DRAFT

ESTUARY MANAGEMENT PLAN REVIEW

ST GEORGES BASIN
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1. INTRODUCTION

1.1 The 1998 Plan

During the 1990s, Shoalhaven City Council, the local community and NSW Government agencies prepared the St Georges Basin Estuary Management Plan. The plan was adopted by Council in 1998 following a lengthy investigation and consultation process in accordance with the NSW Government’s Estuary Management Policy.

So for more than a decade, the St Georges Basin Estuary Management Plan guided how the waterways and surrounding environment of ‘The Basin’ and Sussex Inlet have been managed.

During that time there have been significant achievements in environmental management and provision of facilities. There has also been new information collected, new strategic planning for the region and new issues that require attention.

To ensure the plan stays relevant, Council is again working with the community and NSW Government agencies to review the plan.

1.2 Review of the Plan

Council received 50% grant funding from the NSW Government to undertake reviews of Estuary Management Plans for Lake Conjola, Lake Tabourie and St Georges Basin.

These Plans commenced development in the early 1990s and were adopted in the late 90s. Since then, Council has been actively implementing the Plans and many high priority actions are now complete. There is a need to consider emerging issues and new information.

To maintain the currency and relevance of the Plans, their first formal review is being undertaken.

In reviewing the plan, Council has:
• Identified issues currently and potentially affecting the estuary
• Reviewed actions in the plan and proposed new actions for ecologically sustainable, integrated management of natural resources.
• Assessed and applied new studies and information
• Addressed NSW Government policy direction and relevant legislation

The review has drawn heavily from sustainability assessments and management plans that were prepared by the NSW Government in response to the Healthy Rivers Commission Inquiry into Coastal Lakes.
2. REVIEW OF VALUES AND ISSUES

Values are those things which are assessed as being scientifically important or are perceived by the community as being important to their lifestyle, their sense of place or their sense of community.

The St Georges Basin Estuary Management Plan is a value based plan for natural resources. To equitably manage a resource requires identification of the key ecological, social and economic values that people consider important and wish to see preserved into the future. Values can be important in a local, regional or national sense.

Objectives for future management of the natural resources of Basin and Sussex Inlet can be developed through identification of the values of St Georges Basin’s natural resources and the threats to the condition of the resources.

The ecological, social and economic values are highly interrelated and should be viewed in relation to each other. It is possible that some natural, social and economic values will conflict. The Estuary Management Plan attempts to balance potentially mutually exclusive values.

The 1998 St Georges Basin Estuary Management Plan identified values and management objectives that set direction for the strategies and actions through which the plan has been implemented.

As part of the 2010 review of the plan, these values were revisited to assess whether they are still relevant and appropriate.

Members of the Central Natural Resources and Floodplain Management Committee were canvassed (Appendix 1) and a community survey (see 0) was undertaken.

Questionnaires were delivered to 1725 letterboxes (selected by Australia Post) in villages around St Georges Basin as follows:

- Erowal Bay 100
- Sanctuary Point 500
- St Georges Basin 300
- Basin View 200
- Old Erowal Bay 100
- Wandandian 25
- Sussex Inlet 500

Members of the community who did not receive a questionnaire in their letterbox were able to request one from Council, and the questionnaire was also available on Council’s internet site. An additional ten questionnaires were sent to the Basin Villages Forum for distribution at its monthly meeting. The questionnaire was sent to all Councillors and to all members of the Central Shoalhaven NRFMC.
110 responses (80 on paper and 30 via internet) were received and analysed.

On the basis of comments received from committee members, members of the community and recent research, the values have been amended as follows.

2.1 Values – What’s Important About St Georges Basin

ECOLOGICAL
- a largely unmodified shoreline and healthy waterway
- a diversity of aquatic habitats (including shallow sand and mud flats, seagrass beds and deep mud basins), flora and fauna
- aquatic habitats that are ecologically valuable
- sixteen wetlands which have been classified as SEPP 14 - Coastal Wetlands
- generally good to excellent water quality which supports a productive and diverse lake ecosystem
- a biologically diverse catchment, with ecological communities, and animal and plant populations of high conservation significance.

SOCIAL
- a significant tourist and residential infrastructure in an attractive coastal/estuarine setting
- a relaxed atmosphere for both residents and holiday makers
- a popular recreational resource with attractions such as boating, sailing, waterskiing, fishing and swimming in the Basin and inlet, fishing in the adjacent Wreck Bay, bushwalking, car touring and sightseeing in the surrounding areas
- a productive recreational fishery which is easily accessible
- a high level of visual amenity
- a significant aboriginal heritage with links to the area’s Aboriginal population
- generally good to excellent water quality which promotes recreational use

ECONOMIC
- caravan parks and other tourist accommodation that rely on holiday makers for income
- commercial outlets that rely on a healthy and usable lake for income
- property values
3. REVIEW OF STRATEGIES AND ACTIONS

3.1 Management Areas and Key Issues Identified in the 1998 Estuary Management Plan

During the preparation of the 1998 Estuary Management Plan, key issues and conflicts associated with the estuary were identified by the community, Task Force members, Local and State Government representatives and from the outcomes of the estuary processes component of the study.

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Key Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Nature Conservation</td>
<td>• Urban expansion into wetland areas and forested foreshores</td>
</tr>
</tbody>
</table>
| 2) Water Quality                 | • Accumulation of nutrients in the muddy sediments of the shallow waters in the north of the basin and deeper waters in the central section
  |                                  | • Quality of the water entering the Basin from the surrounding catchment. Localised deterioration of lake water quality is evident, possibly due to urban and catchment development. Low oxygen levels and excessive phytoplankton growth in tributaries and high turbidity levels associated with sediment input to the Basin from local drainage and tributary creeks have been recorded.
  |                                  | • Levels of nutrients and suspended sediments and their effect on algal growth and sea grass quality                                      |
| 3) Sedimentation                 | • Sediment and nutrient input into the Basin and its impact on sea grasses and the embayment foreshore near Tomerong Creek
  |                                  | • Sediment deposits at drainage outlets                                                                                             |
| 4) Flooding                      | • Access to Sussex Inlet in time of flood
  |                                  | • Impact of flooding in combination with high ocean levels during storm conditions                                                  |
| 5) Entrance Conditions /Navigation | • Safe access to Wreck Bay from Sussex Inlet. Shallow entrance conditions and exposure to local storm waves create potentially dangerous conditions under certain tide levels and weather conditions
  |                                  | • Exposure of rocks in Inlet entrance by channel shifting and erosion
<p>|                                  | • Navigation hazards associated with the shifting                                                                                   |</p>
<table>
<thead>
<tr>
<th>Management Area</th>
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</tr>
</thead>
</table>
| 6) Erosion      | • Erosion along Sussex Inlet is causing a loss of foreshore vegetation and contributing to shoaling. Continuing uncontrolled erosion could lead to increased areas of destabilised bank and denuded vegetation  
• Collapsing banks in the canal estate which is reducing amenity and increasing sedimentation  
• Potential of power boats in tributaries to cause erosion  
• Formation of informal picnic/boat parking areas along banks which create areas susceptible to erosion by flood flows and boat wash |
| 7) The Fishery  | • Decline in the fishery and its impact on the local economy  
• Impact of fishing activities, especially on the seagrass  
• Conflict between recreational and commercial fishers over fish taken and bycatch etc. and the impacts of these activities  
• Loss of sea grasses  
• Decline in water quality |
| 8) Waterway Access | • Restricted foreshore access acts to preserve areas which are difficult to reach but encourages overutilisation of accessible areas  
• Boating access is restricted and generally sub-standard  
• User conflicts exist, both on the waterway and over foreshore access |
| 9) Visual Amenity | • Limited opportunity for public viewing of and access to waterways  
• Impact of development on the Basin’s visual quality especially in the south western section |
| 10) Aboriginal Heritage | • Urban expansion into potential Aboriginal sites  
• Erosion around foreshores and impact on sites |

Continuing growth and development of the village and catchment of St Georges Basin has resulted in pressure on the Basin and Inlet environment. Concerns have been raised by the community on the degradation that is occurring in the lake. During development of the plan concern was also
raised for future damage to the lake’s environment and for the lack of information on which to develop sound management strategies.

Concerns for St Georges Basin which were raised by the community, Government representatives and by the outcomes of the Estuary Processes Study were often localised. However, many of the issues identified during the development of the Estuary Management Plan are common to other estuaries on the NSW coast.

For ease of management, issues raised were grouped into the following ten areas:
3.2 Management Objectives

Management objectives were developed to ensure that the Basin and Inlet’s key values were maintained or improved and to address the issues identified by the community.

The objectives developed address the ten management areas identified.

**Management Area 1: Nature Conservation**
To ensure urban expansion does not degrade the conservation values of the waterway and to preserve the ecology of the wetland and foreshore habitats.

**Management Area 2: Water Quality**
To maintain or improve existing water quality to a level consistent with recreation and aesthetic enjoyment of the lake and protection of the aquatic ecosystem.

**Management Area 3: Sedimentation**
To reduce the rate of sediments entering the Basin to predevelopment levels and to restore degraded foreshore areas in the north of the Basin.

**Management Area 4: Flooding**
To minimise the impact of flooding on existing and future developments and to determine more clearly the likely extent and frequency of flooding.
To accommodate sea level rise and other climate change effects.

**Management Area 5: Entrance Condition/Navigation**
Improve entrance navigability and investigate alternative access to Wreck Bay.

**Management Area 6: Erosion**
Monitor erosion along the estuary foreshores, canals and tidal creeks and to implement measures to limit erosion and reduce the loss of foreshore amenity.

**Management Area 7: The Fishery**
Ensure the fish catch does not exceed the sustainable capacity of the waterways and to find a balance between recreational and commercial fisheries.

**Management Area 8: WATERWAY ACCESS**
To improve user facilities, particularly boating facilities. Reduce uncontrolled use of waterways and foreshores and develop appropriate usage controls and facilities for a range of users.

**Management Area 9: Visual Quality**
To maintain the visual qualities of the area and to improve public access to the views.
Management Area 10: ABORIGINAL HERITAGE

To improve knowledge about and to protect the Aboriginal heritage of St Georges Basin.

3.3 Review of Strategies and Actions Identified in the 1998 Estuary Management Plan

The 1998 St Georges Basin Estuary Management Plan included 50 strategies and 136 actions to restore, protect and conserve the natural resources of St Georges Basin.

As part of the review of the 1998 plan, the current implementation status of the strategies has been assessed. The full list of strategies is included in Table 1 and a summary of the review is presented in Table 2. Terms used in the tables are defined as:

**Status April 09**

- **“done”** the strategy has been completed
- **“partly done”** the strategy has been commenced and is still underway, or some actions associated with the strategy have been done but others have not
- **“not done”** no action appears to have been taken

**Possible Future Direction**

- **“delete”** the strategy has been completed and/or is no longer relevant
- **“ongoing”** the strategy will continue to be relevant, either until it is “done” or because it will need to be repeated from time to time
- **“review appropriateness”** more information is being gathered to assess whether the strategy should be retained or deleted

From Table 2 it can be seen that 46% of the strategies are done, 44% partly done and 10% not done.

Later in the plan review process, a revised set of strategies will be developed, which may include some of the existing ones, if they are still relevant and appropriate, as well as new ones for dealing with emerging issues such as climate change and sea level rise.

NC = Nature Conservation   WQ = Water Quality   SED = Sedimentation   FL = Flooding
NAV = Entrance Conditions/Navigation   ER = Erosion   FISH = The Fishery
ACC = Waterway Access   VIS = Visual Amenity   AHER = Aboriginal Heritage
CCA = Comprehensive Coastal Assessment   DCP = Development Control Plan   DPI = Department of Primary Industries
FRMS/P = Floodplain Risk Management Study /Plan   JBREP = Jervis Bay Regional Environmental Plan
LEP = Local Environmental Plan   MER = NSW Natural Resource Monitoring, Evaluation and Reporting Strategy
SRCMA = Southern Rivers Catchment Management   SCA = State Conservation Area
MER = NSW Natural Resource Monitoring, Evaluation and Reporting Strategy
UOW = University of Wollongong   WSUD = Water Sensitive Urban Design

<table>
<thead>
<tr>
<th>ID</th>
<th>STRATEGY</th>
<th>Status April 09</th>
<th>Possible Future Direction</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC1</td>
<td>Provide environmental protection zoning to land adjacent to foreshores, watercourses or draining into sensitive aquatic habit. See NC2, NC3 and NC4.</td>
<td>partly done</td>
<td>review appropriateness</td>
<td>Riparian corridors desktop study; Sensitive Urban Lands Review; LEP 2009; some waterway; some env. prot. (incl SEPP 14 wetlands); but a lot still public recreation and some still residential and business; DCP 62 Residential Development in Foreshore Areas</td>
</tr>
<tr>
<td>NC2</td>
<td>Provide buffer zones between new development and landward extent of wetland areas.</td>
<td>done ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC3</td>
<td>Retain natural vegetation corridors along streams and watercourses.</td>
<td>partly done ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC4</td>
<td>Provide foreshore buffer zones around the Basin (in as natural a condition as possible) with linking vegetation corridors.</td>
<td>partly done review appropriateness</td>
<td>Corramy SCA; Jervis Bay National Parkl Nebraska, Jerbera &amp; Heritage Estate studies; LEP 2009 Environmentally Sensitive Land; Foreshore Policy</td>
<td></td>
</tr>
<tr>
<td>NC5</td>
<td>Allow only essential clearing for urban areas (leaving lots untouched).</td>
<td>partly done review appropriateness</td>
<td>JBREP 1966; South Coast Regional Strategy 2006</td>
<td></td>
</tr>
<tr>
<td>NC6</td>
<td>Ensure foreshore walkways and boating facilities are not located in environmentally sensitive areas. See ACC1, ACC3 and ACC4.</td>
<td>done ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NC7</td>
<td>Prevent disturbance to important wildlife habitat areas by fencing.</td>
<td>not done</td>
<td>review appropriateness</td>
<td></td>
</tr>
<tr>
<td>NC8</td>
<td>Construct gross pollutant and sediment traps on watercourses flowing into wetland areas from urban areas and infrastructure.</td>
<td>partly done review appropriateness</td>
<td>SMP prepared in 2000; reviewed 2003</td>
<td></td>
</tr>
<tr>
<td>NC9</td>
<td>Erect warning signs adjacent to sensitive habitat areas (such as seagrass beds or wetland areas).</td>
<td>partly done review appropriateness</td>
<td></td>
<td></td>
</tr>
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</tr>
<tr>
<td>NC10</td>
<td>Re-map seagrass beds and wetland areas.</td>
<td>done</td>
<td>review appropriate-ness</td>
<td>CCA; Meehan thesis; wetland inventory; Caulerpa mapping</td>
</tr>
<tr>
<td>WQ 1</td>
<td>Adopt the criteria set out in the &quot;Australian Water Quality Guidelines for Fresh and Marine Waters&quot; for protection of aquatic ecosystems which produce edible fish and are used for primary recreational contact.</td>
<td>done</td>
<td>ongoing</td>
<td>SMP 2000; WBM Foreshore Erosion Study 2003; GeoScience nutrient study 2004</td>
</tr>
<tr>
<td>WQ 2</td>
<td>Implement and monitor Council’s “Soil and Water Management Plan Guidelines” to restrict suspended sediment runoff from catchment development.</td>
<td>done</td>
<td>ongoing</td>
<td>Educate site operators and improve compliance, eg. Pollution hotline number on site sign</td>
</tr>
<tr>
<td>WQ 3</td>
<td>Allow only essential clearing for new urban areas and retain natural vegetation corridors.</td>
<td>done</td>
<td>ongoing</td>
<td>JBREP 1996; Native Veg Act 2003; South Coast Regional Strategy 2006</td>
</tr>
<tr>
<td>WQ 4</td>
<td>Construct gross pollution and sediment traps and macrophyte basins on drainage paths from existing and future major urban areas and infrastructure developments.</td>
<td>partly done</td>
<td>review appropriate-ness</td>
<td>SMP prepared in 2000; reviewed 2003; WSUD</td>
</tr>
<tr>
<td>WQ 5</td>
<td>Survey catchment and undertake remedial erosion measures where significant suspended sediments are identified.</td>
<td>partly done</td>
<td>ongoing</td>
<td>SMP covers urban areas; WBM Foreshore Erosion Study 2003</td>
</tr>
<tr>
<td>WQ 6</td>
<td>Monitor basin water quality and urban runoff on an ongoing basis.</td>
<td>done</td>
<td>ongoing</td>
<td>Review monitoring protocols consistent with MER</td>
</tr>
<tr>
<td>WQ 7</td>
<td>Encourage sewer connections through incentives/punitve rating measures.</td>
<td>done</td>
<td>delete</td>
<td>Sewer in urban areas only</td>
</tr>
<tr>
<td>WQ 8</td>
<td>Undertake a community education program on water pollution.</td>
<td>partly done</td>
<td>ongoing</td>
<td>Drain stencilling; update information brochure and redistribute from time to time; include on Council’s website</td>
</tr>
<tr>
<td>SED1</td>
<td>Implement and monitor Council’s “Soil and Water Management Plan Guidelines” to restrict sediment runoff from development sites.</td>
<td>done</td>
<td>ongoing</td>
<td>Educate site operators and improve compliance, eg pollution hotline number on site sign</td>
</tr>
<tr>
<td>SED2</td>
<td>Construct sediment traps and ponds on drainage paths leading from major urban and infrastructure developments.</td>
<td>partly done</td>
<td>review appropriate-ness</td>
<td>SMP prepared in 2000; reviewed 2003; WSUD</td>
</tr>
<tr>
<td>SED3</td>
<td>Survey catchment and undertake erosion remedial measures where significant erosion/sediment supply is identified.</td>
<td>partly done</td>
<td>ongoing</td>
<td>SMP covers urban areas; WBM Foreshore Erosion Study 2003</td>
</tr>
<tr>
<td>SED4</td>
<td>Evaluate the need for restoration works in degraded shallow deposition areas.</td>
<td>partly done</td>
<td>ongoing</td>
<td>WBM Foreshore Erosion Study 2003; FRMS 2006</td>
</tr>
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<tr>
<td>SED5</td>
<td>Undertake education program for rural property owners.</td>
<td>partly done</td>
<td>ongoing</td>
<td>SRCMA approach to private land; DPI Sustainable Agriculture</td>
</tr>
<tr>
<td>SED6</td>
<td>Monitor water turbidity at selected inflow and basin general sites on an ongoing basis to monitor suspended sediment levels.</td>
<td>partly done</td>
<td>review appropriateness</td>
<td>Review monitoring protocols consistent with MER</td>
</tr>
<tr>
<td>FL1</td>
<td>Continue the current interim flood policy which requires minimum floor levels above the maximum recorded flood level plus a freeboard.</td>
<td>done</td>
<td>delete</td>
<td>DCP 106 Floodplain Management replaces interim flood policy</td>
</tr>
<tr>
<td>FL2</td>
<td>Prepare and implement a floodplain management plan.</td>
<td>done</td>
<td>ongoing</td>
<td>Flood Study 2001; FRMP 2006; implementation ongoing</td>
</tr>
<tr>
<td>FL3</td>
<td>Provide flood free access to the Sussex Inlet area.</td>
<td>not done</td>
<td>ongoing</td>
<td>See FRMP recommendations</td>
</tr>
<tr>
<td>FL4</td>
<td>Prepare contingency plans to deal with flood access problems.</td>
<td>done</td>
<td>delete</td>
<td>Local Flood Plan 1999</td>
</tr>
<tr>
<td>NAV1</td>
<td>Remove “floaters” or large mobile surface rocks from the entrance channel.</td>
<td>done</td>
<td>review appropriateness</td>
<td>30 tonnes removed 1999</td>
</tr>
<tr>
<td>NAV2</td>
<td>Monitor channel location and relocate navigation markers as required.</td>
<td>done</td>
<td>ongoing</td>
<td></td>
</tr>
<tr>
<td>NAV3</td>
<td>Undertake a feasibility study of entrance improvement works including: entrance training walls, entrance dredging, ebb-tide bed fluidisation</td>
<td>partly done</td>
<td>review appropriateness</td>
<td>FRMS 2006; Muhlbauer 2000 UOW student report; entrance sensitivity study; entrance survey</td>
</tr>
<tr>
<td>NAV4</td>
<td>Investigate boating access to Wreck Bay as an alternative to entrance works such as the provision of boat launching facilities on Farnham Headland.</td>
<td>not done</td>
<td>review appropriateness</td>
<td>Waterways asset management plan</td>
</tr>
<tr>
<td>ER1</td>
<td>Upgrade boat speed controls along Sussex Inlet and enclosed waters to minimise boating impacts on the banks.</td>
<td>done</td>
<td>delete</td>
<td></td>
</tr>
<tr>
<td>ER2</td>
<td>Establish an erosion monitoring program along Sussex Inlet and other narrow trafficable waterways (such as Wandandian Creek)</td>
<td>done</td>
<td>ongoing</td>
<td>WBM Foreshore Erosion Study 2003; foreshore rehabilitation projects</td>
</tr>
<tr>
<td>ER3</td>
<td>Construct permanent warning/education signs and physical barriers to discourage use of the entrance erosion scarps as sand slides.</td>
<td>done</td>
<td>review appropriateness</td>
<td></td>
</tr>
<tr>
<td>ER4</td>
<td>Undertake a bank stability/erosion study for both the inlet channel and the canal estate.</td>
<td>done</td>
<td>ongoing</td>
<td>WBM Foreshore Erosion Study 2003; foreshore rehabilitation projects</td>
</tr>
<tr>
<td>FISH1</td>
<td>Implement management strategies which would protect water quality and important</td>
<td>partly done</td>
<td>ongoing</td>
<td>SMP review; MER; monitor “at risk habitats”</td>
</tr>
<tr>
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<tr>
<td></td>
<td>habitat areas such as wetlands and seagrass beds.</td>
<td>partly done</td>
<td>ongoing</td>
<td></td>
</tr>
<tr>
<td>FISH2</td>
<td>Implement provisions of relevant commercial and recreational estuarine fishery management plans to ensure harvest levels are sustainable over the long term.</td>
<td>partly done</td>
<td>ongoing</td>
<td>Increased enforcement when recreational licence introduced; recreational fishing area; signs at ramps; artificial reefs</td>
</tr>
<tr>
<td>FISH3</td>
<td>Monitor commercial and recreational fish catches to determine trends and facilitate and early response to unnatural declines.</td>
<td>partly done</td>
<td>review appropriateness</td>
<td>Recreational fishing area</td>
</tr>
<tr>
<td>ACC1</td>
<td>Upgrade existing boating restrictions and monitor boating impacts on the waterway, particularly in narrow trafficable reaches.</td>
<td>done</td>
<td>review appropriateness</td>
<td></td>
</tr>
<tr>
<td>ACC2</td>
<td>Develop new facilities and undertake maintenance works on the existing boat ramp and associated facilities.</td>
<td>partly done</td>
<td>ongoing</td>
<td>Waterways asset management plan</td>
</tr>
<tr>
<td>ACC3</td>
<td>Develop new walkways and picnic locations within the foreshore buffer zone.</td>
<td>done</td>
<td>ongoing</td>
<td>Foreshore rehabilitation projects</td>
</tr>
<tr>
<td>ACC4</td>
<td>Investigate and recommend appropriate waterway recreational facilities in accordance with Council’s Waterway Strategy and NSW Government Guidelines.</td>
<td>done</td>
<td>ongoing</td>
<td>Waterways asset management plan</td>
</tr>
<tr>
<td>ACC5</td>
<td>Investigate possible mechanisms for re-establishing public foreshore access along the northern Basin and implement if feasible.</td>
<td>not done</td>
<td>review appropriateness</td>
<td></td>
</tr>
<tr>
<td>ACC6</td>
<td>Monitor channel location and relocate channel navigation markers as required (relate to NAV2 which deals with the entrance to Sussex Inlet from the ocean). This strategy also relates to other entrances with the Basin/Inlet area.</td>
<td>done</td>
<td>ongoing</td>
<td></td>
</tr>
<tr>
<td>VIS 1</td>
<td>Finalise and implement Visual Management System</td>
<td>partly done</td>
<td>review appropriateness</td>
<td>Visual Management Plan prepared 1994; not adapted; visual considerations included in some DCPs</td>
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<tr>
<td>VIS 2/ ACC3</td>
<td>Develop new walkway and viewing locations around the foreshore.</td>
<td>partly done</td>
<td>ongoing</td>
<td>Foreshore rehabilitation projects</td>
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<tr>
<td>VIS 3/ ACC5</td>
<td>Investigate possible mechanisms for re-establishing public foreshore access along the northern Basin and implement if feasible</td>
<td>not done</td>
<td>review appropriateness</td>
<td></td>
</tr>
<tr>
<td>ID</td>
<td>STRATEGY</td>
<td>Status April 09</td>
<td>Possible Future Direction</td>
<td>Notes</td>
</tr>
<tr>
<td>----</td>
<td>---------------------------------------------------------------------------</td>
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<td>----------------------------------------------------------------------</td>
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<tr>
<td>AHER 1</td>
<td>Ensure adequate information is included in any development application in areas likely to contain heritage sites.</td>
<td>done</td>
<td>ongoing</td>
<td></td>
</tr>
<tr>
<td>AHER 2</td>
<td>Expand knowledge of the Aboriginal heritage of the area and include Aboriginal heritage information in historical documentation about the occupation and uses of St Georges Basin.</td>
<td>partly done</td>
<td>ongoing</td>
<td>CCA; Shoalhaven Regional Aboriginal Heritage Study</td>
</tr>
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Table 2. Summary of Status of Strategies, St Georges Basin Estuary Management Plan 1998.

NC = Nature Conservation  WQ = Water Quality  SED = Sedimentation  FL = Flooding
NAV = Entrance Conditions/Navigation  ER = Erosion  FISH = The Fishery
ACC = Waterway Access  VIS = Visual Amenity  AHER = Aboriginal Heritage

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<th>Management Area</th>
<th>NC</th>
<th>WQ</th>
<th>SED</th>
<th>FL</th>
<th>NAV</th>
<th>ER</th>
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<td>1</td>
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</tbody>
</table>
4. REVIEW OF MANAGEMENT AREAS

In order to facilitate the delivery of the revised action plan new management areas have been identified that are better aligned with State and Federal Government’s programs and also better reflect council’s structure.

The new management areas are:

**Catchment Inputs and Their Effects**
- Onsite Sewage Management
- Rural Land Management
- Runoff from Roads and Other Cleared Land
- Urban Stormwater
- Sewer Overflows

**Biodiversity and Ecosystem Protection and Rehabilitation**
- Terrestrial Habitat and Bushland
- Riparian Habitat
- Aquatic Habitat

**Access and Recreation**
- Foreshores
- Boating and Swimming
- Navigation and Entrance Management

**Natural Hazards - Adapting to Climate Change**
- Sea Level Rise
- Floodplain Risk Management
- Bushfire

**Cultural Heritage**
5. CATCHMENT INPUTS AND THEIR IMPACTS

5.1 Introduction

St Georges Basin’s aquatic recreational potential and clean water are highly valued by the community as indicated by responses to the 2009 Shoalhaven City Council community survey. Responses identified concern for threats to the Basin’s water quality, catchment inputs and amenity. Some of the concerns identified include: impacts from development, pollution, siltation and weeds.

Nutrients, sediment and other pollutants originating in the catchment of St Georges Basin can significantly affect the ecology of the water body. Degraded water quality and rapid sedimentation can also diminish aesthetic appeal, amenity and recreational values, such as swimming and impacts on fish stocks.

Management of St Georges Basin, therefore, begins with the management of its broader environment. Controlling pollutants in the Basin’s catchment reduces the amount of undesirable inputs reaching the water body. This is far better than instigating ‘catch up’ programs to deal with contaminants once they reach the Basin.

5.2 Catchment description

St Georges Basin lies on the south coast of NSW, 150km south of Sydney (Figure 1). The estuary is moderately large at around 37 km$^2$ with a 327 km$^2$ catchment. The Basin discharges to the ocean through Sussex Inlet, a 6.5 km long, narrow channel. The entrance to Wreck Bay has no record of closure, but at times is quite confined. (WBM, 2003). A large Holocene marine barrier (Bherwerre barrier/beach) separates the Basin from the oceanic Wreck Bay.
Much of the catchment upper reaches are zoned for rural use. More than 80% remains uncleared. Grazing is the main agricultural activity. Residential and tourism use make up around 6% of the catchment and there are increasing pressures from this form of land use with intermittent applications for zoning changes from rural to village. Industrial zoning is limited, with the main areas being in Sussex Inlet and some smaller areas in the townships on the north of the Basin.
Figure 2: St Georges Basin LEP Zoning

State Forests and National Park cover 53% of the catchment (47% and 6% respectively) as shown in Error! Reference source not found.. Environmentally sensitive areas cover 4% of the catchment and wetlands (including SEPP 14 Wetlands) make up 1%.
Further information relating to St Georges Basin catchment can be found in Appendix XX and by doing an estuary search for 'Saint Georges Basin' on the Ozcoasts website at:
http://www.ozcoasts.org.au/search_data/detail_result.jsp

5.3 St Georges Basin Water Quality and Sedimentation

The St Georges Basin Estuary Management Plan (1998) identified water quality as generally considered to be good. Good water quality needs to be maintained as it is important for human enjoyment, including amenity and recreation and for the ecology of aquatic system.

Shoalhaven City Council has collected water quality data since 1990. Council’s monitoring serves a number of objectives including facilitating the maintenance/improvement of recreational and aesthetic enjoyment if the lake and protection of aquatic ecosystem health. Council also monitors in a number of locations to determine the impact that catchment activities have upon the basin, these sites are generally located at the confluence of tributaries or downstream of major inputs.

Over the last two decades approximately 24 sites have been monitored in the St Georges basin (site locations are shown in Figure 4). The type of indicators monitored at each site varies with a mix of condition and pressure/stressor indicators monitored.
Council reports this information through State of the Environment Reporting and its website

http://shoalhaven.nsw.gov.au/council/pubdocs/soe/Region/Indicator%20Results%202008/Surfacewaterqualitystgeorgesbasin%202008.htm

Figure 4: Shoalhaven City Council Water sampling sites for St Georges Basin

Council uses a Water Quality Index (WQI) to rate sites on a scale from ‘very poor’ to ‘excellent’ (Figure 5). The sites in the St Georges basin have been assessed against the WQI for the period 2004-2008, were reported as having ‘good’ to ‘excellent’ water quality for that period. All Water samples collected met the swimming guidelines for faecal coliforms.
Figure 5: Water Quality Index for the Shoalhaven River 2004-2008

For the purpose of this review the historical water quality data has been further analysed and compiled into graphs comparing the data with water quality guidelines value. A summary of the data is in Appendix XX.

Scanes et al 2007 found that using water quality testing (such as nitrogen and phosphorus concentration) as the sole means of determining lagoon condition was simply inadequate in NSW lagoons. They recommended that ecological outcome indicators such as algal abundance (macro and micro) and turbidity were most likely to show interpretable patterns at low to moderate nitrogen loadings, such as occur in St Georges Basin. A one year trial of an estuary health monitoring program is currently underway and will inform a revised long term monitoring program that will be reflective of catchment inputs and associated estuary health. Three sites within St Georges Basin are included in this study (Sites 28, 33 and 772).

Sedimentation in St Georges Basin occurs in a number of areas. Infill from tributaries occurs around the edges of the Basin, while a flood tide delta is developing on the Basin side of Sussex Inlet. Prior to European settlement sedimentation rates were low. As clearing and urbanization have increased infilling rates have increased slightly, however the large size of the Basin relative to sediment input has meant impacts from this are fairly minimal (WBM, 2003).
5.4 Overview of Processes Affecting Water Quality

Processes affecting water quality in an estuary are shown in Figure 6. They include:

- catchment inflows: point source pollutants - direct source eg. stormwater pipe outflow) and diffuse source (eg. sediment, nutrients);
- water exchange with ocean and from fresh water inputs (rainfall); and
- internal lake processes

![Figure 6: Nutrient cycling as an example of some processes affecting water quality in an estuary (from Murray et al., 2003). In addition to nutrients, other pollutants from the catchment such as sediment and chemicals also have an impact](image)

5.4.1 Catchment inflows

Key sources of catchment impacts affecting water quality in an estuary are shown in Figure 7.
Disturbances and Pressures on Estuarine Ecosystems

1. Entrance manipulation and dredging can change water depth, inundation regimes and salinity gradients in the estuary.
2. Stormwater from urban and industrial areas can introduce toxic substances and increase the amount of sediment in the estuary.
3. Overfishing from both commercial and recreational practices can change plant and animal communities in the estuary.
4. Estuary disturbance can increase the amount of sediment and nutrients in the estuary.
5. Estuary disturbance increases the abundance of pest plants and animals and reduces the diversity and abundance of plants and animals.

Figure 7: Catchment impacts on estuarine ecosystem (DECCW, 2010)
Sources of catchment inputs include

- On site sewage
- Rural land management practices
- Road, driveway, track and cleared land runoff
- Urban stormwater
- Sewer overflows

The top three problems for immediate attention, identified in the NSW Diffuse Source Pollution Strategy (DECC, 2009), are shown in Table 1. Catchment inputs of most concern for St Georges Basin are sediment and nutrients (especially Nitrogen and Phosphorus). Other inputs of concern can include toxic pollutants and pathogenic bacteria.

Table 1: NSW Diffuse Source Pollution Strategy priorities (DECC, 2009)

<table>
<thead>
<tr>
<th>Priority problem</th>
<th>Key impacts to address</th>
</tr>
</thead>
</table>
| 1 Sediment levels exceeding ANZECC Guidelines | • smothering of aquatic ecosystems  
• increased water infrastructure maintenance costs |
| 2 Nutrient levels exceeding ANZECC Guidelines | • nuisance weed growth and harmful algal blooms  
• increased water treatment costs  
• reduced fishery production (commercial and recreational) |
| 3 Pathogen levels exceeding ANZECC Guidelines | • reduced fishery production (aquaculture, commercial and recreational fishing)  
• human health impacts from aquatic recreation |

5.4.2 Water exchange

St Georges Basin is a large estuary with a confined entrance and therefore limited tidal/oceanic exchange.

Inlet sand bar coverage between 1998 and 2006 has increased by approximately 1 hectare or 6% (Boardman, 2009). No studies have been done to quantify the impact of this on water exchange between the estuary and the ocean, however given that Sussex Inlet is such a confined entrance, shoaling is unlikely to be a significant contributing factor in limiting exchange.

The past decade for the NSW east coast has been relatively dry compared with historic data, as indicated by Figure 8 (Schwerdtfeger, 2008). This has led to lower fresh water inputs for St Georges Basin than in previous decades.

New precipitation patterns brought about by climate change are likely to alter the delivery of inputs to the water body, including sediments, contaminants and nutrients. Decreased average rainfall, accompanied by an increase in
rainfall intensity will result in contaminants being washed into the lake less frequently but at a higher volume with each rainfall event (Haines and Thom 2007). Lake level rise instigated by climate change will lead to new areas being subject to foreshore erosion (WBM, 2003).

Figure 8: Mean annual rainfall for South East Australia 1900-2007 (Schwerdtfeger, 2008)

5.4.3

5.4.4 Internal lake processes

A dynamic relationship exists within the lake between nutrients entering, cycling through and exiting the aquatic system, and plant growth and decay (Figure 6).

Growth of aquatic vegetation is dependent on nutrients such as nitrogen (N) and phosphorus (P) which are supplied from either the catchment or from cycling within the lake. Excess nutrient supply, however, can lead to algal blooms and their undesired effects. Water bodies with high nutrient levels are classified as eutrophic.

During the decay of organic matter nutrients are released either to the lake water, where they stimulate further plant growth, or are buried within the sediments. Nitrogen is commonly released to the water column as ammonia (NH₃) or may exit the system as nitrogen gas (N₂). Both nitrogen and phosphorus may be cycled through these processes several times before exiting the system, however, as phosphorous readily binds with clays it is likely to be buried more quickly.
Disturbance of sediments can have a twofold detrimental effect:

- It may lead to nutrients being re-released to the water body.
- The lake basin sediments support a diverse bacterial community that helps to deal with nutrients in the water column, and which may be displaced following disturbance.

Nutrients may also leave the system through ocean exchange as oceanic waters are generally much lower in nutrient levels (oligotrophic) than fresh water systems.

Bacteria involved in the breakdown of organic matter consume oxygen, thereby lowering the lake’s dissolved oxygen (DO). Low DO can lead to problems such as fish kills through suffocation (Murray, E.J. et al., 2003; Heggie, D., 2006).

St Georges Basin has low sedimentation rates. This means that burial is unlikely to occur quickly enough to prevent nitrogen being recycled through plant growth. It is also difficult for nutrients to exit the system through oceanic exchange in St Georges Basin due to its confined entrance.

An interim report from a 2003 survey suggested that the Basin was mesotrophic to eutrophic (Murray et al., 2005). However, following another field survey in spring 2004 and further analysis of results, the same group of authors published a more conclusive, peer reviewed report (Haese et al., 2007) in which they concluded that St Georges Basin has retained its more pristine, oligotrophic, character until the present time.

5.5 Dealing with pollutant sources in the catchment

5.5.1 On-site Effluent Treatment Systems

Treated effluent from on-site systems often has high concentrations of nitrogen and phosphorous, particularly when not managed appropriately. Since the 1998 EMP Council has required landholders to gain approval for the operation of on-site effluent treatment systems. This change has increased their management and control and has decreased associated pollution risks.

Figure 9 shows parcels of land on which there were licensed on-site treatment systems as at May 2009. Council monitors performance of these systems through periodic inspections to ensure that approval conditions are being complied with and that those systems are not creating pollution or public health problems. Any defect or non conformance detected following an inspection carried out by Council staff must be reported to NSW Health.
5.5.2 Sewage treatment plants and sewage overflows

There are two sewage treatment plants (STP) in the catchment, St Georges Basin STP and Sussex inlet STP.

The St Georges Basin STP serves the communities of St Georges Basin, Sanctuary Point, Erowal Bay, Old Erowal Bay and Wrights Beach.

There are twenty-two Council operated sewage pumping stations and catchments in the St Georges Basin sewage scheme. Each of these pump station contains a flow relief location. In addition, overflows can occur from other flow relief points such as manholes and boundary risers. As part of its Risk Assessment, Risk Minimisation and Incident Management strategy,
Shoalhaven City Council examined the degree of risk from sewage overflows to adjacent surface water catchments. The portions of the Basin View, Sanctuary Point, St Georges Basin and Old Errol Bay adjacent to St Georges Basin have been classed as ‘medium risk’. Other portions of the sewerage system were classified as ‘low risk’. There are no ‘high risk’ areas identified.

To address the risk of sewer overflows, Shoalhaven City Council has a number of programs in place to help prevent and also efficiently respond to overflow events if they occur.

The St Georges Basin Sewerage Scheme forms part of the Northern Shoalhaven Reclaimed Water Management Scheme (REMS) which provides reclaimed water for irrigation of agricultural land on the Shoalhaven River floodplain. Secondary treated effluent from the St Georges Basin STP is pumped to the Huskisson/Vincentia treatment plant and provided tertiary treatment before being discharged into the REMS distribution system. Reclaimed water produced by the St Georges Basin STP is also provided to the St Georges Basin Country Club and the Bay and Basin Leisure Centre via a transfer main.

Since the completion of the REMS works, Shoalhaven Water has identified the need to upgrade the St Georges Basin STP to ensure that wet weather flow management is consistent with all other STPs within REMS. It is proposed to create a 20.6 ML storm detention pond for storage of wet weather inflows. This would allow bypassed flows to be transferred back to the inlet works for full treatment.

The Sussex Inlet STP has adequate capacity for existing development. Council intends to commence investigation of expansion options in the next couple of years to cater for new development areas identified in its Development Servicing Plan (DSP). Any proposed development not included in the DSP will be required to investigate alternatives for management of sewerage.

Any proposed augmentation of the STP/reclaimed water system would be the subject of appropriate environmental assessment and community consultation.

Since 1998, the management of sewage overflows and sewage treatment plants has significantly improved and associated pollution risks significantly reduced.

5.5.3 Nitrogen – Phosphorus – Sediment:

Any changes in land use in the Saint Georges basin catchment would have implications on the generation rates for nitrogen, phosphorus and suspended sediments. Since 1998, water quality models such as the CERAT (Coastal Eutrophication Risk Assessment Tool) have been developed that permit to assess the potential ecological impacts of planning decisions and changes in land use.
Other things that bear on actual generation rates of nutrients and sediment are, for example, grazing rates, fire, maintenance of vegetation cover, sewerage schemes.

5.5.4 Urban Areas and Stormwater Management

Stormwater modelling of St Georges Basin catchment identified unsealed road verges as primary sources of erosion and sediment. Through the use of this strategic information, areas that have the greatest potential for sediment and nutrient suspension and transportation have been, and continue to be, successfully targeted on an annual basis within the capacity of available budgets. Road verge sealing works are funded through the stormwater levy and/or roads budget, and are aimed at achieving a reduction in the volume of suspended sediments and attached nutrients that enter St Georges Basin via drainage networks.

In addition to road verge sealing, Council is also managing stormwater quality control structures positioned at different locations within the St Georges Basin catchment. These structures include sediment pits or ponds, trash racks (to capture leaves and litter), detention basins and gross pollutants traps (to capture organic matter, litter, sediment and oils), and participate in improving the quality of the stormwater discharge to the St Georges Basin. A list of these structures is given in Appendix XX.

During both the construction and post construction phases, new developments also have the potential to generate significant amounts of sediments that could enter the stormwater system. These sediment loads increase the average natural rate of sedimentation and can also carry other pollutants, such as nitrogen and phosphorus, into the basin.

5.6 Actions

Attention should be directed to minimising pollutant loads at the source by focusing on land use and related management practices which reduce water quality problems. Managing catchment inputs is vital for the protection of water quality and ecosystem health in St Georges Basin.

Three broad objectives exist for managing catchment inputs in St Georges Basin:

(i) To protect natural lake processes
(ii) To restore past damage
(iii) To reduce/prevent inflow of pollutants from the catchment

5.6.1 Strategic Planning

New developments have the potential to increase catchment input to St Georges Basin. Through appropriate strategic planning there is an opportunity to protect and improve the natural water cycle quality within the Shoalhaven Local Government Area. Minimizing the impacts of urban
development on the water cycle will improve the health of aquatic ecosystems.

Action 1.1 Implement the South Coast Regional strategy and in particular the following action: Local Environmental Plans will not include further residential or rural-residential zoning in the catchment unless it is demonstrated that a neutral or beneficial effect on water quality as measured at the boundary of the proposed new zoning can be achieved.

Action 1.2 Include stormwater quality and quantity management objectives and targets for new developments that will seek to mimic pre-development conditions by promoting Water Sensitive Urban Design into council's Citywide DCP.

Action 1.3 Identify existing adequate riparian vegetation buffers and identify areas where creation of riparian vegetation buffers is required.

Action 1.4 Protect existing adequate riparian vegetation buffers and create riparian buffers where required though the estuary management program.

5.6.2 Development and Environmental Services

Action 1.5 Implement a revised long term monitoring program that will be reflective of catchment inputs and associated estuary health.

Action 1.6 Ensure development applications meet the stormwater objectives and targets of council's DCP and comply with stormwater management development controls.

Action 1.7 Ensure compliance of on site sewage effluent system.

Action 1.8 Ensure compliance during construction phase of sediment and erosion control measures with industry’s and council’s standards.

5.6.3 Works and Operations

Action 1.9 Continue to implement the road verge sealing program to limit sediment loads.

Action 1.10 Ensure new roads are constructed to best practice to reduce and minimise sediment runoff.

Action 1.11 Investigate stormwater treatment options such as sediment basins and bio retention swales to treat stormwater runoff before it reaches the St Georges Basin.

Action 1.12 Limit dredging of the lake and inlet in order to inhibit release of nutrients stored in sediments.

5.6.4 Effluent Management
Action 1.13 Implement St Georges Basin STP augmentation works to better manage wet weather flows.

Action 1.14 Investigate expansion options of the Sussex Inlet STP, to cater for new development areas identified in its Development Servicing Plan.

Action 1.15 Monitor and document the environmental impact of treated effluent release to sand dunes.

Action 1.16 Monitor and document the environmental impacts of the REMS scheme in the St Georges Basin catchment.

Action 1.17 Inspect onsite sewage management systems.

Action 1.18 Identify illegal connection to stormwater system and take corrective action.

5.6.5 Management of Private Lands

Action 1.19 Maintain vegetated riparian buffer to waterways as they provide for pollutant filtration from farmed lands and prevent erosion.

Action 1.20 Educate rural landholders on best management practices for nutrients and water cycle management.

5.6.6 Education

Action 1.21 Educate the community to minimise at source pollution of stormwater (ie washing cars away from drains on lawns, not washing wastes down the drains, etc.).

Action 1.22 Inform people of the lake’s health and water quality conditions.

Action 1.23 Develop an information brochure for residents and tourists identifying the DO’S and DON’T’S when living or residing next to an estuary.
APPENDIX 1. CENTRAL NRFM COMMITTEE
JUNE 2009 VALUES, ISSUES
AND ETHICS QUESTIONS
Central NRFM Committee June 2009

St Georges Basin Estuary Management Plan

Review of Values, Issues and Objectives
File 3420

The 1998 St Georges Basin Estuary Management Plan identified values, issues and management objectives that set direction for the strategies and actions through which the plan has been implemented.

As part of the review of the plan, there is a need to revisit these values, issues and objectives to assess whether they are still relevant and appropriate.

Please consider the extracts from the 1998 plan on the attached pages and answer the following questions. You can write directly on the attached pages as well if you want to, preferably in red or blue. There is an electronic version on the cd if you would rather use that. If so, please turn on ‘Track Changes’.

Please return your comments to me (address below) by Friday 26th June 2009. You can post it to me or drop it in to the Nowra office of Council and ask them to send it to me. Or you can email it to council@shoalhaven.nsw.gov.au marked to my attention.

If you want to discuss, call me on 4429 3380.

Thank you for your contribution to the review of the St Georges Basin Estuary Management Plan.

Peter Dalmazzo
Natural Resources Project Officer
Shoalhaven City Council
PO Box 42 Nowra NSW 2541

Privacy Notification: The information requested below is being collected by Shoalhaven City Council and will be used by Council and NSW Government agencies to assist in the review of the St Georges Basin Estuary Management Plan. The provision of this information is voluntary and you may apply to Council for access to or amendment of the information at any time.

Please provide the following details so we can contact you to get more information if needed:

Name:........................................................................................................................................
Organisation:................................................................................................................................
Address:......................................................................................................................................
Telephone:................................................. E-mail:...........................................................................
1. Are the values listed in the attached extract from the 1998 Estuary Management Plan still important to you or your organisation? If not, why not?

2. Is there anything else that you think is important about St Georges Basin and should be protected through actions in the Estuary Management Plan?

3. In your view, what is the most important value?

4. Are the issues listed in the attached extract from the 1998 Estuary Management Plan still relevant to the management of St Georges Basin? If not, why not?

5. Are there other issues that you think should be dealt with in the revised St Georges Basin Estuary Management Plan? Please tell us what they are.

6. In your view, what is the most pressing issue?

7. Are the objectives listed in the attached extract from the 1998 Estuary Management Plan still appropriate for the management of St Georges Basin? If not, please suggest changes.
Values

To equitably manage a resource requires identification of the key ecological, social and economic values that people with an interest consider important and wish to see preserved into the future. Values can be important in a local, regional or national sense.

Through identification of the values of St Georges Basin’s resources and the threats to the condition of the resources, objectives for future management of the Basin and Sussex Inlet can be developed. In summary, the key values identified for St Georges Basin were the:

- Largely unmodified shoreline and a diversity of aquatic flora and fauna
- Aquatic habitats that are ecologically valuable, sixteen of which are classified as SEPP 14 coastal wetlands
- Popularity of the area as a tourist destination with a variety and high quality of recreational activities available
- High level of visual amenity

The full lists of values were identified as:

**ECOLOGICAL**
- a largely unmodified shoreline in the Basin and a diversity of aquatic flora and fauna
- aquatic habitats that are ecologically valuable, sixteen of which have been classified as SEPP 14 - Coastal Wetlands
- a level of water quality which supports a viable lake ecosystem

**SOCIAL**
- a significant tourist and residential infrastructure in an attractive coastal/estuarine setting
- a relaxed atmosphere for both residents and holiday makers
- a popular tourist destination with attractions such as boating, sailing, waterskiing, swimming, walking and sight-seeing in the Basin and inlet, fishing in the adjacent Wreck Bay, bushwalking, car touring and sightseeing in the surrounding areas
- a significant commercial fishery
- a high level of visual amenity in the Basin
- a significant aboriginal heritage with links to the area’s aboriginal population

**ECONOMIC**
- caravan parks, tourist accommodation and commercial shopping outlets that rely on holiday makers for income
- property values
- commercial fishery
Management Issues

During the preparation of the 1998 Estuary Management Plan, key issues and conflicts associated with the estuary were identified by the community, Task Force members, Local and State Government representatives and from the outcomes of the estuary processes component of the study.

Continuing growth and development of the village and catchment of St Georges Basin has resulted in pressure on the Basin and Inlet environment. Concerns have been raised by the community on the degradation that is occurring in the lake. Concern was also raised during development of the plan for future damage to the lake’s environment and for the lack of information on which to develop sound management strategies.

Concerns raised by the community, Government representatives and by the outcomes of the Estuary Processes Study for St Georges Basin were often localised. However, many of the issues identified during the development of the Estuary Management Plan are common to other estuaries on the NSW coast.

For ease of management, issues raised were grouped into the following ten areas:

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Key Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Nature Conservation</td>
<td>• Urban expansion into wetland areas and forested foreshores</td>
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<tr>
<td>2) Water Quality</td>
<td>• Accumulation of nutrients in the muddy sediments of the shallow waters in the north of the basin and deeper waters in the central section</td>
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<td></td>
<td>• Quality of the water entering the Basin from the surrounding catchment. Localised deterioration of lake water quality is evident possibly due to urban and catchment development. Low oxygen levels and excessive phytoplankton growth in tributaries and high turbidity levels associated with sediment input to the Basin from local drainage and tributary creeks has been recorded.</td>
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<td>• Levels of nutrients and suspended sediments and their effect on algal growth and sea grass quality</td>
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<tr>
<td>3) Sedimentation</td>
<td>• Sediment and nutrient input into the Basin and its impact on sea grasses and the embayment foreshore near Tomerong Creek</td>
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<td>• Sediment deposits at drainage outlets</td>
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<tr>
<td>4) Flooding</td>
<td>• Access to Sussex Inlet in time of flood</td>
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<td>• Impact of flooding in combination with high ocean levels during storm conditions</td>
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<tr>
<td>Management Area</td>
<td>Key Issues</td>
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<td>-----------------------</td>
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</tbody>
</table>
| 5) Entrance Conditions/Navigation | - Safe access to Wreck Bay from Sussex Inlet. Shallow entrance conditions and exposure to local storm waves create potentially dangerous conditions under certain tide levels and weather conditions  
- Exposure of rocks in Inlet entrance by channel shifting and erosion  
- Navigation hazards associated with the shifting entrance channel |
| 6) Erosion            | - Erosion along Sussex Inlet is causing a loss of foreshore vegetation and contributing to shoaling. Continuing uncontrolled erosion could lead to increased areas of destabilised bank and denuded vegetation  
- Collapsing banks in the canal estate which is reducing amenity and increasing sedimentation  
- Potential of power boats in tributaries to cause erosion  
- Formation of informal picnic/boat parking areas along banks which create areas susceptible to erosion by flood flows and boat wash |
| 7) The Fishery        | - Decline in the fishery and its impact on the local economy  
- Impact of fishing activities, especially on the seagrass  
- Conflict between recreational and commercial fishers over fish taken and bycatch etc. and the impacts of these activities  
- Loss of sea grasses  
- Decline in water quality |
| 8) Waterway Access    | - Restricted foreshore access acts to preserve areas which are difficult to reach but encourages overutilisation of accessible areas  
- Boating access is restricted and generally sub-standard  
- User conflicts exist, both on the waterway and over foreshore access |
| 9) Visual Amenity      | - Limited opportunity for public viewing of and access to waterways  
- Impact of development on the Basin’s visual quality especially in the south western section |
| 10) Aboriginal Heritage | - Urban expansion into potential Aboriginal sites  
- Erosion around foreshores and impact on sites |
Management Objectives

Management objectives were developed to ensure that the Basin and Inlet’s key values were maintained or improved and to address the issues identified by the community.

The objectives developed address the ten management areas identified.

Management Area 1:  NATURE CONSERVATION
To ensure urban expansion does not degrade the conservation values of the waterway and to preserve the ecology of the wetland and foreshore habitats.

Management Area 2:  WATER QUALITY
To maintain or improve existing water quality to a level consistent with recreation and aesthetic enjoyment of the lake and protection of the aquatic ecosystem.

Management Area 3:  SEDIMENTATION
To reduce the rate of sediments entering the Basin to predevelopment levels and to restore degraded foreshore areas in the north of the Basin.

Management Area 4:  FLOODING
To minimise the impact of flooding on existing and future developments and to determine more clearly the likely extent and frequency of flooding.

Management Area 5:  ENTRANCE CONDITION/NAVIGATION
Improve entrance navigability and investigate alternative access to Wreck Bay.

Management Area 6:  EROSION
Monitor erosion along the estuary foreshores, canals and tidal creeks and to implement measures to limit erosion and reduce the loss of foreshore amenity.

Management Area 7:  THE FISHERY
Ensure the fish catch does not exceed the sustainable capacity of the waterways and to find a balance between recreational and commercial fisheries.

Management Area 8:  WATERWAY ACCESS
To improve user facilities, particularly boating facilities. Reduce uncontrolled use of waterways and foreshores and develop appropriate usage controls and facilities for a range of users.
Management Area 9:  VISUAL QUALITY
To maintain the visual qualities of the area and to improve public access to the views.

Management Area 10:  ABORIGINAL HERITAGE
To improve knowledge about and to protect the Aboriginal heritage of St Georges Basin.
For more than a decade, the St Georges Basin Estuary Management Plan has guided how the waterways and surrounding environment of ‘The Basin’ and Sussex Inlet have been managed. To ensure the plan stays relevant, Council is again working with the community and NSW Government agencies to review the plan.

As part of the review, Council needs to know whether there have been any changes to the things that people value about the Basin and the Inlet, or to the things that need to be managed.

The information gathered in the survey below will help to update St Georges Basin Estuary Management Plan, a draft of which will be exhibited for public comment later this year.

To participate in this community survey, please fill in your answers on this form, fold it and mail it without a stamp, or if you prefer you can complete the survey on-line at http://shoalhaven.nsw.gov.au/council/pubdocs/communityissues/basin

Please return the survey by Friday 21st August 2009.

For more information on this project please contact Peter Dalmazzo at Council’s Natural Resources & Floodplain Management Unit on 4429 3392, or email council@shoalhaven.nsw.gov.au

Excerpts from the 1998 plan can be viewed at: http://shoalhaven.nsw.gov.au/council/pubdocs/LandManagement/StGeorgesBasinEMP.pdf

Privacy Notification: The information requested below is being collected by Shoalhaven City Council and will be used by Council and NSW Government agencies to assist in the review of the St Georges Basin Estuary Management Plan. The provision of this information is voluntary and you may apply to Council for access to or amendment of the information at any time.

Optional: Please provide your details so we can contact you for more information if needed:

Name ………………………………………………………………… ………………………..………………………………………………...

Postal Address …………………………..…………………………………………………...…………………………………..………………

Telephone ……………………………………………..   E-mail ………………..……………………….……………………………………

1. In the space below, please write single words that come to mind when you think about the waterways and surrounding environment of St Georges Basin/Sussex Inlet. You can write any words you want – whatever pops into your head. No explanation is required for your choice of words.

Please provide up to a maximum of 10 words.

1. 6.

2. 7.

3. 8.

4. 9.

5. 10.
2. What do you think is the single best thing about the waterways and surrounding environment of St Georges Basin/Sussex Inlet?

3. What else do you think is important about the waterways and surrounding environment of St Georges Basin/Sussex Inlet?

4. What do you think is the single biggest problem with the waterways and surrounding environment of St Georges Basin/Sussex Inlet?

5. What other problems are there with the waterways and surrounding environment of St Georges Basin/Sussex Inlet?

6. What is your age? 1-15 16-25 26-35 36-45 46-55 56-65 66-75 76-85 86 or older