

# Appendix E

## Implementation of the Tuggerah Lakes Estuary Management Plan



A detailed report on the implementation of the Tuggerah Lakes Estuary Management Plan (EMP) is available online. The EMP included four individual action plans relating to water quality, ecology, socio-economics and knowledge and management. In summary, a total of 86% of the actions have been completed or are ongoing. Outstanding actions will be reviewed as part of the CMP process. Tables AE.1 to AE.4 detail these actions. The priority programs and actions along with their progress, either complete, ongoing, or needing further work are shown below.

**Table AE.1 Water Quality Action Plan**

Priority Program	Action 1	Action 2	Action 3	Action 4	Action 5	Action 6						
<b>PP1 Streambank rehabilitation</b>	Prepare creek management plans and identify areas experiencing poor creek condition or streambank erosion (including urban streams)	Complete	Develop a programme of prioritised remediation measures	Complete	Implement rehabilitation works including bank stabilisation, bush regeneration and limit stock access/ boat wash - \$500K p.a.	Ongoing	Assess effectiveness of rehabilitation, collate data, present to stakeholders and inform management	Ongoing				
<b>PP2 Stormwater management - new urban areas</b>	Review Stormwater Management Plan to improve strategy for new urban areas including DCP's, guidelines and any supporting works	Ongoing	Develop and apply an assessment protocol to determine appropriate stormwater interventions (in terms of flow and WQ) for new developments	Ongoing	Design and cost stormwater harvesting and stormwater pollution control infrastructure (including ongoing maintenance costs)	Ongoing	Manage the installation of infrastructure (funding through S. 94)	Ongoing	Assess effectiveness of stormwater management programmes in achieving objectives and adjust management plans accordingly	Ongoing		

Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP3 Stormwater management - existing areas</b>	Prepare a 5 year plan for stormwater remediation upgrades focusing on priority catchment first rather than available space	Complete	Undertake design and construction on a 5 year plan as part of the drainage infrastructure upgrade programme	Ongoing	Assess the performance of the devices and link back to design and management plans	Ongoing						
<b>PP8 Audit for compliance in catchments</b>	Develop a rationale and criteria for conducting audits	Complete	Undertake the audits and provide constructive advice	Ongoing	Link results for the audits to management planning	Ongoing						
<b>PP9 Develop a sub-catchment prioritisation tool</b>	Develop a process/ system for assessing which catchments are a high priority, and what type of intervention is required	Complete	Collect catchment data and device performance data to improve understanding of priorities and responses	Ongoing	Undertake the assessments on an annual basis for prioritising works	Ongoing	Use the information for refining planning (Stmw Mgt Plan) and doing drainage upgrades (PP3)	Ongoing				
<b>PP10 Recreational water quality</b>	Revise the existing programme to inform management while ensuring it continues to meet statutory requirements	Complete	Resolve question about faecal sources in the estuary	Ongoing	Target and fix sources as needed	Ongoing						

Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP20 Maintenance of stormwater devices</b>	Continue existing maintenance programme	Ongoing	Review adequacy of existing devices and retrofit devices where necessary to improve performance and maintainability	Ongoing	Develop a system for handling, processing and disposing of collected material	Complete	Record data on collected material	Ongoing	Review data and feed into catchment management decisions and design of future devices	Ongoing	Review adequacy of maintenance programmes	Ongoing
<b>PP26 Educate people about stormwater pollution</b>	Identify key groups that need to be targeted	Complete	Devise and implement the education programme	Ongoing	Assess attitudinal and behavioural change through time to determine effectiveness	Ongoing						
<b>PP27 Sustainable use of water</b>	Review of innovative schemes and current best practice	Ongoing	Conduct trial of incentive schemes	Ongoing	Implementation of successful trial	Ongoing	Review community acceptance, cost impacts and demand changes	Ongoing				

Table AE.2 Ecology Action Plan

Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP4 Restore degraded catchment habitat</b>	Identify catchment habitats important to the estuary that require active rehabilitation and management	Complete	Assess rehabilitation requirements and plan the approach to habitat management	Complete	Implement the rehabilitation/ bush regenerators programme	Ongoing	Assess effectiveness of habitat rehabilitation	Ongoing				



Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP5 Foreshore rehabilitation</b>	Identify location of important foreshore habitat	Complete	Assess threats and future uses to determine if rehabilitation is required and set objectives for rehabilitation	Complete	Develop and implement rehabilitation programmes and designate protective zones	Ongoing	Assess effectiveness of rehabilitation in meeting objectives	Ongoing				
<b>PP7 Limit access to sensitive parts of the estuary</b>	Identify points of public access to sensitive habitats and assess appropriate controls	Ongoing	Implement access controls and educate the community and key stakeholders	Ongoing	Assess recovery/ protection of the sensitive habitats and feed back into management decisions	Ongoing						
<b>PP11 Monitor key wetlands</b>	Identify key natural wetlands important for the estuary and investigate appropriate monitoring programmes (qualitative and quantitative)	Complete	Provide an ongoing monitoring programme and develop a series of triggers that indicate when urgent action is required	Complete	Review wetland conditions and revise management accordingly	Ongoing						
<b>PP17 Protect important catchment habitats</b>	Identify sensitive threatened habitats in the catchment that are important to the estuary and require strategic protection	Complete	Develop strategic policies and plans that protect these habitats	Ongoing	Implement the programmes	Ongoing	Assess the effectiveness of strategies and plan future programmes	Ongoing				

Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP22 Maintenance of foreshore rehabilitation areas</b>	Develop a maintenance schedule for rehabilitation sites	Ongoing	Implement the maintenance schedule	Ongoing	Review the effectiveness and longevity of the rehabilitation programmes	Ongoing						
<b>PP24 Assess riverine ecology and river flow</b>	Assess the ecology of tributaries to determine how regulation is affecting riverine and estuarine health	Complete	Determine the flow requirements for river/estuary health	Complete	Examine ways of improving flow without impacting on water supply (e.g. by modelling changes to requirements from water cycle management planning)	Ongoing						

**Table AE.3 Socio-economic Action Plan**

Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP6 Foreshore recreation facilities</b>	Undertake community consultation to determine interest groups and recreational requirements	Complete	Identify and designate recreational locations. Develop prioritised works schedule addressing the interests of the various foreshore users	Complete	Implement programmes of works for new foreshore facilities and programme to encourage users back to the lakes (including boating facilities and business opportunities)	Complete	Assess community response to the improvements	Needs further work				

Priority Program	Action 1	Action 2	Action 3	Action 4	Action 5	Action 6
<b>PP12 Develop a population strategy</b>	Assess the need/feasibility for determining the limits of impact the lake can sustain before irreversible change	Complete Determine load and flow changes under a range of scenarios and assess estuarine processes to determine "tipping point"	Complete Include as a consideration in population planning	Needs further work		
<b>PP14 Develop partnerships with business</b>	Establish a "Friends of the Lake" business forum	Needs further work Devise initiatives/programmes that solve estuary/catchment management problems and still integrates business with estuary requirements	Needs further work Assess the initiatives and field test them	Needs further work		
<b>PP18 Entrance Management</b>	Provide funding and resources for the continuation of the dredging programme	Complete Assess ocean entrance dredging effects on key estuarine/physical processes	Complete Develop flood, safety and ecological triggers that aid in determining dredging requirements/timing	Ongoing Review the dredging program in light of any new information	Needs further work	

Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP19 River mouth dredging</b>	Assess all creek entrances and determine the need for dredging and identify causes of sedimentation	Ongoing	Develop remediation plans where sedimentation can be minimised (tie to PP1)	Complete	Develop a rolling plan for dredging creeks that need it	Needs further work	Implement the dredge programme and the remediation programme and obtain rolling approvals (N.B. remediation is costed in PP1)	Needs further work	Review effectiveness of programmes and feed back into management planning	Needs further work		
<b>PP21 Maintain foreshore recreation facilities</b>	Assess the maintenance required at each site to improve the visitor experience (clean beaches, wrack harvesting, beach nourishment)	Ongoing	Develop and implement a maintenance programme	Ongoing	Review the effectiveness	Needs further work						

**Table AE.4 Knowledge and Management Action Plan**

Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP13 Develop partnerships with universities</b>	Identify academic institutions and researchers with expertise to review existing catchment management practices	Complete	Develop memoranda of understanding between Council and the universities	Complete	Sponsor research programmes that answer management questions (see PP23)	Ongoing	Feed this information back into management plans (PP23)	Ongoing				



Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP15 Develop and estuary management body</b>	Develop an organisational model for implementing the EMP, educating staff and the public, liaising with users etc.	Complete	Establish the estuary management body based on the management model	Ongoing	Review the effectiveness of the team	Ongoing	Consult with the community to determine satisfaction with the administration of estuarine programmes. Revise administration if required	Needs further work				
<b>PP16 Prepare and implement a funding strategy</b>	Review spending and effectiveness of any environmental levy	Ongoing	Evaluate additional funding strategies (grant funding)	Ongoing	Link to management reporting (especially Council's Management Plan)	Ongoing						
<b>PP23 Address key estuary management questions</b>	Resolve outstanding high priority management questions	Complete	Develop a process for identifying new management questions	Ongoing	Develop a protocol for undertaking the research including QA/QC procedures such as peer review	Ongoing	Undertake data collection and assessment	Ongoing	Develop a process for incorporating new knowledge into management planning and programmes	Ongoing		

Priority Program	Action 1		Action 2		Action 3		Action 4		Action 5		Action 6	
<b>PP25 Educate community and stakeholders about the estuary</b>	Preparation and implementation of community education programme focusing on residents, tourists and school students (as future estuarine managers)		Complete	Preparation and implementation of capacity building programme for staff. Needs revisiting. Commenced through internal "Smart Eats" program.		Ongoing	Review effectiveness of programmes and revise approach		Needs further work			