Sydney Metropolitan Strategy 2005</p> <p>Draft Subregional Strategy: North East Subregion, July 2007</p>	<p>The Metropolitan Strategy is a broad framework to secure Sydney's place in the global economy by promoting and managing growth. It is a strategic document that outlines a vision for Sydney over the next 25 years. It is also the start of a process to bring the State Government, local government, stakeholders and the community together to discuss, review and then make decisions to guide the future of Sydney's economy, environment and communities.</p> <p>A key objective of the Metropolitan Strategy is to protect Sydney's natural environment from the impacts of growth for dual benefit: our waterways, biodiversity, clean air and heritage are protected; and development processes are streamlined with greater certainty. This Strategy will contribute to the many initiatives underway to improve the health of Sydney's waterways, by ensuring new development is located and designed to meet the community's aspirations for our rivers, coasts and estuaries.</p> <p>More detailed planning follows via regional strategies and subregional strategies. There will be 10 sub-regional plans, to support Sydney Metropolitan Strategy. The LGAs of Manly Council, along with Pittwater and Warringah constitute under North East Sub-region.</p> <p>The North East Subregion is well known for its natural environment including coastline, waterways and national parks. Growing sustainability requires managing the environmental impact of development and reducing consumption of natural resources as well as safeguarding assets from natural hazards, which are expected to increase over time with climate change. The strategy includes, among others, actions to: improve the health of waterways, coasts and estuaries; protect the loss of biodiversity; conserve and manage Aboriginal and other cultural heritage; and respond to the risk of climate change and sea level rise. The draft Strategy was on public exhibition till 18 September 2008.</p>
<p>Sharing Sydney Harbour Access Plan, August 2003</p>	<p>The Access Plan has been jointly prepared by the NSW Department of Planning and the NSW Maritime. An integrated approach has been taken by looking at both land and water access issues. A catchment-wide network of accessways will link metropolitan parklands with urban waterfronts and connect to water access points. Improved boating facilities will provide better public access for recreational craft such as dinghies, canoes, kayaks and sailing boats.</p> <p>The Access Plan identifies opportunities to improve access to the foreshores and waterways for a range of recreational users including pedestrians, cyclists and recreational boaters.</p> <p>The Access Plan identifies strategic projects that may be developed in the longer term, i.e. over the next 20 years. Implementation of the Access Plan will be assisted via the Sharing Sydney Harbour Access Program.</p> <p>The Sharing Sydney Harbour Access Program was launched in February 2003. The NSW Government announced in 2007 that the Program will be extended over five years to provide \$6.75 million until 2013.</p> <p>Each year up to \$1.35 million is distributed on a dollar-for-dollar basis for specific capital works projects such as walking tracks, cycle paths, new public waterfront parks, jetties, pontoons and boat launching facilities. With matching funds from applicants, the program is expected to lead to at least \$30 million worth of access</p>

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Management Documents	Relationship to the document
	improvements.
Sydney Regional Coastal Management Strategy 2005-2008	<p>This strategy was prepared by the Sydney Coastal Councils Group, represented by 15 Local Councils including Manly, to coordinate and integrate relevant coastal planning and management activities, and the responsible organisations, to improve coastal management in Sydney. This strategy applies to the coastal areas between Pittwater local government area and Sutherland local government area, including all areas that were previously excluded from the NSW Coastal Zone.</p> <p>The primary aim of the present strategy is “to protect and conserve terrestrial and marine ecosystems in the study zone, and to manage the social and economic conditions to achieve this, through the implementation of identified, sustainable coastal planning and management practices.” The Strategy is now being revised.</p>
The Northern Sydney Aboriginal Social Plan (NSASP) 2007-2011	<p>The Northern Sydney Aboriginal Social Plan is a document compiled by ten Councils in Northern Sydney Region, including Manly, to address the needs of Aboriginal and Torres Strait Islander people in the area. The aims of the Social Plan are to:</p> <ul style="list-style-type: none"> • Improve outcomes for the Aboriginal community living in Northern Sydney • Improve coordination and relationships with government on Aboriginal issues • Increase sharing and co-operation between individuals, groups, and agencies across Northern Sydney <p>The NSASP identifies 6 key areas of need; collaboration and cooperation, health and wellbeing, education and training, housing, employment and culture and heritage. The first Aboriginal Social Plan (a five year plan) was adopted in 2000.</p>
The NSW Sea Level Rise Policy Statement (November 2009)	<p>The NSW Government has recently released the Sea Level Rise Policy Statement which provides guidance on sea level projections through the adoption of benchmarks for a rise relative to 1990 mean sea levels of 40 cm by 2050 and 90 cm by 2100.</p> <p>The primary objective of this Sea Level Rise Policy Statement is to minimise the social disruption, economic costs and environmental impacts resulting from long-term sea level rise.</p> <p>The NSW Government has also released guideline documents to support the Policy Statement for public consultations.</p>

1.10 SUPPORTING DOCUMENTS

Key supporting documents in relation to this Plan are:

- North Harbour Coastline Management Study, Manly Council, February 2009
- Davis Marina to Manly Point Coastline Hazard Definition Study, Patterson, Britton & Partners, 2004
- Natural Environment Assessment and Recommendations for the Coastline Management Plan: North Harbour, GIS Environmental Consultants, March 2004

2. THE MANAGEMENT AREA

2.1 LOCATION & SETTING

This study area includes the northern portion of the North Harbour (part of Port Jackson / Sydney Harbour) and foreshore that lies within the Manly Local Government Area boundary. North Harbour study area extends both seaward and landward from the shoreline between Federation Point and Wellings Reserve. The study area covers approximately 180 hectares and takes in the suburbs of Fairlight, Balgowlah and Balgowlah Heights including Precinct Community Forum areas of Fairlight, North Harbour and Balgowlah Heights. Population of the study area, according to 2006 census, is estimated to be 6,980.

The study area consists primarily of semi-natural, landscaped and built areas. It is characterized by natural and cut sandstone cliffs and escarpments with fringing native bushland pockets and landscaped areas along the Esplanade Reserves. Included in the study area are rocky intertidal platforms, sandy beaches, grassed reserves, swimming pool, sandstone cliffs, bushland, commercial, retail and residential areas. The Manly Scenic Walkway, a 10km scenic harbour walking track extending from the Spit Bridge to Manly, directs large numbers of walkers along the length of the study area.

North Harbour Aquatic Reserve lies very close to the study area. A new proposal to extend North Harbour Aquatic Reserve to include entire water side of the study area has now been submitted to the Department of Environment & Climate Change for consideration and approval.

The entire study area is also part of the Sydney Harbour Foreshores and Waterways Area and Sydney Metropolitan Catchment Management Area. The area, being within Sydney Harbour, is excluded from the legally defined NSW coastal zone. This has implications on administrative and legal management of the study area.

Ownership and management responsibilities for the land and seabed within the study area are shared by a number of government agencies and Manly Council. In general, land of North Harbour CMP study area consists of private, Crown, Manly Council and Energy Australia owned and administered land, with Crown land representing by far the major public land holding. As the study area is located within Sydney Harbour, NSW Maritime is responsible for management of both seabed and waterways.

2.2 HISTORY

The study area has a rich history, beginning with extensive Aboriginal occupation, which is evidenced through the many middens that are still present. The entire North Harbour study area was used extensively by the Aboriginals, known locally as the Gayemal clan of the Guringai tribe, who spent much of their time on the foreshores of Sydney Harbour (AHO, 2008). At that time, North Harbour was known as *Kunn-na*, *Kunna* or *Cannae* (Living Harbour 2008). More recently, Metropolitan Local Aboriginal Land Council has recognised Bob Waterer as a traditional owner of Guringai country. The oldest Aboriginal site known in the Manly LGA is dated to about 4100 years before present. There are 5 recorded Aboriginal sites within the study area: open middens, midden with shelter and rock engraving.

Though Captain Philip raised the flag for the first settlement at Sydney Cove on 26 January 1788, records show that he visited North Harbour either on 21 January 1788 (pictured Plaque) or 23 January 1788 (Balgowlah 150 Committee 1991).

After European settlement began in 1788 the study area slowly became populated, with several regionally important farms established. An early map of about 1822 shows a plan of establishing a proposed township of Manly at North Harbour. From the early 1820s scattered settlement began in the Manly Cove and North Harbour areas. Major Thomas Livingstone Mitchell drew a plan of North Harbour in 1828, with 31 allotments laid out in rectangular grid to form the streets, and looked as an amphitheatre, watered by streams and a sheltered harbour. John Fincham, Robert Tiffen, James Jenkins are some of the early convict settlers of North

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Harbour. Jenkins made a road in 1826 between North Harbour to Pittwater with thirteen bridges at a cost of 300 pounds and made North Harbour a gateway to Sydney long before connection through Ellery's Punt at the Spit.

Henry Gilbert Smith, an English businessman living in Sydney, saw that Manly - with an ocean beach on one side and fine sandy cove on the other - could provide a great "watering place" for the people of Sydney, as Brighton did for Londoners. He started acquiring land in the area in the 1850s.

The home of first Prime Minister – Sir Edmund Barton is situated here and was probably built in 1870's. Situated near the corner of Boyle Street and Lauderdale Avenue, the Lookout was a local landmark.

Two natural water creeks existed as shown on a 1913 map. Creeks used to reach the tidal flat underneath a bridge on the Condamine Street. Children swam and splashed, fishermen netted and one could canoe under the wooden bridge to the bottom of the waterfall that began near the dairy. During 1936-38, North Harbour Park was reclaimed on sandy tidal flat. Eventually a four lane road replaced the wooden bridge.



2.3 NATURAL PROCESSES & ENVIRONMENT

2.3.1 Coastal Processes, Water Quality & Foreshore Structures

The waves, increased water levels and winds associated with storms, together with coastal currents and rivers, set a series of coastal processes and affect human infrastructure such as seawalls and reshape its two beaches, Fairlight & Delwood and shift beach sediments offshore and onshore.

The study area is characterized by natural and cut sandstone cliffs and escarpments with fringing native bushland pockets and landscaped areas along the Esplanade Reserves. The study area has gradual rise to an altitude of 90m with a rapid rise between 40 to 70m.

Storms play an important role in determining the rate and magnitude of shoreline change. The most devastating storm to strike the NSW coastline was the May - June 1974 storm.

Waves occur at Fairlight and Delwood beaches as a result of a combination of ocean swell entering the Harbour during storm events and local wind conditions. Both Fairlight and Delwood Beaches are exposed to wind generated waves, with an open fetch in a 10 degree sector to the south-south-east. Average wave height is established at 80cm, 1.05m with 1 in 10 yr return period and 1.20m with 1 in 50 yr return period.

Longer term sand movements at Fairlight and Delwood Beaches have been examined. In overall terms, for the period 1965 to 1998, Fairlight Beach underwent slight recession, the total loss of sand was approximately 3.2 m³/m. For Delwood Beach, the total gain of sand volume between 1956 and 1998 was approximately 10.6 m³/m.

Water quality is crucial in overall coastal processes and to protect the health of the North Harbour embayment. The total load of pollutants in stormwater, based on the modelling exercise undertaken for a normal rainfall year, is estimated to be 1,850 kg/year of Total Nitrogen; 220 kg/year of Total Phosphorus; 140 kg/year of

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Copper, 190 kg/year of Lead, 400 kg/year of Zinc, and 105,300 kg/year of sediment. Roads and residential land-uses deliver the highest loads of almost all pollutants.

DECCW routinely measures the two major indicators of bacterial contamination in coastal water, *faecal coliforms* and *enterococci*, at Fairlight Beach site within the study area. *Faecal coliform* levels complied with swimming guidelines 100% of the time over the last five years between 2003-04 and 2007-08. With the exception of one season, *enterococci* levels complied 100% of the time over the last five years. There are 3 known sewer overflow locations within the study area.

I&I NSW (formerly NSW DPI) placed a ban on all commercial fishing within Sydney Harbour, stating the presence of elevated levels of dioxins in fish and crustaceans. Recreational fishing is still permitted, although dietary advice has been issued, stating that limits should be placed on the amount of Harbour caught fish that are consumed.

There are some foreshore structures within the study area. There are two public seawalls: Fairlight Beach Seawall and North Harbour Reserve Rock Revetment Seawall. Total length of seawalls is 0.34km. North Harbour study area has 111 privately leased moorings and 3 commercial operations leasing 91 moorings. Moored boats are generally accessed by dinghies that are stored in various locations, both legally and illegally, along the adjoining foreshore areas. Treharne's Manly Boat Shed is located within the study area and offers full shipwright services in timber and fibreglass. Davis Marina is located in nearby Forty Basket area. Fairlight pool, located at the eastern end of Fairlight beach, is a well appreciated recreational facility and popular with locals.

2.3.2 Coastline Hazards & Climate Change Impacts

Beach erosion is measured in terms of the volume of sand transported offshore and is usually expressed in terms of cubic metres per metre (*m³/m*). Beach erosion hazard value of 40 to 60 m³/m for a 100 year Average Recurrence Interval (ARI) storm event is considered reasonable for both Fairlight & Delwood Beaches.

Excluding the effects of sea level rise, a recession rate of about 0.04 m/yr is adopted for Fairlight Beach. A recession rate of 0.04 m/yr would mean that the beach would reduce in width by 0.8 to 2 m over a period of 20 to 50 years respectively. The current beach width, measured at mean sea level, is approximately 15 m. Similarly, a zero recession rate is adopted for Delwood Beach. It currently has a width, measured at mean sea level, of approximately 8 m.

At present, the hazard posed by drifting sand is generally not significant for Fairlight or Delwood Beaches. There is no historical evidence that inundation has been an issue.

A total of 27 sites with potential geotechnical hazards have been identified. Remediation works at two sites, Fairlight Pool and Delwood beach, have already been completed.

Due to impacts of climate change, temperature is projected to rise +0.2 - +1.6°C in 2030 and +0.7 - +4.8°C in 2070. Number of days above 35°C is to increase from 3 to 4-6 days in 2030 and 4-18 days in 2070. Sydney's coastal catchments, at present, has relatively warm summer, with average maximum January temperatures of approximately 26°C with approximately 3 days above 35°C each year. Winters are cool to mild, with average maximum July temperatures of 17°C. Temperatures rarely fall below 0°C. The catchments receive approximately 1,100 mm of rainfall each year.

The Sydney Coastal Councils Group has assessed the vulnerability of the SCCG region and its' member Councils to climate change (SCCG 2008). Manly Council possesses a moderate degree of vulnerability to climate change relative to other Councils. However, due to its coastlines and coastal development, vulnerability to sea-level rise and coastal hazards was assessed to be particularly high. In addition, stormwater management may become a challenge in the future due to development and projected increases in future rainfall. The vulnerability of the coastline and the paucity of natural landscapes suggest the Councils' natural ecosystems have a low resilience to the effects of climate change.

Since, Council has prepared Climate Change Actions for Manly LGA 2008 > 2038 (Cardno, April 2008) and is in the process of finalising Climate Change Risk Assessment and Adaptation Action Plan. Council has initiated

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formulation of the Carbon Neutral Plan. The NSW Government has prepared a Draft Sea Level Rise Policy Statement (February, 2009) which provides guidance on sea level projections through the adoption of benchmarks for a rise relative to 1990 mean sea levels of 40 cm by 2050 and 90 cm by 2100. (to be finalised by the end of 2009).

2.3.3 Ecological Environment

The ecosystems within the study area are highly fragmented and have signs of the many pressures placed on them through development and high usage.

The marine environment within the study area ranges from rocky intertidal zone to seagrass beds. Three predominant aquatic communities along the foreshore of the study area are 'mixed rocky intertidal & sand', 'sandy beaches' and 'seagrass beds'. The conservation status of these three ecological units is 'high', 'medium' and 'high', respectively. Over 570 species of fish have been recorded in greater Sydney Harbour, and it is likely that a large proportion of these are also present within the study area. The list includes 3 endangered, 5 vulnerable and 18 protected species.

North Harbour Aquatic Reserve lies between an imaginary line from the headlands at North Head and Grotto Point and another line joining Little Manly Point, Manly Point and Forty Baskets Beach. The Reserve extends from the seabed at these outer boundaries up to the mean high water mark between them and covers an area of approximately 260 hectares. There is a proposal to extend this Aquatic Reserve to include total water area of the study area.

The intertidal areas within the North Harbour study area include rocky reefs and platforms, sandy beaches and mudflats and artificial habitat including seawalls, jetties and pontoons. Many types of algae (e.g. - red, green, brown) inhabit the intertidal zone, providing a food source for the many grazing invertebrates. Numerous types of invertebrates, such as worms, crabs and molluscs, can be found in the sediment.

The entire foreshore of North Harbour, north of a line from Manly Point to the South end of Forty Baskets Beach, are not protected as Intertidal Protected Area (IPA) despite the remaining foreshores of Sydney Harbour and its tributaries being protected as Intertidal Protected Area (IPA) under the *NSW Fisheries Management Act, 1994*.

The NSW State Government has designated large areas as Wetlands Protection Area (WPA) though the wetland habitat is limited in the study area. A total of 62 species are known to be present within intertidal areas. The majority of these species are invertebrates. A small colony of soldier crab is located on the sand bank at the far south west end of North Harbour. A small number of Little Penguins are known to use the Federation Point area for breeding and the rocky foreshore and this area is designated as a Wildlife Protection Area.

The terrestrial environment within the study area has experienced the largest change. Bushland reserves occur in a total 9.93 hectares and are scattered throughout the study area. Two reserves have SEPP 19 status under the *NSW Environmental Planning & Assessment Act* (EP&A Act 1979), requiring preparation of management plans: Nolan Bush (3.00 ha) and West Esplanade Park (4.71 ha). Smaller patches of bushland on both public and private land do exist throughout, and in some places provide corridors between the reserves. There are four specific vegetation communities present within these reserves. A total of 3 amphibian, 39 birds, 8 mammal and 9 reptile species have been recorded (Skelton *et al* 2004).

2.4 CURRENT CONDITION

2.4.1 Human Interventions

Human activities have altered and modified the natural systems of the study area. Foreshore development has been extensive. From the early 1820s scattered settlement began in the Manly Cove and North Harbour areas. Major Thomas Livingstone Mitchell drew a plan of North Harbour in 1828, with 31 allotments laid out in rectangular grid to form the streets, and looked as an amphitheatre, watered by streams and a sheltered harbour. James Jenkins made a road in 1826 between North Harbour and Pittwater which included thirteen bridges and made North Harbour a gateway to Sydney long before connection through Ellery's Punt at the Spit. Seawalls, both public and private, exist throughout the study area. The North Harbour Reserve was reclaimed

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by the construction of a sandstone retaining wall and landfill on a tidal flat during the mid 1930's. Total length of seawalls is 0.34km. Two prominent seawalls are Fairlight Beach Seawall & North Harbour Reserve Rock Revetment Seawall. Fairlight Pool, Manly Boat Shed and walkways including Manly Scenic Walkway are some other developments on the shore. Public access to foreshore is available at several points. There is no public pontoon/jetty in the study area. Stormwater now flows through 14.1 km artificial drainage networks. The five most important activities carried out by residents in North Harbour are walking/jogging, swimming, passive recreation, picnic/BBQ and dog walking. Other activities are cycling, kayaking, rowing/canoeing, group exercise, bird/wildlife watching, sight-seeing with visitors, bush generation and playing with children. Fairlight is favourite snorkelling and scuba diving spot. Dogs are allowed off-leash in the North Harbour Reserve. These alterations have all impacted the natural environment.

2.4.2 Processes & Impacts

With most parts of the North Harbour CMP study area being highly urbanised, there is significant pressure placed on environmental health.

Despite the reported improvements in water quality, pollution is indeed still evident, particularly in times of rain when stormwater transports terrestrial pollutants into the bay. Loads of pollutants in the bay from the study area have been estimated at approximately 1,850 kg/year of Total Nitrogen; 220 kg/year of Total Phosphorus; 140 kg/year of Copper, 190 kg/year of Lead, 400 kg/year of Zinc, and 105,300 kg/year of Sediment. Road surfaces and residential use contribute to these loads of pollutants. No Gross Pollutant Traps (GPTs) are currently installed in the study area. The Department of Primary Industries has placed a ban on all commercial fishing within Sydney Harbour including the study area, because of the presence of elevated levels of dioxins in fish and crustaceans. There are three known sewer overflow locations within the study area.

Boating is an extremely popular recreational activity within the study area, but it can have detrimental impacts on the marine environment. Anchors, moorings, propellers and hulls can all damage the seafloor and associated seagrass beds. Also, boating contributes to water pollution which also degrades the marine environment.

An ecosystem health card has also been developed for the study area.

The study area will experience many of the impacts of climate change, with the low lying areas close to the North Harbour Reserve foreshore likely to be subject to greater impacts than the elevated areas. These impacts are likely to include: sea level rise; inundations, blocked storm water outlets, and more frequent and more severe storm events.

2.5 CURRENT UTILISATION

The current land use is predominantly residential (69.8%). This is followed by open spaces and parks (16.5%) and road surfaces (12.4%). Long stretches of parkland (Esplanade Park) separate residential blocks from shoreline except behind King Avenue and North Harbour Street where residential properties border shoreline. Reserves and parks occur scattered throughout the area with North Harbour Reserve providing space for many passive activities. Wellings Reserve, a SEPP 19 bushland, occurs in neighbouring Forty Basket CMP area. Manly Scenic Walkway runs through the study area.

North Harbour study area is provider of popular recreational resource for locals and visitors alike. The attraction of North Harbour is enhanced by its generally good water quality. This results in numerous primary and secondary contact recreational pursuits, including swimming, sailing, kayaking, diving, sail boarding, kite-surfing, water skiing and boat and shore fishing. The five most important activities carried out by residents in North Harbour are walking/jogging (86.2%), swimming (70.4%), passive recreation (66.4%), picnic/BBQ (57.9%) and dog walking (41.4%). Manly Scenic Walkway runs through the study area.

The study area is zoned under both the *Manly Local Environment Plan 1988* and the *Sydney Regional Environmental Plan - Sydney Harbour Catchments 2005* or simply the Harbour REP. The Manly LEP establishes land use zones within the study area as zone 2 – Residential, 3 – Business Zone, 5 – Special Uses

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Zone and 6 - Open Space. The foreshores and waterways of the study area are designated as W2 (Environment Protection) zone under the Sydney Harbour Regional Environmental Plan.

2.6 PLANS OF MANAGEMENT FOR COMMUNITY LANDS

Development of the North Harbour CMP is also undertaken to meet requirements for community land management under the *NSW Local Government Act 1993*, and addresses legislative requirements with respect to community land within the study area. Under the *NSW Local Government Act 1993*, Council is required to prepare Plans of Management (PoMs) for Public Land classified as 'Community Land'.

Manly Council has prepared a series of Plans of Management for all nine community land parcels (MC 1996). The following Plans of Management (PoM) cover all parcels of community lands:

Bareena Park PoM: Covers both land titles 1424/752038 and 1427/752038 of Bareena Park. Land is categorised sports ground (in part) and park (in part). These have been last leased to Balgowlah Bowling Club in 2006.

Bushland Reserve, Geddes Street PoM: Covers land title 79/9202. This is a steep triangular shaped reserve separating Fisher & Geddes Street. Land is categorised as natural area – bushland.

Brimbecom Park PoM: Covers land titles 6/25542, 103/555215, 203/537569 and 204/537569 of Brimbecom Park. Land is categorised as a park, general community use and natural area – bushland.

North Harbour Reserve PoM: Covers land title 1/115707. Land is categorised as a park and natural area – foreshore and bushland.

Esplanade Park PoM: Covers, among others, land title 1/569379. Land is categorised as natural area – foreshore.

No PoM has yet been prepared for the land parcel 1/1060275 on Fairlight Crescent, Fairlight (photo). This is formerly Arlington Drive, closed through a Gazette dated 26/3/2004. Manly Council has classified the land parcel as community land but no zoning has been done yet. This land parcel is proposed to be categorised as 'general community use', subject to specific process of public hearing. It is the intention of Council that this CMP will serve as the PoM for this area unless the decision is made to develop a separate PoM at a later stage.



3. STRATEGIC FRAMEWORK & MANAGEMENT STRATEGY

3.1 GENERAL

The Coastline Management Plan is a tool for integrating the needs and values of the environment within the development-based planning framework of local and state government. Therefore, the focus of the Plan is on addressing environmental concerns through a series of actions that are both effective and easy to implement.

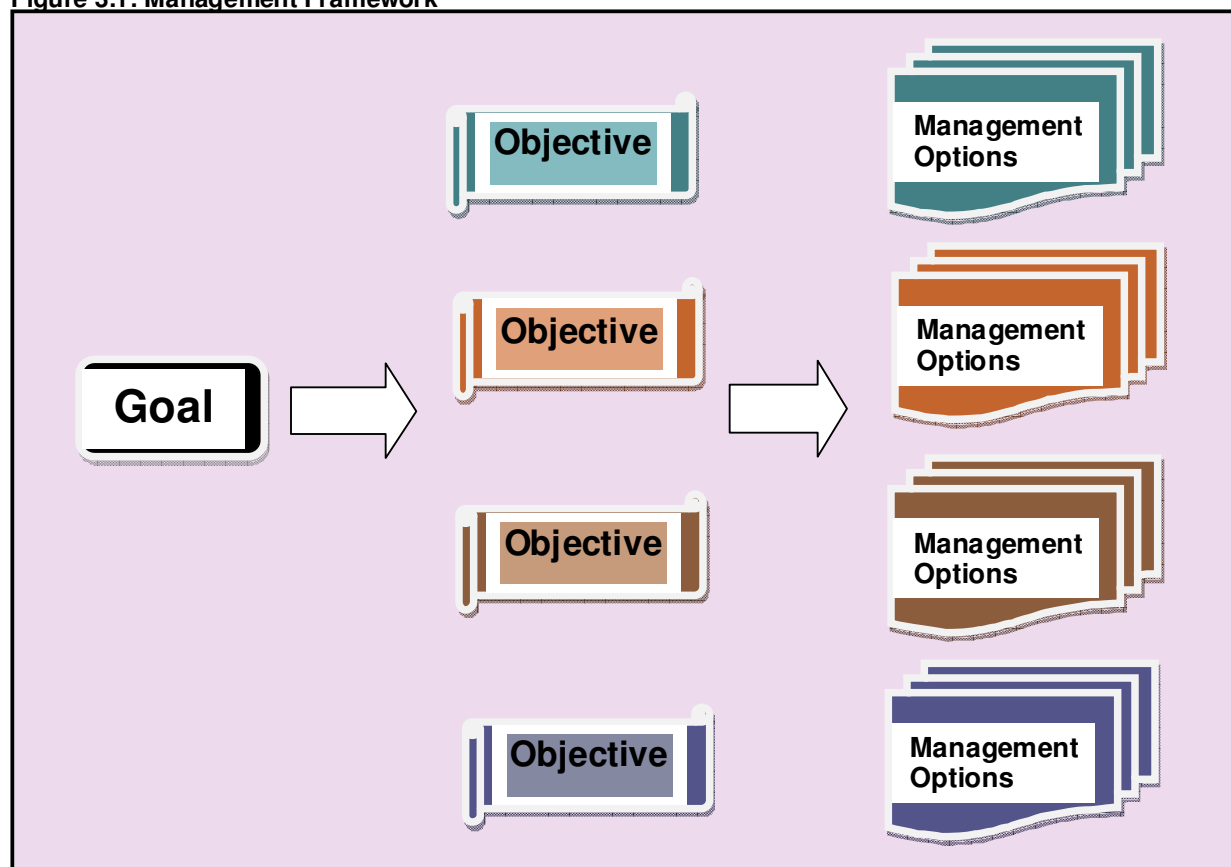
A series of goals and objectives for the future management of the North Harbour were developed on the basis of information received through the community and stakeholder consultations, input from the the Harbour Foreshores & Coastline Management Committee and a sound appreciation of coastal processes and human interactions.

Key management issues and goals have already been described in section 1.6.

Management Objectives provide the 'goal posts' towards which future management of the North Harbour should be directed. In short, the objectives aim to rectify the problems or issues facing the Harbour, whilst preserving and enhancing its inherent values.

For each management issue a goal has been defined, along with a range of management objectives that have been further partitioned into management options (**Figure 3.1**).

Figure 3.1: Management Framework



3.2 MANAGEMENT PRINCIPLES

The basis for the Coastline Management Plan needs to be Ecologically Sustainable Development (ESD). ESD is development that aims to meet the needs of the present, while conserving our ecosystems for the benefit of future generations. By following the principles of ESD, we should be able to reduce the likelihood of serious environmental impacts arising from our present day economic activities.

There are four basic principles of Ecologically Sustainable Development (ESD):

1. Conservation of biological diversity and ecological integrity;
2. Social equity, including inter-generational equity;
3. Improved valuation, pricing and incentive mechanisms; and
4. The precautionary principle.

These principles form the basis of matters to be considered in deciding whether projects are consistent with ecologically sustainable objectives.

3.3 STATE & OTHER TARGETS

NSW Government has released the State Plan on 14 November 2006. It is tipped as 'A New Direction for NSW'. The Plan reflects the hopes and goals of people across NSW and the priorities for the public sector. The Plan sets out clear targets for improved outcomes and service delivery. The Plan contains 14 long term social, economic and environmental goals and 34 priority areas for action for NSW. The Priority E4 of the State Plan is

"Better outcomes for native vegetation, biodiversity, land, rivers and coastal waterways".

This has been translated into state-wide targets (**Box A**) by the Natural Resources Commission (NRC) and adopted by the Government in the State Plan.

Box A	State-wide targets for natural resource management adopted in the State Plan
	<p style="text-align: center;">Biodiversity</p> <ol style="list-style-type: none"> 1. By 2015 there is an increase in native vegetation extent and an improvement in native vegetation condition 2. By 2015 there is an increase in the number of sustainable populations of a range of native fauna species 3. By 2015 there is an increase in the recovery of threatened species, populations and ecological communities 4. By 2015 there is a reduction in the impact of invasive species <p style="text-align: center;">Water and Coast</p> <ol style="list-style-type: none"> 5. By 2015 there is an improvement in the condition of riverine ecosystems 6. By 2015 there is an improvement in the ability of groundwater systems to support groundwater dependent ecosystems and designated beneficial uses 7. By 2015 there is no decline in the condition of marine waters and ecosystems 8. By 2015 there is an improvement in the condition of important wetlands, and the extent of those wetlands is maintained 9. By 2015 there is an improvement in the condition of estuaries and coastal lake ecosystems <p style="text-align: center;">Land</p> <ol style="list-style-type: none"> 10. By 2015 there is an improvement in soil condition 11. By 2015 there is an increase in the area of land that is managed within its capability <p style="text-align: center;">Community</p> <ol style="list-style-type: none"> 12. Natural resource decisions contribute to improving or maintaining economic sustainability and social well-being 13. There is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management

At regional level, the Sydney Metropolitan Catchment Management Authority (SMCMA), responsible for the coordination and management of Sydney's natural resources, adopted the following vision:

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"The Sydney community has the knowledge and skill to achieve healthy waterways and bushland that all Sydneysiders can enjoy, now and in the future."

The SMCMA has completed its Catchment Action Plan (CAP). The CAP will guide the activities of the SMCMA while forming the basis for partnerships with the community, business, industry and government. The CAP will assist the SMCMA in ensuring that natural resource management projects are undertaken in priority areas within the catchment, and that these projects lead to the best outcomes for the environment and the community. There are four themes: biodiversity, water, land and community. Under each of these, there are Catchment Targets (**Box B**), Management Targets and Actions.

Box B

SMCMA Catchment Targets

Biodiversity

Enhance ecological resilience and connectivity of bushland and aquatic habitats

- CTB1 By 2016 the extent and condition of terrestrial native vegetation in all landscapes is maintained or improved.
- CTB3 By 2016 there is an increase in the connectivity of terrestrial native vegetation.
- CTB4 By 2016 aquatic and terrestrial threatened species and Endangered Ecological Communities (EECs) and endangered populations are better conserved by implementing actions identified in the Priorities Action Statement.
- CTB5 By 2016 the impact of terrestrial and aquatic invasive species on biodiversity is reduced by decreasing the number, distribution and impact of invasive weeds, pest animals and pathogens.

Water

Enhance the positive connectivity of aquatic processes

- CTW1 By 2016 there is a net improvement in the health of modified waterways and riparian corridors and conservation of natural waterways.
- CTW2 By 2016 there is an improvement in the condition and extent of wetlands.
- CTW3 By 2016 there is measurable progress towards achieving the Water Quality and River Flow Objectives adopted for each waterway.
- CTW4 By 2016 there is an improvement in the quality and sustainable use of groundwater systems so that they are able to support groundwater dependent ecosystems and designated beneficial uses.
- CTECM1 By 2016 there is an improvement in the condition of estuaries and coastal lakes.
- CTECM2 By 2016 there is an improvement in the condition of coastal and marine ecosystems.

Land

Reduce the negative edge effects of urban expansion

- CTLD1 By 2016 there is an increase in the amount of land managed within its capability.
- CTLD2 By 2016 implement actions under the Sydney Metropolitan Strategy that recognise, protect and improve key natural resources.
- CTLD 3 By 2016 Indigenous cultural landscape values are identified, acknowledged and incorporated into all natural resource management activities and land use planning.

Community

Improve community and institutional connections between natural resources, strong communities and robust economy

- CTC1 By 2016 more people, communities and organisations have increased capacity to engage in practices that contribute to improved natural resource management.
- CTC2 By 2016 there is improved focus and collaboration between organisations that act in or influence natural resource management.
- CTC3 By 2016 there is a framework for monitoring, evaluating and reporting natural resource indicators.
- CTC4 By 2016 there is improved recognition across the community of the contribution of healthy natural resources to valued social and economic activities in the region.
- CTC5 By 2016 there is improved awareness and willingness to adopt adaptive and mitigating strategies for climate change impacts on natural resource values.

4. STRATEGIC MANAGEMENT OPTIONS

Strategic management options were formulated covering a wide range of structural and non-structural solutions. Responsibility for implementing the options is spread across local government (planning, management and works staff), state government agencies and volunteer community groups.

This Plan sets six Goals and 21 Objectives to be addressed through 49 Management Options (**Table 4.0**). Only 30 of these are new activities. Of these 30, three management options are proposed for immediate implementation, 19 within 2 years, seven within 3-4 years and only one at later years. Overall, 18 management options have been rated to have high priority, 29 as medium priority and only one as low priority.

Table 4.0 Facts & Figures about proposed management options

Management Issue	Objectives set	Options proposed	Priorities			Activity Type		Implementation Time Frame of new activities			
			High	Medium	Low	On-going	New	Immediate	Within 2 years	Within 3-4 years	On 5 th or later
Aquatic Habitat	4	10	8	2	0	3	7	0	4	3	0
Terrestrial Habitat	3	8	1	7	0	3	5	1	2	2	0
Public Facilities	4	10	3	7	0	6	4	0	3	0	1
NHR Improvement	4	6	1	4	1	0	6	2	4	0	0
Hazards & Climate Change	4	12	2	10	0	4	8	0	7	1	0
Heritage Conservation	2	2	2	0	0	2	0	0	0	0	0
Total	21	48	17	30	1	18	30	3	20	6	1

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4.1 OPTIONS ADDRESSING AQUATIC/INTERTIDAL HABITAT CONSERVATION & MANAGEMENT

The key habitat management priority for the study area is to protect habitats of high ecological and coastal value. It is more cost effective to protect these areas now than to rehabilitate them in the future if habitats are allowed to deteriorate.

A total of 10 management options are proposed addressing four different objectives. Of these, eight management options have been rated as of high priority and the remaining two as medium priority. No option is proposed for immediate implementation. Three management options are already on-going activities.

Goal

Restore and maintain a healthy and diverse mix of aquatic and intertidal habitats.

Objectives	Strategic Management Options	Implementation timeframe*	Priority	
			Individual	Overall
AH 1 Establish structured and community led management for an expanded North Harbour Aquatic Reserve.	AH1.1. Pursue a submitted proposal to extend the boundary of North Harbour Aquatic Reserve.	On-going	H4, M1,L2	High
	AH1.2. Assist DECCW with preparation and implementation of North Harbour Aquatic Reserve Management Plan.	Within 2 years	H5, M2	High
AH 2 Ensure all areas of ecological significance are properly protected and conserved.	AH2.1. Pursue & process to declare inter-tidal areas as 'Inter-tidal Protected Area' under the <i>Fisheries Management Act</i> .	Within 2 years	H3, M2,L2	Medium
	AH2.2. Continue managing Wildlife Protected Area at Federation Point.	On-going	H5,M1,L1	High
	AH2.3 Assess marine biodiversity of North Harbour including Aquatic Reserve.	Within 2 years	H4, M2,L1	High
	AH2.4. Locate soldier crab colony at the far west end of North Harbour and undertake protection measures	Within 3-4 years	H4, L2	High
AH 3 Preserve existing seagrass and kelp beds.	AH3.1. Continue to encourage I&I NSW to support conservation of seagrass and kelp beds.	On-going	H6, M1	High
	AH3.2. Work with NSW Maritime and I&I NSW to introduce seagrass friendly moorings	Within 3-4 years	H3, M4	Medium
AH 4 Ensure that water quality is suitable for healthy natural habitat conservation	AH4.1. Investigate feasibility of Stormwater Quality Improvement Devices (SQIDs) on major stormwater outlets that discharge into North Harbour to ensure healthy aquatic habitat.	Within 2 years	H7	High
	AH4.2. Place screens on minor stormwater outfalls to improve water quality and aquatic health	Within 3-4 years	H6, M1	High

*After adoption of the CMP

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DETAILS OF MANAGEMENT OPTIONS

Objective

AH1 Establish structured and community led management for an expanded North Harbour Aquatic Reserve.

AH1.1. Pursue a submitted proposal to extend the boundary of North Harbour Aquatic Reserve.

Context: North (Sydney) Harbour Aquatic Reserve lies between an imaginary line from the headlands at North Head and Grotto Point and another line joining Little Manly Point, Manly Point and Forty Baskets Beach. The reserve extends from the seabed at these outer boundaries up to the mean high water mark between them and covers an area of approximately 260 hectares.

At the Ordinary Meeting of 17 March 2008, Manly Council moved a resolution to extend the boundaries of North Harbour Aquatic Reserve to include both Little Manly Cove and North Harbour.

Letters of support were sought and received from community user groups, NGOs, research organisations, relevant agencies and Precincts. Based on Council resolution, a proposal has been formally submitted to DECC for its approval.



Action:

- Pursue the submission with DECCW

Council has received the following response from DECC in a letter dated 7 May 2009:

"The Department is currently analysing adequacy of the existim system of marine protected areas in NSW, and this analysis will inform any decision regarding the declaration of new, or the expansion of existing, marine protected areas including within the Hawkesbury Shelf marine bioregion."

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Advantages: Area under aquatic reserve will increase. Biodiversity of the area will be enhanced through expanded regulation and improved management. This will be achieved through a collaborative approach to management, education and compliance.

Disadvantages: Lack of ability for State Government to enable compliance activity

Objectives addressed: AH1, AH2, AH3

Addressing actions under Manly Council's MSS 2006: C1.2.8 – partnership with NSW DPI and NSW Maritime to conserve marine resources; C1.2.14 – lobby to extend boundary of the Aquatic Reserve in North Harbour

Addressing SMCMA catchment targets: CTECM2 – improvement in the condition of coastal and marine ecosystems

Addressing NRC targets (State Plan 2006): 7 – marine water and ecosystems

Performance Target: North Harbour Aquatic Reserve expanded

Indicative Cost: Staff Cost

Time Frame: On-going

Responsible Agency: Manly Council – NR

Priority: High

AH1.2. Assist DECCW with preparation and implementation of the North Harbour Aquatic Reserve Management Plan.

Context: NSW Department of Environment, Climate Change and Water (DECCW) is currently responsible for the administration and management of NSW Aquatic Reserves. NSW Aquatic Reserves are managed under the Fisheries Management Act 1994 and the Fisheries Management (Aquatic Reserves) Regulation 2002. Under s197.A of the Fisheries Management Act 1994 the Minister for Environment and Climate Change may make arrangements for the preparation of a Management Plan for an Aquatic Reserve.

DECCW, under an Operational Agreement with Manly Council, has already agreed in principle to prepare the North Harbour Aquatic Reserve Management Plan.

Community involvement is critical in the management of aquatic reserves. Through public involvement in management planning processes and in implementation, the Government and Council seek to achieve community partnership, providing ongoing protection for the future.

Actions:

- Establish a multi-stakeholder Working Group ensuring wider community representations.
- Assess the current health (including pollution status) of the reserve and take appropriate measures
- Carry out User's Survey
- Conduct community consultation and seek input in identifying management options
- Identify management options in consultation with the Working Group
- Implement the Management Plan and encourage community monitoring during implementation
- Review any plan every 3 years as factors like overfishing and climate change has accelerated the impacts marine habitats.

Advantages: This will guide measures to protect biodiversity and varied marine life and habitats of the North Harbour Aquatic Reserve.

Disadvantages: Restrict all types of fishing in all or part of the reserve

Objectives addressed: AH1, AH 2, AH3, HR3 and HR4

Addressing actions under Manly Council's MSS 2006: C1.2.8 – partnership with I&I NSW (formerly NSW DPI) and NSW Maritime to conserve marine resources

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Addressing SMCMA catchment targets: CTB4 – aquatic threatened species are better conserved; CTECM2 – improvement in the condition of coastal and marine ecosystems; CTC1 – community engagement in improved NRM

Addressing NRC targets (State Plan 2006): 7 – marine water and ecosystems

Performance Target: Management Plan prepared and implemented

Indicative Cost: Staff Time

Time Frame: Within 2 years

Responsible Agency: NSW DECCW, Manly Council – NR and I&I NSW

Priority: High

Objective

AH2 Ensure all areas of ecological significance are properly protected and conserved.

AH2.1. Pursue & process to declare inter-tidal areas of North Harbour as 'Inter-tidal Protected Area' under the Fisheries Management Act.

Context: Foreshores of Sydney Harbour and all its tributaries are protected under Intertidal Protected Area (IPA) excluding foreshores of North Harbour (see map under AH 1.1). Excluded areas are foreshores north of a line from Manly Point to the south end of Forty Baskets beach.

There are currently nine IPAs in NSW. These are temporary fishing enclosures and complement the NSW marine protected area system by protecting rocky shore intertidal invertebrates. IPAs extend from the mean high water mark to 10 meters seaward from the mean low water mark. IPAs are declared under the Fisheries Management Act 1994 and are managed by I&I NSW. The aim of these IPAs is to minimize threats and to ensure the sustainability of rocky shore animals and plants.

This option will required to be implemented only if proposal for extension of North Harbour Aquatic Reserve is not successful.

Actions:

- Prepare a background paper and proposal for declaring rocky foreshores of North Harbour as IPA.
- Collect and collate letter of support from relevant agencies and Precincts
- Submit the proposal to I&I NSW and pursue for its approval

Advantages: Area under IPA will increase. Biodiversity of the area will be protected.

Disadvantages: There are no apparent disadvantages

Objectives addressed: AH1, AH2, HR3 and HR4

Addressing actions under Manly Council's MSS 2006: C1.2.8 – partnership with I&I NSW and NSW Maritime to conserve marine resources

Addressing SMCMA catchment targets: CTB4 – aquatic threatened species are better conserved; CTW2 – improvement in condition and extent of wetlands; CTECM2 – improvement in the condition of coastal and marine ecosystems

Addressing NRC targets (State Plan 2006): 7 – marine water and ecosystems; 8 – improvement and maintenance of wetlands

Performance Target: Proposed intertidal areas declared as IPA.

Indicative Cost: Staff time

Time Frame: Within 2 years

Responsible Agency: Manly Council – NR, and I&I NSW

Priority: Medium

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AH2.2. Continue managing Wildlife Protected Area at Federation Point.

Context: A small colony of Little Penguin has nested at Federation Point east along the foreshore behind Manly Pier. For the conservation of Manly's endangered population of Little Penguins, Council designated the foreshore area of Federation Point a Wildlife Protection Area (WPA). Administered under the Companion Animals Act 1998, the designation of the WPA precludes dogs and cats from the foreshore. To coincide with the designation of the WPA the stairs and boardwalk/walkway around to Ocean World has been made a dog 'on leash area'. Signage has also been installed. Recent renovations and changes in use of the Bather's Pavillion, as has been assessed, is likely to pose threats to wildlife and habitats in the area.

Penguin site at Federation Point is not shown on Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005.

During community consultation, some local residents have reported sighting of Little Penguin near Treharne boatshed. This should be investigated.

Actions:

- support continuation of the WPA.
- support increased Penguin Wardens to patrol the area
- improve educational/interpretive signage : much bigger, penguin specific signage painted on the path at several points (eg at Federation Point & at start of WPA) – perhaps a penguin with a speech bubble.
- Indicate a contact number on signage that the public may ring if they discover injured or at risk penguin.
- Interact with DoP and DECCW to update its maps to show penguin habitat at Federation Point & the Wharf & to gain "critical habitat" protection.
- improve fencing to restrict companion animal interactions with Little Penguin
- Investigate existence of Little Penguins near Treharne Boatshed.

Advantages: Little penguin habitat protected and population size increased.

Disadvantages:

Objectives addressed: AH2

Addressing actions under Manly Council's MSS 2006: C1.2.17 – enforce restrictions near Penguin Critical Habitat

Addressing SMCMA catchment targets: CTB4 – terrestrial threatened species are better conserved

Addressing NRC targets (State Plan 2006): 2 – native fauna species; 3 – threatened species, populations and ecological communities

Performance Target: WPA maintained and continued

Indicative Cost: Staff & Warden time

Time Frame: On-going

Responsible Agency: Manly Council – Natural Resources, Precincts

Priority: High

AH2.3 Assess marine biodiversity of North Harbour including Aquatic Reserve.

Context: North Harbour Aquatic Reserve has been established to protect biodiversity and representative samples of varied marine life and habitats. Baseline data on diversity and abundance of marine and estuarine species within the Reserve was collected in 2003/04 by URG Dive Club and can be viewed at:

<http://www.urgdiveclub.org.au/Research/NHARProject/tabid/71/Default.aspx>

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The baseline study was designed following a reproducible methodology permitting subsequent analyses of changes in the Reserve's ecology. Methodology for the North Harbour Biodiversity Research can be viewed at:

<http://urgdiveclub.org.au.85.seekdotnet.com/Portals/0/Research/Page3/EnvirofundNHARProcess.pdf>

This work would assist DECCW in developing management initiatives for the North Harbour Aquatic Reserve.

Action: The option involves organising follow-up survey immediately, preferably within 2 years following the methodology used during baseline study. Also consider interpretive signage describing marine diversity at Fairlight.

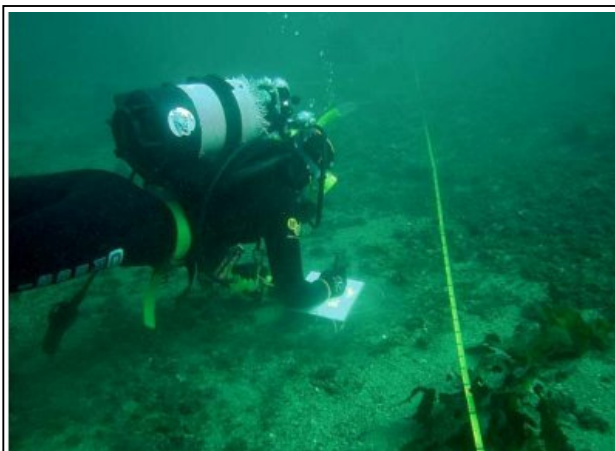


Photo : URG Dive Club

Advantages: This will identify possible changes and status of biodiversity. Results will be used to take appropriate management interventions.

Disadvantages:

Objectives addressed: AH1, AH2 and HR3

Addressing actions under Manly Council's MSS 2006: C1.2.8 – partnership with I&I NSW and NSW Maritime to conserve marine resources

Addressing SMCMA catchment targets: CTB4 – aquatic threatened species are better conserved; CTECM2 – improvement in the condition of coastal and marine ecosystems

Addressing NRC targets (State Plan 2006): 7 – marine water and ecosystems;

Performance Target: Investigation completed

Indicative Cost: \$20,000

Time Frame: Within 2 years

Responsible Agency: Manly Council – Natural Resources & DECCW

Priority: High

AH2.4. Locate soldier crab colony at the far west end of North Harbour and undertake protection measures

Context: Mud flats of North Harbour, before its reclamation, used to have colony of thousands of soldier crabs. During community consultation, local residents have reported sighting of soldier crab colony on mud flats of North Harbour. If present, it is important that the colony is protected.

Action: The option involves investigation to locate soldier crab colony in order to facilitate their protection.

Advantages: This will possibly identify soldier crab colony within the study area and help in implementing protection measures.

Disadvantages: -

Objectives addressed: AH2 and HR3

Addressing actions under Manly Council's MSS 2006: C1.2.1 – identify areas of fauna population needing rehabilitation

Addressing SMCMA catchment targets: CTB4 – aquatic and terrestrial threatened species are better conserved

Addressing NRC targets (State Plan 2006): 2 – sustainable populations of native fauna species

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Performance Target: Soldier crab colony located
Indicative Cost: Staff time
Time Frame: within 3-4 years
Responsible Agency: Manly Council – Natural Resources
Priority: High

Objective AH 3 Preserve existing seagrass and kelp beds.

AH3.1. Continue to encourage I&I NSW to support conservation of seagrass and kelp beds.

Context: The total seagrass bed within the study area is 2.79ha. Seagrass beds exist in front of North Harbour tidal flat and also in areas between the Manly Boatshed and extended southern tip in front of Esplanade Park. Kelp (*Ecklonia radiata*) beds are present on rocky substrate on the eastern side of the study area and occur on 4.32 ha area.

Seagrass and kelp beds provide extremely important aquatic habitat by providing food and shelter for a variety of juvenile fish and invertebrate species. Many such species are of considerable value to recreational and commercial fishing industries. Hence, it is important to conserve existing beds. These areas are identified as Wetlands Protected Area under the Sydney Regional Environmental Plan (Sydney Harbour Catchment), 2005.

Actions:

- Periodic updates of macrophyte distribution map within the study area.
- Facilitate measures to remove/ reduce threats to seagrass so as to foster natural re-establishment e.g. seagrass friendly moorings, water sensitive urban design.
- Conserve seagrass beds through community education and compliance monitoring.
- Ensure water based development does not negatively impact on marine vegetation.

Advantages: Continued conservation of these ecologically valuable habitats.

Disadvantages:

Objectives addressed: AH3 and HR3

Addressing actions under Manly Council's MSS 2006: C1.2.6 – local residents involved in seagrass monitoring; C1.2.8 – partnership with I&I NSW and NSW Maritime to conserve marine resources

Addressing SMCMA catchment targets: CTB4 – aquatic threatened species are better conserved; CTECM2 – improvement in the condition of coastal and marine ecosystems

Addressing NRC targets (State Plan 2006): 1 – improvement in native vegetation condition; 7 – marine water and ecosystems; 8 – improvement and maintenance of wetlands

Performance Target: Areas of seagrass and kelp beds conserved.
Indicative Cost: Staff time
Time Frame: on-going
Responsible Agency: I&I NSW, Manly Council – NR, NSW Maritime, SMCMA
Priority: High

AH3.2 Work with NSW Maritime and I&I NSW to introduce seagrass friendly moorings

Context: North Harbour has 111 licenses and sites for private moorings and 3 licenses for 91 sites for commercial moorings. All these are swing moorings.

The I&I NSW (formerly NSW DPI) is currently trialing seagrass friendly moorings in an attempt to minimise the impact of boating on seagrass beds. Many private companies have patented and marketed seagrass friendly mooring designs. One of such mooring system uses a single point screwed into place mooring post as the anchor point. Attached to the mooring post just below the sea bed is a

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set of load spreaders to stabilize the post. This is then attached to shock absorber to the swivel head and run a hawser rope from the shock absorber to a surface buoy.

The I&I NSW has, with NSW Maritime, SMCMA as part of federally funded project, initiated preliminary arrangements to install seagrass friendly moorings in Manly Cove, Manly.

Actions: The option involves working with I&I NSW and NSW Maritime to assess and introduce seagrass friendly moorings in suitable areas within the study area.

Objectives addressed: AH3 and AH4

Addressing actions under Manly Council's MSS 2006: C1.2.15 – lobby for eco-friendly mooring buoys to replinish sea grasses; C1.2.16 – upgrade all moorings to seagrass friendly moorings

Addressing SMCMA catchment targets: CTB4 – aquatic threatened species are better conserved; CTECM2 – improvement in the condition of coastal and marine ecosystems

Addressing NRC targets (State Plan 2006): 4 – reduction in the impact of invasive species;



Photo source: <http://www.abc.net.au/tv/newinventors/txt/s1940114.htm>

Performance Target: Moorings introduced

Indicative Cost: Staff time

Time Frame: Within 3-4 years

Responsible Agency: NSW Maritime, I&I NSW, SMCMA and Manly Council-NR

Priority: Medium

Objective

AH 4 Ensure that water quality is suitable for healthy natural habitat conservation

AH4.1. Investigate feasibility of Stormwater Quality Improvement Devices (SQIDs) on major stormwater outlets that discharge into North Harbour to ensure healthy aquatic habitat.

Context: High water quality is important for healthy aquatic habitat. However with all nine sub-catchments within the study area draining directly into the waters of North Harbour, water quality may deteriorate following rainfall. Manly Council is committed to contribute to improving stormwater quality to protect the health of harbour waterways.

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Further, there is strong community demand to install Stormwater Quality Improvement Devices (SQIDs) including GPTs on all major stormwater outlets where feasible. It is essential that installation of new SQIDs is based on current best practice technologies. Council has

Actions:

- Assess current best practice technologies
- Prioritise installation of SQIDs based on modelled pollutant loads and available funding resources.
- Install a GPT for stormwater pipe at North Harbour Reserve. Consider location near parking area on north of Condamine Street.
- Liaise with Sydney Water and other relevant agencies.



Advantages: With new SQIDs, significant improvements to harbour water quality can be expected particularly through solids, litter, sediment and nutrient capture. This would in turn improve the aquatic habitat, possibly resulting in more abundant or diverse aquatic fauna.

Disadvantages: Increased cost; cannot be implemented if funding is not secured.

Objectives addressed: AH2 and AH4

Addressing actions under Manly Council's MSS 2006: C1.1.3 – Implement Integrated Pollution Prevention Program; C1.1.6 – water quality monitoring; C1.2.11 – impacts of stormwater upon coastal processes

Addressing SMCMA catchment targets: CTW3 – measurable progress towards achieving the Water Quality objectives; CTECM2 – improvement in the condition of coastal and marine ecosystems

Addressing NRC targets (State Plan 2006): 7 – marine waters and ecosystems;

Performance Target: SQIDs installed

Indicative Cost: \$90,000 (external funding to be sought)

Time Frame: Within 2 years

Responsible Agency: Manly Council – Natural Resources & Urban Services

Priority: High

AH4.2. Place screens on minor stormwater outfalls to improve water quality and aquatic health

Context: There are three major and 13 minor outfalls discharging stormwater directly into the waters of North Harbour. Manly Council is committed to contribute to improving stormwater quality to protect the health of harbour waterways.

Discharged water, apart from carrying pollution loads, also deposits rubbish. Screens placed on minor outfalls can prevent the deposit of rubbish into water.

Actions:

- Assess current best practice technologies
- Liaise with Sydney Water
- Assess maintenance requirements
- Place screen/gully pit devices on minor outfalls.
- Clean devices periodically.

Advantages: Removes gross pollutants from stormwater, which otherwise will pollute water of North Harbour

Disadvantages: System clogs if not regularly cleaned. Increased cost



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Objectives addressed: AH2 and AH4

Addressing actions under Manly Council's MSS 2006: C1.1.3 – Implement Integrated Pollution Prevention Program; C1.1.6 – water quality monitoring; C1.2.11 – impacts of stormwater upon coastal processes

Addressing SMCMA catchment targets: CTW3 – measurable progress towards achieving the Water Quality objectives; CTECM2 – improvement in the condition of coastal and marine ecosystems

Addressing NRC targets (State Plan 2006): 7 – marine waters and ecosystems;

Performance Target: Screen / gully pit devices installed

Indicative Cost: \$50,000

Time Frame: Within 3-4 years

Responsible Agency: Manly Council – Natural Resources & Urban Services, Sydney Water

Priority: High

NORTH HARBOUR COASTLINE MANAGEMENT PLAN

4.2 OPTIONS ADDRESSING BUSHLAND/TERRESTRIAL HABITAT CONSERVATION & MANAGEMENT

Bushland reserves occur in a total 9.93 hectares and are scattered throughout the study area. Smaller patches of bushland on both public and private land do exist throughout, and in some places provide corridors between the reserves. The fragmentation of natural bushland areas in Manly has reduced the viability of habitat in many bushland reserves to support populations of native fauna. The State Environmental Planning Policy (SEPP) No. 19 - Bushland in Urban Areas is targeted to protect and preserve bushland within the greater Sydney area.

Goal
Protect and enhance urban bush land and native vegetation areas

A total of eight management options are proposed addressing three different objectives. Of these, one has been rated as of high and the remaining seven as medium priority management options. One option is proposed for immediate implementation. Three management options are already on-going activities of the Council.

Objectives	Strategic Management Options	Implementation timeframe*	Priority	
			Individual	Overall
TH 1 Continue to manage Council's bushland management program.	TH1.1. To structure systematic and continued bushland management, prepare a comprehensive management plan (in conjunction with Precincts) and develop a staged implementation programme.	Within 3-4 years	H3,M3,L1	Medium
	TH1.2. Prepare site specific management plans for Nolan Bush and West Esplanade Park, the two SEPP 19 bushland, to fulfill statutory requirement.	Within 2 years	H2,M4,L1	Medium
	TH1.3. Initiate processes to obtain SEPP 19 status for Heathcliff Reserve.	Immediate	H2,M2,L2	Medium
	TH1.4 Prepare and implement Walkway Landscape Masterplan – Federation Point to Lauderdale Ave.	Within 2 years	-	Medium
TH 2 Undertake systematic program to reduce weed cover in open spaces, reserves and bushland	TH2.1. Continue enhanced weeding program at high weed density areas on a priority basis.	On-going	H2,M4,L1	Medium
	TH2.2. Investigate sources of nutrient – rich discharges at stormwater outlets located in bushland and implement appropriate control measures.	Within 3-4 years	H3,M2,L2	Medium
TH 3 Continue to encourage community participation in bush regeneration program and in native plants on public	TH3.1. Continue Community Bush Care Volunteers program in the study area.	On-going	H4,M2,L1	High

NORTH HARBOUR COASTLINE MANAGEMENT PLAN

Objectives	Strategic Management Options	Implementation timeframe*	Priority	
			Individual	Overall
and private lands	TH3.2. Continue Council's Street Tree Planting Programme within the study area and initiate assessment of the programme.	On-going	H1, M4, L2	Medium

*After adoption of the CMP

DETAILS OF MANAGEMENT OPTIONS

Objective TH 1 Continue to manage Council's bushland management program

TH1.1. To structure systematic and continued bushland management, prepare a comprehensive management plan (in conjunction with Precincts) and develop a staged implementation programme.

Context: Manly has a rich diversity of natural landscapes protected in around 55 hectares of bushland reserves. Nearly 90% of Manly's natural environment has been degraded to some extent due to human activities.

The Local Government Act 1993 requires that all Councils establish Plans of Management for their Parks and Reserves. The management of bushland areas within Manly are covered by a number of plans and programs. Plans of Management that cover bushland areas have the objectives of ensuring the ongoing ecological viability and biodiversity of the land, protection of aesthetic and scientific values, restoration of degraded bushland and to protect landforms and bushland as a natural stabiliser of the soil surface. Whilst these plans and programs satisfy the requirements of the Local Government Act 1993 (as amended), there is merit in preparing a Bushland Management Plan for Manly to encompass all the bushland areas.

A Bushland Management Plan would focus on preserving and regenerating Manly's bushland areas. The Plan would detail the staging, appropriate techniques and methodology for implementation of bushland restoration, various site specific Plans of Management, Threatened Species Conservation Act 1995 and the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999.

Actions: The preparation of a Bushland Management Plan would be undertaken by Council's Bushland Management staff in consultation with the various volunteer bush care groups and the community. The plan should address regular regeneration, weeding, view maintenance, bushfire management and storm water runoff issues. The aims and objectives of the plan would be to:

- manage bushland for its aesthetic, recreational, educational and scientific value to the community, and to maximise these values as part of Manly's natural heritage
- manage bushland in a way that maintains biodiversity of native species in the long term
- fulfil Council's responsibilities under other community and Government plans and programs, NSW legislation.

Advantages: Provides a holistic approach to bushland management of the area. The report will provide more structured and prioritized actions considering all options.

Disadvantages: Plan preparation is time consuming and costly. Value of the Plan is lost if not implemented readily.

Objectives addressed: AH2, TH1, TH2, TH3 and HC1

Addressing actions under Manly Council's MSS 2006: C1.5.6 – implement recommendations of the Manly flora & Fauna Study

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Addressing SMCMA catchment targets: CTB1 – extent and condition of terrestrial native vegetation is improved; CTB4 - terrestrial threatened species are better conserved; CTB5 – impact of terrestrial invasive species is reduced

Addressing NRC targets (State Plan 2006): 1 – increase in native vegetation extent; 3 – recovery of ecological communities

Performance Target: Bushland Management Plan prepared

Indicative Cost: \$40,000

Time Frame: Within 3-4 years

Responsible Agency: Manly Council- Bushlands, Parks & Reserves

Priority: Medium

TH1.2. Prepare site specific management plans for Nolan Bush and West Esplanade Park, the two SEPP 19 bushlands, to fulfill statutory requirement.

Context: The general aim of SEPP No. 19 – Bushland in Urban Areas is to protect and preserve bushland within the Greater Sydney area. It requires that bushland not be disturbed without the consent of Council. The SEPP also identifies the need to prepare management plans for SEPP 19 Bushland areas. This Policy is integrated into Council's Development Application process. The following two reserves within the study area have State Environmental Planning Policy No.19 (SEPP 19) status:

- Nolan Bush (3.00 ha)
- West Esplanade Park (4.71 ha)

Action: The option involves preparation of site specific management plans for these bushland parcels.

Advantages: Statutory requirement is fulfilled. These bushland will be subjected to planned and structured management.

Disadvantages:

Objectives addressed: AH2, TH1, TH2, TH3 and HC1

Addressing actions under Manly Council's MSS 2006: C1.5.6 – implement recommendations of the Manly flora & Fauna Study

Addressing SMCMA catchment targets: CTB1 – extent and condition of terrestrial native vegetation is improved; CTB4 - terrestrial threatened species are better conserved; CTB5 – impact of terrestrial invasive species is reduced

Addressing NRC targets (State Plan 2006): 1 – increase in native vegetation extent

Performance Target: Site specific Management Plans prepared

Indicative Cost: \$20,000

Time Frame: Within 2 years

Responsible Agency: Manly Council – Parks & Reserves, Bushlands

Priority: Medium

TH1.3. Initiate processes to obtain SEPP 19 status for Heathcliff Reserve.

Context: Skelton et.al. (2004) classified part of Heathcliff Reserve (0.37ha) within the study area that meets the definition of SEPP 19 status and recommended formalisation of its approval.

The general aim of SEPP No. 19 – Bushland in Urban Areas is to protect and preserve bushland within the Greater Sydney area.

Action: The option involves Council seeking SEPP 19 status for the bushland parcels.

Advantages: SEPP19 status will ensure this important bushland parcel is provided with legislative protection.

Disadvantages: Attention has to be diverted from other bushland areas

Objectives addressed: AH2, TH1 and TH2

Addressing actions under Manly Council's MSS 2006: C1.5.6 – implement recommendations of the Manly flora & Fauna Study

Addressing SMCMA catchment targets: CTB1 – extent and condition of terrestrial native vegetation is improved; CTB4 - terrestrial threatened species are better conserved; CTB5 – impact of terrestrial invasive species is reduced

Addressing NRC targets (State Plan 2006): 1 – increase in native vegetation extent

Performance Target: SEPP19 status obtained

Indicative Cost: Staff time

Time Frame: Immediate

Responsible Agency: Manly Council – Parks & Reserves

Priority: Medium

TH1.4 Prepare and implement Walkway Landscape Masterplan - Federation Point to Lauderdale

Context: Fairlight Precinct did a detailed (GPS) survey of the bush from Federation Point to Bolingbroke 3 years ago. Precinct is updating the survey Fairlight Precinct has adopted "Greening Fairlight" as its theme for 2009-10 Precinct projects.

Action: The option involves preparation of site specific management plans considering, among others:

1. Possibility of a bush garden with zig zag path (eg for kids) at bottom of Margaret St
2. Use of low plantings along some walls to reduce graffiti & improve look
3. Shade trees at Fairlight Beach
4. Re-locate some of the rubbish bins at Fairlight Beach
5. Some additional tree planting on landward side of Walkway
6. The possibility of play equipment (or some playful things) & maybe even one or more sculptures

Involvement of relevant Precincts will be solicited

Advantages: Provides a holistic approach to bushland management of the area. The report will provide more structured and prioritized actions considering all options.

Disadvantages:

Objectives addressed: AH2, TH1, TH2, TH3 and HC1

Addressing actions under Manly Council's MSS 2006: C1.5.6 – implement recommendations of the Manly flora & Fauna Study

Addressing SMCMA catchment targets: CTB1 – extent and condition of terrestrial native vegetation is improved; CTB4 - terrestrial threatened species are better conserved; CTB5 – impact of terrestrial invasive species is reduced

Addressing NRC targets (State Plan 2006): 1 – increase in native vegetation extent

Performance Target: Site specific Management Plans prepared

Indicative Cost: \$20,000

Time Frame: Within 2 years

Responsible Agency: Manly Council – Parks & Reserves, Bushlands

Priority: Medium

Objective

TH 2 Undertake systematic program to reduce weed cover in open spaces, reserves and bushland

TH2.1. Continue enhanced weeding program at high weed density areas on a priority basis.

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Context: There are 139 weed species recorded within the study area. These species have reached bushland areas by escaping from gardens, illegal dumping of garden refuses, dispersion by fauna (e.g. - birds eating seeds) and illegal plantings. The largest area of high density weeds used to be in western portion of West Esplanade Park but a lot of bush regeneration activities are already happening in the area. Weed management will involve seasonally prioritised strategies.

Actions:

- Prioritise high weed density areas for immediate attention.
- Control weeds using appropriate bush regeneration methods to minimise disturbance to the environment.
- Take steps to prevent dispersal of weeds
- Follow Weed Management Strategy 2007-11 for Sydney Metropolitan CMA.

Advantages: Contributes in healthy native vegetation

Disadvantages: Labour intensive, must ensure sufficient maintenance

Objectives addressed: TH2 and TH3

Addressing actions under Manly Council's MSS 2006: C1.5.10 – implement weed control; C1.6.1 – implement Weed Management Strategy;

Addressing SMCMA catchment targets: CTB1 – extent and condition of of terrestrial native vegetation is improved; CTB5 – impact of terrestrial invasive species is reduced

Addressing NRC targets (State Plan 2006): 4 – reduction in the impact of invasive species

Performance Target: Weed density lowered

Indicative Cost: \$10,000 per year

Time Frame: On-going

Responsible Agency: Manly Council – Bushlands

Priority: Medium

TH2.2. Investigate sources of nutrient-rich discharges at stormwater outlets located in bushland and implement appropriate control measures.

Context: Impact of high nutrient stormwater on Manly Bushland Reserves was investigated (Skelton et al. 2002). High nutrient loads were found to occur at 5 of 19 sites located within the study area. The source of nutrients was not investigated but possible causes include sewage leaks, incorrect use of lawn and garden fertilizer and disposal of dog faeces down the drain.

Actions:

- Inspect all sites and record any observable sources of contamination
- Investigate leakage by CCTV, dye testing or other measures
- Implement appropriate control measures at sources
- Liaise with Sydney Water to minimize sewage leaks & illegal connections within the study area.

Objectives addressed: TH2

Addressing actions under Manly Council's MSS 2006: C1.6.4 – address areas where stormwater causing significant damage to native vegetation

Addressing SMCMA catchment targets: CTB1 – extent and condition of of terrestrial native vegetation is improved; CTB5 – impact of terrestrial invasive species is reduced

Performance Target: Control measures implemented, water quality improved

Indicative Cost: \$40,000

Time Frame: Within 3-4 years

Responsible Agency: Manly Council- Bushlands, Natural Resources

Priority: Medium

Objective**TH 3 Encourage and establish community participation in bush regeneration program and in native plants on public and private lands****TH3.1. Continue Community Bush Care Volunteers program in the study area.**

Context: The Manly Council Bushcare Programme encourages the community to get involved in the protection and restoration of precious urban bushland. Bushcare groups work each week in a variety of bushland areas. During 2007-08, there were 11 active groups, involving 66 registered bushcare volunteers providing 528 volunteer hours.

Bushcare activities include

- encouraging natural bushland regeneration by removing weeds
- native plant and weed species identification
- recreating bushland by planting native species
- erosion control and mulching
- recreating habitat.

Council supports the bush care programme by providing qualified supervisors, tools and gloves to use on site, plants and mulch as needed along with additional support.

Action: The option involves continuation of the program encouraging wider community participation.

Objectives addressed: AH1, TH2 and TH3

Addressing actions under Manly Council's MSS 2006: C1.2.6 – residents involvement in voluntary ranger program

Addressing SMCMA catchment targets: CTB1 – extent and condition of of terrestrial native vegetation is improved; CTC1 – communities engaged in improved natural resource management; CTC4 – community recognising the contribution of healthy natural resources

Addressing NRC targets (State Plan 2006): 1 – improvement in native vegetation condition; 4 – reduction in the impact of invasive species

Performance Target: Program supported & continued with increased volunteer participation

Indicative Cost: \$10,000 per year

Time Frame: On-going

Responsible Agency: Manly Council- Bushlands

Priority: High

TH3.2 Continue Council's Street Tree Planting Programme within the study area and initiate assessment of the programme.

Context: Manly Council's policy is to maintain the attractiveness, appeal and amenity of the area by preserving healthy trees in recognition of the value and importance of trees held by the community. Trees play an important part in maintaining the health of our environment, they help to protect soil and water supplies, provide shade, provide habitat, food, shelter and protection for wildlife. Trees in urban areas act as extensions of and links between core bushland, also known as bushland corridors.

Consider not to use *Cyprus* spp. as they grow too tall. Always replace any tree with native trees.

The Manly Council Tree Preservation Order 2001 applies to all trees in the Manly LGA. It is illegal to remove or prune any trees on public land, parks, bushland reserves or foreshore areas.

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Consider reviewing the landscape section of the 1986 Manly Heritage Study for background into any culturally significant tree plantings in the area; and conserve and enhance any existing listed street tree plantings.

Actions:

- *Review the present programme of tree plantation*
- *Develop a comprehensive list of site specific recommended and appropriate trees*
- *Accommodate view eminence by selecting suitable plant type. Consider not to use *Cyprus* spp.*

Objectives addressed: TH3

Addressing actions under Manly Council's MSS 2006: C1.6.17 – actively police breaches of Tree Preservation Order

Addressing SMCMA catchment targets: CTB1 – extent and condition of of terrestrial native vegetation is improved; CTB2 – increase in the connectivity of terrestrial native vegetation

Addressing NRC targets (State Plan 2006): 1 – improvement in native vegetation condition

Performance Target: *Recommended list prepared & program continued*

Indicative Cost: *\$10,000 per year*

Time Frame: *On-going*

Responsible Agency: *Manly Council-Parks & Reserves*

Priority: *Medium*

NORTH HARBOUR COASTLINE MANAGEMENT PLAN

4.3 OPTIONS ADDRESSING UPGRADING & ENHANCEMENT OF PUBLIC FACILITIES

Infrastructure provision, more specifically social infrastructure provision is important to people. The presence of these kinds of infrastructure has a direct impact on living conditions, health and potential for economic development. Social infrastructure is usually considered as services, such as health care facilities, public toilets, schools, neighbourhood centres, parks, and opens space but also includes access to a variety of community services

Goal

Public facilities are upgraded and maintained to facilitate improved social amenity

A total of 10 management options are proposed addressing four different objectives. Of these, three have been rated as of high and seven as medium priority management options. No option is proposed for immediate implementation. Six of the management options are on-going activities.

Objectives	Strategic Management Options	Implementation timeframe*	Priority	
			Individual	Overall
PF 1 Facilitate improvements to general amenities, traffic and safety within foreshore areas, public reserves and beaches	PF1.1. Enhance general amenities for public use	On-going	H3,M3,L1	Medium
	PF1.2 Improve and facilitate traffic management around public reserves and beaches	On-going	M5,L2	Medium
	PF1.3 Audit and remove unused watercrafts stored on foreshores within the study area with provision of dinghy and kayak storage facility in future.	Within 2 years	H3,L2	Medium
	PF1.4 Organise facilities for Scuba divers near Fairlight pool.	Within 2 years	M3,L2	Medium
PF2 Ensure safe accessibility to public places including provision of disabled access	PF2.1 Construct paved footpath on Lower Beach Street from Condamine Street towards the shore	Within 5 th year	H3,M1,L3	Medium
	PF2.2 Audit disability access of all parks and bays within the study area.	Within 2 years	H3,M3,L1	Medium
PF3 Facilitate dog walking with better provisions	PF3.1 Install adequate dog faeces bins, water bowl and bag dispensers.	On-going	H3,M2,L2	Medium
PF4 Support sustainable recreational fishing	PF4.1 Support continuation of ban on commercial fishing.	On-going	H6,L1	High
	PF4.2 Encourage relevant agencies to continue to monitor Dioxin levels in Sydney Harbour waters.	On-going	H6,L1	High
	PF4.3 Facilitate recreational fishing and work with NSW DPI to educate community about rules and regulations applying to recreational fisher (bag limits, size limits and species types) through NSW Fishcare Program.	On-going	H4,M3	High

*After adoption of the CMP

DETAILS OF MANAGEMENT OPTIONS**Objective**

PF 1 Facilitate improvements to general amenities, traffic and safety within foreshore areas, public reserves and beaches

PF1.1. Enhance general amenities for public use

Context: North Harbour Reserve and other reserves near beaches are popular places for both local and visiting families. It is important that general amenities are not only maintained but also enhanced and upgraded. Public toilets are priority among facilities. There are four public toilets well spread throughout the study area. According to Fairlight Precinct, toilet / shower facilities at Fairlight Beach are poor. Telephone booths are important for general and emergency use. None exists near the North Harbour Reserve [In fact, Telstra is removing three of five phone booths located within or near the study area after April 2009]. Lights are also upgraded in reserves. Improved lighting is needed on Manly Scenic Walkway especially on Fairlight to Manly and further west.

Actions: The option involves auditing of existing public facilities, and in consultation with Precincts, encourages relevant agencies to establish additional toilet, telephone and street light facilities.

Objectives addressed: PF1 and PF2

Addressing actions under Manly Council's MSS 2006: D1.5.2 – ensure liveable neighbourhoods

Performance Target: Facilities enhanced

Indicative Cost: \$75,000

Time Frame: On-going

Responsible Agency: Manly Council – Urban Services, Waste

Priority: Medium

PF1.2 Improve and facilitate traffic management around public reserves and beaches

Context: According to community consultation, traffic management is an important issue to residents. Traffic needs to be slowed down on Condamine Street for safety of kids. Traffic restrictions on Condamine Street adjacent to NH Reserve, Bolingbroke Parade & Fairlight Crescent are not effective at present. 2-hour parking permits are not monitored routinely.

Actions:

- Enforcement of 2-hour parking in residential area
- Lower speed limits on Condamine Street for safety of kids
- Investigate installation of speed humps in Fairlight Crescent to avoid fatal accidents from speeding vehicles.
- Investigate possible preferable arrangement of shared zone or one-way flow of traffic through Lower Beach Street and North Harbour Street

Objectives addressed: PF1 and PF2

Addressing actions under Manly Council's MSS 2006: B1.4.4 – Access to all recreational facilities

Performance Target: Improved traffic management

Indicative Cost: \$15,000

Time Frame: On-going

Responsible Agency: Manly Council – Traffic, RTA, Risk Manager

Priority: Medium

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PF1.3 Audit and remove unused water crafts stored on foreshores within the study area with provision of dinghy and kayak storage facility in future.

Context: Historically dinghies have been stored along the foreshore of Wellings Reserve and North Harbour Bay. The extensive number and random storage of dinghies and other boats impact on the aesthetic and environmental quality of the area. Dinghies have been found to damage tree bark at places, Aboriginal midden sites have been affected.



Many of the stored dinghies and kayaks are abandoned and/or rarely used. Initiate an audit and remove all unused water crafts. Consider safe storage of used and active boats. Installation of horizontal dinghy storage is proposed for safety, park maintenance and liability reasons. In determining dinghy storage arrangements in the area, Council has already provided dinghy storage facilities at nearby Forty Baskets Reserve. This option should be explored in light of the space limitations within the reserve areas. Similar to Council facilitated formal dinghy storage facilities at Little Manly and Forty Baskets, new storage is also subject to registration and 'boat storage fee' charged per annum.

Actions:

- Conduct an audit of the dinghies in the area. Remove unused dinghies and kayaks after notification to possible owners.
- Seek community and Precinct feedback
- Introduce a dinghy registration/licensing system to establish improved storage.
- Regulate dinghy storage to ensure vessels are consolidated into identified dinghy storage facility
- Based on 'active dinghies' in the area, investigate appropriate design and location for dinghy and kayak storage facilities within or near the North Harbour Reserve including area near Davis Marina.
- Investigate options to improve water access for dinghy and kayak users

Advantages: This will bring in facilities in line with other foreshore areas. This will also increase visual amenity and reduce potential for public liability claims.

Disadvantages: -

Objectives addressed: PF1

Performance Target: Foreshore cleared of unused boats and storage rack installed

Indicative Cost: \$11,000

Time Frame: Within 2 years

Responsible Agency: Manly Council – Urban Services, Design & Technical Group, NR

Priority: Medium

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PF1.4 Organise facilities for Scuba divers near Fairlight pool.

Context: Among many attractive sites around Sydney, Fairlight boasts a diversity of sea life including fish, invertebrates, algae. Scuba divers visit the site regularly. The entry point is off an exposed rock platform (low tide) - they swim approx 50 metres to the drop off which runs parallel to the shore. Here one will find small overhangs, small boulders & caves. The depth ranges to a depth of about 6 metres and is an excellent night dive. However, there is no diving preparatory deck or table (as in Shelly Beach). Hence, the divers use the grassy reserve to the north west of the pool. Uncontrolled storage of dive equipments impacts on enjoyment and use of the site.

Actions:

- Install divers coralling platforms (low-level table) for preparation prior to diving. Position carefully with salt-tolerant grass around.
- Install a beach shower

Advantages: This will bring in facilities in line with facilities provided at Shelley Beach.

Disadvantages: Loss of grassed area



Objectives addressed: PF1

Performance Target: Table installed

Indicative Cost: \$8,000

Time Frame: Within 2 years

Responsible Agency: Manly Council – Urban Services, Design & Technical Group

Priority: Medium

Objective

PF2 Ensure safe accessibility to public places including provision of disabled access

PF2.1 Construct paved footpath on Lower Beach Street from Condamine Street towards the shore

Context: North Harbour Reserve borders Condamine Street and Lower Beach Street. Condamine Street is one of the more heavily used roads in Manly and connects important landmarks such as North Harbour Reserve and Balgowlah Shopping Centre. Many people use footpaths for recreational walking or jogging. Parents with children go to schools. At present, there is a paved footpath which has been extended recently. There is a need to extend paved footpath on Lower Beach Street.

Actions:

- Investigate feasibility of constructing paved footpaths
- Consult with relevant Precincts
- Design and construct paved footpath.

Objectives addressed: PF1 and PF2

Addressing actions under Manly Council's MSS 2006: B1.4.4 – Access to all recreational facilities

Performance Target: Footpath designed and constructed

Indicative Cost: \$80,000

Time Frame: Within 5th year

Responsible Agency: Manly Council – Urban Services

Priority: Medium

PF2.2 Audit disability access of all parks and bays within the study area.

Context: People with disability identified problems with wheelchair access to theatres, libraries, parks, shops, doctors' surgeries and banks. They have identified the supply of accessible transport services including taxis for the disabled, transport for medical appointments in an emergency, and wheelchair friendly public transport as a high priority need for Manly residents.

An audit is required to plan improving facilities for persons with disabilities and seniors through the provision of enhanced infrastructure and facilities. This will allow them easy access to reserves and where possible to bays and water fronts. The need for an audit is in line with the federal Disability Discrimination Act 1992 and also Manly Council's Social Plan 2004.

Actions:

- Undertake Access Audit for popular parks and reserves including North Harbour, Heathcliff & Fairlight Beach reserve areas.
- Discuss the proposal with the Access Committee, Manly Council
- Implement disability access at these priority locations.

Objectives addressed: PF1 and PF2

Addressing actions under Manly Council's MSS 2006: B1.4.4 – Access to all recreational facilities

Performance Target: Audit completed

Indicative Cost: Staff time

Time Frame: Within 2 years

Responsible Agency: Manly Council – Planning & Strategy

Priority: Medium

Objective**PF3 Facilitate dog walking with better provisions****PF3.1 Install adequate dog faeces bins, water bowl and bag dispensers.**

Context: Dogs are valued part of community. However, dog faeces contribute to the pollution of estuary and bushland, as they are washed into the stormwater system after rain. Dog faeces are a source of nutrients and a potential source of pathogens.

Manly Council is participating in the DECCW supported Community Watch-dog Project to set up a system so dog owners could be responsible for their pets' waste and dispose of it thoughtfully. Councils recruited volunteers, many of whom were dog owners. Volunteers were trained to inform other pet owners about stormwater pollution from dog faeces and provide them with Pooch Pouches.

In addition, Manly Council has already made a number of dog faeces bins, water bowl and dog dispensers at key locations. These are not regarded as adequate.

Actions:

- run a systematic education program focussed on dog owners and water pollution
- Develop a Council's Code of Conduct for responsible dog management
- Install additional dog faeces bins, water bowls and bag dispensers
- Consider non-plastic or biodegradable bags.
- Schedule regular and frequent collections from these facilities
- Install regulatory signs advising dog owners of appropriate conduct and penalties associated with non-compliance through increased patrol.

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Objectives addressed: PF1 and PF3

Addressing actions under Manly Council's MSS 2006: B1.7.3 – Promotion of responsible pet ownership

Performance Target: Facilities established

Indicative Cost: \$20,000

Time Frame: On-going

Responsible Agency: Manly Council – Waste Services

Priority: Medium

Objective

PF4 Support sustainable recreational fishing

PF4.1 Support continuation of ban on commercial fishing.

Context: A ban has been placed on commercial fishing as a precautionary measure following the release of test results which revealed elevated levels of dioxins in fish and crustaceans across the Harbour, including Parramatta River and other connected tidal waterways. This fishing closure took effect on 10 February 2006 and to remain in effect until 9 Feb 2011, unless sooner amended or revoked.

Anecdotal reports indicate that fish species abundance and distribution in Sydney Harbour has increased since the ban.

Action: The option involves continuation of the ban.

Objectives addressed: AH4 and PF4

Addressing actions under Manly Council's MSS 2006: C1.2.14 – lobby to prohibit commercial fishing

Addressing NRC targets (State Plan 2006): 3 – recovery of threatened species, populations and ecological communities; 7 – no decline in the condition of marine waters and ecosystems

Addressing SMCMA catchment targets: CTB4 – aquatic threatened species are better conserved; CTECM2 – improvement in the condition of coastal and marine ecosystems

Performance Target: Ban maintained

Indicative Cost: Staff time

Time Frame: On-going

Responsible Agency: Manly Council – Natural Resources, I&I NSW, SCCG, SMCMA,

Priority: High

PF4.2 Encourage relevant agencies to continue to monitor Dioxin levels in Sydney Harbour waters.

Context: There are many agencies involved in addressing the issue of Dioxin level in Sydney Harbour waters. The Department of Environment, Climate Change and Water advises the Industry & Investment NSW on ecosystem contamination issues. The Industry & Investment NSW acts on advice from NSW Health and the NSW Food Authority on fish contamination issues. When advised by these agencies, the Industry & Investment NSW takes action by implementing fishing closures where appropriate, communicating health warnings where appropriate, and assisting these agencies with sampling of fish.

About 1200 fish have been tested in total as part of the comprehensive testing regime till December 2007 (Department of Food Authority 2007). Some good news for the State's anglers with several recreational fish species caught east of the Sydney Harbour Bridge found to be relatively free of dioxin. Unfortunately, the tests for commercial species such as Bream, Prawns and Squid are so high as to make it unlikely for commercial fishing to return to the Harbour in the foreseeable future.

Action: The option involves continuation of monitoring of dioxin levels.

Objectives addressed: PF4

Addressing NRC targets (State Plan 2006): 7 – no decline in the condition of marine waters and ecosystems

Addressing SMCMA catchment targets: CTW3 – measurable progress towards achieving the Water Quality & River Flow objectives; CTECM2 – improvement in the condition of coastal and marine ecosystems

Performance Target: Dioxin level monitored

Indicative Cost: Staff time

Time Frame: On-going

Responsible Agency: DECC, Department of Food Authority, I&I NSW, NSW Health, SMCMA

Priority: High

PF4.3 Facilitate recreational fishing and work with I&I NSW to educate community about rules and regulations applying to recreational fisher (bag limits, size limits and species types) through NSW Fishcare Program.

Context: Fishing is one of the most common recreational activity undertaken within the study area. A total of 17% of the NSW population participate in recreational fishing. This is almost 24% of the NSW male and 10% of female population. Almost half the State's recreational fishers lived in Sydney.

Various bag and size limits apply to recreational fishers for most common fish species. However, not everyone adheres to these regulations. A number of changes to size limits, bag limits and fishing methods were introduced in September 2007.

Actions: The option involves working with I&I NSW to improve recreational fishing practices through educational programs. Fish care Volunteers talk to anglers about fishing rules and responsible fishing and help in a range of activities, such as fishing clinics, catch surveys and community fishing events. Policing is an important component of facilitating recreational fishing.

Objectives addressed: PF4

Addressing actions under Manly Council's MSS 2006: C1.2.12 – police breaches of bag limits; C1.2.13 – foster behaviour change amongsts marine recreational users

Addressing SMCMA catchment targets: CTC1 – people and communities have increased capacity to engage in improved natural resource management; CTC4 – community recognising the contribution of healthy natural resources

Performance Target: Education program implemented

Indicative Cost: Staff time

Time Frame: On-going

Responsible Agency: I&I NSW and Manly Council – Community Environment Partnership

Priority: High

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4.4 OPTIONS ADDRESSING NORTH HARBOUR RESERVE IMPROVEMENT

North Harbour Reserve is an open harbour foreshore reserve situated on low lying reclaimed land to the east of North Harbour Bay. It has scenic harbour and marine views. The reserve is suitable for picnics, dog walking, exercise, and ball games. The Reserve is the centre piece of the study area and used extensively by residents and visitors.

A total of six management options are proposed addressing four different objectives. Of these, one has been rated as of high, four as medium and the remaining one as low priority management options. Two options are proposed for immediate implementation. None of the management options are on-going activities.

Goal

Enhance safe public use of North Harbour Reserve (NHR) while preserving natural environment and beauty of the Reserve

Objectives	Strategic Management Options	Implementation timeframe*	Priority	
			Individual	Overall
NR 1 Ascertain health safety issues from landfill and soil of NHR	NR1.1. Carry out necessary investigations to ascertain any health risk in soil and sediments at North Harbour Reserve.	Immediate	H3,M1,L3	Medium
NR 2 Initiate and implement a Masterplan for North Harbour Reserve	NR2.1 Prepare and implement a Landscape Masterplan for North Harbour Reserve, in consultation with Precincts and community.	Immediate	H4,M3	High
NR3 Assess irrigation options for North Harbour Reserve	NR3.1 Assess recycling of stormwater to irrigate North Harbour Reserve.	Within 2 years	H4,L3	Medium
NR4 Improve (including disable) access in and out of NHR	NR4.1 Widen and upgrade access paths leading to and within North Harbour Reserve.	Within 2 years	H1,M4,L2	Medium
	NR4.2 Locate and investigate suitability of graded wheel chair access	Within 2 years	H2,M2,L2	Medium
	NR4.3 Investigate provision of improved parking facility at North Harbour Reserve.	Within 2 years	M1,L5	Low

*After adoption of the CMP

DETAILS OF MANAGEMENT OPTIONS

Objective

NR 1 Ascertain health safety issues from landfill and soil of North Harbour Reserve

NR1.1. Carry out necessary investigations to ascertain any health risk in soil and sediments at North Harbour Reserve.

Context: During community consultation, people expressed concerns about the possible health risks from sand/soil near North Harbour waterfall and North Harbour Reserve in general. Accumulated sediment near upstream water fall is black/blue in colour and produces distinct odour.

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Further, according to Manly LEP (1988), Class 2 acid sulphate soil is located at North Harbour Reserve (NHR) and surrounds. Acid sulphate soils occur when soils containing naturally occurring iron sulphide are dried and exposed to the air, usually as a result of human activity. In air, iron sulphides are oxidised and sulphuric acid is produced. This sulphuric acid has the potential to leach into the surrounding environment, where it can affect the health of waterways, groundwater, aquatic and terrestrial plants and animals, and also causes damage to engineering structures. However, Skelton & White (2004) did not find any indication of acid sulphate soil from core samples of North Harbour Reserve and thereby risks from potential acid sulphate soil is minimised, if not eliminated.

Actions:

- Conduct sediment sampling and water testing immediately below waterfall.
- Take precautionary measures, if needed, based on test results.
- Alternatively, inform community to dispel concerns if no health risks exist.

Advantages: Improved protection of human and ecosystem health

Disadvantages: -

Objectives addressed:

Addressing NRC targets (State Plan 2006): 10 – improvement in soil condition

Addressing SMCMA catchment targets: CTLD1 – increase in the amount of land managed within its capability

Performance Target: Health risks assessed

Indicative Cost: \$5,000

Time Frame: Immediate

Responsible Agency: Manly Council-NR, P&S

Priority: Medium

Objective

NR 2 Initiate and implement a Masterplan for North Harbour Reserve

NR2.1 Prepare and implement a Landscape Masterplan for North Harbour Reserve, in consultation with Precincts and community.

Context: North Harbour Reserve is the central recreational spot of the study area and used extensively by residents and visitors. Improvements in North Harbour Reserve have been made, so far, on an ad hoc basis. With the increasing use of the Reserve, it has become necessary to prepare a detailed Landscape Masterplan.

The Masterplan should seek to distribute appropriately the various functions of the reserve and to maximise the opportunities presented by the foreshore setting and by the arrangement of the elements within it. Principles, to prepare the Masterplan, are:

- recognition of value of the existing open spaces and landscape;
- reinforcement of the existing native and indigenous planting and bushland;
- further establishment of safe, quiet and planted seating and picnic areas around the edges;
- recognition of existing play area with upgraded play equipments;
- consideration of noise issue
- measures for child safety as the Reserve is also a dog off-leash area; and
- emphasis of the historic past with signage and other interpretative and informative features.

This Masterplan should consider and analyse suggestions made during community consultation by different user groups. Among others, considerations should be given for:

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- Widening of footpath in front of rock revetment sea wall (implemented).
- A new walking trail around the Reserve or only on north and south sides of the reserve
- Removal of hedges located near Redlands house
- A dinghy and kayak storage facility with water access at suitable location within or near the North Harbour Reserve
- Exploring possibility of an extended observation deck on water front.
- Solar panel on already upgraded toilet block
- Addition and improvement of seating, BBQ, recycling bins and other facilities
- Formalisation of the important pedestrian entrance and exit (including disabled access and use of prams) from King Ave., north and south sides of Beach Street and Condamine Street;
- Improvement of parking spaces across Condamine St opposite the kerb ramp access point.

Mr. Simon Vaughan, a resident of the area, through the North Harbour Precinct has presented a conceptual sketch plan identifying scopes for improvement of the Reserve. This will be considered during Masterplan preparation.

Actions:

- Commission a Landscape Masterplan preparation of North Harbour Reserve including site survey
- Consider a sketch plan provided by Mr. Simon Vaughan, a resident of the area during landscape preparation.
- Consult Precincts and community after plan preparation through public exhibition of the Plan.
- Implement the adopted Masterplan gradually.

Advantages: A planned improvement of North Harbour Reserve will satisfy user needs

Disadvantages: -

Objectives addressed:

Addressing actions under Manly Council's MSS 2006: B1.4.2 walking trails in open spaces; B1.4.4 – Access to all recreational facilities

Addressing SMCMA catchment targets: CTLD1 – increase in the amount of land managed within its capability

Performance Target: Masterplan prepared, adopted and implemented

Indicative Cost: \$20,000 for masterplan only

Time Frame: Immediate

Responsible Agency: Manly Council-NR, Parks & Reserve, Urban Services

Priority: High

Objective

NR3 Assess irrigation options for North Harbour Reserve

NR3.1 Assess recycling of stormwater to irrigate North Harbour Reserve.

Context: North Harbour Reserve has an irrigation system but unfortunately with water restrictions, the system has not been used since they were introduced. In the current water shortage in Sydney, Manly Council is turning to alternative water supplies, such as stormwater, to maintain public parks and reserves.

There are two possibilities. Creek water from Clarence Street (near wooden bridge) can be diverted to irrigate North Harbour Reserve. Alternatively, stormwater can be diverted from Jackson Street Drainage Reserve.

Actions:

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- Assess stormwater recycling options and their feasibility
- Utilise current best practice technologies
- Compare cost benefit from both sources
- If found feasible, prepare detailed engineering design
- Implement, if found acceptable and economical.

Advantages: Efficient use of stormwater

Disadvantages: Huge investment cost; cannot be implemented if funding is not secured.

Objectives addressed:

Addressing actions under Manly Council's MSS 2006: C1.1.3 – address stormwater quality and quantity issues by identifying reuse and infiltration opportunities

Performance Target: stormwater recycled

Indicative Cost: \$20,000

Time Frame: Within 2 years

Responsible Agency: Manly Council – Natural Resources, Parks & Reserves & Urban Services

Priority: Medium

Objective

NR4 Improve (including disabled) access in and out of NHR

NR4.1 Widen and upgrade access paths leading to and within North Harbour Reserve.

Context: Access to North Harbour Reserve is via four possible routes. All these accesses are narrow and pose risk to pedestrians. Of the four access ways, only limited disabled access is provided from footpath on Condamine Street. People with prams usually use access from the corner of Beach Street and Condamine Street, beside the toilet block via a narrow concrete walkway that goes directly to children's playground.

It is recommended that these access ways are widened to meet required standards and improve user safety and aesthetics.

Actions:

- Assess present condition of all four access paths
- Design wider paths with railings
- Implement designed wider access paths.

Advantages: Access to and from North Harbour Reserve is improved to enhance user safety

Disadvantages: cost prohibitive

Objectives addressed:

Addressing actions under Manly Council's MSS 2006: B1.4.4 – Access to all recreational facilities

Performance Target: Access paths widened

Indicative Cost: \$80,000

Time Frame: Within 2 years

Responsible Agency: Manly Council-Urban Services

Priority: Medium

NR4.2 Locate and investigate suitability of graded wheel chair access.

Context: Access in or out of North Harbour Reserve is via four possible routes. Of the four access ways, only limited disabled and aged access is provided from kerbside on Condamine Street. This limits the use of the Reserve by elderly and disabled. Wider graded disabled access paths can be constructed either through Burton's bushland on northern side of the Reserve from King Avenue or from

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southern side from Beach Street near toilet blocks. Disabled access via Burtons Bush could be problematic due to impact on bushland. Beach Street is near to parking lot and apparently appears to be more suitable.

Actions:

- Compare advantages of two alternative locations and discuss with Precincts
- Design a graded wheel chair access
- Implement designed wheel chair access.

Advantages: Access to and from North Harbour Reserve is facilitated

Disadvantages: -

Objectives addressed:

Addressing actions under Manly Council's MSS 2006: B1.4.4 – Access to all recreational facilities

Performance Target: Wheel chair access assessed

Indicative Cost: Staff time

Time Frame: Within 2 years

Responsible Agency: Manly Council-Urban Services

Priority: Medium

NR4.3 Investigate provision of improved parking facility at North Harbour Reserve.

Context: Community consultation identified that traffic management is an important issue to residents. The current parking situation deteriorates over weekends around North Harbour Reserve. At present, cars are parked in a haphazard manner at an open space (Crown land) on opposite side of Condamine Street. A marked parking would accommodate more cars in a systematic fashion.

Actions:

- Landscape the area for a car park
- Make provisions for vehicle movement and parked cars

Objectives addressed:

Addressing actions under Manly Council's MSS 2006: B1.4.4 – Access to all recreational facilities

Performance Target: Improved parking facility

Indicative Cost: Staff time

Time Frame: Within 2 years

Responsible Agency: Manly Council – Traffic, Urban Services

Priority: Low



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4.5 OPTIONS ADDRESSING HAZARDS & CLIMATE CHANGE

As identified in the Davis Marina to Manly Point Hazard Definition Study, North Harbour study area is subjected to a number of hazards including beach erosion, shoreline recession, sand drift, inundation, stormwater erosion and slope & cliff instability. A number of sites have been identified as exhibiting potential risks.

Climate change is likely to have significant impacts on the region including the study area. Since 1950, Sydney region has experienced warming of around 0.8°C. The region has also experienced a significant drop in annual rainfall at a rate of approximately 55 mm per decade.

Goal
Assess, minimize and mitigate risks from coastal hazards and climate change

Manly Council possesses a moderate degree of vulnerability to climate change relative to other Councils within the SCCG Region. However, due to its coastlines and coastal development, vulnerability to sea-level rise and coastal hazards was assessed to be particularly high. The vulnerability of the coastline and the paucity of natural landscapes suggest the Councils' natural ecosystems have a low resilience to the effects of climate change.

A total of 12 management options are proposed addressing four different objectives. Of these, two have been rated as of high and 10 as medium priority management options. No option is proposed for immediate implementation. Four management options are already on-going activity of the Council.

It should be mentioned that many of the proposed management options and related actions will eventually be guided by Council's proposed *Climate Change Risk Assessment and Adaptation Action Plan* (being drafted) and the Council's proposed Carbon Neutral Plan (yet to be drafted).

Objectives	Strategic Management Options	Implementation timeframe*	Priority	
			Individual	Overall
HR 1 Reduce to an acceptable level, the risk to property and risk to life as a result of slope and cliff instability identified in the Coastline Hazard Definition Study.	HR1.1. For hazards that are located on private property, owners are contacted, reminded of the identified hazards and recommended to undertake inspections and stabilization works where required.	Within 2 years	H2M1L3	Medium
	HR2.1. Monitor shoreline changes of Fairlight Beach and damage, if any, of foreshore structures	Within 2 years	H2M1L3	Medium
	HR2.2. Ensure future development of Fairlight Beach is compatible with erosion and recession hazards including impacts of climate change	Within 4 years	H2M2L1	Medium
	HR2.3. Ensure any protective works minimise impact on beach amenity and access, and where practical improve existing amenity and access	On-going	H2M2L2	Medium
	HR2.4. Encourage DECCW to carry out photogrammetric analysis periodically or after major storm events.	As needed	H2M1L3	Medium

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Objectives	Strategic Management Options	Implementation timeframe*	Priority	
			Individual	Overall
HR3. Protect properties and assets from the impacts of sea level rise	HR3.1 Assess specific impacts of sea level rise on North Harbour Reserve and devise adaptive measures.	Within 2 years	H2M1L3	Medium
	HR3.2 Assess impact of climate change on areas of ecological significance and devise adaptive measures.	Within 2 years	H2M1L3	Medium
	HR3.3 Work with Sydney Coastal Councils Group to develop regional/ local level climate change model considering protection provided by existing seawalls and rocky foreshores.	On-going	H2M1L3	Medium
	HR3.4 Promote environmentally- friendly sea walls while upgrading existing seawalls or constructing new seawalls.	Within 2 years	-	Medium
HR4. In consultation with Community Precinct Forums, undertake adaptation and mitigation measures in relation to climate change impacts	HR4.1 Continue with on-going climate change mitigation and adaptation measures	On-going	H3M1L1	High
	HR4.2 Collect and collate new information and knowledge on climate change impacts relevant to the study area/ Manly LGA.	Within 2 years	H2M2L2	Medium
	HR4.3 Inform and involve community through Precincts about known impacts of climate change on the study area.	Within 2 years	H4M2	High

*After adoption of the CMP

DETAILS OF MANAGEMENT OPTIONS

Objective

HR 1 Reduce to an acceptable level, the risk to property and risk to life as a result of slope and cliff instability identified in the Coastline Hazard Definition Study

HR1.1. For hazards that are located on private property, owners are contacted, reminded of the identified hazards and recommended to undertake inspections and stabilization works where required.

Context: A total of 14 potential risk sites have been identified. Of these, five sites, three on public and two on private lands, poses risks to life. Manly Council has already undertaken remediation works on all three public sites. The remaining two sites, sites 14 and 19 are located on private property and have risks to property and life.

Actions:

- Contact owners
- Detailed geotechnical inspection of piers and rear yards (for item 14) and concrete walls (item 19).
- Stabilization works may comprise concrete or masonry piers (for item 14) and wall reconstruction (item 19).

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Objectives addressed: HR1 and HR3

Addressing actions under Manly Council's MSS 2006: C1.3.10 – mitigate risk posed by individual hazards

Performance Target: Stabilization works completed

Indicative Cost: staff time

Time Frame: On-going

Responsible Agency: Property owners

Priority: Medium

Objective

HR 2 Reduce to an acceptable level, the risk of damage as a result of beach erosion and shoreline recession.

HR2.1. Monitor shoreline changes of Fairlight Beach and damage, if any, of foreshore structures

Context: Fairlight Beach underwent slight recession over the period 1965 to 1998. This was possibly due to a loss of sand offshore during severe storms which did not fully return to the beach in calmer swell periods.

The total loss of sand from Fairlight Beach between 1965 and 1998 was 3.2 m³/m. Therefore a total volume of some 130 m³ of sand was eroded from Fairlight Beach between 1965 and 1998 or about 0.1 m³/m per year. If the average height of sand on the back beach is taken to be about 2.2 m AHD, this would correspond to a landward shoreline movement of about 0.04 m/year.

Actions:

- Develop and implement a natural shoreline and shoreline structure monitoring program for Fairlight beach
- Revise the assessment of coastline hazards as required based on the findings of monitoring program
- Consider beach nourishment to restore the volume of sand so that the seawall would not be damaged
- Should the risk of damage to the existing seawall in the future become unacceptable, repair/reconstruct the seawall or seawall stabilization works to prevent damage

Objectives addressed: HR2 and HR3

Addressing actions under Manly Council's MSS 2006: C1.3.10 – mitigate risk posed by individual hazards

Addressing SMCMA catchment targets: CTC5 – adaptive and mitigating strategies for climate change impacts on natural resource values

Performance Target: Monitoring program initiated

Indicative Cost: staff time

Time Frame: Within 2 years

Responsible Agency: Manly Council (NR)

Priority: Medium

HR2.2. Ensure future development of Fairlight Beach is compatible with erosion and recession hazards including impacts of climate change

Context: Fairlight is one of the popular local beaches. Fairlight beach underwent slight recession over the period 1965 to 1998. This was possibly due to a loss of sand offshore during severe storms. This requires that future development of the beach accommodates safety from these hazards.

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Actions:

- Control new development so that it is appropriately sited and is not adversely affected by the erosion and recession hazard over a suitable planning time frame (minimum 50 years)
- Ensure any redevelopment and public facilities are compatible with the erosion and recession hazard and do not adversely affect coastal processes
- Develop design guidelines for any structures located within areas subject to coastline hazards and climate change which address matters such as, siting, foundation design and materials.

Objectives addressed: HR2 and HR3

Addressing SMCMA catchment targets: CTC5 – adaptive and mitigating strategies for climate change impacts on natural resource values

Addressing actions under Manly Council's MSS 2006: C1.3.10 – mitigate risk posed by individual hazards

Performance Target: Erosion, recession hazards taken into account prior to any works

Indicative Cost: Staff time

Time Frame: Within 3-4 years

Responsible Agency: Manly Council - NR

Priority: Medium

HR2.3. Ensure any protective works minimise impact on beach amenity and access, and where practical improve existing amenity and access

Context: The current width of Fairlight beach, measured at mean sea level, is approximately 15 m. This beach has shown a recession rate of about 0.04 m/yr which would mean that the beach would reduce in width by 0.8 to 2 m over a period of 20 to 50 years respectively. Hence, all protective works should at least maintain existing amenities and access.

Actions:

- Design any future stabilization works or new seawall at Fairlight beach to minimise impact on coastal processes, minimise impact on beach amenity and access, and where practical improve existing amenity and access and takes into account impacts of climate change
- Ensure any new seawall is as landward as practicable
- Ensure any stabilization works involve the minimum encroachment on the beach and/or rock platform in front of the seawall
- Consider inclusion of steps and/or access ramp, and seating, in the design of any new seawall
- Consider use of coloured concrete for any new seawall to match the colour of the beach sand or rock platform.
- Procure required State Govt. or other approvals for any works.

Objectives addressed: HR2 and HR3

Addressing actions under Manly Council's MSS 2006: C1.3.10 – mitigate risk posed by individual hazards

Performance Target: Designs made

Indicative Cost: Staff time

Time Frame: On-going

Responsible Agency: Manly Council – Design & Urban Services

Priority: Medium

HR2.4. Encourage DECCW to carry out photogrammetric analysis periodically or after major storm events.

Context: Photogrammetry is the practice of obtaining information about physical objects through the process of recording, measuring, and interpreting photographic images. Photogrammetric measurements of erosion or accretion of Fairlight & Delwood beaches were done with relatively short

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period of the historical data and may have affected the result. It is proposed that routine data are collected at different points covering the entire LGA. Flights should be undertaken annually and close to the same dates and tidal conditions to allow easy comparison. Clear weather and good light are required for best results. Tide levels should be below mean low water to allow important process information to be derived for the beach.

Actions:

- Encourage DECCW to take out routine photographic images
- Analyse these images every 4-5 years or immediately after major storm events to monitor trend in changes in beach profiles.
- Use results to undertake mitigation measures

Objectives addressed: HR2

Addressing actions under Manly Council's MSS 2006: C1.3.6 – continue beach profile monitoring program

Performance Target: Photographic images collected

Indicative Cost: Staff time

Time Frame: As needed

Responsible Agency: DECCW, Manly Council – GIS

Priority: Medium

Objective

HR3. Protect properties and assets from the impacts of sea level rise

HR3.1 Assess specific impacts of sea level rise on North Harbour Reserve and devise adaptive measures.

Context: Cardno (2008) has made an assessment of the likely effects of climate change. A preliminary mapping has been prepared using Digital Elevation Model (DEM) to provide a broad indication of the likely spatial effects of climate change. North Harbour Reserve and its surrounds are likely to be affected by sea level rise.

North Harbour Reserve and surrounds are also likely to be inundated with 100 year flooding. This together with 30% increase in rainfall and sea level rise will exacerbate the situation further.

Actions:

- Assess specific impacts of sea level rise to identify risk to public and private properties and infrastructure
- Develop possible mitigation and adaptation measures.
- Consider raising the bed level of Condamine Street as protective wall against projected sea level rise
- Maintain and upgrade sea walls. Consider environment friendly seawalls while upgrading.

Objectives addressed: HR3 and HR4

Addressing actions under Manly Council's MSS 2006: C1.3.8 – incorporate climate change and sea level rise into management decisions

Addressing SMCMA catchment targets: CTC5 – adaptive and mitigating strategies for climate change impacts on natural resource values

Performance Target: Mitigation and adaptation measures identified

Indicative Cost: \$ 30,000

Time Frame: Within 2 years

Responsible Agency: Manly Council – Natural Resources

Priority: Medium

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HR3.2 Assess impact of climate change on areas of ecological significance and devise adaptive measures.

Context: In a preliminary assessment, the study area is expected to face high vulnerability to ecosystems due to impacts of climate change. However, this has not yet been specified. It is believed that natural ecosystems have low resilience to the effects of climate change. Hence, there is need to plan and implement adaptive measures to prevent further damage to critical ecosystem of the study area.

Actions: Overlay map of areas of ecological significance on climate change impact area map (to be prepared), define vulnerable ecosystems and devise adaptation measures.

Advantages: Impacts on ecosystems of the area will be specified. Adaptive measures will prevent further damage to critical ecosystems.

Disadvantages: -

Objectives addressed: AH2, HR3 and HR4

Addressing actions under Manly Council's MSS 2006: C2.4.2 – review the possible social, economic and environmental impacts of climate change on Manly

Addressing SMCMA catchment targets: CTC5 – adaptive and mitigating strategies for climate change impacts on natural resource values

Performance Target: Ecological impact maps

Indicative Cost: \$10,000

Time Frame: Within 2 years

Responsible Agency: Manly Council – NR, GIS unit, SCCG, SMCMA

Priority: Medium

HR3.3 Work with Sydney Coastal Councils Group to develop regional/ local level climate change model considering protection provided by existing seawalls and rocky foreshores.

Context: Manly Council is collaborating with the Sydney Coastal Councils Group (SCCG) to better understand the implications of climate change at regional level through participation in susceptibility modeling. In a preliminary assessment, Manly LGA has been found to possess a moderate degree of vulnerability to climate change. The study area, however, faces high vulnerability to sea level rise, ecosystems and extreme rainfall and subsequent stormwater management. This collaboration has already proved to be fruitful. It has been indicated that modeling does not consider the level of protection provided by existing seawalls. At a later stage, the model results have to be refined by inclusion of the parameter.

Action: The option involves continuation of collaboration.

Objectives addressed: HR3 and HR4

Addressing actions under Manly Council's MSS 2006: C2.4.7 – partnership with SCCG for best practice management responses to climate change

Addressing SMCMA catchment targets: CTC5 – adaptive and mitigating strategies for climate change impacts on natural resource values

Performance Target: Model Results & Impact Report

Indicative Cost: Staff time

Time Frame: On-going

Responsible Agency: SCCG, DECC, Manly Council- NR

Priority: Medium

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HR3.4 Promote environmentally- friendly sea walls while upgrading existing seawalls or constructing new seawalls.

Context: Seawalls, both public and private, exist throughout the study area. They are now common features of landscape in shallow coastal waters of urbanised areas. In some areas, they have replaced considerable portions of natural habitats, such as natural rocky shores or beaches. In Sydney Harbour, approximately 50% of the shore is composed of retaining seawalls or other built habitats. Total length of seawalls within North Harbour is only 0.34km. Two prominent seawalls within the study area are Fairlight Beach Seawall & North Harbour Reserve Rock Revetment Seawall.

Based on the results of the test pit investigation, it is considered that the likelihood of any portion of the Fairlight beach seawall failing is 'unlikely'. However, the North Harbour Reserve rock revetment seawall was assessed to pose a minimal risk to life or property in its present state. However, there is some minor disrepair that could potentially allow further deterioration of the seawall to occur more rapidly than it would otherwise, affecting the durability and longevity of the structure.

While considering repair or replacing the North Harbour Reserve rock revetment seawall and also considering adaptation measures for sea level rise, investigate options for environmentally-friendly designs. A number of Councils within SMCMA have already applied innovative designs to improve the environmental value of existing seawalls. SMCMA and DECC have recently published a guideline (June 2009).

Actions: This option involves regular inspection of seawalls, especially after storms. If upgrading is found necessary, construct environmentally-friendly seawalls. Incorporate these requirements in Development Applications for foreshore structures.

Objectives addressed: HR3

Addressing SMCMA targets: Management target ECM1.4 – in-stream and marine structures

Addressing actions under Manly Council's MSS 2006: C1.3.2 - Monitoring seawall stability

Performance Target: Completion of innovative designs

Indicative Cost: Staff time

Time Frame: Within 2 years

Responsible Agency: Manly Council- Urban Services, Design & NR, SMCMA

Priority: Medium

Objective

HR4. In consultation with Community Precinct Forums, undertake adaptation and mitigation measures in relation to climate change impacts

HR4.1 Continue with on-going climate change mitigation and adaptation measures

Context: Manly Council has undertaken several greenhouse projects including education programs, energy efficient lighting and retrofits of public amenities (including the beachfront and several sports fields), installation of a solar hot water at Swim Centre and energy efficient equipment in offices. Council has also initiated Climate Change Risk and Adaptation Action Strategy.

Council is also implementing a few adaptation measures including:

- Improving water-use efficiency, recycling and public education about water usage.
- Developing and gradually implementing coastal zone and estuary management plans.
- Maintaining green spaces (parks and bushland) in urban areas.

Actions:

- Completion of Manly LGA Climate Change Risk Assessment and Adaptation Action Plan.

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- *Modify on-going mitigation and adaptation measures based on periodic assessment and also accommodating new knowledge*
- *Identify opportunities to install water and energy efficient systems on public facilities throughout the study area.*

Objectives addressed: HR4

Addressing actions under Manly Council's MSS 2006: C2.4.1 – implement best-practice risk management

Addressing SMCMA catchment targets: CTC5 – adaptive and mitigating strategies for climate change impacts on natural resource values

Performance Target: Positive measurable impacts achieved

Indicative Cost: \$70,000

Time Frame: On-going

Responsible Agency: Manly Council – NR, Precincts, Urban Services

Priority: High

HR4.2 Collect and collate new information and knowledge on climate change impacts relevant to the study area/ Manly LGA.

Context: Knowledge of possible impacts of climate change is always growing. Research at global, regional, national and local levels is feeding into knowledge on climate change impacts. It is sometimes difficult to synthesize information/knowledge relevant for the study area. A structured effort should be made to collect and collate relevant information.

Actions:

- *Information for the community on Climate Change in the Manly LGA will be provided through and following the development of the Climate Change Strategy, Climate Change Education Strategy and the Climate Change Risk and Adaptation Strategy.*
- *In addition, prepare an e-book with relevant information on climate change impacts of Manly LGA including information on on-going mitigation and adaptation measures*
- *Host this e-book on Manly website*
- *Revise periodically*

Objectives addressed: HR4

Addressing actions under Manly Council's MSS 2006: C2.4.4 – implement climate change education and awareness program

Addressing SMCMA catchment targets: CTC5 – adaptive and mitigating strategies for climate change impacts on natural resource values

Performance Target: Strategic documents and e-book published and hosted

Indicative Cost: staff time

Time Frame: within 2 years

Responsible Agency: Manly Council – CEP

Priority: Medium

HR4.3 Inform and involve community through Precincts about known impacts of climate change on the study area.

Context: Knowledge of possible impacts of climate change is always growing. Community is often confused with information reaching to them from media. Community needs to receive relevant and structured information. Precincts can facilitate in disseminating knowledge and community involvement.

Actions:

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- *Prepare a booklet on key climate change impacts on Manly LGA including information on on-going mitigation and adaptation measures (a combination of Cardno, SCCG and Risk/Mitigation Assessment reports)*
- *Publish and distribute the booklet through Precincts*

Objectives addressed: *HR4*

Addressing actions under Manly Council's MSS 2006: *C2.4.4 – implement climate change education and awareness program*

Addressing SMCMA catchment targets: *CTC1 – people, communities have increased capacity to engage in improved natural resource management; CTC5 – adaptive and mitigating strategies for climate change impacts on natural resource values*

Performance Target: *Booklet published and distributed*

Indicative Cost: *\$15,000 + Staff time*

Time Frame: *within 2 years*

Responsible Agency: *Manly Council – CEP, Precincts*

Priority: *High*

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4.6 OPTIONS ADDRESSING HERITAGE CONSERVATION & MANAGEMENT

The entire North Harbour study area was used extensively by the Aboriginals, known locally as the Gayemal clan of the Guringai tribe, who spent much of their time on the foreshores of Sydney Harbour (Aboriginal Heritage Office, 2008). The oldest Aboriginal site known in the Manly LGA is dated to about 4100 years before present although it is expected that older sites will be discovered. There are 5 known Aboriginal sites in the study area. The area is considered to have high potential for further unrecorded sites. Therefore, seemingly unused shelters and vantage points may actually contain archaeological evidence of past Aboriginal occupation. These and other landscapes have cultural significance for generations of Aboriginal people and make up an important part of Australia's heritage.

Goal

Ensure that all Aboriginal and European (cultural and natural) heritage sites in the study area are preserved and protected.

However, the entire study area has been populated by Europeans soon after European settlement in 1788. Areas such as North Harbour (then called Balgowlah) became popular destination for picnic. James Jenkins Trailblazer was constructed around 1827s. This became a gateway to Pittwater, a short cut to Sydney long before Ellery's Punt or the Steamer. Home of the First Prime Minister of Australia, Sir Edmund Barton is also located within the study area.

A total of two management options are proposed addressing two different objectives. These two management options are already on-going activities of the Council and rated as of having high priority.

Objectives	Strategic Management Options	Implementation timeframe*	Priority	
			Individual	Overall
HC 1 Ensure that sites of Aboriginal heritage are protected under relevant legislations and appropriately and regularly maintained.	HC1.1. Review Aboriginal Site Management Report for Manly Council (2006) and associated reports to prioritise management needs and develop a plan of implementation.	On-going	H3M3	High
HC2 Ensure that all sites of non-indigenous heritage are protected under relevant legislations and in Council planning instruments.	HC2.1. Ensure physical protection and maintenance of all heritage listed items.	On-going	H3M3	High

*After adoption of the CMP

DETAILS OF MANAGEMENT OPTIONS

Objective

HC 1 Ensure that sites of Aboriginal heritage are protected under relevant legislations and appropriately and regularly maintained.

HC1.1. Review Aboriginal Site Management Report for Manly Council (2006) and associated reports to prioritise management needs and develop a plan of implementation.

Context: The Aboriginal Heritage office (AHO) has prepared the Aboriginal Site Management Report (2006) for Manly Council. This report has been reviewed. While many sites are in good to reasonable condition, others show signs of degrees of degradation because of exposure to a variety of uses including lack of understanding in the community. Two of the sites are located on the Manly Scenic Walkway. This report has been used to prioritise management needs.

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Action: The option involves continuation of Aboriginal site management through formulation of Works program. Consult and maintain liaison and seek approval with the Metropolitan Aboriginal Lands Council and Aboriginal Heritage Office.

Objectives addressed: HC1

Addressing actions under Manly Council's MSS 2006: D2.2.5 – implement the Management Plan for Aboriginal heritage

Addressing SMCMA catchment targets: CTLD3 – Indigenous cultural landscape values are identified, and incorporated into natural resource management activities

Performance Target: Prioritisation done

Indicative Cost: Staff time

Time Frame: On-going

Responsible Agency: AHO, Manly Council – Planning & Strategy

Priority: High

Objective

HC2 Ensure that all sites of non-indigenous heritage are protected under relevant legislations and in Council planning instruments.

HC2.1. Ensure physical protection and maintenance of all heritage listed items.

Context: It is likely that many sites of historical significance (primarily European heritage) have become degraded with time. Some of these sites are still used on a regular basis (e.g. swimming enclosures and seawalls) and in some cases, may represent a public risk.

Action: This option involves Council carrying out repairs to these structures to ensure their integrity, or possibly restoring currently degraded structures / sites as show-pieces of former usage and activities.

Council would primarily be responsible for the repairs and restoration of historical items / structures under its control.

Objectives addressed: HC2

Addressing actions under Manly Council's MSS 2006: D2.1.7 – retention of heritage fabric

Performance Target: Maintained & cleaned

Indicative Cost: \$20,000

Time Frame: On-going

Responsible Agency: Manly Council – P&S, Urban Services

Priority: High

5. IMPLEMENTATION PLAN

The Manly Plan is the key planning document driving the operations of Council. It is a rolling three year plan that identifies a range of objectives and strategies that Council will implement through the provision of programs, services and facilities to those who live, work and visit Manly. The Manly Plan pursues sustainability across environmental, social and economic considerations. The management options within this Coastline Management Plan will be implemented through integration into the Manly Plan.

Each year, the Council allocates the organisation's annual expenditure to the five Principal Activities: governance, people & place, people services, infrastructure services and the environment, taking into account priorities identified in the various supporting Plans and Strategies and taking into account emerging issues, community feed back, advice from Manly Council's operational management, and progress towards the Manly Vision. Many program activities are on-going and are considered "core services" of Local Government. These operate on a continual improvement model and attract funding each year. Others are one-off initiatives which must compete competitively for funds based on merit. An exhaustive list of capital works programs are itemised as part of the budget section of the document.

The current plan is Manly Plan 2009 - 2012.

5.1 FUNDING REQUIREMENTS

The total cost of implementing (including 1-5 years of operation and maintenance) the 48 management options addressing six key management issues have been indicatively estimated as **\$ 889,000**. Council expenditure is often supplemented by a variety of external grant sources derived from State and Federal Government, as well as industry. A summary of estimated indicative cost is presented in **Table 5.1**. However, cost of each management option is indicated with details for that individual option (Sections 4.1 -4.6).

Table 5.1 Summary of estimated cost

Management Issues	Number of Management Options	Estimated Indicative Cost (\$)			
		High priority	Medium Priority	Low priority	Total
Aquatic Habitat	10	160,000	0	0	160,000
Terrestrial Habitat	8	50,000	220,000	0	270,000
Enhancement of Facilities	10	11,000	198,000	0	209,000
North Harbour Reserve	6	0	120,000	5,000	125,000
Hazards & Climate Change	12	85,000	40,000	0	125,000
Heritage Conservation	2	0	0	0	0
	48	295,000	569,000	5,000	889,000

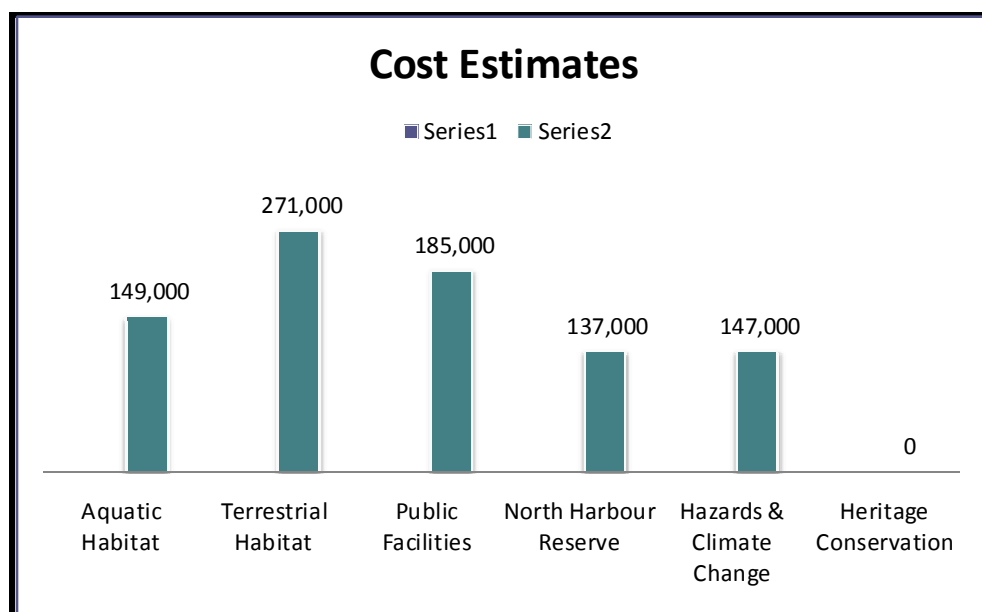
More than 50% of the total cost will be required to implement management options addressing terrestrial habitat and improvement of public facilities (**Fig 5.1**).

Funding schedule for the total estimated cost is:

Years	1	2	3	4	5	Total
\$	149,000	271,000	185,000	137,000	147,000	889,000

Some actions require an on-going commitment from existing staff rather than the outlay of expenditure and this is noted as 'Time'. Some recommended actions require significant capital costs, especially where large-scale works are involved such as restoring collapsed swimming enclosure and foreshore protection structures.

Fig 5.1 Cost allocations to address key issues



As indicated elsewhere, implementation responsibility of all proposed management options rests with a number of agencies including Manly Council. Hence, adoption of this CMP does not commit Council to allocate immediate funding.

5.2 FUNDING SOURCES

Funding from different alternative sources will be pursued (**Appendix B**). These include but are not limited to:

- Council's Environment Levy (subject to a budget bid process);
- Council's General Revenue Budget (subject to a budget bid process);
- State Government's Coastal & Estuary Management Program (50% subsidy funding subject to a submission process);
- Other Commonwealth and State Government funded programs such as SSHAP, MIP, Greenspace, CMA Funding etc etc

5.3 COLLABORATIVE PARTNERSHIPS

A number of state and other agencies have institutional mandate to address a range of issues covered under different management options within this report. Agencies involved in the implementation of management options are identified in chapter 4. Manly Council, as the primary implementor of the CMP, must seek to sustain collaborative partnership agreements with these agencies either specifically for this CMP or for overall LGA.

5.4 AGENCY RESPONSIBILITIES

Although Manly Council is the lead agency responsible for implementing the CMP, there will be several state Government and other agencies responsible for implementing specific management options, as per mandate of their activities. Agencies will have the main role for some and supportive role for others, as indicated in **Table 5.4a**.

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Table 5.4a: Roles of different agencies in implementation of proposed management options

Agency	Management Options with Implementation Responsibilities	
	Main	Supportive
Manly Council*	AH1.1 [#] , AH2.1, AH2.2, AH2.3, AH2.4, AH4.1, AH4.2, TH1.1, TH1.2, TH1.3, TH2.1, TH2.2, TH3.1, TH3.2, PF1.1, PF1.2, PF1.3, PF1.4, PF2.1, PF2.2, PF3.1, PF4.1, NR1.1, NR2.1, NR3.1, NR4.1, NR4.2, NR4.3, HR2.1, HR2.2, HR2.3, HR3.1, HR3.2, HR3.4, HR4.1, HR4.2, HR4.3, HC2.1	AH1.2, AH3.1, AH3.2, PF4.3, HR2.4, HC1.1
NSW Maritime*	AH3.2	AH3.1,
I&I NSW*	AH3.1, PF4.3,	AH1.2, AH2.1, AH3.2, PF4.1, PF4.2,
NSW DECCW*	AH1.2, PF4.2, HR2.4	AH2.3, HR3.3
Sydney Water		AH4.2
SCCG	HR3.3	PF4.1, HR3.2,
AHO	HC1.1	
SMCMA		AH3.1, AH3.2, PF4.1, PF4.2, HR3.2, HR3.4
RTA		PF1.2,

* Members of the Harbour Foreshores & Coastline Management Committee and participated in the development of the CMP

AH = Aquatic Habitat, TH = Terrestrial Habitat, PF = Public Facilities, NR = North Harbour Reserve, HR = Hazards & Risks and HC = Heritage Conservation

Within Manly Council, different Divisions/Branches of Council will share responsibilities for implementing specific management options. These responsibilities have also been identified (**Table 5.4b**).

Table 5.4b: Roles of different Divisions/Branches within Manly Council in implementation of proposed management options

Division	Branch	Management Options with Implementation Responsibilities	
		Main	Supportive
Landuse & Sustainability	Natural Resources	AH1.1 [#] , AH2.1, AH2.2, AH2.3, AH2.4, AH4.1, AH4.2, PF4.1, NR1.1, NR2.1, NR3.1, HR2.1, HR2.2, HR3.1, HR3.2, HR4.1,	AH1.2, AH3.1, AH3.2, TH2.2, PF1.3, HR3.3, HR3.4
	Planning Instruments	PF2.2, HC2.1	NR1.1, HC1.1
	Environmental Partnerships & Programs	HR4.2, HR4.3,	PF4.3
	Waste & Cleansing	PF3.1	PF1.1,
People, Places & Infrastructures	Urban Services	PF1.1, PF1.3, PF1.4, PF2.1, NR4.1, NR4.2, HR3.4	AH4.1, AH4.2, PF1.5, NR2.1, NR3.1, NR4.3, HR2.3, HR4.1, HC2.1

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Division	Branch	Management Options with Implementation Responsibilities	
		Main	Supportive
	Civic Services Parks & Bushlands	PF1.2, NR4.3 TH1.1, TH1.2, TH1.3, TH2.1, TH2.2, TH3.1, TH3.2,	NR2.1, NR3.1,
	Design & Technical	HR2.3,	PF1.3, PF1.4, HR2.4, HR3.2, HR3.4

AH = Aquatic Habitat, TH = Terrestrial Habitat, PF = Public Facilities, NR = North Harbour Reserve, HR = Hazards & Risks and HC = Heritage Conservation

5.5 COORDINATION

Implementation of Manly Council's adopted Coastline and Estuary Management Plans is coordinated by the Coastal Management Team, within Council's Natural Resources Branch. The Manly Harbour Foreshores & Coastline Management Committee assist with setting the strategic direction associated with development and implementation of such Plans.

5.6 COMMUNITY INVOLVEMENT

Many of the management options adopted for North Harbour CMP offer opportunities for community involvement particularly activities such as revegetation projects, monitoring programs and environmental education, as well as general monitoring of plan implementation and effectiveness. Local community groups are therefore encouraged to take active part in the management of North Harbour, to liaise regularly with the community representatives on the Harbour Foreshores & Coastline Management Committee, and seek out opportunities wherever possible for community participation in implementation of the options adopted.

5.7 REVIEW OF PLAN

The Coastline Management Plan will be reviewed every 5 years. During the process, there will be a mechanism established to identify new issues and conflicts concerning the coastline management and ensure their incorporation into a revised plan. A program for the following 5 years will be developed by designating priority to any new actions and reassigning priority to the remaining actions. These programs are fed back into and form the revised CMP for the next 5 years.

The revised CMP will recognise any new innovations, knowledge in general or on climate change and variability in particular, decision support tools for management of the North Harbour that may not have been available at the time of the initial plan development.

6. MONITORING, EVALUATION & REPORTING

Monitoring & evaluation is a key component of any coastline/estuary management plan. The NSW Government has endorsed a strategy for a 'monitoring, evaluation and reporting (MER)' system for natural resource management in NSW in 2006. The purpose of the MER Strategy is to refocus the resources of NSW natural resource and environment agencies and coordinate their efforts with CMAs, local governments, landholders and other natural resource managers to establish a system of monitoring, evaluation and reporting on natural resource condition.

The Natural Resources Commission (NRC) recognises that implementing MER for NRM is challenging and traditionally has not been done well.

When used for management purposes, monitoring provides an on-going picture of the health and response of the estuary & coast, e.g. water quality levels, species and numbers of fauna, area and productivity of seagrass beds etc. A monitoring program can be involved and quite expensive. Hence, it is important that the monitoring program is realistic, useful, implementable and affordable on a continual basis.

Understanding coast and estuary health will also contribute to effective adaptation to climate change impacts.

6.1 MONITORING

To manage its coastal beach and foreshore locations in a holistic and sustainable manner, Council has adopted a strategic approach to coastal zone management which aims to enhance the human experience whilst minimising environmental impact. Prior to the development of the North Harbour CMP, Manly Council has already prepared & adopted six of eight estuary/coastal management plans to cover entire coast & foreshores. The remaining two plans, including this one, are expected to be adopted by end of 2009.

It is timely that a structured long-term monitoring program is established to continually assess environmental health of the estuary & coast.

6.1.1 Status of Monitoring within Manly Council

At present, Council has no structured & written monitoring plan to assess environmental health of coast & estuary. However, the SHOROC State of the Environment Report, prepared annually in collaboration with other regional Councils, provides numerical data on a comprehensive range of indicators.

A State of the Environment (SoE) Report is an important management tool for councils to determine the effect of management actions on environmental conditions in the local area. It provides a snapshot, among others, of the State (or condition) of the environment. i.e. the environmental quality and quantity of natural resources. The SoE also provides a document to report Manly's progress towards meeting the goals and objectives of the Manly Sustainability Strategy, and therefore towards our overall goals of sustainability. Comparing SoE reports from year to year enables Council to gauge improvements in different sectors of the environment, and also identify those areas that will need attention in the future. Indicators used in the SoE report along with data related to Manly LGA are presented in **Appendix C**.

Long-term water quality monitoring data is, however, available at present from the 'Harbour Watch Program' and 'Beach Watch Program' of the Department of Environment and Climate Change (DECC). Key concern of these program's is human health relating to the use of waters. Hence, the two major indicators of bacterial contamination, *faecal coliforms* and *enterococci*, are measured at various harbour swimming locations. There are 11 sampling sites: 4 under Beach Watch and 7 under Harbour Watch Programs within Manly LGA area (**Table 6.1.1**).

Recently Council has started 'Recreational Water Quality Monitoring Program' (MC 2008). The pilot sampling program was run at 10 sites for summer season from December 2008 to March 2009. At this stage, the plan is continue the program for six summer seasons.

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Table 6.1.1 Water Quality Sampling Sites within Manly LGA

Harbour Watch Program (DECC) (Bath/pool/swimming enclosures)		Beach Watch Program (DECC)		Recreational WQ Monitoring Program (Manly Council 2008)	
1	Little Manly	1	Queenscliff beach	S1	Queenscliff
2	Manly Cove	2	North Steyne beach	S2	North Steyne
3	Fairlight	3	South Steyne beach	S3	South Steyne
4	Forty Baskets	4	Shelly beach	S4	Shelly beach
5	Clontarf			S5	Little Manly
6	Sangrado			S6	Manly Cove
7	Garney Crescent			S7	Fairlight P
				S8	Fairlight beach
				S9	Forty Baskets
				S10	Clontarf

Monitoring estuary & coastal health, no doubt, goes beyond indicators being monitored for the SoE report & other water quality assessments.

6.1.2 Model Monitoring System

The Natural Resources Commission has made a rapid assessment of several models of monitoring being implemented in Australia (NRC 2007) and cited the 'Ecosystem Health Monitoring Program (EHMP)' undertaken in south-east Queensland' as an example.

The Ecosystem Health Monitoring Program (EHMP) is one of the most comprehensive marine, estuarine and freshwater monitoring programs in Australia (EHMP 2009). It delivers a regional assessment of the ambient ecosystem health (or 'pulse') for each of South East Queensland's (SEQ) 19 major catchments, 18 river estuaries, and Moreton Bay, highlighting where the health of waterways is getting better or worse. The EHMP is managed by the South East Queensland Healthy Waterways Partnership on behalf of its various partners and is implemented by a large team of experts from the Queensland Government, universities and CSIRO.

The EHMP uses rigorous science to measure waterway health using a broad range of biological, physical and chemical indicators of ecosystem health. These indicators were chosen because they provide essential information about the condition of waterways. Currently, 135 freshwater sites are monitored twice a year (in spring and autumn), and 254 estuarine and marine sites are monitored on a monthly basis. The results provide an assessment of the responses of aquatic ecosystems to human activities, such as catchment alterations and point source discharges (e.g. wastewater treatment plants (WWTPs)), and also take into account natural processes such as rainfall. The estuarine/marine component, one of three components of EHMP assesses the tidal reaches of waterways including Moreton Bay.

The Estuarine/Marine EHMP monitors a range of physical/chemical and biological indicators: water quality, seagrass depth range and distribution, $\delta^{15}\text{N}$ mapping, *Lyngbya* and coral.

- *Water quality* is measured monthly at 167 sites and is comprised of physico-chemical parameters, dissolved and total nutrients, water clarity and phytoplankton abundance. Water quality information is collected to assess baseline ecosystem process and to track changes in the zones of human impact.
- Sewage nitrogen mapping, measured annually at 167 sites, assesses the extent of sewage treatment plant discharges into SEQ waterways through measurements of the uptake of the stable nitrogen isotope ^{15}N by the macroalga *Catenella nipa*.
- The seagrass depth range (SDR) is the difference in elevation (m) between the upper and lower depth record of the seagrass *Zostera capricorni* at a site. The distribution of seagrass in Moreton Bay is mapped every three years using a combination of remotely sensed images, underwater camera observation and visual estimation of seagrass cover.
- Riparian vegetation provides the interface between the land and a waterbody. The EHMP measures the extent of riparian habitat in the estuaries as the percentage of the total system that has retained unmodified riparian habitat. Measured 3 yearly.

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Indicators & parameters used in EHMP is presented in **Table 6.1.2**.

Table 6.1.2: Ecosystem Health Monitoring Program (Estuarine & Marine)

Indicators		Frequency
Water Quality	Turbidity	monthly
	Salinity	??
	Water temperature	??
	Secchi depth	??
	Dissolved Oxygen	??
	pH	monthly
	Nitrogen	monthly
	Phosphorus	monthly
	Chlorophyll a	monthly
Sewage Plume Map (Algae $\delta^{15}\text{N}$ Mapping)	$\delta^{15}\text{N}$ value	annually
Seagrass Depth Range & Distribution	Seagrass Depth Range (SDR)	3-yearly
Riparian Assessment		annually

6.1.3 Indicators Framework & Indicators

A framework of indicators is designed as a continual process of identification, preparation, decision-making, implementation and evaluation of interventions. Indicators would serve the purpose to structure and facilitate this process, to monitor it and make it accountable. Indicators should thus provide concrete and meaningful information of conditions and changes over time of input into the process of coastal development and their output and outcome.

The National Land and Water Resources Audit (the Audit), established in 1997 under the Natural Heritage Trust Act, was responsible for developing key indicators for the Natural Resource Management M&E Framework, used to assess progress towards improved natural resource condition. The Audit was responsible for the development of indicators, as well as supporting the national collection and collation of data, and reporting against each indicator.

The National NRM Monitoring and Evaluation Framework (NM&EF) called for the identification of key topics or 'matters for target'. Each matter for target has a set of 'indicators' that will be used to monitor and report on the topic.

A total of 19 nationally agreed indicators were developed to measure the effect of the stressors on ecosystem condition (physical/chemical and biological) and habitat extent.

Matter for target/topic:	Estuarine, Coastal & Marine Habitat Integrity
Indicator heading:	Indicators
Estuarine, coastal and marine habitat extent and distribution	1. Extent/distribution of key habitat types
Estuarine, coastal and marine habitat condition	<i>Biological condition:</i> 2. Algal blooms 3. Animal or plant species abundance 4. Chlorophyll a

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	<ol style="list-style-type: none"> 5. Coral bleaching 6. Cass mortality events 7. Pest species (number, density, distribution) 8. Targeted pathogen counts 9. Vertebrates impacted by human activities <p><i>Physical/chemical condition:</i></p> <ol style="list-style-type: none"> 10. Dissolved oxygen 11. Nutrients 12. pH 13. Presence / extent of litter (marine debris) 14. Salinity (EC) 15. Sedimentation/erosion rates 16. Shoreline position 17. Temperature 18. Toxicants (in water / sediments/ biota) 19. Turbidity / water clarity
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Source: The National Land & Water Resources Audit (2008)

6.1.4 Proposed Indicators for Manly's Coastal & Estuarine Program

A long-term monitoring program is considered to be designed on the EHMP of the 'Healthy Waterways Program' and using Council's experience with Recreational Water Quality Monitoring Program. An indicator framework for Manly is proposed essentially based on the National NRM Monitoring and Evaluation Framework (NM&EF) and reviewing indicators currently being used under different programs in Manly including SoE Reporting.

Table 6.1.4 Proposed Indicators to monitor Manly's Estuarine, Coastal & Marine Habitat Integrity

Indicator heading	Indicators	Frequency	Remarks
Habitat Extent & Quality	1. Seagrass distribution and % cover		
	2. Mangrove distribution and % cover		
	3. Beach indicators		
	4. Isohaline position	1-5 years	
	5. Riparian assessment		
	6. Rocky shore assessment		
	7. Intertidal species diversity/abundance??		
Sedimentation Processes	8. Sedimentation/erosion rates	Annual monitoring preferably after the wet season.	
	9. Shoreline position		
Climate Change	10. Saline intrusion into groundwater aquifers		

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Indicator heading	Indicators	Frequency	Remarks
Biotic Indicators	11. King tide levels/inundation events		
	12. Days >35°C		
	13. Algal blooms		
	14. Animal or plant species abundance		
Water Quality	15. Chlorophyll a	Annually	
	16. Pest species (number, density, distribution)	at least every three months (ie summer, autumn, winter and spring),	
	17. Dissolved oxygen	monthly basis on the falling tide	
	18. Nutrients Concentration of oxidised nitrogen. Concentration of organic nitrogen. Concentration of ammonia. Concentration of total nitrogen. Concentration of filterable reactive phosphorus. Concentration of total phosphorus.	Monthly	
Pollution	19. pH		
	20. Salinity (EC)	Monthly	
	21. Temperature	Monthly	
	22. Turbidity / water clarity Turbidity of a waterbody. Secchi depth of a waterbody.	monthly on the falling tide.	
Pollution	23. Sewage Plume Map (Algae $\delta^{15}\text{N}$ Mapping)		
	24. Presence / extent of litter (marine debris)*	at low tide every three months over a one-year period.	
	25. Toxicants (in water / sediments / biota) 1: Concentrations of toxicants in sediments of an estuarine or coastal waterbody. 2: Concentrations of toxicants in waters of an estuarine or coastal waterbody. 3: Concentrations of toxicants in biota of an estuarine or coastal waterbody.	Annual	
	26. Sediment quality (i.e. heavy metals, dioxins etc)	3 years	
	27. Bioaccumulation assessment using oyster	3 years	

6.1.5 Proposed Monitoring System

Objectives

- Design a long-term monitoring set-up to assess environmental health across Manly's coastal environment

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- b) To draft Manly Monitoring, Evaluation & Reporting Plan for coastal & estuary management
- c) Finalise Indicators & establish a baseline
- d) Establish an in-house laboratory

Activities & Output

1. Monitoring, Evaluation & Reporting (MER) Plan for coastal & estuary management.

The MER Plan will provide evidence of a documented monitoring and evaluation approach. The document should indicate appropriate monitoring and evaluation design, taking into account the specific outcomes and targets being measured and the relevant variables. The document should indicate appropriate analysis of data and justification of conclusions. Monitoring and evaluation should be used as a tool for corrective and preventative action and continual improvement. The process of developing the MER would involve the following:

- a) Internal staff liaison
- b) Stakeholder liaison (DECCW, SMCMA, SCCG)
- c) Draft MER Plan
- d) In-house workshops to discuss the draft
- e) Stakeholder Review
- f) Draft Final MER Plan
- g) Present to Harbour Foreshore & Coastline Management Committee then to Council for adoption.

OUTPUT : MER Plan

2. Identification of Sample Site & establish baseline data

Sampling sites should be aligned to sub-catchments. Manly LGA has 19 sub-catchments of which 16 are directly adjacent to coastline, lagoon or estuary. At least one sample site should be considered for each catchments of Manly LGA.

- a) Review Manly LGA catchment map
- b) Identify 20-25 sites, incorporating 10-11 existing sample sites
- c) Map sites using GPS
- d) Collect samples & carry out laboratory tests
- e) Establish baseline

OUTPUT : Baseline

3. Establishment of monitoring facilities and collaborative partnerships

- a) Analyse cost benefit of undertaking analysis in-house or through an external independent laboratory
- b) Establish in-house water quality tests set up.
- c) Purchase softwares for Riparian assessment
- d) Establish collaboration with Universities through MoU mechanism
- e) Encourage community participation and organise training if needed

OUTPUT : Monitoring facilities & linkages

4. Analyse results, modify technique, review coastline/estuary management

OUTPUT : Trend, modify coastline/estuary management

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6.2 PERFORMANCE EVALUATION

The Harbour Foreshore & Coastline Management Committee will assist staff in directing established review and evaluation processes. These processes will assess the performance of the Coastline Management Plan and ensure it is continually updated and improved. A Performance Evaluation Program, to be developed as per the CMP, will propose an integrated program showing the relationships between recommended actions, performance indicators to be monitored, data interpretation methodology, and targets for actions where baseline data is available. This detailed evaluation program shall be consistent with NRC (Natural Resources Commission) and Sydney Metropolitan CMA reporting protocols clearly defining estuary and management targets.

Triple Bottom Line (TBL) accounting, currently being used within the Manly Council, is the process of identifying, assessing and reporting business activities in terms of their impact on society, the environment and economic sustainability. This reporting process is based on continuous improvement, and Council aims to produce a good triple bottom line result today and to provide an even better result tomorrow. With the adoption of the updated Manly Sustainability Strategy in 2006, Council is undertaking a full review of current TBL reporting to further integrate the TBL process into Council operations to assist in improving the sustainability outcomes of operational decisions.

A standardised reporting format should be utilised on an annual basis to briefly evaluate the progress of the plan and the efficiency and effectiveness of management options implemented over each annual reporting period.

A TBL reporting of this North Harbour Coastline Management Plan will be made before adoption of the Plan.

6.3 REPORTING MECHANISM

Reporting on the implementation of the plan through time is to be achieved through the three following mechanisms.

Harbour Foreshore & Coastline Management Committee

Manly Harbour Foreshores & Coastline Management Committee is the primary Committee responsible for overseeing the on-going implementation of the Plan. Regular bi-monthly meetings of the Committee will be held where on-going actions and any variations to the plan will be reported. This way all key stakeholders represented on the Committee will be kept abreast of the on-going implementation of the programs. Some specific items are referred, either as brief mention or full report, to Council's monthly Planning & Strategy Committee meetings.

Reporting to the Community

Progress on implementation of the CMP and/or specific achievements will be reported through an existing dedicated page on Council's website. This Coastline Management Plan and all supporting documents, when adopted, are posted on this site. Selected items will be contributed to Precincts for publication in Precinct Forum Newsletter. Brief reportings will be made to Council's annual Report to the Community.

Other Formal & informal Reporting Processes

Reporting on the progress of implementation of the CMP will be made, among others, through:

- Annual Report
- Environment Levy Report
- Regional 'State of the Environment Report'
- Sydney Coastal Councils Group's monthly e-news updates 'Making Waves' and quarterly newsletter

Internally, progress are discussed during weekly Divisional 'Works in Progress (WIP)' meetings and reported monthly in 'General Manager's report. Further reportings are also made to requirements of individual grant funding agencies.

7. GLOSSARY

Accreted Profile	The profile of a sandy beach that develops in the "calm" periods between major storm events. During such periods, swell waves move sediment from the offshore bar back onto the beach to rebuild the beach form.
Accretion	A build up of sand which may cause or be associated with a seaward movement of the beach profile.
Aeolian Transport	Transport (of sand) by wind.
Bathymetry	Description of the shape of the ocean bed (underwater contours etc.). The measurement of depths of water.
Beach Erosion	The offshore movement of sand from the sub-aerial beach during storms.
Beach Profile	A cross-section of a beach, generally normal to the water line, showing the elevation of the surface relative to some datum. It may also extend some distance offshore.
Benthic	Pertaining to the seafloor (or bottom) of a river, coastal waterway, or ocean.
Berm	The relatively flat section of the beach profile between the top of the swash zone and the toe of the erosion escarpment or frontal dune.
Bluff	Vertical or near vertical cliff face (relatively erosion resistant rock) or moderate to steep slope (less erosion resistant rock or soils perched on rock strata).
Breaker Zone	That area of coastal waters where shoaling effects cause swell waves to break. This typically occurs in the shallower waters over an offshore bar.
Breaking Waves	As waves increase in height through the shoaling process, the crest of the wave tends to speed up relative to the rest of the wave. Waves break when the speed of the crest exceeds the speed of advance of wave as a whole. Waves can break in three modes: spilling, surging and plunging.
Breakwater	Structure protecting a shoreline, harbor, anchorage or basin from ocean waves.
Buffer Zone	An appropriately managed and unalienated zone of unconsolidated land between beach and development, within which coastline fluctuations and hazards can be accommodated in order to minimise damage to the development.
Catchment	The area of land which collects and transfers rainwater into a waterway.
Coastal Process	The active forcing functions (waves, winds, currents etc.) and their interaction with and effects on the coastal environment (sediments, beach and cliff erosion etc.)
Coastal Structures	Those structures on the coastline designed to protect and rebuild the coastline and/or enhance coastal amenity and use.
Coastal Zone	The zone affected by coastal processes and its immediate hinterland.
Corridor	Lines of native vegetation connecting separate habitat areas that are essential for maintaining biodiversity. Corridors enable fauna to access larger habitats by encouraging mobility between areas. Corridors may also assist native plant species to spread and colonise new areas over time.

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Diffraction	The “spreading” of waves into the lee of obstacles such as breakwaters by the transfer of wave energy along wave crests. Diffracted waves are lower in height than the incident waves.
Erosion	The depletion of the land mass by natural forces, such as the reduction of a beach by waves and/or wind. Commonly perceived as the landward movement of an erosion escarpment during storm events.
Erosion Escarpment	A near vertical step formed by wave erosion at the back of a beach. Usually indicates the landward extent of wave incursion during recent storm events.
Estuary (definition 1)	The tidal portions of river mouths, bays and coastal lagoons, irrespective of whether they are dominated by hyper saline, marine or fresh water conditions
Estuary (definition 2)	a semi enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage
Flushing	Exchange of water between an estuary or coastal waterway and the ocean.
Frictional Attenuation	As applied to water waves, the reduction in wave energy as a result of resistant to water particle movement at the sea bed (bottom friction).
Groynes	Low walls built perpendicular to a shoreline to trap longshore sediment. Typically, sediment build up on the up drift side of a groyne is offset by erosion on the down drift side.
Intertidal	The environment between the level of high tide and low tide.
Littoral Drift	The sedimentary material which is moved in the littoral zone by waves and currents.
Littoral Transport	The movement of littoral drift.
Littoral Zone	Extends from the onshore dune system to the seaward limit of the offshore zone and possibly beyond.
Longshore Currents	Currents flowing parallel to the shore within the inshore and nearshore zones. Longshore currents are typically caused by waves approaching the beach at an angle. The “feeder” currents to rip cells are another example of longshore currents.
Longshore Transport	Synonymous with LITTORAL TRANSPORT.
Mud	Fine sedimentary material, typically comprising both inorganic (mineral) and organic material.
Nearshore Zone	Coastal waters between the offshore bar and the 60 m depth contour.
Net	With respect to sediment transport is the resultant difference of the volume of transport in all directions, i.e. the time averaged resultant effect.
Nourishment	The replenishment of a beach with sand. Commonly used to increase the beach width after erosion.

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Offshore Bar	Submerged sandbar formed offshore by the process of beach erosion and accretion. Typically, swell waves break on the offshore bar. Also known as longshore bar.
Offshore Zone	Coastal waters to the seaward of the nearshore zone.
Onshore/Offshore Transport	The process whereby sediment is moved onshore and offshore by wave, current and wind action.
Organic Material	Once-living material (typically with high carbon content), mostly of plant origin.
Refraction	The tendency of wave crests to become parallel to bottom contours as waves move into shallower waters. This effect is caused by the shoaling process which slows down waves in shallower waters.
Rip Currents	Concentrated currents flowing back to sea perpendicular to the shoreline. Rip currents are caused by wave action piling up water on the beach. Feeder currents running parallel to the shore (longshore currents) deliver water to the rip current.
Seagrass	Marine flowering plants which generally attach to the substrate with roots.
Seawalls	Walls built parallel to the shoreline to limit shoreline recession.
Sediment Budget	An accounting of the rate of sediment supply from all sources (credits) and the rate of sediment loss to all sinks (debits) from an area of coastline to obtain the net sediment supply/loss.
Sediments	Unconsolidated detrital material consisting of organic and/or inorganic fragments. The composition and textural characteristics (gravel, sand, mud) vary with sediment source (local, fluvial, marine) and the transporting medium.
Semi-diurnal Tide	Tides with a period, or time interval between two successive high or low waters, of about 12.5 hours. Tides along the New South Wales coast are semi-diurnal.
Shoreline Recession	A net long term landward movement of the shoreline caused by a net loss in the sediment budget.
Spilling Waves	The wave crest breaks gradually as the wave travels to the shore. Characterised by the appearance of white water at the crest.
Spring Tide	A tide greater than the mean tidal range. Occurs about every two weeks, when the Moon is full or new.
Storm Bar	An offshore bar formed by sediments eroded from the beach during storm conditions.
Storm Profile	The profile of a sandy beach that develops in response to storm wave attack. Considerable volumes of sediment form the beach berm, the incipient dune and the foredune can be eroded and deposited offshore. The landward limit of the storm profile is typically defined by a backbeach erosion escarpment.
Storm Surge	The increase in coastal water level caused by the effects of storms. Storm surge consists of two components: the increase in water level caused by the reduction in barometric pressure (barometric setup) and the increase in water level caused by the action of wind blowing over the sea surface (wind setup).

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Subaerial	That section of the beach which is above the waterline.
Subaqueous	The portion of the beach profile below the water surface.
Surging Waves	The wave does not "break" but maintains its basic shape as it moves towards the shore, where it surges up the beach. Very little white water is evident before surging waves reach the shore.
Swell	Wind-generated waves that have travelled out of their generating area. Swell characteristically exhibits a more regular shape and longer period than the sea (c.f. SEA).
Swell Waves	Wind waves remote from the area of generation (fetch) having a uniform and orderly appearance characterised by regularly spaced wave crests.
Turbidity	The condition resulting from the presence of suspended particles in the water column which attenuate or reduce light penetration.
Wave Height	The vertical distance between a wave trough and the following wave crest.
Wave Period	The time taken for consecutive wave crests or wave troughs to pass a fixed point.
Wavelength	The distance between consecutive wave crests or wave troughs.
Wind Waves	The waves initially formed by the action of wind blowing over the sea surface. Wind waves are characterised by a range of heights, periods and wavelengths. As they leave the area of generation (fetch), wind waves develop a more ordered and uniform appearance and are referred to as swell or swell waves.
Wetlands	A wetland is an area of land whose soil is saturated with moisture either permanently or seasonally. Wetlands include swamps, marshes, billabongs, lakes, saltmarshes, mudflats, mangroves, coral reefs, fens, peatlands, or bodies of water — whether natural or artificial, permanent or temporary. Water within these areas can be static or flowing, fresh, brackish or saline.

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APPENDIX A: MANAGEMENT AGENCIES

Integrated Coastal Zone Management (ICZM) is a management regime defined and directed by broader policy and organisational settings, in turn influenced by the prevailing institutional system. It is important to understand roles and responsibilities, direct and indirect, of institutional stakeholders. Like policy environment, institutional stakeholders also come from three levels of governments.

Local and regional

Manly Council

Manly Council (MC) is the principal management agency of this plan.

Manly Council was incorporated as a local government body on 6th January, 1877. Manly Council is a statutory body deriving authority from the *Local Government Act 1993* and other Acts enacted by the Parliament of New South Wales. The Council does not have the power to make decisions outside the legislation by which it derives its authority.

Council is responsible for the overall management of the Local Government Area (LGA) and enforcing the requirements of the *NSW Local Government Act 1993*, *Environmental Planning and Assessment Act 1979* and the *Crown Lands Act 1989* (where Council has care and control).

Manly Council is run by 12-member elected Councillors headed by the Mayor. Council is supported by the executive General Manager and staff. Councillors are elected to Council at local government elections, which are held every four years. In Manly local government area, there are no wards, and each Councillor represents the entire Council area. The Mayor is also directly elected by community for a term of 4 years.

Manly Council is committed to community consultation, a key component of which is the committee-based **Precinct Community Forums** system. The forum approach was introduced in 1990 to extend the involvement of the community through coordinated consultation and participation. The aim is to involve all property owners, residents and workers in the decisions which affect their local area. Precinct Community Forums are groups of people who live, work or own property in a Precinct area. There are 12 Precinct Community Forums in Manly Council area and Precinct meetings are held monthly. The meetings discuss matters referred by Council for community consultation, and matters of local importance and interest to the community. The decisions of the Precincts are advisory. Their comments are responded to and considered by Council in its statutory decision making role. The Community Forums are organised by the residents. They play a vital role in ensuring that future changes in the local area are taken into account, and are sympathetic to the amenity of the local residents.

Another operational arm of the Council is various Special Purpose Committees and Working Groups. Manly Harbour Foreshore & Coastline Management Committee is one of these committees, which oversees the development of the North Harbour Coastline Management Plan. The Committee meets usually bi-monthly.

SHOROC (the Shore Regional Organisation of Councils) is a cooperative group of Councils on Sydney's Northern Beaches representing Manly, Mosman, Pittwater and Warringah. SHOROC was launched in August 1994 in the belief they had significant shared features that would provide more opportunities for information and resource sharing and joint servicing at a local level. The SHOROC Executive plays a strong role in presenting regional issues effectively to all levels of government. SHOROC operates through a Board, made up of the four Mayors and four General Managers who meet at least quarterly. All member councils make an equal annual contribution to the operating costs of SHOROC and have equal voting rights.

The SHOROC Board is supported by a Management Committee, a Secretariat and a number of key working groups comprising cross council professional officers. SHOROC projects are diverse and divided between four portfolios – Planning, Environment, Community and Corporate. Publication of 'Regional State of the



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Environment' Report is one of the key documents produced by SHOROC each year. The Report contains a chapter of 'Land and Coastline'.

The **Sydney Metropolitan Catchment Management Authority (SMCMA)** is a NSW Government agency responsible for the coordination and management of Sydney's natural resources. In Sydney, natural resources include land, rivers, estuaries and coastal systems. The SMCMA was established under the *Catchment Management Authorities Act 2003*. The SMCMA partners with 39 local councils in the metropolitan catchment as well as State and Federal Government departments.

The **Sydney Coastal Councils Group** was established in 1989 to promote co-ordination between member councils on environmental and natural resource management issues relating to the sustainable management of the urban coastal environment.

The Group consists of 15 councils (Botany Bay, Hornsby, Leichhardt, Manly, Mosman, North Sydney, Pittwater, Randwick, Rockdale, Sutherland, City of Sydney, Warringah, Waverley, Willoughby and Woollahra) adjacent to Sydney marine and estuarine environments and associated waterways. The Group represents over 1.3 million Sydneysiders. This area encompasses the waterways of Broken Bay; Pittwater; Port Jackson, the lower Lane Cove River, Middle and North Harbours; Botany Bay, the Lower Georges and Cooks River; and Port Hacking.

The Sydney Coastal Councils Group provides leadership and encourages a coordinated approach to sustainable coastal management undertaken by and in partnership with the member councils to protect and conserve terrestrial and marine ecosystems. The Group facilitates outcomes concerning coastal issues, exceptional to those the member councils could achieve individually.

The Sydney Coastal Councils Group is a Regional Organisation of Councils that provides project facilitation and coordination on environmental and natural resource management issues that relate to the sustainable management of the coastal urban environment. The Group provides strong advocacy and support for its 15 member councils on coastal, climate change and NRM issues. Being a member council also allows council elected and professional staff the opportunity to exchange ideas at a regional level through SCCG forums, presentations, meetings and conferences.

The **Aboriginal Heritage Office** is a joint initiative by Lane Cove, North Sydney, Manly, Warringah, Willoughby, Ku-ring-gai and Pittwater councils, in a progressive move to protect Aboriginal Heritage in these areas. Part of the work of the Aboriginal Heritage office is to monitor Aboriginal Sites on a day to day basis and long term management reports are developed to ensure their preservation and protection.

Another key role of the Aboriginal Heritage office is to give the Aboriginal people and non-aboriginal people involved with these council areas an avenue of approach to discuss issues or concerns they may have. The office is in direct contact with the Metropolitan Local Aboriginal Land Council and its many resources.

An important part of the role is to communicate with school and other groups and teach children an ethos of understanding to appreciate the unique culture of the Aboriginal people. In association with the local councils, talks, walks and activities are planned to enhance appreciation of Aboriginal culture in the wider community. A selection of information leaflets on various Aboriginal Heritage topics are available to download from AHO's website.

State

Department of Environment, Climate Change and Water (DECCW) emerged in July 2009 from the Department of Environment and Climate Change. The NSW Government's aim was to build a broader organisation able to respond to the challenges presented by climate change and further progress reforms in the sustainable management of our land and water resources.

DECCW is building on the strengths and cultures of its constituent agencies by combining knowledge, innovation, regulatory and field experience to tackle priority environmental, climate change, natural resource

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and cultural heritage issues for NSW. In doing so, DECCW contributes towards achieving its corporate vision through:

- working towards a healthy environment cared for and enjoyed by the whole NSW community
- managing the state's natural resources, including biodiversity, soils and natural vegetation
- managing natural and cultural heritage across the state's land and waters
- acting to minimise the impacts of climate change
- promoting sustainable consumption, resource use and waste management
- regulating activities to protect the environment
- conducting biodiversity, environmental and cultural heritage research to improve decision-making.

NSW DECCW serves a number of key functions including:

- The management of natural and cultural heritage;
- Promotion of sustainable consumption, resource use and waste management;
- Regulation of activities to protect the environment; and
- The undertaking of biodiversity, plant, environmental and cultural heritage research to improve decision making.

DECCW provides financial and technical assistance to councils to help develop and implement sustainable coastline management plans through the Coastal Management Program. Under the program, the NSW Government provides a 50% subsidy to local government for:

- Preparation of coastal studies and coastline management plans aimed at ensuring balanced long term management of the coastline;
- Construction of works for the conservation and/or improvement of beaches and public reserves; and
- Investigation, design and implementation of management measures and works to reduce potential damage from coastal processes in existing developed areas.

Similarly, DECCW also provides financial and technical assistance to councils to help develop and implement sustainable estuary management plans through the Estuary Management Program. The Program was commenced in 1992 to assist local government to better manage estuaries through a strategic process outlined in the NSW Estuary Management Manual.

The NSW National Parks and Wildlife Service (NPWS), which forms part of the Department of Environment, Climate Change and Water, is responsible for protecting the State's flora and fauna, and for managing and maintaining National Parks and Nature Reserves. The NPWS is also responsible for Aboriginal Heritage and sites.

NSW Maritime (formerly Waterways Authority) is a statutory State Government body classified by NSW Treasury as a non-budget dependent general government agency. NSW Maritime is a self-funding entity.

NSW Maritime is responsible for the on-water management of all NSW navigable waters, including coastal areas, estuaries, rivers, lakes and dams to three nautical miles offshore. On-water management responsibilities include the management of safety, the protection of the marine environment from degradation by vessels, the provision of waterways infrastructure for vessels, the licensing of vessel operators, commercial vessels, on-water events, and mooring management.

NSW Maritime the government body which owns the seabed of Sydney Harbour, North Harbour and Middle Harbour and all related tidal bays, rivers and their tributaries. Under the *Ports Corporatisation and Waterways Management Act 1995 (PC&WM Act 1995)* the Waterways Authority (NSW Maritime) is the landowner of Sydney Harbour and its tributaries and therefore controls Sydney Harbour.

NSW Maritime is therefore responsible for management of waterways and the sea bed from mean high water mark (MHW) seaward. As owner of the bed of Sydney Harbour, NSW Maritime is the consent and determining authority for a variety of water-based developments and activities. NSW Maritime is also responsible for the investigation of on-water pollution incidents and issuing clean-up and prevention notices in relation to vessels (in navigable waters that are not required to have a pilot).



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From 4 February 2008, most DAs lodged with NSW Maritime seeking consent for water based development under Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 are likely to be 'integrated development applications' because the development is likely to require a controlled activity approval under the *Water Management Act 2000*.

The change in the DA requirements is a result of the repeal of the *River and Foreshores Improvement Act 1948* and commencement of the controlled activity provisions of the *Water Management Act 2000*.

Under the *Water Management Act 2000*, controlled activities include the erection of a building or the carrying out of a work or the removal or deposition of material and approval and approval is required where the work is carried out in, on or over the bed of any river, lake or estuary.

Once lodged with NSW Maritime, special advertising and notification procedures apply to these DAs under the *Environmental Planning and Assessment Act 1979*. These require a minimum public display period of 30 days, a public notice in a local newspaper and notifications to relevant public authorities and neighbours.

NSW Maritime's DA form has been updated so that the integrated referral(s) requirement can be identified. If relevant, other integrated approvals may also continue to be required, for instance, approvals required under the *Fisheries Management Act 1994*.

Industry & Investment NSW (I&I NSW) acts to foster profitable and sustainable development of primary industries in New South Wales. The department was formed in July 2009 with the amalgamation of at least Mineral Resources NSW, NSW Agriculture, NSW Fisheries and State Forests NSW. One of the seven Divisions, Fisheries, Compliance and Regional Relations, deal with the management of sustainable, commercial and recreational use of NSW fisheries' resources, and the protection of the aquatic environment.

The Division has jurisdiction over all fish and marine vegetation in all waters of the state (including all private and public waters and permanent and intermittent waters) extending to 3 nautical miles offshore (and to 80Nm offshore in those fisheries for which it has jurisdiction under the Offshore Constitutional Settlement). This means that it has management responsibility for all aquatic animals (with the exception of aquatic mammals, reptiles, amphibians and birds, which are managed by the NSW Department of Environment & Climate Change) and responsibility for all marine vegetation and key aquatic habitats including seagrass, mangroves, gravel beds and snags. It has also management and research responsibilities related to threatened fish species, populations and ecological communities.

While I&I NSW is responsible for the management of all aquatic animals, the department is a state government authority with limited on-the-ground staff to effectively regulate the management of aquatic environments. As a result Manly Council's rangers are presently licensed as DPI officers to assist Fisheries with some of their on-the-ground 'localised' regulation functions.

The Department of Planning was established in August 2005, following the de-amalgamation of the former Department of Infrastructure, Planning and Natural Resources. In March 2006, the NSW Heritage Office was incorporated into the department. The functionality of the Department is run through the following 7 divisions:

- Cities and Centers
- Corporate Governance and Support Services
- Heritage Office
- Major Project Assessments
- Metropolitan Planning
- Rural and Regional Planning
- Strategic Sites and Urban Renewals.

In developing its roles and responsibilities, the Department identifies the following five major goals:

1. Sustainable growth in the right locations
2. Improved investor and community confidence

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3. Effective management of natural, environmental and cultural resources and values
4. Diverse, equitable and pleasant neighbourhoods which reflect community needs and aspirations
5. Integrated delivery of regional infrastructure and government activities

Environmental planning instruments (State environmental planning policies, regional environmental plans and local environmental plans) are legal documents that regulate land use and development. Local environmental plans prepared by councils guide planning decisions for local government areas. Through zoning and development controls, they allow councils to supervise the ways in which land is used. Development control plans, prepared in accordance with the *Environmental Planning and Assessment Act*, are also used to help achieve the objectives of the local plan by providing specific, comprehensive requirements for certain types of development or locations e.g. for urban design, and heritage Precincts and properties.

Planning and development within the NSW Coastal Zone (as declared under the *Coastal Protection Act 1979*) is now subject to a Ministerial direction for coastal protection, NSW Coastal Policy, SEPP 71 - Coastal Protection, and the Major Projects SEPP (which identifies coastal development that will need the approval of the Minister for Planning). The NSW Government in June 2001 announced its \$11.7 million Coastal Protection Package to protect the State's beaches, headlands and other coastal features for generations to come.

Comprehensive Coastal Assessment is another key element of the NSW Government's Coastal Protection Package. A Comprehensive Coastal Assessment toolkit is now available to help local councils, government agencies and others undertake important strategic land use planning. The toolkit represents a whole-of-government three-year investment in identifying, analysing and assessing data and information on the physical, biological, social and economic values of the State's coastline.

The Coastal Lands Protection Scheme is used to bring significant coastal lands into public ownership and provides for their long term management and care. The Department administers the Scheme which receives an annual budget allocation of \$3 million for acquisitions. The Scheme, which commenced in 1973, identified certain lands to be protected and acquired. These lands usually included features such as headlands, dunes, hinterland, coastal lagoons and lakes, particularly where the original vegetation was still dominant. Since the Scheme commenced approximately 15,336 hectares at a total cost of \$67.87 million have been acquired (as at March 2008).

The **Department of Water and Energy (DWE)** was created on Friday April 27 2007, which incorporates most of the functions of the former Department of Energy, Utilities and Sustainability (DEUS) and the water-related functions of the former Department of Natural Resources as well as the Metropolitan Water Directorate from the former NSW Cabinet Office.

Some of the functions of the former DEUS, such as the Energy and Water Savings Funds and Action Plans have been transferred to the new Department of Environment and Climate Change. The Accredited Service Provider program was also transferred to the Office of Fair Trading.

Sydney Water, a statutory State owned corporation, wholly owned by the New South Wales Government has three equal, principal objectives:

- to protect public health
- to protect the environment
- to be a successful business.

Sydney Water provides drinking water, recycled water, wastewater services and some stormwater services to more than four million people in Sydney, Illawarra and the Blue Mountains. Drinking water is sourced from a network of dams managed by the Sydney Catchment Authority, then treated and delivered to customers' homes and businesses by Sydney Water.

Sydney Water has Memoranda of understanding with

- the Department of Environment and Climate Change

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- NSW Health

The **Natural Resources Commission (NRC)** was created by the *Natural Resources Commission Act 2003*. The NRC provides independent advice to the NSW Government on a range of natural resource management issues. The NRC reports to the Premier, reflecting its independent nature. The Government has adopted the NRC recommended Standard for Quality Natural Resource Management and state-wide targets for NRM. The targets now form priority E4 of the NSW Government's State Plan. The NRC contributes to priority E4 by:

- reporting on progress towards the targets, and advising Government on resolving issues that are restricting progress
- auditing the effectiveness of CMAs' implementation of their Catchment Action Plan in terms of compliance with the Standard and contribution to the targets
- reviewing technical issues to provide a sound scientific basis for decisions on specific NRM issues
- developing and revising the Standard and targets and facilitating their use by natural resource managers across NSW to drive adaptive management towards targets
- conducting reviews on natural resource issues as requested by the Government.

The standard and targets provide a quality assurance framework and clear goals to ensure that the investments of the NSW and Australian Governments and others in the activities of catchment management authorities are cost effective, protect and improve high value natural resource assets, and maximise integrated NRM outcomes from the property scale to the state scale. The standard and targets support flexible and innovative regional planning, investment and decision-making while ensuring consistency, rigour and accountability for NRM in NSW. The NRC follows, at present, the Strategic Plan 2009-2012.

The **State Emergency Service** is an emergency and rescue service dedicated to assisting the community. It is made up almost entirely of volunteers, with 232 Units located throughout New South Wales. The Units comprise of more than 10,000 volunteer members, who are easily identified by their distinctive orange overalls.

Though major responsibilities are for flood and storm operations, the SES also provides the majority of general rescue effort in the rural parts of the state. This includes road accident rescue, vertical rescue, bush search and rescue, evidence searches (both metropolitan and rural) and other forms of specialist rescue that may be required due to local threats. The Service's trained rescuers also support the full-time emergency services during major disasters.

The SES also assists other emergency services when they are performing major operations. These services include the NSW Police Service, the NSW Rural Fire Service, the NSW Fire Brigade and the Ambulance Service of NSW.

Commonwealth

The Australian Government **Department of the Environment, Water, Heritage and the Arts** (formerly the Department of the Environment and Water Resources) develops and implements national policy, programs and legislation to protect and conserve Australia's environment and heritage. The Department, among others, deals with coasts and ocean issues.

The Department sets the scene for national cooperation in managing coastal issues and ensuring effective and complementary arrangements within and across jurisdictions, and to better reflect the interests of coastal stakeholders through the *Framework for a National Cooperative Approach to Integrated Coastal Zone Management*. The implementation of the Framework is managed through the Intergovernmental Coastal Advisory Group (ICAG), comprised of representatives from the Australian Government, each state government, the Northern Territory Government and the Australian Local Government Association (ALGA). ICAG members meet several times a year to share experiences and to work on Framework implementation.

Another program, the Coastal Catchments Initiative aims to achieve target reductions in pollutant discharges to coastal water quality hotspots. This is being done through the development and implementation of Water



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Quality Improvement Plans, prepared in accordance with the Australian Government's *Framework for Marine and Estuarine Water Quality Protection*.

The **Department of Climate Change** was established on 3 December 2007 as part of the Prime Minister and Cabinet Portfolio. The Government takes the challenge of climate change seriously. The approach is to:

- reduce greenhouse pollution in Australia in the short and long term
- work with the international community to develop a global response that is effective and fair
- prepare for the climate change that we cannot avoid.

The *White Paper, Carbon Pollution Reduction Scheme: Australia's Low Pollution Future*, was released on 15 December 2008. The paper outlines the final design of the Carbon Pollution Reduction Scheme and decisions on other significant climate change programs

A number of initiatives to address climate change such as National Climate Change Adaptation Framework, the National Climate Change Adaptation Programme, the Climate Change Adaptation Actions for Local Government are also relevant for coastline management.

APPENDIX B: FUNDING SOURCES

There is range of financial and technical assistance available to assist implementation of the Coastline Management Plan. The following descriptions of likely sources have been provided to assist Council and the Committee with the implementation process. Potential funding opportunities continue to be developed by State and Commonwealth agencies, particularly through their environmental programs.

The Australian **Federal Government** provides a range of funding opportunities to address important natural resource issues at a local level.

Caring for our Country provides \$2.25 billion in funding over five years from 1 July 2008 to June 2013. It integrates a number of existing natural resource management measures into a consolidated initiative, including the Natural Heritage Trust, the National Landcare Program, the Environmental Stewardship Program, and elements of the Working on Country program. From 2009, funding for Caring for our Country will be offered through annual business plans.

Caring for our Country is delivered in partnership with regional natural resource management groups, local, state and territory governments, Indigenous groups, industry bodies, land managers, landcare groups and other community groups, and non-government organisations to secure improved strategic outcomes across six national priority areas:

- the National Reserve System
- biodiversity and natural icons
- coastal environments and critical aquatic habitats
- sustainable farm practices
- natural resource management in northern and remote Australia, and
- community skills, knowledge and engagement.

Through the **Local Adaptation Pathways Program**, the Australian Government is providing funding to help councils undertake climate change risk assessments and develop action plans to prepare for the likely local impacts of climate change. The Australian Government will provide up to \$50,000 to help councils undertake risk assessments and develop action plans to prepare for the likely local impacts of climate change. The funding will also help councils integrate climate change risk assessment into their broader decision-making processes. The process should align with that outlined in the Climate Change Impacts & Risk Management: A Guide for Business and Government publication Under Round 1 of the Local Adaptation Pathways Program, more than 60 local governments received funding for a total of 33 projects. This funding totalled \$1.5 million. The majority of these councils were located in coastal and urban areas.

The **Threatened Species Network Community Grants Program** is a partnership between WWF-Australia and the Australian Government. Funding is available for on-ground activities to protect threatened species and ecological communities such as: habitat restoration, weeding and feral animal control, monitoring and surveying species populations, fencing and fire management. Funding for individual projects is limited to a maximum of \$50,000 (GST inclusive). A total of \$500,000 is available each year. For more info: www.wwf.org.au/ourwork/species/tsn

The **NSW State Government** also provides a range of funding opportunities for Councils, community organisations and individuals to address important natural resource issues at a local level.

The following funding programs are relevant to coasts & estuaries that provide funding assistance to Local Government generally on a 50% subsidy basis.

The NSW Government's **Coastal and Estuary Management Programs** are administered by the Department of Environment, Climate Change and Water (DECC) with grant funding provided by an annual allocation from NSW Treasury. Funding provided to local councils under the programs does not generally extend to matching

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other State Government sources of funds or funds administered by other State Government agencies. Councils are encouraged to develop partnerships with catchment management authorities (CMAs) and submit applications based on joint funding sources. Financial assistance is provided for up to 50% of the project's costs and is dependent upon State-wide priorities and availability of funding. Where a joint application is prepared with a CMA, a council or group of councils must contribute at least 25% of the project costs, with the CMA contributing up to 25% of the costs.

A review of these programs has resulted in a revised focus on funding, with a greater emphasis placed on:

- _ updating coastal hazard studies to incorporate sea-level rise benchmarks
- _ updating estuary plans to consider climate change impacts
- _ estuary health monitoring and improvement
- _ focusing on high-hazard coastal areas and stressed estuaries.

During 2007–08, 36 grants totalling \$2.89 million were approved under the Coastal Management Program in 17 local government areas for projects such as hazard mitigation works, dune restoration and enhancement of coastal facilities. Similarly, the Estuary Management Program approved 79 grants totalling \$3.52 million in 39 council areas. These funds have supported projects such as protection and improvement works, rehabilitation of degraded coastal wetlands and habitats, and environmental monitoring.

The **Floodplain Management Program** provides technical advice, data collection and funding assistance on a varying subsidy basis. Activities subsidised include studies, mitigation works and other measures that reduce the impact of flooding and flood liability on existing owners and occupiers of flood liable land (existing problems) or ensure that future development is compatible with the flood hazard (potential additional problems).

In 2007–08, DECCW allocated \$7.97 million for 254 grants to 85 councils and two authorities under the State Floodplain Management Program for the development and implementation of plans.

The **NSW Climate Change Fund** was established in July 2007. This new program is currently being developed. It includes:

- \$100 million Residential Rebate Program providing rebates for hot water systems, insulation and rainwater tanks and washing machines
- \$30 million NSW Green Business Program
- \$30 million Public Facilities program
- \$100 million Renewable Energy Development Program
- \$100 million Recycling and Stormwater Harvesting Program
- \$20 million School Energy Efficiency program
- \$20 million Rainwater Tanks in Schools program

In addition, the Climate Change Fund provides \$2 million a year for the Central Coast Water Savings Fund.

Grants are available from **Recreational Fishing (salt water) Trust Fund**, operated by I&I NSW for various groups including councils for the improvement of recreational fishing for a period of one year, up to a maximum of three years. Applications are sought in February each year but can also be submitted any time. Contact Recreational Fishing Trusts Executive Officer.

Each year up to \$1.35 million is distributed on a dollar-for-dollar basis under **Sharing Sydney Harbour Access Program**, a NSW government initiative operated by the Department of Planning to improve public access to and enhance the recreational enjoyment of Sydney Harbour and its tributaries for the people of and visitors to Sydney. The Sharing Sydney Harbour Access Program was launched in February 2003 to assist with implementing the Sharing Sydney Harbour Access Plan. The NSW Government has recently announced that the Program will be extended over five years to provide \$6.75 million until 2013. Grant is available for specific capital works projects such as walking tracks, cycle paths, new public waterfront parks, jetties, pontoons and boat launching facilities.

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The aim of the **Environmental Restoration & Rehabilitation Grants** is to improve the capacity of communities and organisations to protect, restore and enhance the environment. The grants are offered by the Environmental Trust, administered by the Department of Environment, Climate Change and Water (DECC). The Trust is offering ten competitive grant programs in 2009 up to a value of \$6.75 million. The Objectives of the Environmental Restoration and Rehabilitation Program are:

- to restore degraded environmental resources, including rare and endangered ecosystems
- to protect important ecosystems and habitats of rare and endangered flora and fauna
- to prevent or minimise future environmental damage
- to enhance the quality of specific environmental resources
- to improve the capacity of eligible organisations to protect, restore and enhance the environment
- to undertake resource recovery and waste avoidance projects and to prevent and/or reduce pollution.

Total funds being offered under the R&R program in 2009 are: \$1.5 million allocated to the Community grants program and \$1.5 million allocated to the State and Local Government grants program. Grants between \$5,000 and \$100,000 are available.

Over the next five years (2006-11?), the **City and Country Environment Restoration Program** will make \$80 million in new grants available to fund local environment programs. Projects will support stormwater harvesting and its reuse, waste recycling and avoidance, and campaigns to prevent litter and illegal dumping, as well as initiatives to restore local waterways and urban bushland.

The **Better Boating Program** provides up to 100% funding to local government and other agencies for new and improved boat ramp facilities within Sydney Harbour. The Better Boating Program is funded by the NSW Maritime and is administered as part of the Maritime Infrastructure Program (MIP).

The program provides funding towards:

- boatramp construction
- car/trailer parking
- pontoons and jetties at boatramp sites
- wash-down areas
- fish cleaning facilities, landscaping and other amenity improvements at boatramp sites.

Under the program funding is also made available for major upgrades of existing boat ramps and additional facilities such as pontoons and wharfs at appropriate boat ramp sites.

The **Metropolitan Greenspace Program (MGP)** has been identified in the Government's City of Cities plan for Sydney's future as a key initiative for improving links between bushland, parks, waterways and centres. In implementing the program, the Department of Planning works closely with local councils to plan and improve regionally significant greenspace, including parks, trails and reserves.

In 2008, MGP delivered \$2.4 million to councils across Sydney on a dollar-for-dollar basis for the embellishment of Sydney's trails and open space. In 2009, the Department of Planning commits a further \$2.4 million towards MGP projects.



APPENDIX C: STATE OF THE ENVIRONMENT (MANLY COUNCIL) – MONITORING INDICATORS & DATA

Indicators	2006/07	2007/08	2008/09	Comments
Land Clearing and Re-vegetation				
Approvals to remove trees (private land)	159	193	173	
Total number of local native plants supplied to volunteers, contractors and residents	10,679	13,237	8,576	
Air Quality				
Air pollution complaints received by Council	20	8	3	
Greenhouse Gas Emissions				
Registered vehicles in council LGA*	23,113	23,727	24,585	Data source RTA
Number of council fleet vehicles^	170	162	177	
GHG emissions from all council fleet vehicles (tonnes CO2e)^	1,335	1,367	1,384	
Electricity use – council's operations (mWh)	5,698	5,441	5,427	
GHG Emissions from kilowatt hrs (tonnes CO2e)	5,485	5,775	5,760	
Stormwater				
Number of gross pollutant traps (council control)	23	24*	23**	*Two units were not performing to full operational capacity during 2007/08.
Total gross pollutants removed from GPTs (tonnes)	183	158*	79**	** Four units were not performing to full operational capacity during 2008/09
Water Consumption				
Total LGA potable water use (kilolitres)	3,776,919	3,565,403	3,774,512	
Total residential potable water use (kilolitres per capita)	80	76	77	
Total council potable water use (kilolitres)	104,967	79,185	80,350	
Biodiversity Condition				
Noxious weed notices*	48	83	40	
Noxious weed assessments undertaken*	0	47	80	
Number of registered active Bushcare volunteers	210	66	86	
Bushcare program volunteer hours	583	528	598	
Number of active volunteer groups	16	11	12	
Number of native plant species recorded	449	449	449	
Number of threatened flora	10	10	10	
Number of threatened fauna	20	20	20	
Number of endangered ecological communities	2	2	2	
Number of endangered fauna populations	2	2	2	
Number of feral fauna species targeted through programs	2	2	1	



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Indicators	2006/07	2007/08	2008/09	Comments
Population				
Residential density (persons per hectare)*	25.82	26.21	26.20	
Noise				
General noise complaints received	40	90	87	
Barking dog complaints received	7	67	41	
Waste				
Total waste to landfill including general cleanup (tonnes)	7,922	7,858	7,333	
Total waste to recycling including metal and green waste (tonnes)	7,479	7,576	6,618	
Total waste to landfill including general cleanup per capita (kg)	204	198	185	
Total waste to recycling including metal and green waste per capita (kg)	193	191	167	
Green waste diverted from landfill per capita (kg)	41	44	30	
General cleanup sent to landfill per capita (kg)	22	22	30	
Aboriginal Heritage				
Number of Aboriginal Heritage Sites	110	112	99*	Data provided to Council by DECCW through the AHO for the 2008/09. SoE has revealed anomalies in previously reported Aboriginal heritage site data.
Non-Aboriginal Heritage				
Total Number of Non-Aboriginal Heritage items	306	312	314	
Number of built items	194	199	201	
Number of landscape items	78	79	79	
Number of archaeological Items	34	34	34	
Heritage conservation areas	2	2	2	

Source: SHOROC State of the Environment Report 2008/2009, Manly Council data