



Image – Looking west across the Lake Illawarra Entrance Channel towards the Illawarra Escarpment, Windang Island is in the foreground.

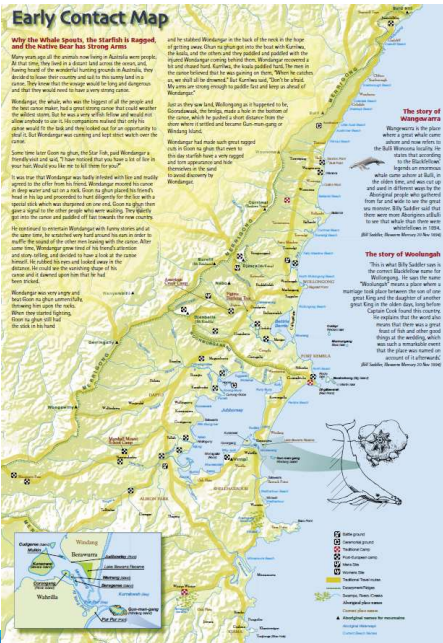
# Implementing the Lake Illawarra Coastal Management Program

## A YEAR OF LEARNING

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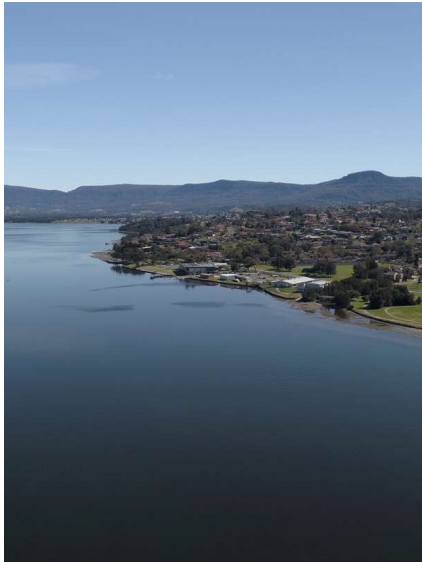
# Moolawang Ngayagang Yanba Come to the mouth of the Lake with me

## Lake Illawarra is on Dharawal Country.

- We begin today by acknowledging the people of Bundjalung Nation, Traditional Custodians of the land on which we meet, and pay my respects to their Elders past and present and emerging.
- We would also like to acknowledge the people of the Dharawal Nation, who are the Traditional Custodian of Lake Illawarra's lands and waters.
- We extend that respect to Aboriginal and Torres Strait Islander peoples here today.
- Traditional Dharawal clan groups and their people occupied the southern part of the Dharawal area with several camp sites around Lake Illawarra including Berkeley and Hooka Creek.



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# Overview

- About Lake Illawarra and the Coastal Management Program
- Moving from Stage 4 to Stage 5 of the Coastal Management Framework
- CMP Governance
- Integrating actions into the IP&R Framework
- Year 1 Actions
- Celebrating success
- Sharing Learnings



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2000: natural entrance, with varying opening position south or north of Windang Island



2009: trained entrance, with twin breakwaters and southern training wall fixing the entrance opening position.

Estuary Area: 35km<sup>2</sup>  
 Catchment Area: 240km<sup>2</sup>  
 Average Rainfall: 995.35mm  
 2018/19 Rainfall: 660mm

# About Lake Illawarra

- Lake Illawarra is a large wave dominated barrier estuary system with a shallow flat bottomed bed.
- In its natural condition it was an ICOLL, intermittently closed or open lake or lagoon.
- Between 2000 and 2007, it was permanently opened.
- The entrance breakwaters have resulted in major geomorphic, hydrodynamic and ecological changes to the Lake.
- Lake Illawarra is in a state of transition towards more marine-like estuarine ecology in response to the permanently open entrance conditions and changed tidal regime.



2017: Mangroves establishing in bay adjacent to Pelican Park

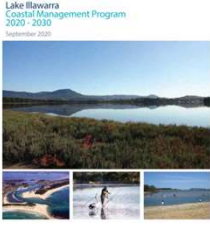


2021: Mangroves in bay adjacent to Pelican Park

Images obtained from the Lake Illawarra Information Synthesis Report



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**Lake Illawarra Coastal Management Program 2020-2030**  
September 2020

**Identified Threats to Lake Illawarra**


	Risk Rating	
	Now	Future
Water pollution	Very High	Very High
Catchment development	Very High	Very High
Changes due to entrance channel opening	Very High	Very High
Loss of estuarine vegetation	High	High
Wetland degradation	High	High
Litter, plastics and marine debris	High	High
Contaminated sediments	High	High
Inappropriate / degraded / insufficient infrastructure	High	High
Loss of tangible and intangible cultural heritage	High	High
Foreshore development encroaching public land	Medium	Very High
Loss of riparian habitat	Medium	Very High
Foreshore and bank erosion	Medium	High
Climate change	Medium	High
Park management practices impacting adjacent natural areas	Medium	Medium
Commercial fishing*	Medium	Medium
Inefficient/ Incorrect Lake management	Medium	Medium
Introduced species	Low	Medium

\*Commercial fishing is managed by DPI Fisheries and changes to local fishing regulations are beyond the scope of this CMP.



## Lake Illawarra Coastal Management Program

- Sets the long-term strategy for the coordinated management of Lake Illawarra
- The overall intent of the CMP is to work towards achieving ecological sustainability for Lake Illawarra over the long term
- Outlines 39 actions to be implemented over 10 years
- Actions are divided into nine management strategies that address the identified threats to the Lake
- Delivery of the CMP is estimated to cost \$36,340,000 over 10 years.



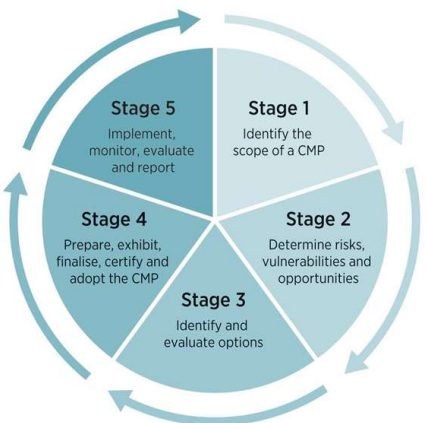
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## Coastal Management Framework

### Moving from Stage 4 to Stage 5

- Slow and steady – It took around nine months between submission to the Minister and gazettal of the CMP.
- During this time three important factors were considered –
  - Memorandum of Understanding (MOU) between Wollongong City Council and Shellharbour City Council
  - Keeping key stakeholders engaged
  - Developing a good governance framework
  - Integrating the CMP into IP&R



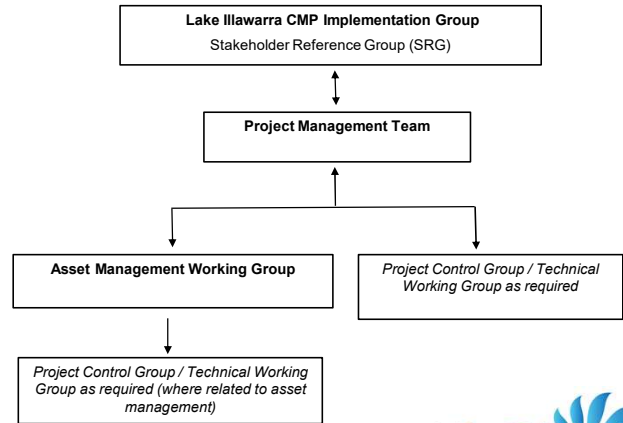


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# Designing a Governance Framework for the Lake Illawarra CMP

- Design was guided by CMP action PM2 and the MOU
- Include all CMP Stakeholders responsible and supporting of action implementation
- Consists of four groups -
  - Lake Illawarra CMP Implementation Group,
  - Lake Illawarra Project Management Team
  - Asset Management Working Group
  - Action Specific Technical Working / Project Control Groups
- Groups guided by specific Terms of Reference / Charters



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# Integrating the CMP into IP&R Framework



- The IP&R framework includes a suite of integrated plans that set out a vision, goals and strategic actions to achieve them and involves a reporting structure to communicate progress
- It is used by all New South Wales Local Councils
- Councils are currently updating their IP&R documents, including –
  - Community Strategic Plan (CSP)
  - Resourcing Strategy
  - Delivery Program
  - Operational Plan
- This update allows us to integrate the CMP into all documents



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Action ID	Action	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
W01	Implement a risk based decision-making framework for the Lake Biawarra catchment	\$200,000	\$40,000									\$240,000
W02	Upgrade existing stormwater quality management measures, or install new measures, which may include water sensitive urban design or other options that will improve water quality as well as enhance habitat and coastal safety	\$20,000	\$400,000						\$1,000,000			\$1,460,000
W03	Review and provide maintenance and clearing regime for existing stormwater quality measures	\$20,000	\$600,000						\$1,500,000			\$2,620,000
W04	Design and implement targeted catchment input monitoring as required for developments resulting in a large-scale change or identification of high risk					\$20,000						\$20,000
W05	Reduce sediment loads to tributaries of the Lake by improving compliance with erosion and sediment controls for development sites	\$160,000	\$140,000	\$180,000	\$180,000	\$180,000	\$160,000	\$160,000	\$180,000	\$180,000	\$180,000	\$1,660,000
W06	Reduce the impact of sewer overflows											\$0
W07	Implement existing water quality monitoring programs for industry health, recreational use and physico-chemical and bacteriological indicators in the Lake and its tributaries	\$120,000	\$200,000						\$200,000			\$1,120,000
W08	Improve fish management	\$20,000	\$210,000						\$200,000			\$230,000
W09	Investigate and manage potential pollution sources including contaminated sites that contribute to poor water quality in the lake		\$240,000									\$240,000
W10	Coordinate integration of key objectives and strategies from the CMP into relevant planning and policy documents of both Councils	\$40,000							\$50,000			\$100,000
W11	Provide ongoing coordinated management of the Lake, which will require ongoing support for existing staff resources	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$2,000,000
W12	Develop and implement a community engagement and participation strategy that enhances the community's knowledge of, skills in and involvement in, protecting Lake Biawarra	\$40,000	\$400,000						\$200,000			\$640,000
W13	Establish a Lake Biawarra Basin Management Working Group that provides coordination services for agencies that manage assets around the Lake Biawarra Basin	\$20,000	\$20,000						\$20,000			\$100,000
E01	Investigate options to manage erosion and accretion changes in the entrance channel and implement management solutions	\$600,000				\$1,200,000						\$1,800,000
E02	Undertake small scale works to break existing, including any to maintain swimming access		\$100,000			\$100,000			\$200,000			\$500,000
E03	Undertake emergency works or small scale non-emergency works as required to mitigate known risks to property and public safety	\$100,000	\$600,000									\$700,000
E04	Monitor changes to the entrance channel	\$10,000			\$5,000				\$5,000			\$30,000
E05	Monitor and maintain existing entrance channel infrastructure, with any works to be informed by E01-E04 and E04	\$200,000	\$800,000						\$1,000,000			\$2,000,000
E06	Rehabilitate vegetation and manage public access along shorelines and banks of the Lake, its tidal tributaries, streams and broader low-lying areas	\$300,000	\$1,200,000						\$800,000			\$2,300,000
E07	Undertake targeted action to control damage to freshwater and lake vegetation, including ingressives	\$100,000	\$470,000						\$200,000			\$1,170,000
E08	Prepare and deliver an information program for the Lake catchment	\$20,000	\$400,000						\$200,000			\$1,020,000
E09	Prepare and implement an estuarine macrophyte mapping and monitoring program	\$20,000	\$10,000			\$50,000			\$50,000			\$160,000
E10	Develop and implement a program to enhance opportunities for estuarine vegetation migration		\$170,000						\$100,000			\$270,000
R01	Manage freshwater and estuarine recreational infrastructure	\$1,277,000	\$2,700,000				\$4,100,000		\$4,100,000			\$16,177,000
R02	Construct new sections of shared pathways to complete the pathway linkage around the Lake	\$200,000	\$700,000						\$400,000			\$1,300,000
R03	Negotiate a public "right of way" along the shoreline, as opportunities present themselves											\$0
R04	Build on the Tourism opportunities for Lake Biawarra											\$0
R05	Conduct small scale mapping to improve public recreational outcomes and to improve the functionality of recreational coastal infrastructure	\$200,000	\$200,000						\$200,000			\$1,000,000
R06	Investigate the need for and feasibility of larger scale mapping of bays and estuaries to create, or other measures to improve recreational amenity and access within the Lake Biawarra catchment area, the changed nature of the entrance channel linkages impacted on recreational use	\$200,000	\$200,000						\$200,000			\$1,000,000
C01	Protect and promote cultural heritage in and around the lake and its catchment	\$100,000	\$480,000						\$500,000			\$1,200,000
P01	Undertake a bank condition assessment and determine and implement erosion control measures	\$40,000	\$210,000						\$200,000			\$450,000
P02	Improve the environmental performance and outcomes for shoreline protection works when the removal of existing or construction of new infrastructure is required, and demonstrate and distribute this	\$100,000	\$100,000						\$200,000			\$500,000
P03	Undertake bathymetric survey of the entire Lake and tributaries up to the tidal limit				\$50,000							\$50,000
M01	Update Asset Management Plans for all publicly owned and managed assets to clearly identify asset at risk from inundation over future floodplains, including tidal inundation		\$60,000						\$70,000			\$130,000
M02	Update of Lake Forewarn Adaptation Plan for public community and environmental assets				\$10,000		\$10,000					\$20,000
M03	Incorporate tidal inundation mapping into strategic land use planning documents		\$20,000						\$50,000			\$70,000
M04	Water level and condition monitoring for all lake inundation events	\$10,000	\$40,000						\$50,000			\$100,000
M05	Investigate novel solutions to manage inundation risks to assets such as stormwater, sewer, and water, railways, roads and bridges, etc				\$10,000				\$20,000			\$30,000
M06	Develop and implement a fauna management program including shorebirds, fish, and other fauna	\$20,000	\$60,000						\$40,000			\$120,000

# Year 1 Actions Status Report


- 24 CMP actions were scheduled to commence in 2021/22
- Of the 24 actions to be implemented in year one of the CMP -
  - 20 are in progress,
  - 4 are delayed,
- One action that has commenced early
- 3 are to be completed on an "as required basis"



# Year 1 Actions Projects and Partnerships




- Collaborative relationships with diverse group of stakeholders including –
  - Wider community
  - State Government Agencies
- These stakeholders are working together on a variety of projects –
  - Litter prevention
  - Natural Area Restoration
  - Water Quality Monitoring
  - Entrance Channel Options Study



**Estuary Health Condition**  
Water quality parameters and estuary health indicators are measured every month at 11 sites in Lake Illawarra. The estuary health condition grading is based on chlorophyll *a* and turbidity levels across the year. Most sites were found to be in good condition, with the sites in the main body of the lake rated very good. Site 4 at Darling Bay is the only site to be rated poor, largely as a result of several high chlorophyll *a* and turbidity events over the summer. This sampling was occurred since 2013, and several sites are showing a long term decreasing trend over time in turbidity and chlorophyll *a*. This is a good sign, as despite this being a wet summer compared to other years and hence more catchment runoff, the health of some sites within the estuary continues to show improvement.

**Recreational Water Quality**  
Three sites have been sampled over summers since 2018/19 for enterococci levels to give an indication of recreational water quality for primary and secondary contact. The sites were suitable for swimming and playing most of the time especially at Shell Park and Karahooka. However, the water may be susceptible to pollution from potential sources of faecal contamination, especially after prolonged heavy rain. Rainfall is the major driver of pollution to recreational waters, generating stormwater runoff and triggering untreated discharges, and it is recommended not to go swimming after rain.

**For more detailed information on the monitoring program, please refer to the accompanying technical report on Council's website.**

**Estuary health indicators**  
Chlorophyll *a* is a measure of microscopic algae biomass in water. Excessive input of nutrients from catchment runoff can increase chlorophyll *a* levels, leading to algal blooms and detrimental effects on estuarine plants and animals. Turbidity is a measure of light scattered by suspended particles such as sediment, algae and dissolved material in the water. Lower low turbidity levels in the estuary is important for seagrasses, fish and other organisms.


## Year 1 Actions


### Water Quality and Estuary Health Monitoring Program

- Action WQ7 in the CMP calls for water quality monitoring
- Monthly monitoring for estuary health at 11 sites
- Four sites included in the Beachwatch Program
- Work closely with DPE, grant funding enables Councils to continue long term monitoring program
- Links with the Marine Estate Management Strategy

**Table 6: Results of trend analysis for chlorophyll *a*, turbidity, total nitrogen and total phosphorous at all sites**

Site	Chlorophyll <i>a</i>	Turbidity	Total nitrogen	Total phosphorous
2	none	none	none	none
3	none	none	Increasing trend	Increasing trend
3A	Decreasing trend	Decreasing trend	Decreasing trend	none
4	Decreasing trend	Decreasing trend	Decreasing trend	Decreasing trend
5	Decreasing trend	Decreasing trend	Decreasing trend	Decreasing trend
6	Decreasing trend	Decreasing trend	Decreasing trend	Decreasing trend
NS1	none	none	Decreasing trend	none
NS2	none	none	none	none
NS3	none	none	none	none
EW1	none	none	none	none
EW2	none	none	none	none






## Year 1 Actions

### Community Programs

- The CMP identifies that a disengaged community can threaten the success of implementation
- Community can help reduce threats to Lake Illawarra
- Volunteer programs include Bushcare, Dunecare, Rise & Shine
- Opportunities for the community to participate in implementation of the CMP set to expand thanks to two new grants



# Celebrating Success

- Shared Staff Resource between Councils allows for coordination of CMP Implementation
- Nurturing relationships with internal and external stakeholders is key
- Establishment of a grant support fund allows Councils to be ready to apply for funding
- Since certification Councils have received grant funding for joint projects implementing 14 actions
- Grant funding obtained through the NSW Government Coast and Estuary Grant Program exceeds \$1M



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# Sharing Learnings



- Keep up to date with the Marine Estate Management Strategy
- Expect delays if it's not lockdown its La Nina
- Staffing difficulties and grant funding
- Wording of actions and integrating them into IP&R
- Look for opportunities to improve engagement with key stakeholders
- Harness community passion



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