

Wagonga Inlet Estuary Management Study and Plan - Review 2010

July 2010



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Abbreviations.

BMP- Batemans Marine Park

CoC- Narooma Chamber of Commerce

DECCW- NSW Department of Environment, Climate Change, and Water

DoL- NSW Department of Lands

DoP- NSW Department of Planning

EPA- NSW Environment Protection Authority

ESC- Eurobodalla Shire Council

Fisheries- NSW Department of Industry and Investment- Fisheries

LEP- Local Environment Plan

MPA- Marine Park Authority

NPWS- NSW National Parks and Wildlife Service

RCVP- Royal Coastal Volunteer Patrol (Narooma)

RTA- NSW Roads and Traffic Authority

SRCMA- Southern Rivers Catchment Management Authority

WLALC- Wagonga Local Aboriginal Lands Council

Introduction

1.1 Background

Wagonga Inlet is located in the Eurobodalla Shire on the south coast New South Wales. The Inlet adjoins the township of Narooma that has a population of approximately 8 000, which includes the suburbs of Dalmeny and Kianga. The Wagonga Inlet estuary covers an area of approximately 6.9km² with an identified catchment area of around 110km². The entrance of the inlet has been open to the ocean permanently since the construction of two entrance training walls in the 1970's. The estuary extends approximately 9km inland, and is split into two basins- Wagonga and Forsters Bay. Major tributaries to feed the Wagonga Inlet are Billa Bilba, Punkally and Burrimbidgee Creeks. The waterway is popular with recreational fishers and has an established thriving oyster industry. The Wagonga Inlet is part of the Batemans Marine Park.

In November 2001 the *Wagonga Inlet Estuary Study and Plan* was completed under direction of the Eurobodalla Shire Council (ESC), the Wagonga Inlet Estuary Management Committee (now disbanded), and the NSW Department of Land and Water Conservation (now DECCW), following the planning process for estuary management as laid out in the NSW Government's *Estuary Management Manual*. The Plan formulated actions that would assist in maintaining identified values of the inlet; being environmental, cultural, scenic, recreational and water safety and quality.

Identified goals of the plan were to:

- Protect water quality within the inlet for human health and to maintain a healthy ecosystem;
- Ensure future development does not detract from the values of the inlet and is appropriately designed;
- Conserve the natural ecological communities and their component flora and fauna;
- Protect and increase recognition of Aboriginal and European heritage;
- Improve boat navigation and safety; and
- In keeping with conservation values, ensure equitable use of the inlet's waterway and recreational resources.

For more information on the area covered under the plan, including regional context and a background to the Wagonga Inlet Estuary, please see the original document available through Eurobodalla Shire Council's website at:

http://www.esc.nsw.gov.au/site/Environment/Estuaries/Estuary/narooma/WagongaEMS_01.pdf .

1.2 Purpose of this review

The purpose of this review is to recognise the achievements of the *Wagonga Inlet Estuary Management Study and Plan 2001*. The review will identify new management issues that have developed since the original Plan was adopted, with the overarching aim to maintain the *Wagonga Inlet Estuary Management Plan 2001* as a current and ongoing management tool for the Inlet.

Many of the actions identified in the *Wagonga Inlet Estuary Management Study and Plan 2001* have been fully implemented or incorporated into ongoing management systems, policies and plans. Completed projects, such as increased pollution monitoring and remediation, dredging of the navigation channel, construction of the Mill Bay Walkway and bush regeneration at Ringlands Point, have benefited the oyster industry, local and visiting boaters, bushwalkers and the environment.

Two major changes have occurred since the adoption of the 2001 plan that will influence how Wagonga Inlet is managed:

- Gazettal of the Batemans Marine Park
- Exhibition of the draft Eurobodalla Local Environmental Plan.

When gazetted, the Eurobodalla LEP will control land use practices within the catchment and foreshores of the Inlet.

In 2008/09, ESC received funding through NSW DECCW Estuary Management Program to review the existing estuary plan, with the goal of identifying:

- actions completed;
- obsolete objectives;
- incomplete actions;
- incorporation of new policies/plans into relevant actions; and
- future actions that would benefit the Wagonga Inlet.

The review has engaged the community and other stakeholders to identify new management actions to address priority issues and to categorise them in order of importance for future monitoring. The review was completed in consultation with the NSW Department of Environment, Climate Change and Water and conducted in accordance with the *NSW Estuary Management Manual (1992)*.

1.3 Planning Framework

The current planning instruments for land in and around the Wagonga Inlet are the *Eurobodalla Urban Local Environment Plan 1999* and the *Eurobodalla Rural Local Environmental Plan 1987*. These Local Environment Plans (LEP's) are currently under review, with a draft LEP being publicly displayed in June 2009. This draft is due for completion in 2010 and will form the one document to control land around the Wagonga Inlet under ESC jurisdiction. Assisting the framework for development in the Narooma area are the *Narooma Structure Plan* and ESC's *Residential Design Code*.

The Bodalla State Forest is still managed under the *Ecologically Sustainable Forest Management Plan for the South Coast Forestry Region (2001)*.

1.4 Management

The Eurobodalla Shire Council is responsible for the management of public spaces and facilities around the Wagonga Inlet.

The Department of Lands- Land and Property Management Authority (LPMA) holds responsibility for the bed of the Wagonga Inlet and also some lands surrounding the Inlet, both under tenure and under trust arrangements.

Operational land under ForestryNSW jurisdiction is managed by the Southern Forests Region- Batemans Bay office.

The Marine Parks Authority is responsible for administering the *Marine Parks Act 2004* and the *Marine Parks Regulation 2006* in Wagonga Inlet. Marine Parks are a declared area in which activities are managed for the purpose of conserving marine biodiversity. Ownership and tenure of lands and waters within a marine park do not change with the declaration of a Park, however the MPA works in tandem with many regulatory authorities to achieve its goals of conserving marine biodiversity.

NSW Department of Industry and Investment- Fisheries (Fisheries) regulate fishing, fish kills, invasive species and species listed a threatened under their act and oyster leases present in the estuary via delegations under the *Fisheries Management Act 1994*.

Navigation infrastructure, oil spill and vessel based pollution and boating is managed by NSW Maritime.

The Southern Rivers Catchment Management Authority (SRCMA) also has a key role in the management of natural resources such as the Wagonga Inlet and surrounding lands. SRCMA has identified Wagonga Inlet as a priority inlet in the region, due to its high conservation value and the targeted restoration works that can be undertaken. The SRCMA has been working in cooperation with the oyster industry to deliver incentives aimed at improving water quality through better industry practices.

NSW DECCW administers the Estuary Management Program which provides the framework, funding and advice to councils and their communities in the preparation of estuary management plans. DECCW is the peak agency for managing and developing key policy initiatives for estuary management in NSW.

1.5. Consultation

1.5.1 Agency Consultation

This review was undertaken by ESC in consultation with the following agencies/parties:

- NSW DECCW (Coast & Estuaries)
- NSW State Forests (Forests)

- NSW DECCW (Shorebird Recovery Officer)
- NSW National Parks and Wildlife Service (NPWS)
- Wagonga Local Aboriginal Lands Council (WLALC)
- Eurobodalla Shire Council- Euroworks, Eurowater, Environmental Health Officers, Strategic Planning Officers, and Council's Rangers.
- NSW Department of Primary Industries- Fisheries (Fisheries)
- NSW Roads and Traffic Authority
- NSW Marine Park Authority
- Wagonga Oyster Farmers Association
- Southern Rivers Catchment Management Authority
- Royal Volunteer Coastal Patrol (Narooma)

1.5.2 Public Consultation

Community consultation was undertaken with one open forum meeting (17 November 2009), prior to a public display of the draft review. A second open meeting was held in the public display period (3 March 2010) with three attendees. 52 written comments were also received.

1.5.3 Outcomes

The consultation program was valuable in identifying several new actions not included in the original Estuary Study and Plan.

Identified future actions from consultation were:

- the need to undertake necessary planning for flood mitigation
- planning to incorporate sea level rise and climate change impacts as outlined by the NSW Department of Planning (DoP) and NSW DECCW, and
- the maintenance of water quality within the Wagonga Inlet.

Attention was also sought for Rotary and Quota Parks, and Lewis Island on the Wagonga Inlet (western) side, all of which exhibit erosion problems and may require remedial action to halt this erosion. Erosion at Quota Park is especially noticeable and is threatening infrastructure present in a popular, well-utilised public area.

Initial consultation identified the footbridge to Lewis Island as a public safety issue due to repair works required. The Pied Oystercatcher, listed as endangered under the NSW *Threatened Species Act 1992* has attempted to breed on the island for several years with no success. The island is also infested with Myrtle-leaf Milkwort (*Polygala myrtifolia*), an invasive South African weed often found in coastal areas. The draft review suggested that the footbridge be removed and the area be classified as a sanctuary. However, comments in the public exhibition period indicated that the area is well used by local residents, who do not wish to see the footbridge removed. Several submissions suggested a

“Friends of Lewis Island” group. A Landcare group to work in the area addressing the erosion, weed infestation and infrastructure requirements would aid in protection of the island and ultimately enhance its aesthetic values for residents and visitors. This does not address the issue of nesting shorebirds however, and possible seasonally banning the presence of dogs on the island over the nesting period of the Pied Oystercatchers could be considered.

Siltation effects from land clearing and excavations was also raised as a major issue that needs constant monitoring by ESC and other land managers to protect the Inlet.

A threat to the Inlet from a substantial traffic accident, such as semi-trailer overturn, was also expressed. Discussions with NSW Roads and Traffic Authority (RTA) Southern Region Environmental Officers identified that direct response to such an incident rested with emergency services such as the NSW Fire Brigade Hazardous Materials (HAZMAT) and State Emergency Service teams, both of which have the training, equipment and management expertise to handle such an occurrence. The RTA has created and adopted Incident Management Plans to assist in any such event with the diversion of traffic and protection of road users. An Incident Management Plan exists for the Narooma Bridge area. Therefore it was not felt that this would require verification as a new action in this review.

Consultation also identified the need to incorporate key elements of ESC’s LEP and other relevant management documents into this management plan for the Wagonga Inlet.

New actions or amendments to existing actions that have arisen from consultation are shown in Section 5- *Management Issues and Recommendations for Inclusion in the Wagonga Inlet Estuary Management Study and Plan*.

Appendix C outlines all consultation undertaken for this review, with a listing also of suggested amendments and action taken.

2. Review Summary

Overall the existing plan, which has been operational for approximately nine years, has been well implemented, with many actions completed, underway, or no longer relevant. The Wagonga Inlet Estuary Management Plan identified priorities for actions from high to low, and gave implementation timeframes for these as:

- High - two to five years
- Medium - six to ten years
- Low - eleven to twenty years.

Many of the overall **goals** of the plan, with identified “high priority” strategies and actions, are continuing issues, such as monitoring of channel depths for boating safety; ensuring future development does not detract from the values of the inlet; and water quality maintenance for human and ecosystem health. This review has highlighted these ongoing actions under **outcomes**, to recognise that whilst some of the actions have not met a two to five year implementation goal, they are being actioned.

Ongoing objectives include:

- Improvement of the quality of run-off from urban and rural areas
- Maintenance of the scenic views and vistas to and from Wagonga Inlet
- Ensuring development is compatible with natural hazards
- Increasing awareness of the values of natural communities in general and, in particular, the habitat values of wetlands
- Appropriate management of aquatic resources
- Provide a vegetated buffer zone around the entire inlet
- Increasing awareness of Aboriginal and European sites and local history
- Prevention of deterioration of Aboriginal middens and other archaeological sites
- Maintenance of navigation channels
- Improving boat safety awareness.

2.1 Summary of Completed Actions

Whilst many of the goals and related strategies of the 2001 *Wagonga Inlet Estuary Study and Plan* are ongoing, most of the recommended major components of the Plan have been implemented. These include:

- Trial Bar watch system;
- Water Quality Monitoring program;
- Seagrass Monitoring; and
- Forsters Bay Mangrove Boardwalk, jetties and interpretive signs.

Other “future” actions identified that have also been achieved include:

- Computerised Bar watch system;
- Maintenance dredging of North-south Navigation Channel; and
- Major dredging of navigation channels.

It is noted that maintenance, and the need for a major dredging of channels, is an ongoing monitoring issue.

Strategies and actions of the plan considered complete include:

- Improvement of fish cleaning facilities
- Provision of information on natural communities and component species
- Development of walking track brochures for Mitchell’s Mill Walk and Wagonga Inlet Interpretive Walk. This was a collaborative effort between the Narooma Historical Society, Telecom Australia and ESC.

- Development and installation of interpretive signs along Mitchell's Mill Walk and Rotary Walk.
- Ringlands bush regeneration works
- Bush regeneration plans for Mill Bay and Ringlands' Point.

Figure 1 illustrates on-ground actions and works that have been undertaken from the Plan.

Figure 1. Completed works around Wagonga Inlet.



2.1 & 4.2 Mill Bay Boardwalk & Interpretive signs
3.12 Mill Bay Bushland Management Plan

5.4 & 5.5. Removal of rocks at Danger Buoy and dredging of navigation channels, 2007

4.2. Rotary Walk & Interpretive signs

1.11. Upgrade existing fish cleaning tables at Town Wharf and Apex Park, and provision of lighting, wash down hoses and rubbish bins for the disposal of fish offal and litter at Apex Park.

3.12. Flying Fox Bay Bushland Management Plan.

3.11 & 6.6 Fencing & revegetation works at Ringlands Point.

2.2 Summary of Incomplete Actions

Actions as identified from the 2001 plan as incomplete or not as yet undertaken include the following:

ACTION	COMMENT
1.6 Carry out an environmental audit of businesses around the inlet to identify practices which adversely impact on water quality – prepare educational package on appropriate site management practices (see Section 6.1)	<i>ESC has undertaken some educational activities targeted on protection of waterways, though none have been aimed specifically at businesses around the Wagonga Inlet.</i>
2.4 Review design floor levels and development controls in view of the results of the <i>Wagonga Inlet Flooding Investigation</i> (GBA 1999).	<i>This has been completed following the report by GBA, however Flood Planning Levels will need to be reviewed via the completion of a more comprehensive study that considers sea level rise and climate change.</i>
3.8 Include particular problem areas (e.g. walking track from Ringlands Point) in ‘Clean up Australia’ day program and liaise with oyster farmers to gain their participation.	<i>Eurobodalla Shire Council appoints a part-time officer to coordinate and promote Clean Up Australia Day each year, however no residents from Ringlands point have come forward to volunteer.</i>
3.18 Develop a program for weed control along the Princes Highway/Centenary Drive (as per <i>Masterplan</i>) and advertise/approach existing community groups for volunteers to become involved. Resources may also be available through the Green Corps and Natural Heritage Trust. Extend program to other areas as interest develops.	<i>The Dalmeny Landcare group have expressed their resolve to tackle any identified areas of weed infestation around the Wagonga Inlet. However areas identified as of higher weed concern than the Princes Highway/Centenary Dr have been identified and will be addressed first.</i>
4.4 Investigate means to address erosion of the midden at the Wagonga Picnic Area and other sites as necessary.	<i>The Wagonga Picnic Area was closed to visitors in 2007 to help address the issue of erosion. Future protection of the midden could include recovering or sand bagging of the site to protect from wave action.</i>
4.5 Liaise with property owner to gain access to Wagonga Cemetery to repair fence and headstones as and when required.	<i>Liaison with property owners has not been successful in gaining access to the Wagonga Cemetery. Funding is also required to undertake works. The issue will be referred to the Eurobodalla Heritage Committee for consideration.</i>
5.3 Monitor continuing sand intrusion into Forsters Bay and its impacts on Taylors Boat ramp and adjacent private jetties. This is to include details on the frequency and volume of sand removed from the boat ramp	<i>Sand movements are considered a natural phenomenon and this action has been difficult to achieve. The inclusion of photo points or markers to monitor sand intrusions would assist in identifying the level of impact sand is having on</i>

by Council.	<i>Forsters Bay and Taylors Boat Ramp.</i>
6.2 Prepare mooring plan for Wagonga Inlet (with input from EMC and with reference to areas of ecological significance, see Figures 3.1a and 3.1b) identifying existing/future mooring areas (public/private) and the maximum number of moorings per area.	<i>This action is still considered relevant and requires input from a number of stakeholders to ensure moorings are environmentally suitable for the Wagonga Inlet. The mooring plan should consider the siting of moorings away from seagrass beds and the conversion of existing moorings to 'seagrass friendly' methods where possible.</i>
6.3 Prepare design report for the extension of Town Wharf towards the swimming pool. Include boat pumpout facilities. A preliminary concept showing public/commercial space is shown in Figure 5.1 of the 2001 plan. Funding may be available through the Federal Government's Regional Assistance Program. DLWC and Waterways funding is available for public wharves.	<i>The Department of Lands has begun investigations to support a review of the Narooma Town Wharf extension, such as surveying existing jetties and crown land assessments in the Wagonga Inlet area. The action is still considered a priority action for the plan but will take some time to be fully implemented, also relying on the gazettal of ESC's proposed LEP to meet zoning requirements.</i>
6.9 As per the <i>Narooma Foreshore & Townscape Masterplan</i> install mangrove boardwalk off Riverside Drive.	<i>Following the installation of the Mill Bay Boardwalk it is unlikely that a boardwalk on Riverside Drive would be funded.</i>
6.10 As per <i>Masterplan</i> construct walkway under bridge and extend <i>Masterplan</i> to north-western side of bridge (old ferry approach) to address bank erosion, formalise area for fishing/viewing and provide interpretive sign. See Section 6.1 for indicative costs per metre for boardwalks.	<i>Due to safety and approach issues this action is not considered feasible at the current time. With the funding of the Mill Bay Boardwalk it is also considered unlikely that funding would be sourced readily for a new project such as this.</i>
6.12 Construct jetty, provide fish cleaning table, wash down hose, lighting and bins and formalise and seal car park to southern boat ramp at Forsters Bay. Funding is available through DLWC and Waterways programs for public wharves and jetties. Indicative costs per metre are provided in Section 6.1.	<i>This action is still considered achievable but is a long term priority.</i>

2.3 Summary for future actions

This review has identified only a few areas of the plan that require further actions to ensure the overall goals of the 2001 Management Plan are met. These are outlined in section 5. Major new actions include:

- Furthering flood plain risk management and planning for the Wagonga Inlet. Understanding impacts of sea-level rises or storm surge events on the Narooma/Wagonga area is essential to achieve existing actions in the plan. A new action (7.2) has been included in this review aimed at furthering the modelling required to facilitate a floodplain Management Plan since the *Wagonga Inlet Flooding Investigation* was completed in 1999.
- Modelling of Endangered Ecological Communities around the Inlet and their migration in the events of inundation and climate change events.
- Engaging with the public to form a landcare group to rehabilitate the Lewis Island area, and to seek funding to replace or repair the Lewis Island footbridge. Seasonal protection of the area from the presence of dogs for the benefit of nesting threatened shorebirds.
- Assistance to Landcare group for weed control in identified sensitive areas around the Inlet.
- Monitoring and management of invasive Marine Species to protect the biodiversity values of Wagonga Inlet Estuary. As new species have been identified, such as the European Green Shore Crab (*Carcinus aenas*), regulation and monitoring of the Wagonga Inlet is essential to maintain the health of biodiversity in the estuary.
- Analysis of water quality. Previous funding under the *South-east Water Quality Monitoring Project* (<http://www.esc.nsw.gov.au/site/Wq/monitor.htm#top>) to provide baseline on the health of estuaries in the Shire, including the Wagonga Inlet, has provided ESC with ten years of water quality data. Analysis of this data, and future water quality data, will provide information about the ongoing health of the estuary and determine the success of many of the management actions of this plan. Initial analysis through the *South-east Water Quality Monitoring Project* found that, generally, estuary health in the Shire was good, though at Wagonga faecal coliforms had exceeded the ANZECC guidelines on several occasions. The report recommended further/future testing to establish whether health of estuaries was an on-going management issue. DECCW (Coast and Estuaries) has begun funding a monitoring and evaluation program in which estuary health baseline data can be used to measure changes in estuary health. Wagonga Inlet is part of this program within the Eurobodalla Shire. A new action reflecting this program has been incorporated into the review (see action 1.1a in Section 5). **Figure 2** outlines sites around Wagonga Inlet where future works, as outlined in section 5, would be beneficial.

Figure 2. Sites for further action/work around Wagonga Inlet.



New Action: 3.20. Rehabilitation works at Lewis Island, including weed removal, planting and minor works.

Additional Actions: 3.10a & 3.12a. Implement revegetation and remediation works as per the Flying Fox Bay Vegetation Management Plan.

3. Review of other Management Guidelines and Reports.

Guidelines or management plans/reports relevant to the management of the Wagonga Inlet estuary that were not developed at the initial preparation of the estuary management plan, and are of relevance, include:

- **NSW Department of Environment, Climate Change and Water *Floodplain Development Manual (2005)*.**

The *Wagonga Inlet Estuary Management Plan* of 2001 recognised the risk from flooding in the Wagonga area, especially to businesses on the ‘flats’ of Narooma, and had nominated actions to assess flood risks in the area to manage the impacts (actions 2.4 & 2.5).

This review has highlighted additional works that would need to be undertaken to improve the knowledge of flood behaviour within Wagonga Inlet in consideration of the *NSW Sea Level Rise Policy Statement 2009* (Actions 7.2 & 7.3). Implementing this Action will require the completion of a Flood Risk Management Study and Plan in accordance with the management system and guidelines outlined in The NSW Floodplain Development Manual 2005.

- **Batemans Marine Park *Zoning Plan*.**

This map is found at Appendix D. The Batemans Marine Park Plan is currently in preparation.

- **Southern Rivers Catchment Management Authority *Catchment Action Plan (2006)***

http://www.southern.cma.nsw.gov.au/news_publications-plans_strategies.php

The Southern Rivers Catchment Management Plan (2006-2016) outlines the most important natural resources in the region and actions to improve and conserve these resources for a more “resilient” future in the region. The Southern Rivers CMA has a strong focus on working in partnership with other bodies aiming to achieve environmental outcomes in the CMA region which includes all of the Eurobodalla Shire. There are five catchment targets identified by Southern Rivers CMA:

- Community & Partnerships
- Biodiversity
- Soil and Land Capability
- Water
- Coastal & Marine

Catchment targets are met through a series of management targets, many of which relate to current and new actions identified in the *Wagonga Inlet Estuary Management Plan*.

CATCHMENT PROGRAM	MANAGEMENT TARGET	WAGONGA INLET ESTUARY MANAGEMENT PLAN ACTION
<p>The Community & Partnership Program will assist, through funding or application of relevant CMA skills, in assisting volunteers and regional bodies such as ESC, to achieve actions related to management of the Wagonga Inlet.</p>		<p>A new action has been incorporated into the reviewed plan that would assist in meeting the targets of the Community and Partnership program and Biodiversity program targets- 3.13a Provide a range of incentives, such as the Biodiversity Program, Biobanking Information, to landholders to increase protection of foreshore land and biodiversity values.</p>
<p>The Biodiversity Program aims to conserve approximately 30% of each vegetation community within the CMA area, and that by 2016 there will be an improvement in native vegetation condition with an increase in connectivity and extent; and that threatened or regionally significant communities or species have an improved status in the CMA region.</p>	B6-Invasive species threats	<p>3.12- Develop bushland management plan and weed control program for the rainforest at Flying Fox Bay and remnant vegetation at the northern end of Mill Bay</p> <p>3.18 Develop a program for weed control along the Princes Highway/Centenary Drive and advertise/approach existing community groups for volunteers to become involved. Resources may also be available through the Green Corps and Natural Heritage Trust. Extend program to other areas as interest develops.</p>
<p>The Soils and Land Capability Program aims to increase land owners and regulator skills in order to avoid poor land management decisions and actions. This program has been valuable to regional bodies, such as ESC, to help integrate natural resource issues into planning policies and eventual decisions.</p>	SLC2- Development controls	<p>3.15 Rezone SEPP14 wetland No 126(between Punkally and Burrimbidgee Creeks) to 7(a) Environmental Protection-Wetland. Under the draft ESC Local Environmental Plan, this zoning will equate with E2.</p> <p>3.17 In conjunction with current/future review of LEP's consider introduction of an environmental protection zone for riparian buffers, shorebird nesting and feeding areas, regionally uncommon vegetation and wildlife corridors.</p>

		1.13 Prepare DCP which includes guidelines relating to development impacts on water quality.
	SLC3- Erosion	1.12 When DCPs and Residential Design and Development Guidelines are updated include reference to erosion and sediment controls in 'checklist' section for the lodgement of development applications. New action-1.14 Monitor and assess the need for remedial erosion control works at areas surrounding Wagonga Inlet, such as Quota Park, Lewis Island and Mill Bay.
The Water Program aims to protect, maintain and improve river and water body health throughout the CMA region, focussing on priority areas, and also in conserving this resource.	W2- Water Quality. By 2016 the quality of priority water bodies will be maintained or progressively improved. W5-River and Wetland Protection and Rehabilitation.	New action- 1.17 Identify roads with high sedimentation run-off affecting drainage lines or creeks that enter the catchment of Wagonga Inlet. Undertake remedial action to halt/limit sediment flows. New action- 1.16 Undertake to control stock access to tributaries or the foreshore of Wagonga Inlet.
The Coasts and Marine Program	CM2- Protecting and Rehabilitating Estuaries states that by 2016, the condition of estuaries will be maintained or improved through development and implementation of natural resource management plans (including estuary management plans).	The review of the <i>Wagonga Inlet Estuary Management Plan</i> can directly contribute to this target.
	CM5- Conducting strategic coastal and marine research	New actions- 1.1a Implement ecosystem health monitoring program consistent with DECCW's Statewide Monitoring, Evaluation and Reporting Program. New action-3.9a Undertake regular survey work in the Wagonga Inlet to identify invasive marine species,

		<p>and undertake eradication programs where possible.</p> <p>New action- 3.9b Undertake scientific research on Invasive Green Shore crabs to understand its spread and how estuary management influence its distribution.</p> <p>New action 3.9c Undertake scientific research to determine bio-indicators in estuaries and the stressors that drive change.</p>
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- ESC Aboriginal Heritage Study: Stage Four. Managing & Protecting Aboriginal Heritage in the Eurobodalla within the Local Government Planning Framework (2008).***

The Eurobodalla Aboriginal Advisory Committee and the Eurobodalla Shire Council in consultation with Aboriginal people completed a comprehensive five year Aboriginal Heritage Study in December of 2008. The aim of this study was to compile existing archaeological, anthropological and ethno-historical documentation and undertake an oral history recording program designed to inform on a range of Aboriginal heritage values within the Eurobodalla Shire. The study was conducted in four stages and identified 336 Aboriginal places within the Eurobodalla Shire that possess special heritage value to Aboriginal people and provides management recommendations to protect these sites. From the study five larger areas have been identified as “culturally sensitive landscapes” in recognition of the depth of Aboriginal heritage they possess and the ongoing connection Aboriginal people have with the area. Wagonga Inlet is identified as one such culturally sensitive site. The Aboriginal Heritage Information Management System (AHIMS) maintained by DECCW shows that 44 Aboriginal sites have been recorded around the Wagonga Inlet. These sites consist of middens, scar trees, burials, and open camp sites. The importance of the Wagonga Inlet as a food source can be seen through the percentage of midden sites so far found, being 82% of the total number. The Aboriginal Heritage Study identifies that Wagonga Inlet is still an important meeting, teaching, camping and resource place to local Aboriginal people.

Increases in development and rising sea levels are seen as threats to the cultural and archaeological sites that exist around the Wagonga Inlet. The protection of the midden site at the Wagonga Area was previously identified as an action within the 2001 plan, and was addressed through closure of the site. Future management of the midden site has not been addressed as yet. One of the overall aims of the Aboriginal Heritage Study was to assist in incorporating Aboriginal Heritage into planning frameworks within the Eurobodalla to better protect heritage items and maintain the link local Aboriginal people have with their land. These recommendations will, or have, been incorporated into other planning documents ESC has prepared, such as the Local Environment Plan and Development Control Plans. The

Wagonga Inlet represented a focal point for Aboriginal people prior to European settlement of the area. As such the lands surrounding Wagonga Inlet are considered to have a high potential to contain Aboriginal objects protected under Part 6 of the NSW *National parks and Wildlife Act 1974*. DECCW maintain the AHIM System to record Aboriginal objects and sites, and they, along with the Wagonga Local Aboriginal Lands Council and the Aboriginal Heritage Officer at ESC, should be consulted on the discovery of any Aboriginal material in areas surrounding the Wagonga Inlet.

- **NSW Department of Environment, Climate Change and Water *Sea Level Rise Policy Statement (2009)*** <http://www.environment.nsw.gov.au/climateChange/sealevel.htm>

In recognition of the NSW DECCW *Sea Level Rise Policy Statement* that aims to support coastal communities with issues arising from climate change and subsequent sea level rises, ESC has undertaken to commence flood studies and planning for the Eurobodalla region, which will include Wagonga Inlet. To this end, ESC has applied for funding to perform the works required. A new action (7.2) has been incorporated into this review that outlines the flood planning requirements for the Wagonga Inlet.

- **NSW Department of Primary Industry *NSW Oyster Industry Sustainable Aquaculture Strategy (OISAS (2006))***.
http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0009/114939/NSW-Oyster-Industry-Sustainable-Aquaculture-Strategy.pdf.

This strategy aims to strengthen the oyster industry within NSW, whilst maintaining or enhancing water quality in prime oyster production areas, such as the Wagonga Inlet. As such, the document outlines water quality parameters useful in assessing estuary health in relation to oyster growing, and has the objectives of “protecting water quality for safe human consumption and viable production of edible oysters”; and maintaining or rehabilitating estuarine processes and habitats”. These parameters may not be the same as those used to assess environmental or human health levels of water quality; however they are a good indicator of estuary health with the sensitivities displayed by oysters to changes in water chemistry. Water quality parameters can be found at Table 4 of the OISAS document. The OISAS includes actions that align with some already within the *Wagonga Inlet Estuary Management Plan* such as:

- allowing oyster leases in areas where they are ecologically sustainable and the avoidance of areas of environmental sensitivity
- education and regulation of commercial and recreational vessels waste management systems (Actions 1.2 & 1.3);
- elevated monitoring and awareness of septic safe programs in areas adjacent to harvest zones, and improvement of sewer to avoid overflows occurring as a result of maintenance or operational failure, and the minimization of overflows in wet weather; along with the identification of priority urban storm water drains and installation of suitable treatment systems (Actions 1.4-1.7).

The *Aquaculture Compliance Strategy* of the OISAS that aims to identify and halt areas falling into disrepair or becoming derelict, via regular inspections, annual lease reports and lease marking standards, is an element of the plan that has been incorporated into this review (Action 6.1b). Other actions outlined in the OISAS that are also new actions within this plan are the prevention of access to the estuary and its tributaries by stock (see section 5).

- **NSW Department of Planning (DoP) *South Coast Regional Strategy (SCRS)* (2007).**

<http://www.planning.nsw.gov.au/PlansforAction/Regionalplanning/SouthCoast/tabid/197/language/en-AU/Default.aspx>

The aim of the regional strategy by NSW DoP is to provide a framework for development along the south coast, incorporating the Eurobodalla Shire, for an estimated 36% growth in residents over a 25 year period whilst maintaining the ‘environmental assets, rural character and pristine ecosystems’ of the region. High value environments, such as Wagonga Estuary, are targeted for protection under the SCRS through such actions as limiting development lots that front watercourses, vegetation of riparian corridors, and regulation of developments through local environment plans. Objectives such as these, and hazard management as outlined in the SCRS, are included within the *Wagonga Inlet Estuary Management Plan*.

- **ESC *Narooma Plan* (2005).**

<http://www.esc.nsw.gov.au/site/Publications/DCP/index.html>

A development control plan that assisted in formalising development design in the Narooma-Wagonga area to:

- Retain and enhance the relaxed coastal character of Narooma.
- Encourage development that is sympathetic to the character of Narooma.
- Protect and enhance environmental values.
- Protect views to and from public and natural areas.
- Provide appropriate accommodation for a growing local population and an increasing number of visitors.
- Identify appropriate locations for commercial/retail, residential and tourism related expansion.
- Provide high quality and accessible open space with particular emphasis on improving connectivity between public areas and contributes to the quality of the built and natural environment of Narooma.

Actions noted to apply to the Wagonga Inlet included “enhance and restore Narooma’s spectacular natural setting”, “Acquisition or dedication of 6a1 zoned Open Space”, “Extend the Boardwalk”. The direction for a “New cycleway to Dalmeny” is also noted in the *Narooma Plan* and this has been commenced by ESC and volunteer community groups, and noted to enhance the Mill Bay Boardwalk experience (see action 6.10).

Directions that are already elements of the *Wagonga Inlet Estuary Management Plan* include flood liability planning; urban development controls; protection of foreshore areas into public reserves; protection and rezoning of areas with significant environmental values; and limiting vegetation removal surrounding the Inlet. The *Narooma Plan* incorporates identification of heritage items around the Wagonga Inlet and directions for the protection of these. All those identified within the 2001 *Wagonga Inlet Estuary Management Plan* are incorporated in the Narooma Structure Plan. Forsters Bay is identified within the *Narooma Plan* as an area with special characteristics that should be retained. Actions within the reviewed *Wagonga Inlet Estuary Management Plan* do not inhibit retention of the characteristics of this area, focussed on recreation and tourism, though the proposed mangrove boardwalk (action 6.9 and a walkway extending under the Narooma Bridge (action 6.10) are suggested as unlikely to be funded in light of the installation of the Mill Bay Boardwalk (see Section 4, actions 6.9 & 6.10).

4. Review of actions outlined in 2001 Wagonga Inlet Estuary Study and Plan and identification of their status.

Goal: to protect water quality within the inlet for human health and to maintain a healthy ecosystem							
Objective: To gain a better understanding of water quality and compliance with guidelines							
Strategy: Assess changes to water quality within Forsters Bay							
	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
1.1 Develop and implement water quality monitoring program (see Section 6.1 for more details) including testing for chlorophyll-a (to assess ecosystem health) and bacteria (to assess compliance with ANZECC & NH&MRC guidelines for primary contact recreation – a sampling and analysis program currently exists for oysters as part of the NSW Shellfish Quality Assurance Program (SQAP).	<i>ESC, DLWC, Wagonga SQAP</i>	<i>High</i>	<i>Undertaking /ongoing</i>	<p>ESC currently monitors twelve sites around Wagonga Inlet (Figure 3a), measuring dissolved oxygen, faecal coliforms and enterococci, though chlorophyll-a is not measured. Monthly readings have been taken for each site for the last ten years.</p> <p>ESC also received previous funding under the <i>South-east Water Quality Monitoring Project</i> (http://www.esc.nsw.gov.au/site/Wq/monitor.htm#top) to provide baseline on the health of estuaries in the Shire, including the Wagonga Inlet. This project found that generally estuary health in the Shire was good, though at Wagonga faecal coliforms had exceeded the ANZECC guidelines on several occasions. The report recommended further/future testing to establish whether health of estuaries was an on-going management issue.</p> <p>This review identifies that further analysis of water sampling data and standardisation of water quality testing and monitoring techniques would assist in meeting actions</p>		<i>High</i>	<i>ESC, DECCW, Wagonga SQAP</i>

to maintain estuary health –see section 6.

Objective: To minimise discharge of effluent from commercial and recreational vessels

Strategy: Increase awareness of appropriate means of disposal of effluent from boats

	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
1.2 Support initiatives to make holding tanks mandatory for commercial vessels.	<i>NSW Maritime, ESC</i>	<i>High</i>	<i>Not complete</i>	<p>This action was outlined as the responsibility of the Estuary Management Committee in the 2001 Wagonga Inlet Estuary Management Plan and given high importance. The Wagonga Inlet Estuary Management Committee has now been replaced with the Coastal Management Committee.</p> <p>Under the <i>Protection of the Environment Operations Act 1997</i>, it is an offence to pollute waters without a licence (http://www.environment.nsw.gov.au/licensing/aboutpoeo.htm).</p> <p>Under this Act, NSW Maritime is the regulatory authority within the Inlet, and ESC and the NSW EPA are the regulatory authorities in foreshore areas to the low water mark.</p> <p>NSW Maritime has also instigated a "Sewage Pollution from Vessels" strategy to address marine pollution from vessel wastes.</p>			<i>NSW Maritime</i>
1.3 Include information on boat pumpout facility in Forsters Bay when Waterways Map is revised.	<i>Waterways</i>	<i>Medium</i>	<i>Completed</i>	NSW Maritime has released a new map for the Wagonga Inlet area which shows the privately owned pump out facility on the Inlet.		<i>Medium</i>	<i>NSW Maritime</i>

Objective: To improve the quality of run-off from urban and rural areas
Strategy: Ensure the inlet is not affected by seepage from septic tanks

	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
1.4 Continue to carry out environmental audits of septic tanks within the catchment of the inlet to identify poor performance and any illegal discharges. Notify owners of required actions, e.g. desludging, pumpout.	<i>ESC</i>	<i>High</i>	<i>Ongoing</i>	<p>Eurobodalla Shire Council has undertaken 145 septic tank inspections in the Wagonga Inlet area over the last eight years. Areas surrounding the inlet are categorised according to a risk level generated from a risk matrix, which dictates how often septic systems in these areas are inspected. For residential areas surrounding the Inlet that rely on septic systems, inspections are annually or biannually, and these inspections will continue under current management policies.</p> <p>Eurobodalla Shire Council has adopted an Onsite Sewerage Management Policy that is also aimed at protecting sensitive environments, such as the Wagonga Inlet Estuary. The Policy can be found at Council's website: http://www.esc.nsw.gov.au/site/Publications/Strategies/PolicyReg/LivePolicyDocs/2266.pdf.</p>		<i>High</i>	<i>ESC</i>
1.5 As part of the water quality monitoring program for Forsters Bay (see Section 6.1) include sampling sites to identify any changes to run off/water quality	<i>ESC</i>	<i>High</i>	<i>Ongoing</i>	See action 1.1 and figure 3a.		<i>Ongoing</i>	<i>ESC</i>

due to the development of Ringlands Estate							
Strategy: Identify and address possible pollutant sources							
	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
1.6 Carry out an environmental audit of businesses around the inlet to identify practices which adversely impact on water quality – prepare educational package on appropriate site management practices (see Section 6.1)	ESC	Medium	Not complete	An environmental education program on stormwater management was undertaken shire wide by Eurobodalla Shire Council in 2006-2007. However, the Wagonga Inlet area and businesses were not specifically targeted. An education program targeting businesses that utilise or are close to the Inlet would be beneficial in identifying management issues that may arise, and in assessing the ability of businesses to comply with environmental controls.		Medium	ESC
1.7 Continue actions to minimise sewer overflows at Narooma, e.g. pressure cleaning mains of tree roots, pump draw down tests.	ESC	Ongoing	Ongoing	Eurobodalla Shire Council has undertaken yearly maintenance of all sewerage lines surrounding the Wagonga Inlet since 2001. Along with this, two new detention structures have been installed in 2005/2006 with a third due for construction in 2010. Works to reline sewerage lines was also undertaken in the areas of Riverside Dr, Lake View Dr and Gem Cres from 2000 to 2005. As pumps at outlets have required replacement, ESC has done so with submersible pumps. This work will continue in the area of the Wagonga Inlet.	Cleaning of lines around the inlet costs approximately \$15000 per annum. Other works have cost approximately \$58,500.	Ongoing	ESC

				Benefits: Continued environmental health benefits to the Inlet and surrounding land users.			
Strategy: Manage land use/development to prevent accelerated input of sediments from the catchment							
	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
1.8 Encourage the formation of a Landcare group to assist in developing vegetated buffer zones around tributary creeks, as well as promoting erosion control, planting programs, exclusion of stock, protection of SEPP No. 14 wetlands, noxious weed control and feral animal control.	<i>DLWC, ESC, RLPB, EMC</i>	<i>Medium</i>	<i>Completed but ongoing</i>	<p>The Dalmeny/Kianga/Narooma Landcare Group was established in late 1990's. The group has been instrumental in carrying out environmental works in the Bar Beach area, targeting weed species such as Asparagus Fern and Bridal Creeper that are damaging sensitive coastal foreshores.</p> <p>Both ESC and SRCMA have responsibilities to promote erosion control, weed control and revegetation, protection of waterways from stock impacts, and feral animal control. SRCMA has developed a Eurobodalla subregional plan from their Action Plan that looks to address water quality issues, the extent and health of riparian vegetation, and the control of introduced marine pests.</p> <p>ESC is also involved in weed control and revegetation of areas surrounding the Inlet, and the control of domestic and feral animal impacts on the Inlet.</p>	ESC supports Landcare activities through the provision of tools, training and supporting staff to undertake remedial works. ESC also assists groups in applying for funding, that has been forthcoming through the SRCMA, DECCW, and the Commonwealth NHT fund.	<i>Medium</i>	<i>SRCMA, ESC, RLPB, DECCW</i>
1.9 Investigate improvements to maintenance/design of Tourist Drive 4 and Riverview Road including sealing sections of these roads where they cross major creeks to reduce sediment	<i>ESC</i>	<i>Medium</i>	<i>Completed</i>	Roadworks on Wagonga Scenic Drive (Tourist Drive 4) and Riverview Rd have been undertaken by Eurobodalla Shire Council since the inception of the <i>Wagonga Inlet Estuary Management Plan</i>	Riverview Rd 2003-04 realignment/sealing- \$395,600		

washoff during storm events.				<p>to address run-off issues and improve road safety. Both roads have had culverts installed and gravel resheeting works done. Recent studies have shown that gravel resheeting works can reduce sediment runoff by between 35-50%.</p> <p>In 2003-2004, Riverview Road also underwent realignment, culvert installation and areas of bitumen sealing</p> <p>Benefits: Works have benefited environmental protection of the Wagonga Inlet whilst increasing road safety for both visitors and local road users.</p>	<p>Riverview Rd 2003-2008 gravel resheeting and maintenance works-\$24,000</p> <p>Wagonga Scenic Dr- 2003-2008 gravel resheeting and maintenance works-\$150,000</p>		
1.10 Report any incidences of sediment laden run-off (and other water pollution) to ESC or EPA.	<i>Members of EMC</i>	<i>As they arise</i>	<i>Ongoing</i>	As the Wagonga EMC is no longer functioning, this action is the responsibility of ESC staff, and individuals, such as Oyster farmers who may encounter run-off incidents.		<i>Ongoing</i>	<i>ESC, Community</i>
Strategy: Improve fish cleaning facilities							
	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
1.11 Upgrade existing tables and, depending on availability of services, provide lighting, wash down hose and rubbish bins for the disposal of fish offal and litter at Town Wharf and Apex Park.	<i>ESC</i>	<i>High</i>	<i>Complete</i>	Both Town Wharf and Apex Park have fish cleaning facilities and lighting installed, with wash down facilities at Apex Park. Further, Apex Park has upgraded community facilities such as picnic tables, toilets and parking. Photos of completed works are at Appendix B.		<i>High</i>	<i>ESC</i>

Strategy: Include additional guidelines relating to water quality in DCPs.

	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
1.12 When DCPs and Residential Design and Development Guidelines are updated include reference to erosion and sediment controls in ‘Checklist’ section for the lodgement of development applications.	<i>ESC</i>	<i>Medium</i>	<i>Underway</i>	<p>Eurobodalla Shire Council updated the <i>Eurobodalla Residential Design Code-Development Control Plan</i> in 2004. This code included objectives to protect waterways and water bodies from sedimentation/degradation due to erosion, loss of vegetation and impacts of stormwater discharge due to building works surrounding such waterways.</p> <p>The design code is currently under review and will include generic erosion and sedimentation control objectives, as well as site specific objectives for sensitive areas of the Eurobodalla as required. Checklists for DA applications will be updated when the DCP is finalised if required.</p>		<i>Medium</i>	<i>ESC</i>
1.13 Prepare DCP which includes guidelines relating to development impacts on water quality.	<i>ESC</i>	<i>Medium</i>	<i>Underway</i>	<p>ESC developed a Development Control Plan for the Narooma area known as the Narooma Structure Plan (http://www.esc.nsw.gov.au/site/Publications/DCP/index.html, section 3.7.4), that includes sedimentation and erosion control objectives for development applications to protect water quality in the Wagonga Inlet area, in 2005. This DCP is now under review and will continue to include these guidelines.</p>		<i>Medium</i>	<i>ESC</i>

Goal: to ensure future development does not detract from the values of the inlet and is appropriately designed

Objective: To maintain the scenic views and vistas to and from Wagonga Inlet

Strategy: Provide visually unobtrusive viewing points around the inlet

	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
2.1 As per Narooma Foreshore and Townscape Masterplan provide additional boardwalks/platforms to increase opportunities to view the inlet while minimising impacts on foreshore vegetation (see actions under 6.9 and 6.10). Consult with LALC on route selection and siting of structures.	ESC	Medium	Completed	<p>The Mill Bay Boardwalk was completed in December 2001 with a funding grant from DECCW's Estuary Management Program of \$250, 000.</p> <p>Benefits: The boardwalk has become a focal point of tourist activity in Narooma and also enjoyed regularly by permanent residents. To compliment the boardwalk, Eurobodalla Shire Council and community groups are undertaking the Dalmeny cycleway/pathway. Photos of the completed boardwalk are at Appendix B.</p>	\$574,316.		

Strategy: Encourage attractive building design compatible with the visual qualities of the inlet

	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
2.2 Continue to promote existing residential design and development guidelines. Consideration could also be given to introducing annual Shire wide design awards.	ESC	Ongoing	Ongoing	<p>The Coastal Council of NSW, with the NSW DoP produced the <i>Coastal Design Guidelines for NSW</i> in 2003. These can be found at: http://www.planning.nsw.gov.au/PlansforAction/Coastalprotection/CoastalDesignGuidelines/tabid/174/language/en-AU/Default.aspx.</p>		Ongoing	ESC

<p>2.3 Develop DCP for Coastal Villages which includes attractive building design guidelines for foreshore areas.</p>	<p>ESC</p>	<p>High</p>	<p>Underway</p>	<p>The Narooma Structure Plan (http://www.esc.nsw.gov.au/site/Publications/DCP/Narooma%20Plan/Narooma_Plan_full.pdf, section 3.7.4), also includes building design guidelines to protect environmentally sensitive areas and enhance the aesthetic values of the area. This DCP is now under review but will continue to include these guidelines. Eurobodalla Shire Council also developed a Residential Design Code (http://www.esc.nsw.gov.au/site/Publications/DCP/ResDCCode/ResidentialDesignCode_Full.pdf) that took effect in February 2005 that incorporates coastal design principles as part of its commitment to “retaining the high scenic and environmental qualities of the Nature Coast.”</p>			
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Objective: To ensure development is compatible with natural hazards
Strategy: Increase awareness of flood hazards in the Narooma ‘flat area’

	<p><i>Responsible body (2001 Plan)</i></p>	<p><i>Rating (2001 Plan)</i></p>	<p><i>Outcome</i></p>	<p>Comments</p>	<p><i>Cost(if applicable)</i></p>	<p><i>Rating (2010 review)</i></p>	<p><i>Responsible body (2010 review)</i></p>
<p>2.4 Review design floor levels and development controls in view of the results of the Wagonga Inlet Flooding Investigation (GBA 1999).</p>	<p>ESC</p>	<p>High</p>	<p>Not complete</p>	<p>Funding has not been forthcoming to allow the Eurobodalla Shire Council to undertake flood level modelling for the Wagonga Inlet area. This modelling is necessary to complete the recommendations of the <i>Wagonga Inlet Flooding Investigation</i> (GBA 1999) and to amend floor levels and development controls appropriately. A new action (7.2) has been included in this review aimed at furthering the</p>		<p>High</p>	<p>ESC</p>

				modelling required to create a floodplain Management Plan that would then assist in completing this action.			
2.5 When DCPs and Residential Design and Development Guidelines are updated include reference to flood protection.	<i>ESC</i>	<i>Medium</i>	<i>Ongoing</i>	See above		<i>Ongoing</i>	<i>ESC</i>

Goal: to conserve the natural ecological communities and their component flora and fauna

Objective: To increase awareness of the values of natural communities in general and, in particular, the habitat values of wetlands

Strategy: Provide information on natural communities and component species

	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
3.1 Develop community education program that includes information on the protection of shorebirds, migratory species and wetlands and management of vegetation communities.	<i>NPWS, ESC</i>	<i>Medium</i>	<i>Ongoing</i>	<p>ESC has prepared fact sheets on <i>Endangered Ecological Communities</i> found around the Wagonga Inlet. These sheets can be found at Appendix A and at Council's website: http://www.esc.nsw.gov.au/site/Environment/ThreatenedSpecies/index.html.</p> <p>Interpretive signage has been installed around the Wagonga Inlet Estuary by ESC through funding received in 2007 from the NSW Department of Natural Resources (now DECCW) also.</p> <p>Whilst other specific community education programs regarding Wagonga Inlet are not completed and would be subject to funding and resource allocations being available to responsible agencies, information on shorebirds, migratory species and endangered vegetation</p>		<i>Medium</i>	<i>ESC, MPA, DECCW.</i>

				communities is available from the NPWS. DECCW (Coasts & Estuaries) funding of an Estuary Awareness Grant to ESC will assist in accomplishing this action.			
3.2 Include information on the fish nursery and habitat values of mangroves and seagrasses in interpretive signage for proposed boardwalk off Riverside Drive at Forsters Bay (see 6.9).	<i>ESC, Fisheries</i>	<i>High</i>	<i>Completed</i>	Interpretive signage has been installed around the Wagonga Inlet Estuary by Eurobodalla Shire Council through funding received in 2007 from the NSW Department of Natural Resources (now DECCW) that has included the habitat value of mangroves (Appendix B, Photos 6-17). Input into the data and design of these signs was given by DNR (DECCW).			
3.3 Where mangrove clearing is evident, letter-box drop foreshore residents with information from NSW Fisheries habitat management and fish conservation guidelines and details of penalties for illegal clearing.	<i>EMC, ESC, Fisheries</i>	<i>As required</i>	<i>Considered complete</i>	DPI- Fisheries has collated information and finalised a letter to be used in the case of mangrove clearing incidences. So far, this has not been required for the Wagonga Inlet Estuary.	Incorporated into DPI work plans- no specific cost associated to Wagonga		
Strategy: Monitor changes in mangroves and seagrasses							
	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
3.4 Install survey markers to identify changes in the extent of mangroves (possible student project).	<i>EMC, ESC, Fisheries</i>	<i>Medium</i>	<i>Considered complete</i>	From 1985 to 2005, mangrove cover in Wagonga Inlet has declined by only 0.052 sq km, based on GIS mapping by DPI- Fisheries.	Incorporated into DPI work plans- no specific cost associated to Wagonga		

<p>3.5 Repeat seagrass surveys (Forsters Bay beds a priority) to monitor health (as an indicator of nutrient levels) and changes in distribution. See Section 6.1 for more details.</p>	<p><i>EMC, ESC, Fisheries</i></p>	<p><i>Medium</i></p>	<p><i>Ongoing</i></p>	<p>DPI-Fisheries have also GIS mapped seagrass in Wagonga in 2005. Since 1985 total seagrass cover in Wagonga has declined by 0.675 sq km. Mapping of these areas in 1985 and 2005 are shown in figures 4 a & b. Losses of seagrass seem to be confined to the Hobbs Bay area, though refinement of GIS mapping that allows various species of estuarine vegetation to be more closely assigned to sites may account for the slight changes in macrophyte mapping in comparing these two maps.</p>	<p><i>Medium</i></p>	<p><i>ESC, Fisheries</i></p>
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Objective: To appropriately manage aquatic resources
Strategy: Control infestations of the Pacific Oyster

	<p><i>Responsible body (2001 Plan)</i></p>	<p><i>Rating (2001 Plan)</i></p>	<p><i>Outcome</i></p>	<p>Comments</p>	<p><i>Cost(if applicable)</i></p>	<p><i>Rating (2010 review)</i></p>	<p><i>Responsible body (2010 review)</i></p>
<p>3.6 Continue to regularly inspect leases and rocky foreshores and remove Pacific Oysters to protect the existing aquaculture industry from the problems experienced in other NSW estuaries. Liaise with Navy divers to provide assistance.</p>	<p><i>Fisheries, Wagonga Oyster Farmers</i></p>	<p><i>Medium</i></p>	<p><i>Ongoing</i></p>	<p>DPI and CMA along with Nature Coast Marine Group have actively participated with the Oyster Industry to manage Pacific Oysters in the Wagonga Inlet estuary, on both lease areas and crown land. To this end, the Wagonga Inlet Pacific Oyster Management Plan was implemented in 2008 in an effort to ensure all steps possible to tackle this issue on lease areas were DPI and the Oyster Industry in Narooma have also been monitoring the crown land situation, with CMA providing funding for a work crew to cull gigas from this area. In 2008 and 2009 this saw the destruction of c.18 000 Pacific Oysters from the Inlet.</p>		<p><i>Ongoing</i></p>	<p><i>Fisheries, Wagonga Oyster Farmers.</i></p>

Strategy: Collect base-line data on recreational fishing							
	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
3.7 Undertake recreational fishing survey to gain an understanding of the magnitude of the recreational finfish catch and harvesting of intertidal animals. Liaise with universities as possible student project.	<i>Fisheries, EMC, SGFC</i>	<i>Low</i>	<i>Commenced</i>	DPI-Fisheries undertook a recreational fishing survey in 2005, titled “ <i>The importance of recreational fishing expenditure to the economies of two coastal towns in northern and southern New South Wales: Port Macquarie and Narooma/Bermagui.</i> ” This survey found that ocean fishing was more favoured in the Narooma area than estuary fishing, though this along with rock and beach fishing was still highly valued. Further surveys are subject to funding and have a low priority for the future.		<i>Low</i>	<i>Fisheries, SGFC.</i>
Strategy: Encourage cleanup of areas around oyster leases							
	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
3.8 Include particular problem areas (e.g. walking track from Ringlands Point) in ‘Clean up Australia’ day program and liaise with oyster farmers to gain their participation.	<i>ESC, Fisheries, Wagonga Oyster Farmers</i>	<i>High</i>	<i>Not completed</i>	The “Clean up Australia” program is a community education tool that encourages interest in the maintenance of visual amenity and water quality of the Inlet. Fisheries are instigating an Oyster Lease Clean Up program for NSW, though Wagonga Inlet is not identified for immediate remediation works (see figures 5.1 & 5.2). Other remediation work undertaken by bodies such as Wagonga LALC Rangers, Landcare and ESC undertake clean up of rubbish at work sites throughout the year.			

Strategy: Ensure cockle collection does not adversely impact on aquatic habitats

	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
3.9 Continue to employ gathering practices which do not impact adversely on strapweed beds. Continue to assess the feasibility and sustainability of cockle collection within the estuary.	<i>Fisheries, Commercial fishers</i>	<i>High</i>	<i>Ongoing</i>	<p>Under the Fisheries Management (<i>Estuary General Share Management Plan</i>) Regulation 2006, Wagonga Inlet is located within Region 7 of the Estuary General Fishery, which is a “Share Managed Fishery”. This means that a person who owns/leases a fishing business must also hold the minimum number of shares for a given fishing method (e.g. meshing, hand gathering, hauling etc) before being allowed to fish within the fishery.</p> <p>Within Region 7 there are currently 44 fishing businesses. Of these 44 businesses, 5 hold shares for hand gathering. Hand gathering allows the taking of beachworm, pipi, cockle, cuttlefish, mussel and nippers from estuarine waters and ocean beaches. This means that up to 5 commercial fishers may collect in Wagonga Inlet (excluding Sanctuary Zones with the BMP).</p>		<i>Ongoing</i>	<i>Fisheries, Commercial Fishers</i>

Objective: To provide a vegetated buffer zone around the entire inlet

Strategy: Preserve bushland around Wagonga Inlet

	<i>Responsible body (2001 Plan)</i>	<i>Rating (2001 Plan)</i>	<i>Outcome</i>	<i>Comments</i>	<i>Cost(if applicable)</i>	<i>Rating (2010 review)</i>	<i>Responsible body (2010 review)</i>
3.10 Investigate mechanisms to impose harsher penalties for breaches of	<i>ESC</i>	<i>High</i>	<i>Ongoing</i>	This action requires amendment. Mechanisms to prevent breaches of development consents or illegal clearing		<i>ESC</i>	<i>High</i>

<p>development consent and Council's Tree Preservation Order relating to clearing of bushland on Ringlands Estate.</p>				<p>apply to all areas of the Eurobodalla Shire, and would be implementable around the whole of the Wagonga Inlet.</p> <p>The draft Local Environmental Plan 2009 currently under review by ESC includes stringent tree preservation objectives (section 5.9) and Council's Rangers monitor and investigate any reported incidents of illegal clearing.</p> <p>Also, as stated above, ESC's Residential Design Code incorporates coastal design principles that include built form guidelines to take into account mature trees within the building area to protect these natural assets.</p> <p>This action will be amended to be applicable to the whole of the Wagonga Inlet area.</p>			
<p>Strategy: Control damage to vegetation resulting from vehicle access</p>							
<p>3.11 Close track on Crown Reserve adjoining Ringlands Estate to private vehicles. Maintain as emergency bushfire access, access for weed control and walking track.</p>	<p><i>ESC</i></p>	<p><i>High</i></p>	<p><i>Completed</i></p>	<p>This track was closed to prevent damage to the foreshore, however access to a picnic area has been maintained. A photo of the closed track is at Appendix B, photo 18.</p>			
<p>Strategy: Actively manage remnant bushland of conservation significance</p>							
<p>3.12 Develop bushland management plan and weed control program for the</p>	<p><i>Esc</i></p>	<p><i>Medium</i></p>	<p><i>Underway</i></p>	<p>This plan was completed in 2007. Implementation was begun in 2008 with</p>		<p><i>ESC</i></p>	<p><i>Medium</i></p>

rainforest at Flying Fox Bay and remnant vegetation at the northern end of Mill Bay.				funding by DECCW, and works undertaken by Conservation Volunteers Australia teams and Wagonga LALC Rangers. Specific objectives of the Flying Fox Bay Vegetation Management Plan are outlined in section 5- New Objectives /Actions.			
Strategy: Increase the extent of foreshore buffer zones							
<p>3.13 As per Council’s Policy, continue to pursue opportunities to transfer foreshore land into public ownership through conditions of development/subdivision consent, for:</p> <ul style="list-style-type: none"> - land zoned 2ec around Forsters Bay - land zoned Rural 1(a) around Barlow’s and Clarks Bays, Freshwater Bay/Paradise Point, and between Honeymoon Point and Hobbs Point - land zoned “Further Investigation for Rural C” between Brices Bay and Punkally Creek. 	<i>ESC</i>	<i>Ongoing</i>	<i>Ongoing</i>	<p>Proposed land zonings and Lot Sizes in the draft Eurobodalla LEP 2010 will limit subdivision of land surrounding the Wagonga Inlet. As there is limited capacity for subdivision of lands in the area, transfer of foreshore land into public ownership is highly unlikely. However, incentives to land owners to protect or enhance foreshore vegetation are still beneficial to the health of the Wagonga Inlet. As such, an additional action is outlined in Section 5 of this review.</p> <p>Benefits: Foreshore land under public ownership can be developed and managed for the enjoyment of the general public whilst protecting environmental and water qualities.</p>		<i>ESC</i>	<p><i>Ongoing</i></p> <p>Please note that, as the Eurobodalla LEP is still in draft form, zonings and code definitions may vary from the exhibited draft.</p>

3.14 Change zoning of unused road reserves around inlet to 6(a) e.g.: - road reserve on south-western side of Forsters Bay.	<i>ESC</i>	<i>Low</i>	<i>Underway</i>	Under the Draft LEP areas surrounding the inlet, including road reserves on the south-western side of Forsters Bay, have been designated for zoning as RE1- Public recreation, which equates to 6a- Public Open Space.			
3.15 Rezone SEPP 14 wetland No. 126 (between Punkally and Burrumbidgee Creeks) to 7(a) Environmental Protection – Wetland	<i>ESC</i>	<i>High</i>	<i>Underway</i>	SEPP 14 126 has been zoned E2- Environmental Protection.			
3.16 Map riparian buffer zones in Rural 1(c) small holdings zones for better protection.	<i>ESC</i>	<i>High</i>	<i>Completed</i>	The draft LEP recognises riparian buffer zones and has mapped these areas according to a study completed by the (former) Dept of Infrastructure, Planning and Natural Resources.			
3.17 In conjunction with current/future review of LEPs consider introduction of an environmental protection zone for riparian buffers, shorebird nesting and feeding areas, regionally uncommon vegetation and wildlife corridors.	<i>ESC</i>	<i>As arises</i>	<i>Underway</i>	Under the 2010 draft Local Environmental Plan, Rural 1(c) areas are now rezoned based on site constraints and surrounding land uses/constraints.			

Goal: to protect and increase recognition of Aboriginal heritage

Objective: To encourage community participation in the management of foreshore reserves

Strategy: Establish volunteer bush regeneration groups

<p>3.18 Develop a program for weed control along the Princes Highway/Centenary Drive (as per <i>Masterplan</i>) and advertise/approach existing community groups for volunteers to become involved. Resources may also be available through the Green Corps and Natural Heritage Trust. Extend program to other areas as interest develops.</p>	<p><i>ESC</i></p>	<p><i>Medium</i></p>	<p><i>Not completed</i></p>	<p>This action was considered of medium importance in the 2001 <i>Wagonga Inlet Estuary Management Study and Plan</i>. This action is still considered of medium importance in this review.</p> <p>As stated in section 2.2, areas of higher weed concern than the Princes Highway/Centenary Dr have been identified and will be addressed first. Further funding would also be required to achieve weed control in all areas of management concern surrounding the Wagonga Inlet.</p>		<p><i>ESC</i></p>	<p><i>Medium</i></p>
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Objective: To increase awareness of Aboriginal and European sites and local history

Strategy: Continue to develop and seek sponsorship for walking track brochures

<p>4.1 Prepare Narooma Town/Bar Rock brochure (funding has been received).</p>	<p><i>HS, ESC</i></p>	<p><i>High</i></p>	<p><i>Completed</i></p>	<p>This action has been completed. Brochures on the Mitchell's Mill Walk outlining the placement of signage for the Wagonga Inlet Interpretive Walk were produced with the assistance of the Narooma Historical Society and Telecom (now Telstra Australia). A copy of these</p>			
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				brochures is at Appendix B.			
Strategy: Develop design guidelines and program for the installation of interpretive signs							
4.2 Install interpretive signs at: - points of interest along <i>Mitchell's Mill Walk and Ringlands Rotary Walk</i> - log ramp (skids) at Wagonga Picnic Area - at points of interest along proposed Narooma Town/Bar Rock walk – develop major interpretive signage for Rotary Park covering both Aboriginal and European heritage (including <i>Lady Darling</i> wreck).	<i>ESC, HS</i> <i>Forests</i> <i>HS, LALC, ESC, NPWS</i>	<i>Medium</i>	<i>Completed</i>	Interpretive signs covering both Aboriginal and European heritage have been installed at particular points of interest around the Narooma Town and Bar Rock walk, including at Rotary Park, and along Mitchell's Mill Walk, in 2008. (see Appendix B) The Wagonga Picnic area was closed in 2007 and therefore signage at the log skid ramps is no longer required for the site.			
Objective: To prevent deterioration of Aboriginal middens and other archaeological sites							
Strategy: Maintain involvement of LALC in foreshore/catchment works							
4.3 Refer to recommendations contained in Navin Officer (1997) and continue to involve Aboriginal sites officer in the planning for, and construction of, foreshore paths and other recreational facilities (e.g. proposed access from Mill Bay to Apex Park), as well as logging operations/management of Bodalla State Forest.	<i>ESC, NPWS, Forests</i>	<i>Ongoing</i>	<i>Ongoing</i>	This action is considered a continual one, with both ESC and NSW State Forests consulting the Wagonga Local Aboriginal Land Council (WLALC) in planning and construction of facilities around the Inlet or in logging operations in Bodalla State Forest. WLALC were also invited to provide representation and input to the Estuary Management Committee whilst it was functioning. The Eurobodalla Coastal Management Advisory Committee has two positions		<i>ESC, NPWS, Forests</i>	<i>Ongoing</i>

				dedicated to local Aboriginal communities; therefore consultation on Aboriginal matters relating to estuary management is ongoing.			
Strategy: Protect middens and other sites							
4.4 Investigate means to address erosion of the midden at the Wagonga Picnic Area and other sites as necessary.	<i>LALC, Forests</i>	<i>As needed</i>	<i>Not complete</i>	The Wagonga Picnic Area was closed to public access in 2007. Wave erosion may still be impacting on the midden at the old Wagonga Picnic Area. Protection could include buffering works at the foreshore, or covering of the midden. Any action at the site requires detailed liaison with the Wagonga Aboriginal Lands Council and a Section 91 permit from the NSW Department of Environment, Climate Change and Water.		<i>LALC, ForestsNSW</i>	<i>Medium</i>
Objective: To conserve the remains of early European settlement and industry							
Strategy: Ensure access is available to heritage relics for conservation, and where appropriate, interpretation							
4.5 Liaise with property owner to gain access to Wagonga Cemetery to repair fence and headstones as and when required.	<i>ESC, HS</i>	<i>High</i>	<i>Not complete</i>	Liaison with property owners has not been successful in gaining access to the Wagonga Cemetery. Funding is also required to undertake works. The action is still considered of high importance to maintaining the historical record of utilisation of the Inlet and early settlement of the Narooma area.		<i>ESC, HS</i>	<i>High</i>

Goal: to improve boat navigation and safety**Objective: To maintain navigation channels****Strategy: Assess adequacy of navigation channel depths and impact of shoaling**

5.1 Monitor channel depths (by depth sounder) upstream and downstream of the bridge and provide regular reports to the EMC.	<i>Waterways</i>	<i>High</i>	<i>Ongoing</i>	<p>The monitoring of bar depths has been undertaken on a voluntary basis by the RVCP, local charter boat operators and staff of NSW Waterways- Narooma. As the EMC is no longer functioning, these bodies liaise with ESC-Works regarding channel depths.</p> <p>Changes in the navigation channel will trigger actions outlined in 5.2 below.</p>			<i>NSW Maritime Volunteers</i>
5.2 Provide detailed channel surveys (including channel at Shell Point) and depth comparisons at appropriate intervals.	<i>DLWC</i>	<i>High</i>	<i>Ongoing</i>	<p>Further action will depend on channel conditions changing and being detected through the course monitoring program outlined in 5.1 above.</p> <p>Changes in channel conditions likely to impact on navigation will trigger the need for more detailed channel surveys.</p>		<i>High</i>	<i>NSW Maritime</i>
5.3 Monitor continuing sand intrusion into Forsters Bay and its impacts on Taylors Boatramp and adjacent private jetties. This is to include details on the frequency and volume of sand removed from the boatramp by Council.	<i>DLWC, ESC</i>	<i>High</i>	<i>Ongoing</i>	<p>Sand movement is seen as a natural process, and the monitoring of Taylors Boatramp and Forsters Bay has been difficult to undertake. The monitoring of private jetties is the responsibility of owners or the individuals who utilise them. ESC will continue to monitor and maintain the public boat ramps in Wagonga inlet.</p> <p>See 5.3 under Section 5- Management</p>		<i>Low</i>	<i>ESC Private Jetty owners</i>

				Issues and Recommendations for Inclusion.			
Strategy: Maintain adequate depths for commercial and recreational vessels to enter Forsters Bay							
5.4 Remove rocks at danger buoy, downstream of the highway bridge.	<i>Waterways, DLWC, Esc</i>	<i>High</i>	<i>Completed</i>	<p>In 2006, DECCW provided funding to ESC to prepare a <i>Review of Environmental Factors (REF) for Wagonga Inlet Entrance Channel Navigational Improvements</i> (http://www.esc.nsw.gov.au/site/Environment/Estuaries/Estuary/narooma/WagongaREF.pdf) to investigate the removal of rocks at the Danger Buoy and dredging options for the Wagonga Inlet.</p> <p>The REF proposed that total removal of the rocks would disturb or destroy fish habitat and therefore lowering of the pile would improve boating safety whilst maintaining biodiversity within the Inlet. Lowering of rocks was undertaken as part of the dredging works and completed in August 2007. Three channels for small scale dredging were identified and these were dredged in August 2007.</p> <p>Benefits: Safer boating for recreational fishers and visitors to the Wagonga Inlet, and maintenance of in waterway habitats.</p>	\$125 000 for the REF and dredging of channels in 2007.		
5.5 Review need for dredging navigation channels. If required, prepare environmental impact assessment report.	<i>ESC, DLWC</i>	<i>High-Ongoing</i>	<i>Completed but ongoing</i>	Three channels for small scale dredging were identified in the <i>Review of Environmental Factors(REF)for Wagonga</i>	<i>As above</i>	<i>Ongoing</i>	<i>ESC, Maritime</i>

See Section 6.2 for more details.				<p><i>Inlet Entrance Channel Navigational Improvements</i> to avoid impacts on areas of the threatened seagrass <i>Posidonia australis</i>. Dredging on the western side of the Princes Highway bridge was considered successful. On the eastern side of the bridge, dredging was considered less successful as sand returned to the channel. Dredging will be reviewed as necessary.</p>			
<p>Objective: To improve boat safety awareness Strategy: Improve dissemination of information on bar conditions and boat safety</p>							
<p>5.6 Continue to include articles on correct procedures for putting to sea and crossing the bar in the <i>Narooma News</i>, <i>This Month on the Sapphire & Eurobodalla Coast</i> and other tourist/fishing publications.</p>	<p><i>RVCP, EMC, Fisheries, Waterways, CoC</i></p>	<p><i>Ongoing</i></p>	<p><i>Ongoing</i></p>	<p>Both NSW Maritime and ESC have contributed articles on safe boating within the Wagonga Inlet area.</p> <p>NSW Maritime constantly reminds boaters re putting to sea and crossing coastal bars through media releases and brochures. NSW Maritime has installed two large bar warning signs with flashing lights downstream of the town wharf to alert boaters of the dangers of crossing the Narooma Bar. There are smaller signs on every boat ramp warning of the dangers of crossing the bar.</p>			
<p>5.7 Prepare and distribute information on boating safety tips (such as those prepared by the RVCP in the past) so that they are available at caravan parks, motels and other tourist accommodation.</p>	<p><i>RVCP, CoC, Waterways</i></p>	<p><i>High</i></p>	<p><i>Ongoing</i></p>	<p>NSW Maritime updates brochures and handbooks regarding safety tips for the general public. A new licensing system has been introduced where the public must complete a Boating Safety Course and complete a log book before they can sit the Boating License test.</p>			

<p>5.8 Explore opportunities for the implementation of a trial ‘bar watch’ system including dissemination of information via digital display boards and hazard ranking lights. See Section 6.1 for more details. Funding assistance for this system may be available under Waterway’s Asset Development and Management Program (WADAMP).</p>	<p><i>ESC, RVCP, Waterways</i></p>	<p><i>High</i></p>	<p><i>Completed</i></p>	<p>A “Bar Watch” system has been in operation at Narooma Bar since July 2007, through the combined efforts of the RVCP, Coastal Watchers and NSW Maritime. Two bar warning signs with flashing lights and a web camera have been installed.</p>			
<p>5.9 Explore opportunities for repair of Old Pilots Wharf for use by RVCP, subject to funding availability (works to be sympathetic to heritage significance of structure and could include interpretive signage).</p>	<p><i>RVCP, Waterways</i></p>	<p><i>High</i></p>	<p><i>No longer relevant</i></p>	<p>This action is considered no longer relevant as the RVCP is now moored at the Town Wharf.</p>			

Goal: in keeping with conservation values, ensure equitable use of the inlet’s waterway and recreational resources
Objective: To balance the commercial and recreational uses of the inlet
Strategy: Maintain open water areas within the inlet for recreational boating and visual amenity

<p>6.1 Continue current closure on new leases. Assessment of applications to the Minister for relocation of silted leases to take account of areas of ecological significance (see Figures 3.1a and 3.1b), navigation channels and access to/from boat launching and foreshore picnic areas.</p>	<p><i>Fisheries</i></p>	<p><i>As arises</i></p>	<p><i>Completed</i></p>	<p>This action is considered complete. NSW DPI-Fisheries managed oyster leases within the Wagonga Inlet area under guidelines to protect areas of ecological significance. Current and previous oyster lease areas are identified in Figure 5.1 & 5.2 and no new areas will be used for leases. Wagonga Inlet contains 86.6ha of priority oyster aquaculture area of which none is mapped to be phased out of use</p>			<p><i>I&I Fisheries</i></p>
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				presently (OISAS, 2006)			
6.2 Prepare mooring plan for Wagonga Inlet (with input from EMC and with reference to areas of ecological significance, see Figures 3.1a and 3.1b) identifying existing/future mooring areas (public/private) and the maximum number of moorings per area.	<i>Waterways</i>	<i>High</i>	<i>Not complete</i>	<p>NSW Maritime is revising the mooring plan for the Wagonga Inlet in consultation with the Batemans Marine Park Authority. Inspection of proposed new mooring sites is undertaken by NSW Maritime and MPA prior to approval to determine that the site is not in an environmentally sensitive area. Mooring numbers are restricted within the Inlet, as is the size and types of vessels.</p> <p>This action was considered of high importance in the 2001 <i>Wagonga Inlet Estuary Management Study and Plan</i> and is still considered of high importance by this review as there is a high demand for moorings in Wagonga.</p>		<i>High</i>	<i>Maritime MPA</i>
Objective: To promote foreshore facilities that cater for commercial, tourism and public use							
Strategy: Extend Town Wharf							
6.3 Prepare design report for the extension of Town Wharf towards the swimming pool. Include boat pumpout facilities. A preliminary concept showing public/commercial space is shown in Figure 5.1 of the 2001 plan. Funding may be available through the Federal Government's Regional Assistance Program. DLWC and Waterways funding is available for public wharves.	<i>ESC, DLWC, commercial operators, Waterways</i>	<i>High</i>	<i>Not complete</i>	The Department of Lands has begun investigations to support a review of the Narooma Town Wharf extension, such as surveying existing jetties and Crown land assessments in the Wagonga Inlet area. The action is still considered a priority action for the plan but will take some time to be fully implemented, also relying on the gazettal of ESC's proposed LEP to meet zoning requirements. Extension of the wharf would not be constrained by current or future development controls		<i>High</i>	<i>ESC, Lands, commercial operators, Maritime</i>

				implemented by ESC. This action was considered of high importance in the 2001 <i>Wagonga Inlet Estuary Management Study and Plan</i> and is still considered of high importance by this review.			
Objective: To address potential conflicts between recreational users and between recreational use and ecological values/commercial use of the inlet Strategy: Manage boating to avoid conflicts							
6.4 Review existing boating controls and impacts of vessel operation with reference to Figures 3.1a and 3.1b, areas of ecological significance.	<i>Waterways, EMC, ESC</i>	<i>In hand</i>	<i>Ongoing.</i>	See below			<i>Maritime, ESC</i>
6.5 Implement appropriate boating controls (and associated advisory/educational signage at boat launching areas) based on the following principles: - reduced boat speeds upstream of Honeymoon Point to minimise boat wash, effects on oyster leases, SEPP No.14 wetlands and other sensitive foreshore lands - no anchoring in seagrass beds - reduced boat speeds over large beds of strapweed <i>Posidonia australis</i> (see Figure 3.1a and 3.1b- <i>original plan</i>) - reduced boat speeds (i.e. noise levels) adjacent to areas of ecological significance	<i>Waterways</i>	<i>Medium</i>	<i>Ongoing.</i>	These actions were considered “in hand” and of medium importance in the 2001 <i>Wagonga Inlet Estuary Management Study and Plan</i> . A number of areas within the Inlet have new speed restrictions, outlined in the Waterways Map for the area. At this point in time it is not considered necessary to implement exclusion zones for areas of <i>Posidonia australis</i> due to the healthy nature of populations within the Inlet.			<i>Maritime</i>

consistent with use as passive recreational areas.							
Strategy: Manage foreshore reserves in accordance with their ecological values							
6.6 Development of reserves identified as being of ecological significance to be restricted to low impact recreational and educational activities, e.g. bushwalking, nature study and only basic facilities to be provided, i.e. unsealed walking tracks, 'bushland' picnic areas.	<i>ESC</i>	<i>Medium</i>	<i>Ongoing</i>	All reserves currently managed by ESC in the Wagonga Inlet area are for low impact recreational use to preserve environmental and water qualities present. However, maintenance of areas is an ongoing issue requiring resources and funds. Eurobodalla Shire Council is developing a <i>Recreational Strategy</i> for the Shire's reserves, open spaces and facilities. This is due for finalisation in 2010.		<i>Medium</i>	<i>ESC</i>

<p>6.7 Consider exclusion of dogs from areas of high native animal habitat value (e.g. shorebird breeding and feeding areas) and exercise of dog's on-leash only, in other areas of ecological significance.</p>	<p><i>ESC</i></p>	<p><i>High</i></p>	<p><i>Mostly completed</i></p>	<p>The Eurobodalla Rangers report that there are a low number of incidences of dog's off-leash in sensitive areas of the Wagonga Inlet area each year. Eurobodalla Shire Council has developed a Companion Animal Management Policy (http://www.esc.nsw.gov.au/site/publications/strategies/policyreg/livepolicydocs/2171.pdf) to meet its obligations under the <i>Companion Animal Act 1998</i> that requires a 24 hour off-leash area for dogs. At Narooma two such areas operate: at Bar Beach from the northern end to 100 metres of the breakwall; and the southern end of Bill Smyth Oval below Canty Street.</p> <p>Discussion with DECCW Threatened Shorebird Recovery Program Officer for the south coast region identified three areas of breeding habitat for Pied Oystercatchers in the Wagonga Inlet. These areas have a low instance of dog interaction with wildlife, though one area- Lewis Island- is frequented by dogs and owners whilst threatened shorebirds are nesting. In any area where it is considered that dogs may impact on nesting birds, signs and mesh fencing are erected by the Threatened Shorebird Program Officer and the area is monitored with the assistance of volunteers dedicated to helping protect these species. Dog owners</p>	<p><i>High</i></p>	<p><i>ESC</i></p>
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				<p>must adhere to the information given in signage at nesting sites.</p> <p>Eurobodalla Shire Council will monitor dog activity in the Wagonga Inlet and surrounding areas and assess the need for further designated dog activity.</p> <p>It would be beneficial to close off access to Lewis Island for dogs and implement a seasonal closure for people during the nesting season to reduce impacts on shorebirds and to assist in limiting further erosion development.</p> <p>Encouraging responsible pet exercising and excluding dogs from areas of ecological significance has assisted in threatened species recovery, with three to four pairs of Pied Oystercatchers nesting in the Wagonga Inlet area each year.</p>			
Strategy: Encourage responsible dog exercising							
<p>6.8 Monitor impacts of off-leash dog exercise on passive use of reserves. Consider installation of ‘dog litter bins’.</p>	<i>ESC</i>	<i>Ongoing</i>	<i>Complete</i>	<p>Bag dispensers for the removal of dog waste have been installed at the end of the Centenary walkway on the town side of the Mitchell’s Mill boardwalk. Existing litter bins installed by Eurobodalla Shire Council are being utilised by dog owners also.</p>			

Objective: To improve public facilities and foreshore access to the inlet
Strategy: Provide viewing/fishing platforms and boardwalks

<p>6.9 As per the <i>Narooma Foreshore & Townscape Masterplan</i> install mangrove boardwalk off Riverside Drive.</p>	<p><i>ESC</i></p>	<p><i>Medium</i></p>	<p><i>Not complete</i></p>	<p>This action was identified as being of medium importance in the 2001 <i>Wagonga Inlet Estuary Management Study and Plan</i>. However, funding for the action has not been available and is unlikely with funding of the Mill Bay Boardwalk. With the installation of the Mill Bay Boardwalk, the requirement for a mangrove boardwalk is seen as less imperative, and therefore has been given lower importance in this review.</p>	<p><i>Low</i></p>	<p><i>ESC</i></p>
<p>6.10 As per <i>Masterplan</i> construct walkway under bridge and extend <i>Masterplan</i> to north-western side of bridge (old ferry approach) to address bank erosion, formalise area for fishing/viewing and provide interpretive sign. See Section 6.1 for indicative costs per metre for boardwalks.</p>	<p><i>ESC</i></p>	<p><i>Low</i></p>	<p><i>Not complete</i></p>	<p>This action was identified as being of low importance in the 2001 <i>Wagonga Inlet Estuary Management Study and Plan</i>, and funding for the action has not been available. Access issues and landscape surrounding the Narooma Bridge would make implementation a prolonged and costly process. The linking of the Mill Bay Boardwalk to the Dalmeny-Kianga walking/cycle path is a way of increasing enjoyment of the area whilst protecting values. Erosion issues at the north-western side of the bridge still need attention. Therefore this action is still considered necessary, but of low importance.</p>	<p><i>Low</i></p>	<p><i>ESC</i></p>

Strategy: Provide more public jetties							
6.11 Reconstruct existing jetty at Ringlands Point (note that open mesh decking would be required to minimise impacts on strapweed beds (<i>Posidonia australis</i>)).	<i>ESC</i>	<i>High</i>	<i>Complete</i>	Some repair and upgrade work was carried out on the existing jetty at Ringlands Point in approximately 2004. However, a reconstruction has not been attempted. This action was identified as being of high importance in the 2001 <i>Wagonga Inlet Estuary Management Study and Plan</i> , however after the upgrade work it now considered completed as other areas of the Inlet are well serviced and utilised.			<i>ESC</i>
6.12 Construct jetty, provide fish cleaning table, wash down hose, lighting and bins and formalise and seal car park to southern boat ramp at Forsters Bay. Funding is available through DLWC and Waterways programs for public wharves and jetties. Indicative costs per metre are provided in Section 6.1.	<i>ESC</i>	<i>Low</i>	<i>Not complete</i>	This action would be beneficial to recreational fishers who utilise the Forsters Bay area. It is still considered a feasible and worthwhile action to incorporate into future planning for the Inlet. However, fish cleaning facilities exist at Town Wharf and Apex Park, so it is still considered a low priority action that will require funding to undertake.			<i>ESC</i>
Strategy: Improve access for launching sailboats etc							
6.13 Widen sand ramp near NSW Fisheries building so more than one boat can be launched at a time.	<i>ESC, SC</i>	<i>High</i>	<i>No longer considered necessary</i>	This action was identified as of high priority in the 2001 <i>Wagonga Inlet Estuary Management Study and Plan</i> , however since that time the site has been found to be in low use for boat launching. Other areas have shown a higher demand on boating resources and infrastructure and resources have been deployed to these sites.			

5. Management Issues and Recommendations for inclusion in the *Wagonga Inlet Estuary Management Study and Plan*, with rating of priority.

Consultation with community and management agencies identified the following new actions and modifications to existing actions for the management of the Wagonga Inlet:

New Objective: To assess and plan for management of sea level rise impacts on the Wagonga Inlet Estuary and surrounding land uses			
New Strategy: Assess/Model the migration of Endangered Ecological Communities (EEC's) around the inlet according to variable projections of climate change and sea level rise			
<i>Action</i>	<i>Responsible</i>	<i>Rating</i>	<i>Reason for inclusion</i>
<p>New action:</p> <p>7.1 Undertake a project to map current EEC's, and variables affecting presence of EEC's surrounding the Wagonga Inlet and model impacts or movements that might occur for a variety of sea-level rise scenarios.</p>	<p>DECCW, ESC</p>	<p>High</p>	<p>This action has been identified as a management issue by State and Commonwealth agencies. To identify key EEC's that have potential to migrate inwards with sea level rise and to focus on these for protection.</p>

New Strategy: Develop and implement a Floodplain Risk Management Study and Plan for the Wagonga Inlet			
<p>New action:</p> <p>7.2 Complete a Floodplain Risk Management Study and Plan in accordance with New South Wales <i>Floodplain Development Manual 2005</i> and in line with the <i>NSW Sea Level Rise Policy Statement</i>.</p>	ESC	High	<p>This action has been identified as a management issue by State Agencies and Eurobodalla Shire Council.</p> <p>To identify the degree of risk from flooding events on lands surrounding the Inlet.</p> <p>To assist in preparation of development requirements for flood mitigation and land management.</p> <p>To assist with the implementation of Sea Level Rise adaptation strategies.</p>
Existing Goal: to protect water quality within the inlet for human health and to maintain a healthy ecosystem			
Existing Objective: To gain a better understanding of water quality and compliance with guidelines			
Amended Strategy: Assess changes to water quality within Forsters Bay, and the greater Wagonga Inlet area.			
<p>New action:</p> <p>1.1a Implement ecosystem health monitoring program consistent with the Statewide Monitoring, Evaluation and Reporting (MER) Program (2009).</p>	ESC, DECCW	High	<p>This action was identified through agency consultation, and will assist in informing the success of the management plan and implementation of actions over time.</p> <p>ESC has begun implementation of this action via the DECCW funded “Eurobodalla Estuary Health Monitoring Program” that will look at the Clyde River, Tomaga River, Moruya River, Tuross River, Coila Lake and Wagonga</p>

			<p>Inlet. Chlorophyll-a samples will now be collected for twelve months at many of the sites that the ESC-Environmental Health Unit currently take enterococci samples, including seven within Wagonga Inlet (see action 1.1, and figure 3.b).</p> <p>Chlorophyll-a samples are taken as an indicator of photosynthetic plankton biomass and are used to measure water quality as a surrogate of nutrient availability, with low levels suggesting good condition.</p> <p>After 12 months, assessment of data will allow ESC to produce “estuary health report cards” on each estuary, with the possibility of incorporating historical data on estuaries such as Wagonga into a Water Quality Improvement Plan, which would describe the current condition and water quality issues of each estuary and sets realistic targets and identifies how these can be achieved.</p>
<p>Existing Objective: To improve the quality of run-off from urban and rural areas</p>			
<p>New Strategy: Undertake remedial works to halt erosion or sedimentation that may be affecting areas of the Wagonga Inlet</p>			
<p>New action:</p> <p>1.14 Monitor and assess the need for remedial erosion control works at areas surrounding Wagonga Inlet, such as Quota Park, Lewis Island and Mill Bay.</p>	<p>ESC</p>	<p>High</p>	<p>This action was identified through public consultation, and with ESC Works. Photos of erosion at Quota Park are at Appendix B, photos 19-20.</p>

New action: 1.15 Undertake erosion control works and upgrading of retaining wall infrastructure at Forsters Bay and Rotary Park.	ESC	High	This action was identified through public consultation, and with ESC Works.
New action: 1.16 Undertake to control stock access to tributaries or the foreshore of Wagonga Inlet.	ESC, SRCMA	High	This action has been identified as a management issue by State agencies and with ESC's Environment Department.
New action: 1.17 Identify roads with high sedimentation run-off affecting drainage lines or creeks that enter the catchment of Wagonga Inlet. Undertake remedial action to halt/limit sediment flows.	ESC, SRCMA, Agencies responsible for an impacting road.	High	This action has been identified as a management issue by State agencies and with ESC's Environment Department.
Existing Objective: To appropriately manage aquatic resources			
New Strategy: To protect seagrass beds within the Wagonga Inlet from commercial and recreational impacts			
3.5a As per the NSW DPI OISAS (2006) no approval of <i>new</i> oyster aquaculture areas over <i>Posidonia sp.</i> or <i>Zostera sp.</i> Seagrass beds, and the encouragement of oyster growing methods that do not shade seagrass beds.	Fisheries	Medium	Identified in the NSW DPI OISAS (2006).
New Strategy: To control identified invasive marine species, such as European Green Shore Crabs, as per the Commonwealth National System for the Prevention and Management of Marine Pest Incursions.			
New action: 3.9a Undertake regular survey work in the Wagonga Inlet to	I & I Fisheries	High	This action has been identified as a management issue by State agencies and with ESC's Environment Department.

identify invasive marine species, and undertake eradication programs where possible.			
3.9b Undertake scientific research on Invasive Green Shore crabs to understand its spread and how estuary management influence its distribution.	MPA	High	This action has been identified as a management issue by State agencies
3.9c Undertake scientific research to determine bio-indicators in estuaries and the stressors that drive change	MPA	High	This action has been identified as a management issue by State agencies
Existing Objective: To provide a vegetated buffer zone around the entire inlet			
Existing Strategy: Preserve bushland around Wagonga Inlet			
3.10 Enforce penalties for breaches of development consent and Council's Tree Preservation Order relating to clearing of bushland around the Wagonga Inlet area.	ESC	High	Identified in community consultation and by State agencies as requiring amendment due to its focus on only one area of the Wagonga Inlet area.
Existing Objective: To provide a vegetated buffer zone around the entire inlet			
Existing Strategy: Preserve bushland around Wagonga Inlet			
New action: 3.10a. Undertake community consultation with all landholders in the area of any bush regeneration project under ESC direction that may involve changes to views and/or streetscapes. Utilise "shame signs" or screens in any area where vegetation has been illegally destroyed to supplement private views.	ESC	Ongoing	This action has been identified as a management issue by ESC's Environment Department.

Existing Strategy: Actively manage remnant bushland of conservation significance

<p>New action:</p> <p>3.12a. To increase the diversity and environmental quality of the Ringlands Bay area, undertake the following Actions from the bush regeneration plan:</p> <ol style="list-style-type: none"> 1. Break up the expanse of kikuyu on Ringlands Point with carefully sited clumps of trees and shrubs. Ideally, species already existing on the Point should be planted here. 2. Repair, or re-route, the dirt vehicular track from the end of Ron Cross Lane to the picnic area on the Point. 3. Provide care and monitoring of the <i>Dipodium punctatum</i> (Hyacinth orchid) population beside the track at the beginning of Section B. 4. Vegetate the drainage line on the south western edge of the Reserve with rainforest plants, using species already growing in the Flying Fox Bay Rainforest Reserve. 5. Control of noxious and environmental weeds throughout the whole area, together with ongoing monitoring to note any new occurrences. 6. Repair and upgrade the walking track from Ringlands Point to, and through, the Flying Fox Bay 	<p>ESC</p>	<p>Medium</p>	<p>This action will assist in implementing the priority needs as identified in the vegetation management plan for the Ringlands Bay area that was created in response to action 3.12 of the 2001 Wagonga Inlet Management Plan.</p> <p>Whilst point 6 of the “<i>Bush Regeneration Recommendations for Flying Fox Bay Narooma</i>” (2007) suggested repairing or upgrading the track <i>through</i> the Flying Fox Bay Rainforest Reserve, it is considered the current track would be best kept and maintained without extension into the area utilized by Flying Foxes, due to public health issues, to avoid disturbance of the Flying Foxes when utilizing the camp, and to protect the rainforest vegetation. Delineation of the end of the track would be beneficial to assist walkers in staying to public lands in the area. An alternative would be to formalize a walking track as a loop to the area known as “Big Tree” in the Flying Fox Bay rainforest Reserve and keep this maintained. Wording is suggested to read:</p> <p>Repair and upgrade the walking track from Ringlands Point to and within the Flying Fox Bay Rainforest Reserve.</p>
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<p>Rainforest Reserve.</p> <p>This work should follow guidelines and endemic species as outlined in the “<i>Bush Regeneration Recommendations for Flying Fox Bay Narooma</i>” (2007).</p>			
<p>Existing Strategy: Increase the extent of foreshore buffer zones</p>			
<p>New action:</p> <p>3.13a. Provide a range of incentives, such as the Biodiversity Program, Biobanking Information, to landholders to increase protection of foreshore land and biodiversity vales.</p>	<p>ESC, SRCMA, DECCW</p>	<p>Medium</p>	<p>This action has been identified as a management issue by State agencies and with ESC’s Environment Department.</p>
<p>New action:</p> <p>3.19 Identify weeds that may become significant problems for the Wagonga Inlet area and areas of high weed infestation for future remediation work.</p>	<p>ESC, SRCMA</p>	<p>Medium</p>	<p>This action has been identified as a management issue by State agencies and with ESC’s Environment Department.</p>
<p>New Objective: To manage human impacts on threatened flora and fauna within and surrounding the Wagonga Inlet</p>			
<p>New Strategy: Protect important habitat for threatened flora and fauna through restricting access for people, stock and/or domestic pets. Utilise conservation incentive programs where possible to protect areas in perpetuity.</p>			
<p>New action:</p> <p>3.20 Investigate options for future management of Lewis Island, including a management strategy for the footbridge; the establishment of a Landcare group to undertake remediation works, and; the need for seasonal closure of the area to dogs in the nesting period of shorebirds, based on further consultation</p>	<p>ESC, DECCW</p>	<p>High</p>	<p>This action was identified through public consultation, and with ESC Works.</p>

with the community and government agencies.			
Existing Strategy: Assess adequacy of navigation channel depths and impact of shoaling			
Amended action: 5.3 Assess sand intrusion impacts on Taylors Boatramp and requirement to remove sand, as required. Photo points may assist in assessing sand intrusion.	ESC	Low	This action was identified for amending by State agencies.
Existing Strategy: Maintain open water areas within the inlet for recreational boating and visual amenity			
New action: 6.1a. Remediate derelict oyster leases to increase boating safety and foreshore protection and amenity.	I & I Fisheries, Wagonga Oyster Growers	Medium	This action has been identified as a management issue by State agencies. Whilst Wagonga Inlet does not have a high level of derelict oyster leases, those present may become a danger to boating traffic.
New action: 6.1b Implement the <i>Aquaculture Compliance Strategy</i> of the OISAS (see section 3.)	Fisheries, Wagonga Oyster Farmers	High	This action has been identified as a management issue by State agencies.
Existing Strategy: Extend Town Wharf			
New action: 6.3a. Monitor impacts of vessel mooring to marine habitats in Wagonga Inlet and investigate potential solutions, such as the installation of seagrass friendly moorings.	NSW Maritime MPA	High	This action has been identified as a management issue by State agencies.

A revised table of all actions that the 2010 Wagonga Inlet Estuary Management Plan entails is located at Appendix E.

6. Implementation, monitoring and review.

Whilst the 2001 plan has been implemented well, monitoring is still required to ensure existing and newly identified actions are undertaken and achieve the aim of the plan to protect and enhance the values of the Wagonga Inlet.

The original 2001 plan identified assessment and monitoring techniques to ensure the actions were effective (Section 7), including:

- Sampling and analysis of water quality in Forsters Bay to identify trends and compliance with water quality guidelines for public health and ecosystem health.
- Comparisons of channel depths and sand intrusion into Forsters Bay to determine shoaling patterns and impacts on boating.
- Seagrass surveys to assess seagrass and ecosystem health.
- Comparison of the number of Pacific Oysters removed from the Inlet to assess the effectiveness of control measures.
- Comparison of the results of surveys recreational fishers to identify changes in finfish catches and harvesting.
- Annual survey of fishers at Apex boatramp to determine if, or how, recreational boaters receive information on boating safety and bar conditions.
- Use and analyse information relating to water pollution, illegal tree clearing and entrance/bar incidents.
- Recording of participants and hours undertaken in Landcare and bush regeneration works to gauge the success of environmental education programs and the effectiveness of initiatives to increase community involvement in foreshore reserves management.
- Vegetation surveys to map increases in vegetated areas/success of planting programs and weed control.
- A follow-up to the commercial area survey to gauge the implementation of appropriate environmental management practices.

Many of these monitoring techniques can be readily implemented if funding and technical skills allow, and elements such as water quality analysis and comparison analysis of sand intrusions should be built into works programs to ensure compatibility with the aims of this plan and that actions are affecting quality outcomes.

Further on-ground environmental works are scheduled for areas surrounding the Wagonga Inlet from 2010 onwards, and current mapping will allow for a future comparison of the benefits of revegetation and weed control works.

Prioritisation of actions is also required, as some actions identified are reliant on commencement of other actions before they can be progressed. To this end, identified priority actions should include

1. Sea level rise and flood modelling to allow for future planning for areas surrounding the Inlet.
2. Standardised monitoring and analysis program of water quality, including at tributaries to assess nutrient and sediment loads entering the Inlet, to allow for remediation actions to be implemented as necessary.
3. Standardised monitoring program of channel depths and requirements for dredging.

Further monitoring techniques that may assist in analysing the effectiveness of identified actions from this review include:

- photo points for revegetation and weed control areas
- photopoints for sites of historical importance to allow for assessment of impacts,
- mapping of seagrasses surrounding moorings and analysing different mooring techniques, and
- community surveys on usage of facilities around the Inlet and identification of what further is required and suitable placement.

Prioritisation of monitoring techniques is also required to assist in the progress of goals of the Wagonga Inlet Plan. These include:

- Water quality and ecosystem health data analysis to identify ecosystem health that can provide an overview of the effectiveness of management actions.
- Survey of commercial sector utilising the Inlet to identify any environmental issues.

This review has identified the completion of several actions from the original 2001 Wagonga Estuary Management Plan; however in order to achieve many of the overall goals of the Plan new strategies and actions need to be developed and implemented. Furthermore, many of the actions from the original Plan are aimed at delivering longer term or recurrent goals and therefore must remain as ongoing management items.

In view of maintaining and improving Wagonag Inlet, an assessment of the of the management document should be undertaken in five years to ensure the goals of the Plan are being met and the condition of Wagonga Inlet is continually improving.

7. References

ESC- (2008) *Aboriginal Heritage Study: Stage Four. Managing & Protecting Aboriginal Heritage in the Eurobodalla within the Local Government Planning Framework.*

ESC- (2005) *The Narooma Plan. A Development Control Plan for Narooma.*
(<http://www.esc.nsw.gov.au/site/Publications/DCP/index.html>)

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ESC-(2002) *Wagonga Inlet Flooding Investigation 2002-* Gary Blumberg and Associates Pty Ltd.

NSW Department of Environment, Climate Change and Water- (2005) *Floodplain Development Manual 2005.* DECCW, Hurstville, NSW.

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NSW Marine Park Authority- *Batemans Bay Marine Park Zoning Map*
(<http://www.mpa.nsw.gov.au/pdf/bmp-map.pdf>)

Southern Rivers Catchment Management Authority- (2006) *Catchment Action Plan.*
(http://www.southern.cma.nsw.gov.au/news_publications-plans_strategies.php)

Figure 3a. Water Quality testing sites around Wagonga Inlet.

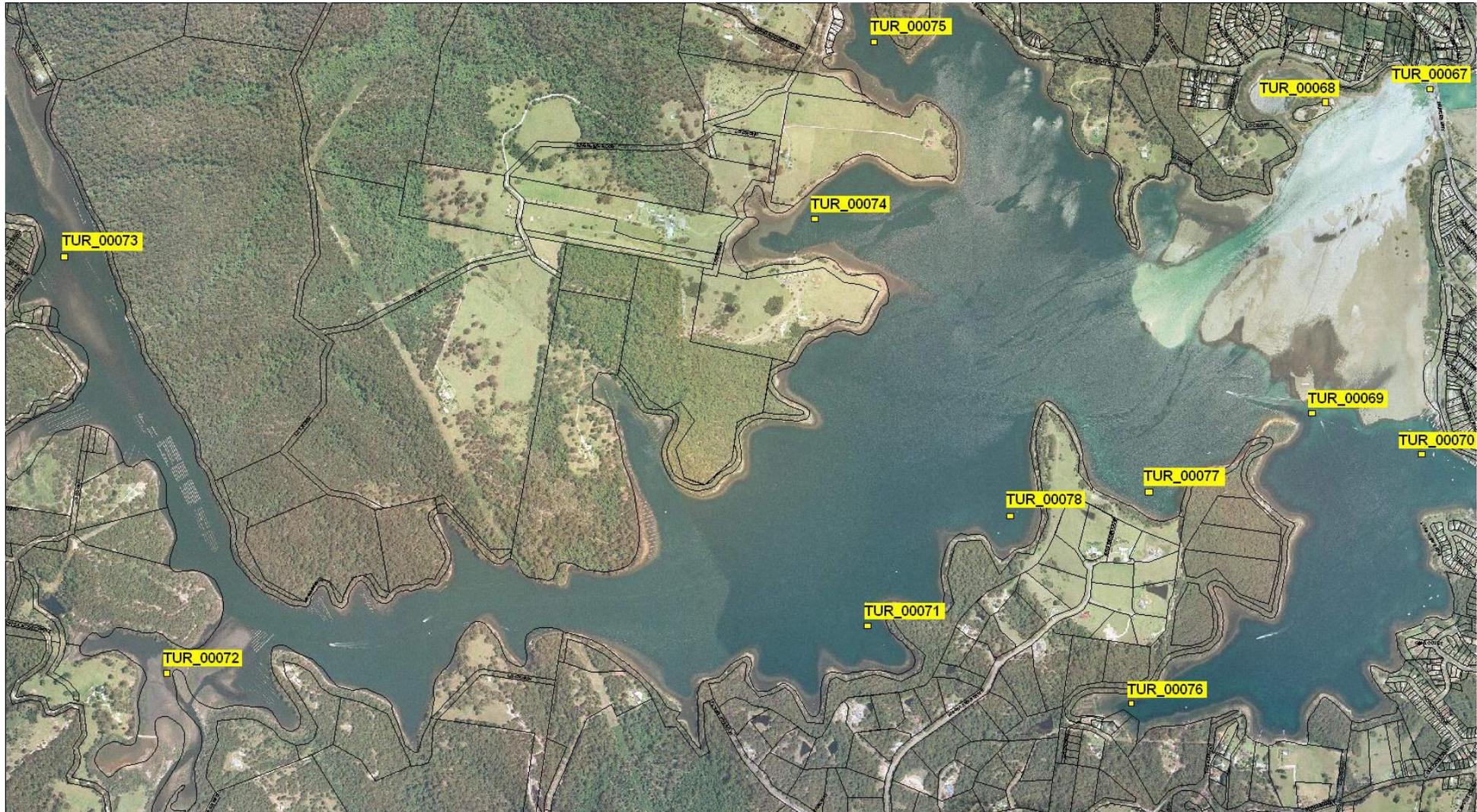


Figure 3b. Water Quality testing sites around Wagonga Inlet for the 2010 *Eurobodalla Estuary Health Monitoring Program*.



Figure 4a. Seagrass mapping of the Wagonga Inlet, and surrounding Lakes, 1985 (Courtesy of the NSW Department of Industry and Investment-Fisheries).

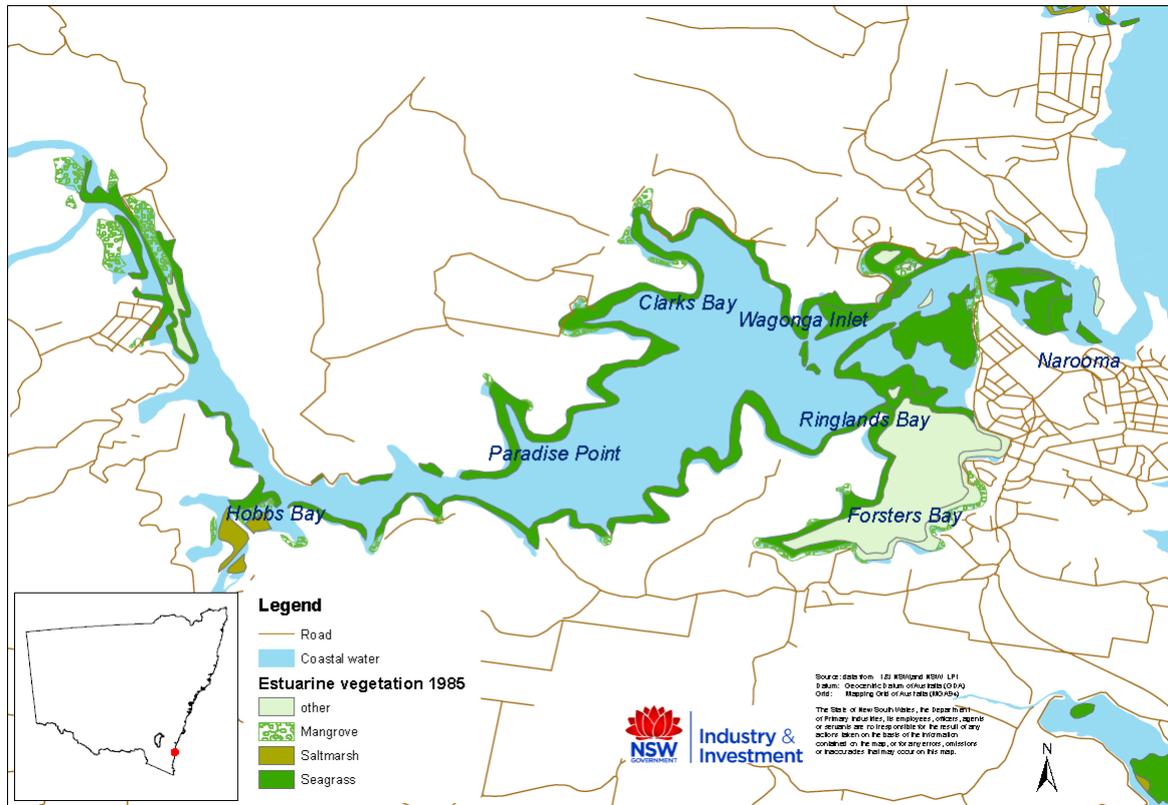


Figure 4b: Seagrass mapping of the Wagonga Inlet, and surrounding Lakes, 2005 (Courtesy of the NSW Department of Industry and Investment-Fisheries and Department of Environment, Climate Change and Water).

Lake Dalmeny, Wagonga Inlet, Nangudga Lake and Corunna Lake

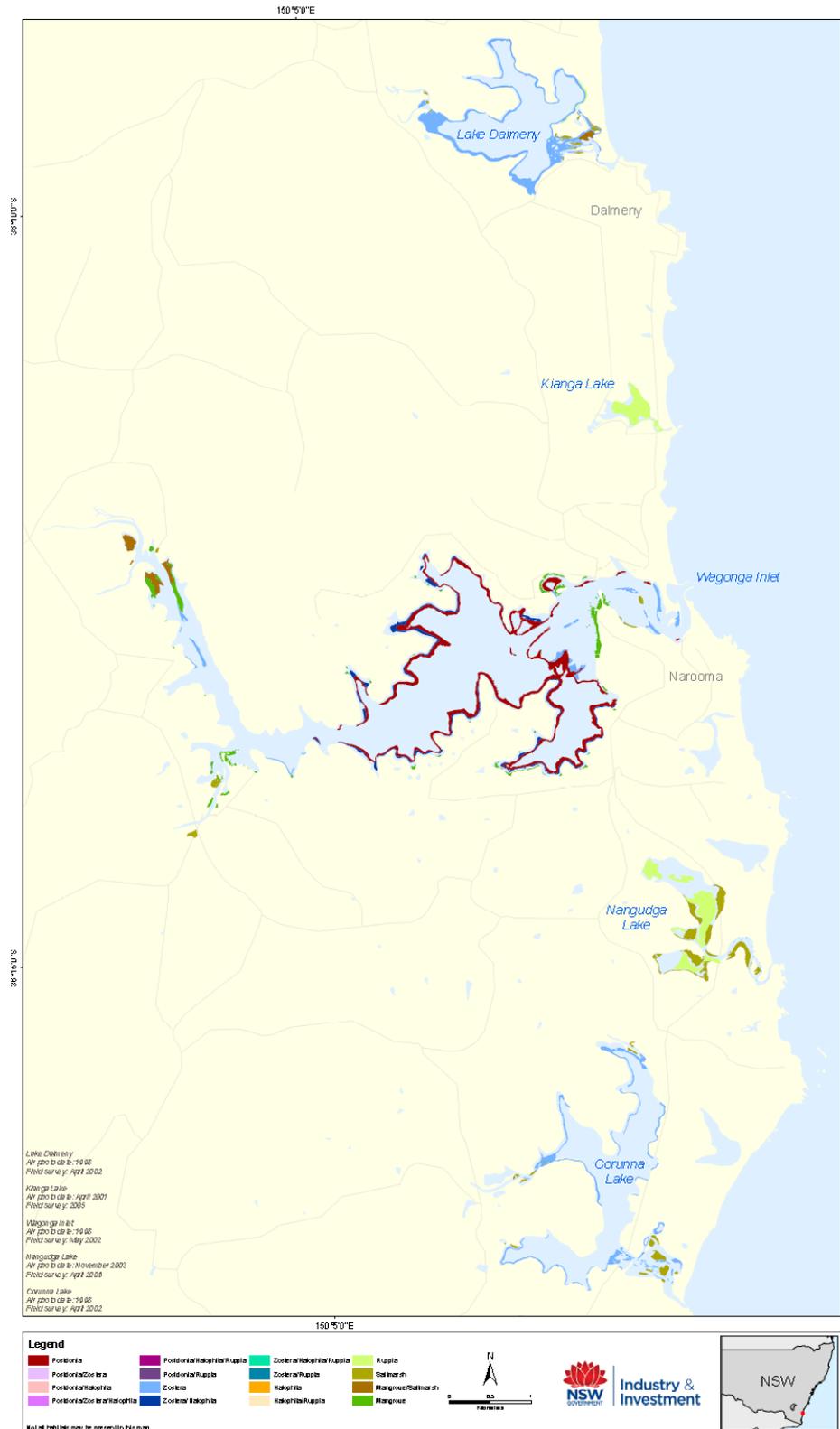
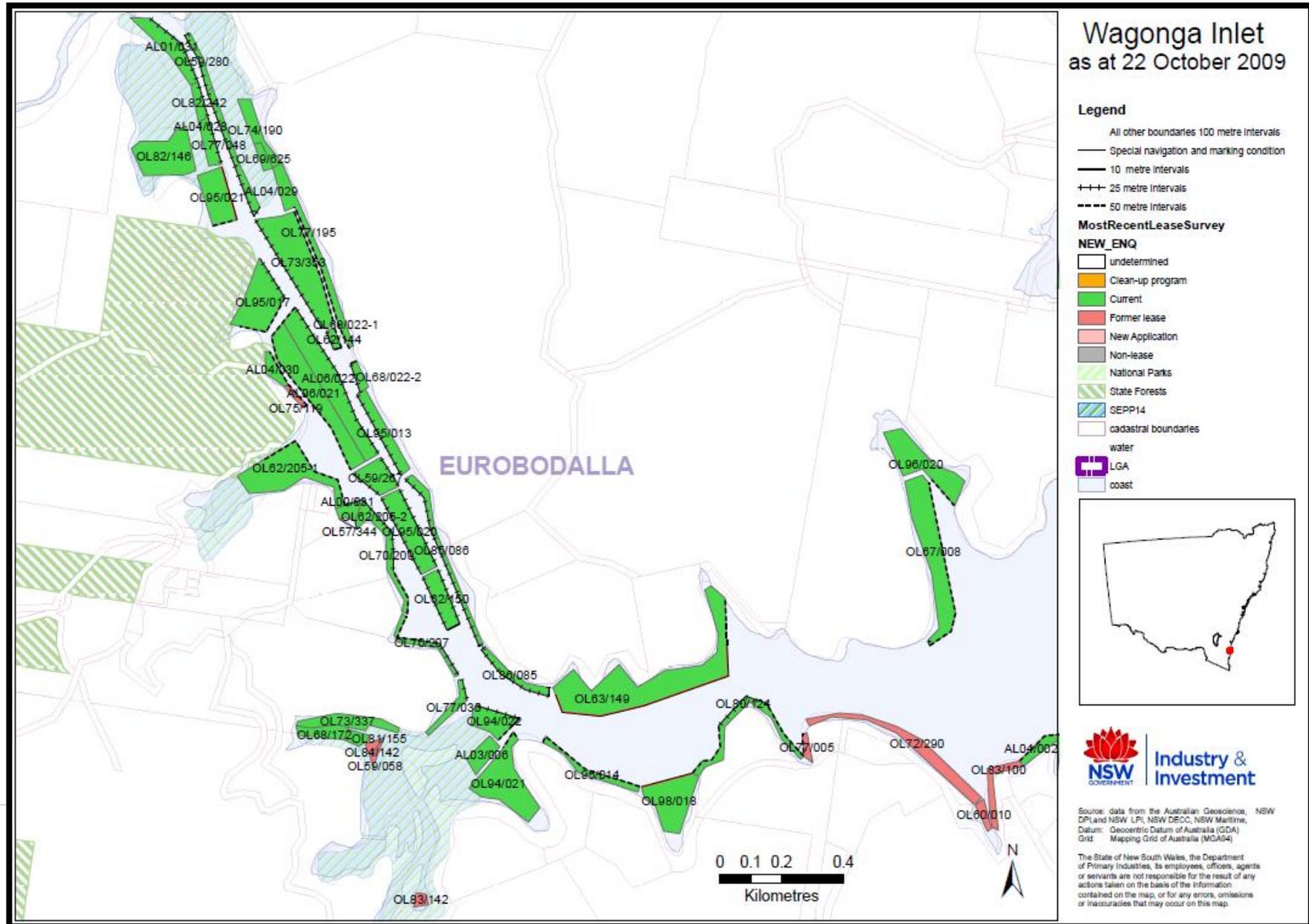
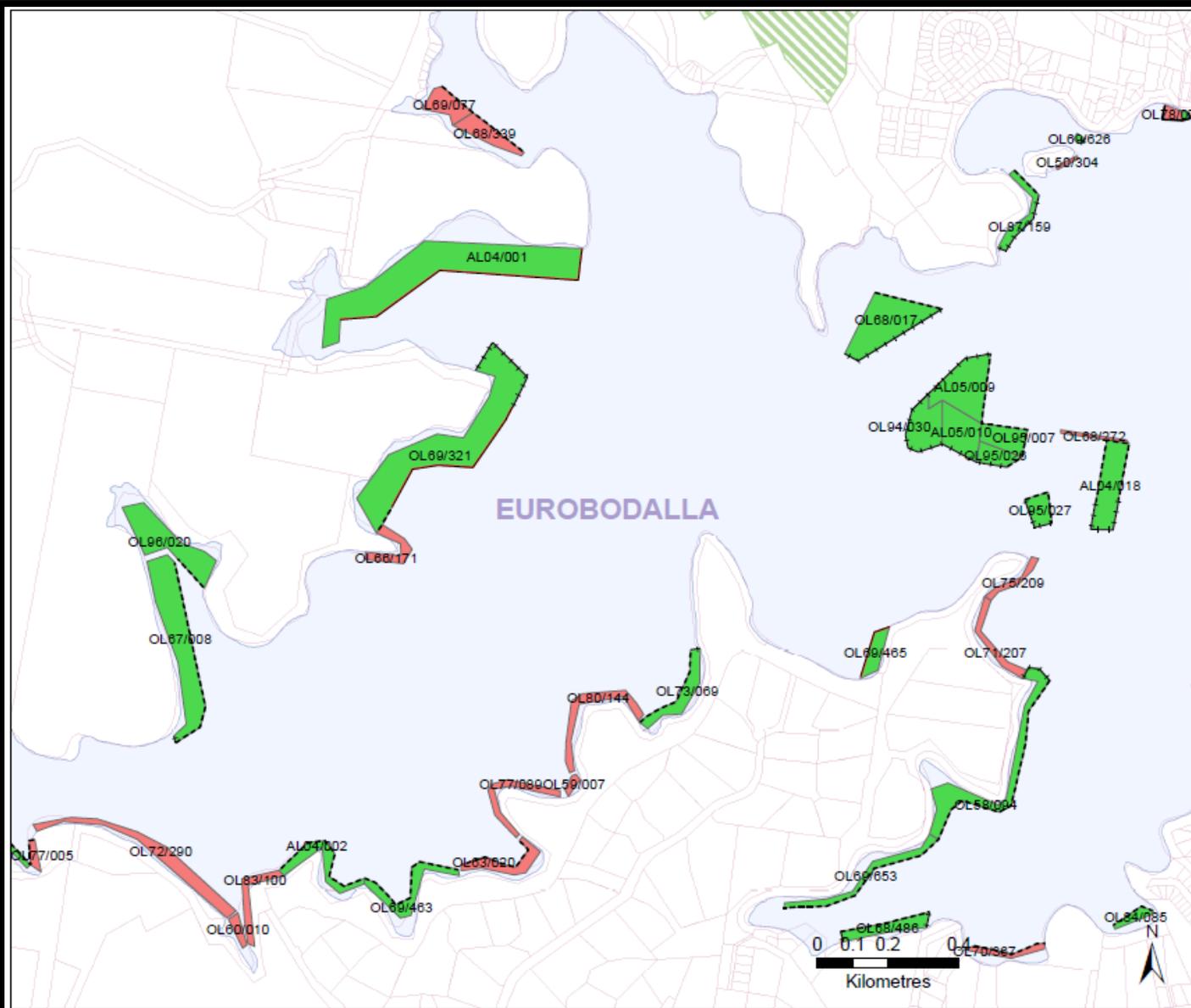


Figure 5.1 & 5.2: Oyster Leases- Wagonga Inlet (Courtesy of the NSW Department of Industry and Investment-Fisheries).

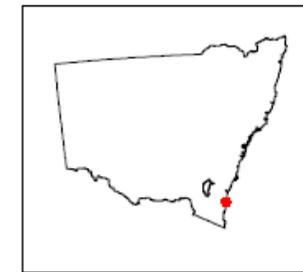


Wagonga Inlet as at 22 October 2009



Legend

- All other boundaries 100 metre intervals
- Special navigation and marking condition
- 10 metre intervals
- +++ 25 metre intervals
- 50 metre intervals
- MostRecentLeaseSurvey**
- NEW_ENQ**
- undetermined
- Clean-up program
- Current
- Former lease
- New Application
- Non-lease
- National Parks
- State Forests
- SEPP14
- cadastral boundaries
- water
- LGA
- coast



Source: data from the Australian Geoscience, NSW DPI and NSW LPI, NSW CECC, NSW Maritime, Datum: Geocentric Datum of Australia (GDA), Grid: Mapping Grid of Australia (MGAG4)

The State of New South Wales, the Department of Primary Industries, its employees, officers, agents or servants are not responsible for the result of any actions taken on the basis of the information contained on the map, or for any errors, omissions or inaccuracies that may occur on this map.



Appendix A. Endangered Ecological Communities of Wagonga Inlet- Fact Sheets

Endangered Ecological Communities of the South East Corner

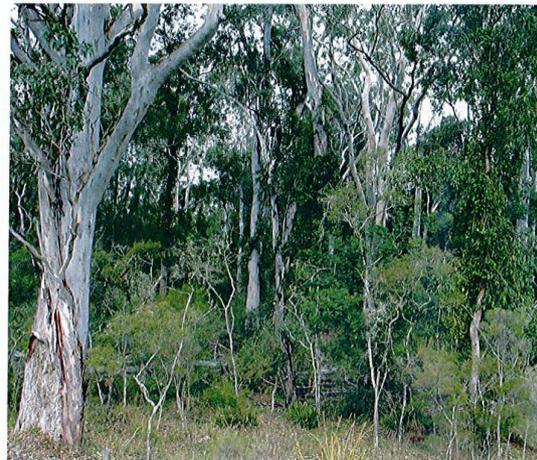
FACT SHEET 5

Swamp Oak Floodplain Forest



This example of Swamp Oak Floodplain Forest includes dense patches of the large saw-sedge *Gahnia clarkei*.

River-flat Eucalypt Forest



This forest red gum dominated stand north of Moruya is typical of this EEC on the larger floodplains.

Swamp Oak Floodplain Forest - Description

Swamp Oak Floodplain Forest is a forest or scrub community generally with a dense tree canopy of swamp oak (*Casuarina glauca*) found on wet flats in the lower areas of coastal floodplains and around the margins of coastal lakes. It may include a substantial proportion of swamp paperbark (*Melaleuca ericifolia*), or even be dominated by this species in some locations, particularly south of Bermagui, which is the southern limit of distribution for swamp oak. The Final Determination of the NSW Scientific Committee to list this EEC states that these southern stands are included in the EEC despite the absence of the species which gives the community its name. Another very characteristic species is the large native vine common silkpod or monkey rope (*Parsonsia straminea*). The understorey will vary depending on the degree of salinity. At the more saline extreme this EEC grades into Coastal Saltmarsh, with many typical saltmarsh species in the understorey, such as sea rush and various succulent herbs. In areas with a more freshwater influence there may be some shrub understorey including saplings of rainforest species such as muttonwood. The groundcover layer is more likely to include freshwater sedges including the tall saw-sedge *Gahnia clarkei*, and herbs with less salt tolerance such as *Centella asiatica* and *Viola banksii*. Swamp Oak Floodplain Forest could be confused with riparian forest dominated by river oak (*Casuarina cunninghamiana*), a larger tree, but otherwise similar in appearance to swamp oak. This is found on river banks above the tidal limit.

River-flat Eucalypt Forest - Description

River-flat Eucalypt Forest on Coastal Floodplains is a community dominated by eucalypts (or angophora) other than swamp mahogany (*Eucalyptus robusta*). Typical dominant tree species on the south coast are forest red gum (*E. tereticornis*), rough-barked apple (*Angophora floribunda*), river peppermint (*E. elata*), bangalay or southern mahogany (*E. botryoides*) and blue box (*E. baueriana*). Swamp gum (*E. ovata*) may occur in this EEC in the far south. Additional species which might occur, but are not diagnostic of this EEC, are woollybutt (*E. longifolia*), apple-topped box (*E. angophoroides*), white stringybark (*E. globoidea*), ribbon or manna gum (*E. viminalis*) and, north of Batemans Bay, cabbage gum (*E. amplifolia*). River oak or swamp oak may be present but should not be dominant, since this is a eucalypt dominated community. The vine common silkpod is frequently present in the more northerly stands of this EEC. The understorey may include swamp paperbark, mesophyll (soft-leaved) shrubs such as tree violet, coffee bush and mintbush, riparian scrub species such as sallee wattle and rainforest trees such as grey myrtle, lillypilly and cabbage palm, above a dense groundcover of mixed grasses, ferns and herbs. On river flats adjacent to tidal sections of rivers, where occasional flooding with brackish water may occur, this rich understorey may be replaced by a few salt-tolerant species of rushes and herbs. Around the drier edges of floodplains in the Moruya and Bega valleys this EEC may grade into the drier EEC, Bega Dry Grass Forest on adjacent low hills, often with the same dominant trees.

(continued overleaf)

Location in the Landscape

Both Swamp Oak Floodplain Forest and River-flat Eucalypt Forest are associated with floodplains along the NSW coastline and may be found in conjunction with two other EECs: Freshwater Wetlands and Coastal Saltmarsh. Typical situations for both Swamp Oak Floodplain Forest and River-flat Eucalypt Forest include the margins of coastal lakes and lower parts of small creeks draining into them and depressions and floodplain margins at the lower end of the larger rivers and some smaller creeks. Remnants of these communities can be observed in undeveloped pockets within the Batemans Bay and Moruya areas and around the edges of some coastal villages. River-flat Eucalypt Forest grows on river banks above the tidal influence, on levee banks or floodplain edges while Swamp Oak Floodplain Forest is found on swampy flats in the lower areas of coastal floodplains.

Although the Final Determination for these two EECs only describes them as having definitely occurred on the Moruya, Bega and Towamba River floodplains on the far south coast, it also states that "many smaller floodplains and river flats also contain examples of the community" (NSW Scientific Committee, 2004).

Threats

These highly fertile and well watered parts of the landscape were among the first cleared for farming, and some have been subject to deliberate draining and filling. Consequently few examples of these communities can be found in good condition today. Only a few tiny remnants occur in National Parks. Floodplain EECs can be highly weed-prone because of their moist and relatively fertile soils. Trampling by livestock can leave them more open to erosion and weed invasion and fencing to control livestock access and weed control are the principal management actions required for these EECs (see Fact Sheet 8).

Some typical species of these two EECs



Casuarina glauca
Swamp oak



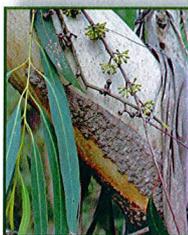
Melaleuca ericifolia
Swamp paperbark



Parsonsia straminea
Common silkpod
(juvenile foliage)



Viola banksii
Banks' violet



Eucalyptus elata
River peppermint



Eucalyptus baueriana
Blue box



Eucalyptus tereticornis
Forest red gum



Angophora floribunda
Rough-barked apple

Freshwater Wetlands on Coastal Floodplains



Description

Freshwater Wetlands on Coastal Floodplains refers to a generally herbaceous (that is, dominated by non-woody plants) swamp vegetation type which includes few or no trees or shrubs. It includes a range of different species assemblages depending on the depth and degree of permanence of the swamp. Typical freshwater wetland types on the south coast include areas of more or less permanent standing water like Waldron's Swamp, which are dominated by tall emergent sedges such as the large tussocky sedge *Cladium procerum*, jointed rush (*Baumea articulata*), tall spike rush (*Eleocharis sphacelata*) and cumbungi (*Typha orientalis*), or more ephemeral shallow wetlands which tend to be grassy, with mat-forming grasses such as water couch (*Paspalum distichum*) and *Pseudoraphis paradoxa*, and herbs such as the water milfoils (*Myriophyllum* spp) and *Crassula helmsii*, which may grow either in water or prostrate on mud at the water's edge.

Location in the Landscape

Natural freshwater wetlands occur most frequently on coastal floodplains, a floodplain being a flat landscape feature beside a river or creek which is inundated during at least some floods. However these communities can also occur in other locations such as along drainage lines in the upper parts of river systems. Many of these have been deliberately or inadvertently drained as a result of gully erosion and no longer support swamp vegetation. Another typical coastal wetland location is in dune swales, which are depressions behind coastal sand dunes. Such wetlands may not be covered by this EEC listing. Additionally it can sometimes be difficult to determine whether water bodies on floodplains are naturally occurring wetlands or farm dams. In some cases natural swamps may have been enhanced by addition of an artificial wall so that they hold more water or are more permanent. Aquatic plants generally colonise artificially constructed dams in time, blurring the distinction between natural and artificial wetlands. Identification of the Freshwater Wetlands on Coastal Floodplains EEC may therefore occasionally be problematic.

Three other EECs occur on coastal floodplains and are covered by Fact Sheets 5, 7 and 8.

Threats

The highly fertile and well-watered floodplains were among the first areas cleared for farming and consequently few remnants of any of their vegetation communities can be found in good condition today. Floodplain EECs are listed as endangered throughout the NSW coastline. The more permanent swamps are likely to be in better condition than ephemeral swamps, since grazing and trampling by livestock is often limited to the edges, and they are less prone to invasion by non-aquatic weed species, which can get a foothold in ephemeral swamps during dry periods. The question of the wetland condition may also contribute to confusion over the identification of this EEC. Some wetlands may be so degraded by changes to flooding regimes, grazing and weeds that although periodically flooded they could no longer be said to belong to the EEC.

The main threats to wetlands are deliberate or accidental drainage, over-frequent drying due to increased drought frequency or over-allocation of water for irrigation or stock use, trampling by livestock or feral animals such as deer or pigs at times of low water level, and weed invasion (see Fact Sheet 8).



Ephemeral wetlands on the Bega River floodplain. These are more often dry than wet and may not fit the definition of the EEC, due to their long grazing history. Note the farm dam in the foreground with wetland plants, and the old trees, relicts of River-flat Eucalypt Forest on slightly higher ground on the floodplain margins.

Some typical Freshwater Wetland species



Eleocharis sphacelata
Tall spike rush



Phragmites australis
Common reed



Typha orientalis



Triglochin microtuberosum
Water ribbons



Azolla pinnata
Floating fern



Ludwigia peploides



Ottelia ovalifolia



Persicaria elatior
Tall knotweed



Philydrum lanuginosum
Frogmouth



Calystegia marginata



Ranunculus inundatus
Pool buttercup



Villarsia exaltata

Coastal Saltmarsh



The effects of vehicle damage can be very long lasting in saltmarsh.

Description

Coastal Saltmarshes on the NSW south coast tend to occupy a narrow strip on flatter parts of coastal lake and estuary margins, and in depressions on the lowest parts of floodplains. They are occasionally more extensive in an infrequently flooded backwater or at the landward end of lakes, such as Coila Lake. While saltmarsh is generally thought of as being vegetation which is subject to tidal influences, it also occurs in other saline or brackish situations subject to fluctuating water levels, such as around the edges of the intermittently opening coastal lakes.

While saltmarsh stands are frequently narrow and linear, they nevertheless often have an internal zonation. The lower areas tend to be dominated by the low-growing perennial herb samphire or glasswort (*Sarcocornia quinqueflora*), or rarely by the threatened species *Wilsonia backhousei* or *Wilsonia rotundifolia*. A succulent shrub to about a metre in height, *Sclerostegia arbuscula*, is sometimes found in this zone. A number of salt tolerant and often succulent herbs may also occur but are seldom dominant. This part of the saltmarsh may include areas of bare mud where hypersaline conditions prevent the survival of any plants. Above this zone there is frequently a strip of taller, dense vegetation dominated by sea rush (*Juncus kraussii*), sometimes with other tussocky plants such as *Gahnia filum*, *Baumea juncea* or *Isolepis nodosa*, coastal speargrass (*Austrostipa stipoides*) or common reed (*Phragmites australis*). The grasses salt-couch (*Sporobolus virginicus*) and couch (*Cynodon dactylon*) usually occupy only the upper part of the marsh. The threatened Australian saltgrass (*Distichlis distichophylla*) occurs in a small number of south coast saltmarshes. Some typical species are illustrated overleaf.

Location in the Landscape

Saltmarsh often forms part of a sequence of wetland communities. In tidal estuaries it is often sandwiched between mangroves and Swamp Oak Floodplain Forest (another EEC). The mangroves are subject to twice-daily tidal inundation, while the slightly higher saltmarsh is inundated only on peak high tides, and the swamp oak or swamp paperbark only in or after floods. The zones are often narrow and these three communities merge where they meet, with saltmarsh sometimes occurring only as an understorey under mangroves or swamp oak.

Coastal Saltmarsh is listed as endangered throughout the NSW coastline and is one of four communities that would have formerly occurred together in a mosaic pattern on floodplains of the South East. Other floodplain EECs are covered in Fact Sheets 5, 6 and 8.

Occurrences of Coastal Saltmarsh may vary over time. As water level varies in intermittently closed lakes, saltmarsh may be completely immersed for lengthy periods and emerge intact when the water level recedes, or it may be damaged by immersion in water of low salinity and take some time to recover. Swamp oak forest or scrub on coastal lake margins may occasionally be killed by fire, or die as a result of prolonged high water levels when lakes close in droughts, causing the vegetation to revert to saltmarsh until trees recolonise the area. Such changes may accelerate in the future as a result of sea level change and increased drought frequency associated with global warming. Newly deposited sediment may be colonised by saltmarsh, mangroves or swamp oak.

(continued overleaf)

Threats

The NSW Scientific Committee lists numerous threats to saltmarsh including in-filling, disruption to tidal flushing, water-borne pollution such as oil and chemical spills, increased runoff of nutrients from the catchment, weed invasion, damage by domestic and feral animals, human disturbance, altered fire regimes and climate change. The most obvious immediate threat to saltmarsh on the south coast is vehicle damage. Because of the harsh growing conditions in saline soils recovery from this can be very slow. Disturbance by vehicles or livestock trampling can facilitate weed invasion (see Fact Sheet 8).

Invasion of saltmarsh by mangroves is a process that has been recorded in numerous sites throughout NSW in recent years. While some mangrove stands consist of widely spaced old trees, extremely high numbers of mangrove seedlings or saplings can be found in some areas, both in the mangrove zone and in saltmarsh. Since the ground on the landward side of saltmarsh sometimes rises relatively steeply in coastal lakes and estuaries, saltmarsh may be gradually squeezed out by mangroves in some locations, being unable to migrate landwards.

Ecology

Saltmarsh often appears devoid of obvious animal life, but it can provide an important high tide roosting area for wading birds which feed on mudflats at low tides. Saltmarshes are also vital components of the estuarine food chain, providing a home for numerous invertebrate animals such as crabs, insects, spiders, worms and small shellfish which are a vital source of food for young fish and other marine life. Saltmarshes, with mangroves, are vital to the maintenance of our lake and ocean fisheries.

Some typical Coastal Saltmarsh species and one saltmarsh weed



Sarcocornia quinqueflora
Sapphire



Wilsonia rotundifolia



Wilsonia backhousei



Mimulus repens and
Leptinella longipes



Atriplex australasica



Selliera radicans



Juncus kraussii
Sea rush



Juncus acutus
Sharp rush (weed)

Appendix B: Photos of completed works; interpretive signs along the Rotary Walk and Mill Bay Boardwalk; associated brochures; and erosion issues at Quota Park.

Photo 1: Mill Bay Boardwalk, Narooma



Photo 2: Centenary Drive walkway, Mill Bay Boardwalk.



Photo3: Fish cleaning tables, Apex Park.



Photo 4: Picnic and playground facilities, Apex Park.



Photo 7: “Pilot Station, guidance from above”. Located at Rotary Park, Bluewater Dr, Narooma



Photo 8: “Trials of the trainers at Wagonga Head”. Located at Rotary Park, Bluewater Dr, Narooma



Photo 9: “The Lure of Narooma”. Located next to the walking track, near the Narooma Pool.



Photo 10: “Connecting Communities”. Located next to the walking track at the southern end of the Princes Highway Bridge.



Photo 11: “The Mitchell’s sawmilling family”. Located at the western entrance of the Mill Bay Boardwalk.



Photo 12: “Getting about by boat”. Located on the Mill Bay Boardwalk, opposite the stairs to Centenary Dr, North Narooma.



Photo 13: “Seagrass, home to some unusual creatures”. Located halfway along the Mill Bay Boardwalk.



Photo 14: “Welcome to the Foreshore Walk- Local abundance, horse drawn tramway and the lure of gold.” Located at the eastern end of the Mill Bay Boardwalk.



Photo 15: “Mangroves, a wealth of resources”. Located next to the walking track, near the skate park along Riverside Dr, Narooma.



Photo 16: "Fishy business at Forsters Bay". Located at Quota Park, Riverside Dr, Narooma.



Photo 17: "Welcome to the Foreshore Walk- Local abundance, shipbuilding around Wagonga". Located at Quota Park, Riverside Dr, Narooma.



Photo 18: Closing of track at Ringlands Estate to vehicle access in order to protect the foreshore.



Photo 19: Erosion at Quota Park.



Photo 20: Erosion at Quota Park.



Appendix C. Consultation Undertaken.

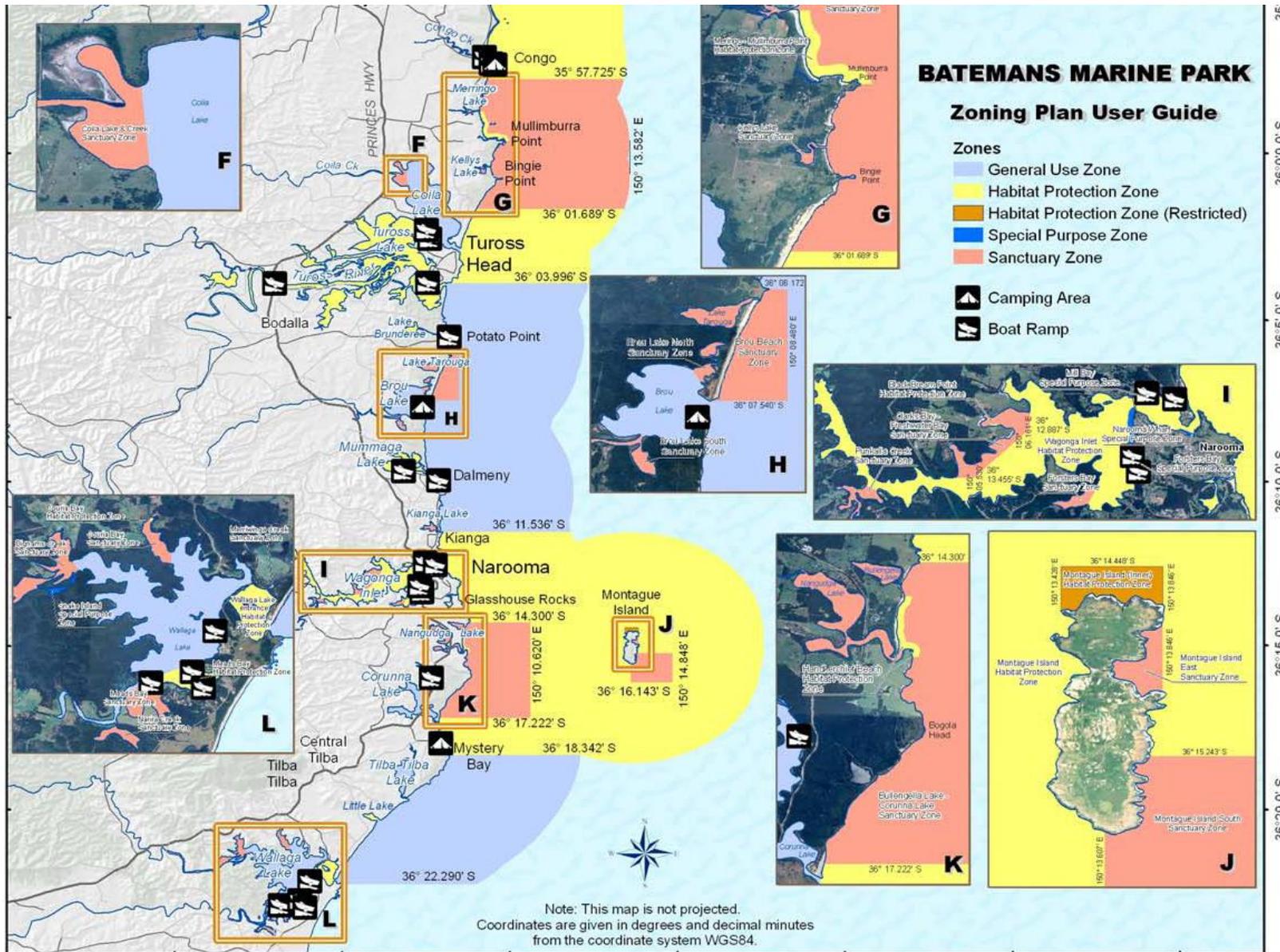
<u>Consultation with:</u>	<u>Undertaken How:</u>	<u>Undertaken When:</u>	<u>Outcome/Comments</u>
Narooma Community	“drop-in” meeting	3-6pm 17 November 2009	Limited community attendance with no new actions/issues to incorporate
Royal Coastal Volunteer Patrol	Written	November 2009	No response
Narooma-Dalmeny-Kianga Landcare	Phone and face-to-face	November 2009	Discussion on on-ground works and availability to tackle new projects
Members of the former Wagonga Estuary Management Committee	Written	November 2009	Two responses with issues and proposed actions incorporated into plan
Narooma Charters	Written	December 2009	No response
Calmwater Charters	Written	December 2009	No response
Island Charters	Written	December 2009	No response
Lighthouse Charters	Written	December 2009	No response
Montague Island Game and Sport fishing Charters	Written	December 2009	No response
NSW Department of Industry and Investment-Fisheries	Email and phone contact	September & October 2009	Information incorporated into review. Issues and new actions identified incorporated into plan- See following table.
Eurobodalla Shire Council- Environmental Health, Environment, Development, Works, & Rangers sections	Email, face-to-face	September 2009 – January 2010	Information incorporated into review.

NSW National Parks & Wildlife Service- Threatened Shorebird Officer & Narooma Office	Email and phone contact	November & December 2009	Information incorporated into review. Issues and new actions identified incorporated into plan- See following table.
NSW Maritime Authority- Narooma	Email	December 2009	Information incorporated into review. Issues and new actions identified incorporated into plan- See following table.
Wagonga Oyster Farmers	Phone	October 2009	Information incorporated into review.
Southern Rivers Catchment Management Authority	Email and phone	December 2009	Information incorporated into review. Issues and new actions identified incorporated into plan- See following table.
Wagonga Local Aboriginal Lands Council	Face-to-face	November 2009	Information incorporated into review. Issues and new actions identified incorporated into plan- See following table.
NSW Department of Lands	Email and phone	January 2010	Information incorporated into review.
NSW DECCW (Coasts and Estuaries)	Face to face, email, phone	Throughout	Instigation meeting at inception of review comments on first and second drafts- See following table.
Narooma Community	“drop-in” meeting Public exhibition period	12-3pm 3 March 2010 12 February-12 March 2010	Three attendees. 52 written submissions- Issues identified incorporated into plan- See following table.

Party making response	Issue Raised	Response in the Wagonga Inlet Estuary Management Plan review
DECCW	1. Incorporation of DECCW into consultation process as outlined and agency responsibilities.	1. Added into section 1.4, 1.5.1 and Appendix C.
	2. Strengthen the incorporation of other management plans and studies that affect the Wagonga Inlet.	2. Added to section 3- Review of other management documents and reports.
	3. Assess water quality data collect by ESC.	3. Assessment of the data has been added as a new action to encourage use of this information to provide baseline information on the health of the Wagonga Inlet.
	4. Additional new action- Implement ecosystem health monitoring program consistent with statewide Monitoring , Evaluation, and Reporting (MER) Program.	4. Added- action 1.1a
	5. Add 2005 macrophyte mapping and compare to 1985 macrophyte mapping for Wagonga Inlet.	5. Mapping has been added at Figure 4a and 4b. Comparison of 1985 mapping has been included in the review at action 3.5.
	6. Reference back to relevant sections in the original estuary management study/plan	6. Done

	as well as the processes study.	
	7. Is action 3.10 a legacy item? Is vegetation clearing still an ongoing issue at Ringlands estate?	7. This action has been amended to incorporate vegetation protection around the whole of the Wagonga Inlet.
Marine Park Authority- Batemans Marine Park	8. Amend the responsibilities of Marine Park Authority within the document to explain the legislative framework under which the Authority exists.	8. Amended- added to section 1.4 and Section 3, and throughout Section 4.
Southern Rivers Catchment Management Authority	9. Identification of erosion issues and roads that may have high sedimentation flows into tributaries, or directly, into the Wagonga Inlet.	9. Added as new action- 1.16 & 1.17
Public Consultation	10. Questioning action 3.10, and if it was still a current issue.	10. As per 7 under DECCW, this action has been amended to incorporate vegetation clearing around the whole of the Wagonga Inlet.
	11. Questioning action 3.12a- vegetation plans for the Ringlands Bay area, especially the walking track in Flying Fox Bay Reserve, and the impact on the rainforest area and incursion of walkers onto private property with current signage.	11. This action has been amended to encourage the walking track to avoid sensitive areas of vegetation and the area used by flying Foxes, and to also highlight the extent of public land and where private property begins in the Flying Fox Bay area.

Appendix D. Abbreviated *Batemans Marine Park Zoning Map*, section applying to Wagonga Inlet.



Appendix E. Action table for the Wagonga Inlet Estuary Management Plan.

Goal: to protect water quality within the inlet for human health and to maintain a healthy ecosystem

Objective: To gain a better understanding of water quality and compliance with guidelines

Strategy	Action	Priority	Responsibility
Assess changes to water quality within Forsters Bay	1.1 Develop and implement water quality monitoring program (see Section 6.1 for more details) including testing for chlorophyll-a (to assess ecosystem health) and bacteria (to assess compliance with ANZECC & NH&MRC guidelines for primary contact recreation – a sampling and analysis program currently exists for oysters as part of the NSW Shellfish Quality Assurance Program (SQAP).	High	ESC, DECCW, Wagonga SQAP

Existing Goal: to protect water quality within the inlet for human health and to maintain a healthy ecosystem				
Existing Objective: To gain a better understanding of water quality and compliance with guidelines				
Strategy: Assess changes to water quality within Forsters Bay, and the greater Wagonga Inlet area.				
	1.1a	Implement ecosystem health monitoring program consistent with the Statewide Monitoring, Evaluation and Reporting (MER) Program (2009).	High	Responsibility ESC, DECCW
Increase awareness of appropriate means of disposal of effluent from boats	1.2	Support initiatives to make holding tanks mandatory for commercial vessels.	High	NSW Maritime

Objective: To improve the quality of run-off from urban and rural areas

Strategy		Action	Priority	Responsibility
Ensure the inlet is not affected by seepage from septic tanks	1.4	Continue to carry out environmental audits of septic tanks within the catchment of the inlet to identify poor performance and any illegal discharges. Notify owners of required actions, e.g. desludging, pumpout.	High	ESC
	1.5	As part of the water quality monitoring program for Forsters Bay (see Section 6.1) include sampling sites to identify any changes to run off/water quality due to the development of Ringlands Estate	Ongoing	ESC
Identify and address possible pollutant sources	1.6	Carry out an environmental audit of businesses around the inlet to identify practices which adversely impact on water quality – prepare educational package on appropriate site management practices (see Section 6.1)	Medium	ESC

	1.7	Continue actions to minimise sewer overflows at Narooma, e.g. pressure cleaning mains of tree roots, pump draw down tests.	Ongoing	ESC
Manage land use/development to prevent accelerated input of sediments from the catchment	1.8	Encourage the formation of a Landcare group to assist in developing vegetated buffer zones around tributary creeks, as well as promoting erosion control, planting programs, exclusion of stock, protection of SEPP No. 14 wetlands, noxious weed control and feral animal control.	Ongoing	DECCW, ESC, RLPB, SRCMA,
	1.10	Report any incidences of sediment laden run-off (and other water pollution) to ESC or EPA.	Ongoing	ESC, Community
Improve fish cleaning facilities	1.11	Upgrade existing tables and, depending on availability of services, provide lighting, wash down hose and rubbish bins for the disposal of fish offal and litter at Town Wharf and Apex Park.	Medium	ESC

Include additional guidelines relating to water quality in DCPs.	1.12	When DCPs and Residential Design and Development Guidelines are updated include reference to erosion and sediment controls in 'Checklist' section for the lodgement of development applications	Medium	ESC
	1.13	Prepare DCP which includes guidelines relating to development impacts on water quality.	Medium	ESC
Undertake remedial works to halt erosion or sedimentation that may be affecting areas of the Wagonga Inlet	1.14	Monitor and assess the need for remedial erosion control works at areas surrounding Wagonga Inlet, such as Quota Park, Rotary Park, Lewis Island and Mill Bay.	High	ESC, MPA, DECCW
	1.15	Undertake erosion control works and upgrading of retaining wall infrastructure at Forsters Bay and Rotary Park.	High	ESC, MPA, DECCW
	1.16	Undertake to control stock access to tributaries or the foreshore of Wagonga Inlet.	High	ESC, SRCMA
	1.17	Identify roads with high sediment run-off creeks within catchment of Wagonga Inlet. Undertake remedial action to halt/limit sediment flows.	High	ESC, SRCMA, Agencies responsible for any impacting road.

Goal: to ensure future development does not detract from the values of the inlet and is appropriately designed				
Objective: To maintain the scenic views and vistas to and from Wagonga Inlet				
Strategy		Action	Priority	Responsibility
Encourage attractive building design compatible with the visual qualities of the inlet	2.2	Continue to promote existing residential design and development guidelines. Consideration could also be given to introducing annual Shire wide design awards.	Ongoing	ESC
	2.3	Develop DCP for Coastal Villages which includes attractive building design guidelines for foreshore areas.	Ongoing	ESC
Objective: To ensure development is compatible with natural hazards				
Strategy		Action	Priority	Responsibility
Increase awareness of flood hazards in the Narooma 'flat area'	2.4	Review design floor levels and development controls in view of the results of the Wagonga Inlet Flooding Investigation (GBA 1999).	High	ESC, DECCW
	2.5	When DCPs and Residential Design and Development Guidelines are updated include reference to flood	Ongoing Flood hazard is currently noted on	ESC

protection.

Section 149
certificates for the
Narooma Flat area

Goal: to conserve the natural ecological communities and their component flora and fauna

Objective: To increase awareness of the values of natural communities in general and, in particular, the habitat values of wetlands

Strategy	Action	Priority	Responsibility
Provide information on natural communities and component species	3.1 Develop community education program that includes information on the protection of shorebirds, migratory species and wetlands and management of vegetation communities.	Medium	ESC, MPA, DECCW.
	3.3 Where mangrove clearing is evident, letter-box drop foreshore residents with information from NSW Fisheries habitat management and fish conservation guidelines and details of penalties for illegal clearing.	As required	Fisheries, ESC, MPA
Strategy: Monitor changes in mangroves and seagrasses	3.4 Install survey markers to identify changes in the extent of mangroves (possible student project).	As required	Fisheries, ESC, MPA

	3.5	Repeat seagrass surveys (Forsters Bay beds a priority) to monitor health (as an indicator of nutrient levels) and changes in distribution. See Section 6.1 for more details.	Ongoing	MPA, ESC, Fisheries
Objective: To appropriately manage aquatic resources				
Strategy		Action	Priority	Responsibility
To protect seagrass beds within the Wagonga Inlet from commercial and recreational impacts	3.5a	As per the NSW DPI OISAS (2006) no approval of <i>new</i> oyster aquaculture areas over <i>Posidonia</i> sp or <i>Zostera</i> spp seagrass beds, and the encouragement of oyster growing methods that do not shade seagrass beds.	Medium	Fisheries
Control infestations of the Pacific Oyster	3.6	Continue to regularly inspect leases and rocky foreshores and remove Pacific Oysters to protect the existing aquaculture industry from the problems experienced in other NSW estuaries. Liaise with Navy divers to provide assistance.	Ongoing	MPA, Fisheries, Wagonga Oyster Farmers
Collect base-line data on recreational fishing	3.7	Undertake recreational fishing survey to gain an understanding of the magnitude of the recreational finfish catch and harvesting of intertidal animals. Liaise with universities as possible student project.	Commenced	Fisheries, SGFC, MPA

Encourage cleanup of areas around oyster leases	3.8	Include particular problem areas (e.g. walking track from Ringlands Point) in 'Clean up Australia' day program and liaise with oyster farmers to gain their participation.	Medium	ESC, Fisheries, Wagonga Oyster Farmers, MPA
Ensure cockle collection does not adversely impact on aquatic habitats	3.9	Continue to employ gathering practices which do not impact adversely on strapweed beds. Continue to assess the feasibility and sustainability of cockle collection within the estuary.	Ongoing	Fisheries, MPA, Commercial Fishers
To control identified invasive marine species, such as Green Crabs, as per the Commonwealth National System for the Prevention and Management of Marine Pest Incursions .	3.9a	Undertake regular survey work in the Wagonga Inlet to identify invasive marine species, and undertake eradication programs where possible.	High	MPA, Fisheries
	3.9b	Undertake scientific research on Invasive Green Shore crabs to understand its spread and how estuary management influence its distribution.	High	MPA

	3.9c	Undertake scientific research to determine bio-indicators in estuaries and the stressors that drive change	High	MPA
Objective: To provide a vegetated buffer zone around the entire inlet				
Strategy		Action	Priority	Responsibility
Preserve bushland around Wagonga Inlet	3.10	Enforce penalties for breaches of development consent and Council's Tree Preservation Order relating to clearing of bushland around the Wagonga Inlet.	High	ESC
	3.10 a	Undertake community consultation with all landholders in the area of any bush regeneration project under ESC direction that may involve changes to views and/or streetscapes. Utilise "shame signs" or screens in any area where vegetation has been illegally destroyed to supplement private views.	Ongoing	ESC
Actively manage remnant bushland of conservation significance	3.12 a	To increase the diversity and environmental quality of the Ringlands Bay area, undertake : 1. Break up the expanse of Kikuyu on Ringlands Point with carefully sited clumps of trees and shrubs. Ideally,	Medium	ESC

species already existing on the Point should be planted here.

2. Repair, or re-route, the dirt vehicular track from the end of Ron Cross Lane to the picnic area on the Point.

3. Provide care and monitoring of the *Dipodium punctatum* (Hyacinth orchid) population beside the track at the beginning of Section B.

4. Vegetate the drainage line on the south western edge of the Reserve with rainforest plants, using species already growing in the Flying Fox Bay Rainforest Reserve.

5. Control of noxious and environmental weeds throughout the whole area, together with ongoing monitoring to note any new occurrences.

6. Repair and upgrade the walking track from Ringlands Point and in the Flying Fox Bay Rainforest Reserve.

This work should follow guidelines and endemic species as outlined in the

<p>“Bush Regeneration Recommendations for Flying Fox Bay, Narooma” (2007).</p>				
<p>Increase the extent of foreshore buffer zones</p>	<p>3.13</p>	<p>As per Council’s Policy, continue to pursue opportunities to transfer foreshore land into public ownership through conditions of development/subdivision consent, for:</p> <ul style="list-style-type: none"> - land zoned 2ec around Forsters Bay - land zoned Rural 1(a) around Barlow’s and Clarks Bays, Freshwater Bay/Paradise Point, and between Honeymoon Point and Hobbs Point - land zoned “Further Investigation for Rural C” between Brices Bay and Punkally Creek. 	<p>Ongoing</p>	<p>ESC</p>
	<p>3.13 a</p>	<p>Provide a range of incentives, such as the Biodiversity Program, Biobanking Information, to landholders to increase protection of foreshore land and biodiversity vales.</p>	<p>Medium</p>	<p>ESC, CMA, DECCW</p>

	3.14	Change zoning of unused road reserves around inlet to appropriate zone from the LEP Standard Instrument	Low	ESC
	3.15	Rezone SEPP 14 wetland No. 126 (between Punkally and Burrimbidgee Creeks) to appropriate zone from the LEP Standard Instrument	High	ESC
	3.17	In conjunction with current/future review of LEPs consider application of an environmental protection zone for riparian buffers, shorebird nesting and feeding areas, regionally uncommon vegetation and wildlife corridors.	As arises	ESC
<p>Goal: to protect and increase recognition of Aboriginal heritage</p> <p>Objective: To encourage community participation in the management of foreshore reserves</p>				
Strategy		Action	Priority	Responsibility
Establish volunteer bush regeneration groups	3.18	Develop a program for weed control along the Princes Highway/Centenary Drive (as per Masterplan) and advertise/approach	Medium	ESC

	existing community groups for volunteers to become involved. Resources may also be available through the Green Corps and Natural Heritage Trust. Extend program to other areas as interest develops.		
3.19	Identify weeds that may become significant problems for the Wagonga Inlet area and areas of high weed infestation for future remediation work.	Medium	ESC
3.20	Investigate options for future management of Lewis Island, including a management strategy for the footbridge; the establishment of a Landcare group to undertake remediation works, and; the need for seasonal closure of the area to dogs in the nesting period of shorebirds, based on further consultation with the community and Government agencies.	High	ESC, DECCW

Objective: To prevent deterioration of Aboriginal middens and other archaeological sites				
Strategy		Action	Priority	Responsibility
Maintain involvement of LALC in foreshore/catchment works	4.3	Refer to recommendations contained in Navin Officer (1997) and continue to involve Aboriginal sites officer in the planning for, and construction of, foreshore paths and other recreational facilities (e.g. proposed access from Mill Bay to Apex Park), as well as logging operations/management of Bodalla State Forest.	Ongoing	ESC, NPWS, ForestsNSW
Protect middens and other sites	4.4	Investigate means to address erosion of the midden at the Wagonga Picnic Area and other sites as necessary.	Medium	LALC, Forests, MPA
Objective: To conserve the remains of early European settlement and industry				
Strategy		Action	Priority	Responsibility
Ensure access is available to heritage relics for conservation, and interpretation	4.5	Liaise with property owner to gain access to Wagonga Cemetery to repair fence and headstones as and when required.	High	ESC,HS

Goal: to improve boat navigation and safety				
Objective: To maintain navigation channels				
Strategy		Action	Priority	Responsibility
Assess adequacy of navigation channel depths and impact of shoaling	5.3	Assess sand intrusion impacts on Taylors Boatramp and requirement to remove sand, as required. Photo points may assist in assessing sand intrusion.	Low	ESC
Maintain adequate depths for commercial and recreational vessels to enter Forsters Bay	5.5	Review need for dredging navigation channels. If required, prepare environmental impact assessment report. See Section 6.2 for more details.	Ongoing	ESC, Maritime
Objective: To improve boat safety awareness				
Strategy		Action	Priority	Responsibility
Improve dissemination of information on bar conditions and boat safety	5.6	Continue to include articles on correct procedures for putting to sea and crossing the bar in the Narooma News and tourist/fishing publications.	Ongoing	RVCP, Fisheries, Waterways, CoC

5.7	Prepare and distribute information on boating safety tips (such as those prepared by the RVCP in the past) so that they are available at caravan parks, motels and other tourist accommodation.	Ongoing	RVCP, CoC, Waterways
Goal: in keeping with conservation values, ensure equitable use of the inlet's waterway and recreational resources			
Objective: To balance the commercial and recreational uses of the inlet			
Strategy	Action	Priority	Responsibility
Maintain open water areas within the inlet for recreational boating and visual amenity	6.1a. Remediate derelict oyster leases to increase boating safety and foreshore protection and amenity.	Medium	Fisheries, Wagonga Oyster Farmers, MPA
	6.1b. Implement the <i>Aquaculture Compliance Strategy</i> of the OISAS (see section 3.)	High	Fisheries, Wagonga Oyster Farmers
6.2	Prepare mooring plan for Wagonga Inlet (with input from EMC and with reference to areas of ecological significance, see Figures 3.1a and 3.1b) identifying existing/future mooring areas (public/private) and the maximum number of moorings per area.	High	Maritime, MPA

Objective: To promote foreshore facilities that cater for commercial, tourism and public use				
Strategy		Action	Priority	Responsibility
Extend Town Wharf	6.3	Prepare design report for the extension of Town Wharf towards the swimming pool. Include boat pumpout facilities. A preliminary concept showing public/commercial space is shown in Figure 5.1 of the 2001 plan. Funding may be available through the Federal Government's Regional Assistance Program. DoL and Waterways funding is available for public wharves.	High	ESC, DoL, commercial operators, MPA, Maritime
	6.3a	Monitor impacts of vessel mooring to marine habitats in Wagonga Inlet and investigate potential solutions, such as the installation of seagrass friendly moorings.	MPA, Fisheries	High
Objective: To address potential conflicts between recreational users and between recreational use and ecological values/commercial use of the inlet				
Strategy		Action	Priority	Responsibility
Manage boating to avoid conflicts	6.4	Review existing boating controls and impacts of vessel operation with reference to Figures 3.1a and 3.1b,	Ongoing	Maritime, ESC

		areas of ecological significance.		
	6.5	<p>Implement appropriate boating controls (and associated advisory/educational signage at boat launching areas) based on the following principles:</p> <ul style="list-style-type: none"> - reduced boat speeds upstream of Honeymoon Point to minimise boat wash, effects on oyster leases, SEPP No.14 wetlands and other sensitive foreshore lands - no anchoring in seagrass beds - reduced boat speeds over large beds of strapweed <i>Posidonia australis</i> (see Figure 3.1a and 3.1b-<i>original plan</i>) - reduced boat speeds (i.e. noise levels) adjacent to areas of ecological significance consistent with use as passive recreational areas. 	Ongoing	Maritime
Manage foreshore reserves in accordance with their ecological values	6.6	Development of reserves identified as being of ecological significance to be restricted to low impact recreational and educational activities, e.g. bushwalking, nature study and only basic facilities to be	Medium	ESC

		provided, i.e. unsealed walking tracks, 'bushland' picnic areas.		
	6.7	Consider exclusion of dogs from areas of high native animal habitat value (e.g. shorebird breeding and feeding areas) and exercise of dog's on-leash only, in other areas of ecological significance.	High	ESC
Objective: To improve public facilities and foreshore access to the inlet				
Strategy		Action	Priority	Responsibility
Provide viewing/fishing platforms and boardwalks	6.9	As per the Narooma Foreshore & Townscape Masterplan install mangrove boardwalk off Riverside Drive.	Low	ESC
	6.10	As per Masterplan construct walkway under bridge and extend Masterplan to north-western side of bridge (old ferry approach) to address bank erosion, formalise area for fishing/viewing and provide interpretive sign. See Section 6.1 for indicative costs per metre for boardwalks.	Low	ESC
Provide more public	6.12	Construct jetty, provide fish cleaning table, wash down hose, lighting and	Low	ESC

jetties		bins and formalise and seal car park to southern boat ramp at Forsters Bay. Funding is available through DLWC and Waterways programs for public wharves and jetties. Indicative costs per metre are provided in Section 6.1.		
Objective: To assess and plan for management of sea level rise impacts on the Wagonga Inlet Estuary and surrounding land uses				
Strategy		Action	Priority	Responsibility
Assess/Model the migration of Endangered Ecological Communities (EEC's) around the inlet according to variable projections of climate change and sea level rise	7.1	Undertake a project to map current EEC's, and variables affecting presence of EEC's surrounding the Wagonga Inlet and model impacts or movements that might occur for a variety of sea-level rise scenarios consistent with the NSW Government's Sea Level Rise Policy.	High	DECCW, ESC
Develop and implement a Floodplain Risk Management Study and Plan for the Wagonga Inlet	7.2	Modelling the impact of flooding events. Develop a floodplain Management Plan in accordance with the New South Wales <i>Floodplain Development Manual 2005</i> and in line with the <i>NSW Sea Level Rise Policy Statement</i> .	High	ESC

