

KEMPSEY SHIRE COUNCIL



CONSULTANT BRIEF MACLEAY RIVER ESTUARY

Data Compilation & Mapping Study and Report

April 2004

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1.0 INTRODUCTION

1.1 General

This brief is to seek consultant services to provide the information base upon which an estuary management plan can be prepared for the Macleay River Estuary. These services will include:

- Data Compilation, Information Register establishment, Historical Context.
- Comprehensive Base Mapping
- Data Compilation Report

The studies shall be prepared in accordance with the general provisions set out in the NSW Government Estuary Management Manual (1992), the NSW Coastal Policy 1997, and directions as detailed by Healthy Rivers Commission North Coast Rivers report (2002).

1.2 Location

The Macleay River estuary is located on the mid north coast of NSW approximately 450 km north of Sydney and 50 km north of Port Macquarie (see **Fig 1**).

The estuary is a principal feature of the region from a cultural, commercial and recreational aspect. Past flood mitigation works, combined with increases in population, tourism, commercial and recreational activities, are placing pressures on the natural processes, the health and integrity of the estuary and its coastal floodplain and foreshores.

In recognition of this, Kempsey Shire Council, through its Coast & Estuary Management Committee have resolved to prepare an Estuary Management Plan for the Macleay River estuary.

Tourism is a major industry within the Kempsey LGA with 415,000 visitors spending an estimated \$90 million per year (Kempsey Tourist Information Centre 2000). The main tourist attractions are Trial Bay Goal, Hat Head National Park, waterways of the lower Macleay and the many recreation areas and bushwalks throughout the LGA.

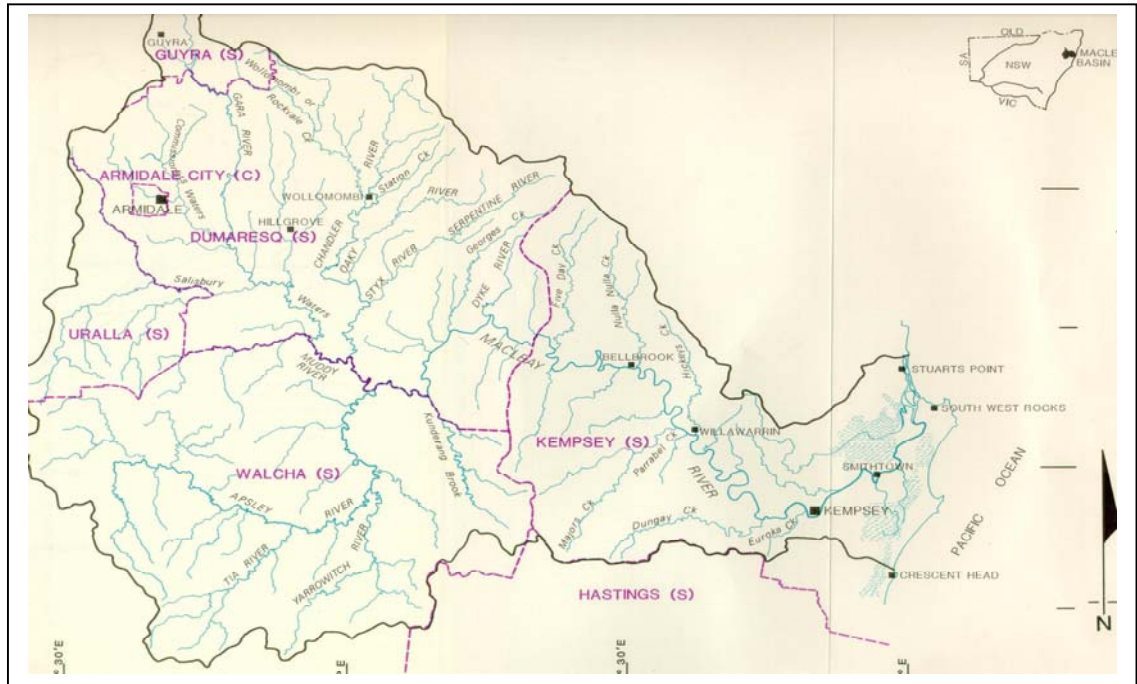


Figure 1 Map of Macleay River Estuary Catchment locality map.

1.3 Background

Kempsey Shire Council established a Coastal & Estuary Management Committee in 1997 charged with the task of preparing management plans for all its estuaries and coastal lands.

Lack of resources, and organisational changes within Council delayed action until September 1999 when funding was gained from the NSW Government Estuary Management Program to assist in preparation of management plans for Killick and Saltwater Creeks, centred in the high growth coastal villages of Crescent Head and South West Rocks respectively.

Whilst these Plans are nearing completion, Council has gained additional funding in 2003 to prepare a management plan for the Macleay River estuary

The Committee is being guided by the NSW Coastal Policy, NSW Government Estuary Management Manual (1992) which outlines a structured management process leading to the adoption and implementation of an integrated, balanced and community-supported estuary management plan.

2.0 Description of Macleay River Estuary

2.1 Catchment

The coastal Macleay sub-catchment has an area of 739 km². and waterway area of 18.2 km². The Macleay River has a catchment area of 11,435 km². Defined as a mature barrier estuary formed by the gradual infilling of the coastal basin by fluvial sediments from the landward end and by marine sediments from the seaward entrance, the Macleay catchment is bordered by the Nambucca catchment to the north and Hastings catchment to the south.

The small coastal creeks and lagoons of Back, Killick and Korogoro Creeks and Saltwater Lagoon are located to the east and south of the Macleay River entrance.

2.2 Geomorphology

The headwaters rise in the Great Dividing Range (1600 m AHD) and flow across the New England Tableland before falling some 400 m into rugged gorge country, the Macleay River emerging from the gorges some 35 km upstream of Kempsey

The Macleay River estuary extends some 54 km upstream from the ocean at South West Rocks to the tidal limit at Belgrave Falls about 10 km upstream of Kempsey.

The coastal floodplain has an area of 400 km² and includes well defined levees up to 7 m AHD along the rivers and creeks below Kempsey, grading to large semi permanent backswamps often < 1 m above 0 AHD (Tulau & Naylor 1999). These swamps cover some 240 km² representing 60% of the floodplain.

The entire floodplain below Kempsey to South West Rocks is underlain by extensive estuarine deposits that include potential and actual Acid Sulfate Soil (ASS). It is estimated that some 31,000 ha of the floodplain below Kempsey is underlain by high risk ASS that is either at or near the surface.

The outlying headlands of Grassy Head, Smoky Cape, Hat Head and Crescent Head are linked by Pleistocene sand masses up to 70m above sea level (Tulau & Naylor 1999).

Extensive flood mitigation works initiated after the 1949 and 1950 floods have significantly modified the coastal floodplain with some 210 floodgates in 47 separate structures servicing some 116 km of excavated drains, 180 km of levees. Some 80% of the main channel from Kempsey is lined with rock protection works. (Tulau & Naylor 1999)

While the Macleay River is the dominant watercourse on the floodplain, significant tributaries include Christmas, Borirgalla and Clybucca Creeks, Macleay Arm, Andersons Inlet to the north and Belmore River and Kinchela Creek to the south.

The Macleay enters the ocean through a trained river entrance at South West Rocks which was first breached during the flood of 1893. Previously the river entrance was at Grassy Head. The old river channel between South West Rocks and Grassy Head now a backwater known as the Macleay Arm. (Webb 1997).

The mangrove area on the Macleay is about 5 km² representing some 5% of the NSW estuarine total. Seagrass covers a further 1.097 km² with a resource of 3.652 km² of significant saltmarsh.

2.3 Early Description of the Macleay after Government Surveyor Clement Hodgkinson in his historic descriptions (*Australia from Port Macquarie to Moreton Bay, London. Oct 1844*)

“In ascending the Macleay River, from its entrance, the first objects which meet the eye on both banks are extensive mangrove flats, with thickets of myrtle, palm,

and swamp oak, which are few miles further on, are superseded by dense alluvial brushes, rising like gigantic green walls on both sides of the river.” (p3).

He goes on to explain the term “brush”

.....”brush trees in general possess a rich umbrageous foliage of bright shining green. The popular names of the most remarkable brush trees are as follows:- Red Cedar, White Cedar, Mahogany, Tulipwood, Rosewood, Ironwood, Lightwood, Sassafras, Corkwood the Australian Tamarind, Box numerous and elegant varieties of the Myrtle genus, the Australian Palms, and the Brush Fig.....But the peculiar appearance of the brush is principally caused by the countless species of creepers, wild vines and parasitical plants of singular conformation, which interlaced and intertwined in inextricable confusion, bind and weave together the trees almost to their summits, and hang in rich and elegant flowering festoons from the highest branches.When this brush land is cleared, and cultivated, its fertility seems inexhaustable.”. (p4).

Now he continues with the description of the Macleay River.....

”It is navigable for vessels of fifty or sixty tons, to a distance of thirty four miles from its bar (Grassy Head), the water being of good depth, except at Shark and Pelican islands, where sand flats extend across the river, which can be passed by vessels only at high water. The reaches of the river are long and straight, averaging about a quarter of a mile in width, flanked on both sides by huge walls of the dense brush I have just described. These borders of alluvial brush land on the banks of the river, are generally half a mile, or a mile wide, and are then backed by extensive swamps of many thousand acres in extent, whose verdant sea, of high waving reeds and sedge, stretches away to the base of the distant forest ranges. There are several lagoons in these swamps, and the stagnant water is very generally diffused over their surface”. (p9)

”The continuous brush renders the lower part of the Macleay very monotonous to the admirer of picturesque scenery; however an occasional glimpse of the azure tinted peaks of the distant mountain ranges, with green islands covered with palms, now and then varying the sameness of the reaches of the river, not to speak of the air of cheerfulness imparted to the scene by the large flocks of aquatic birds, of wonderful variety, all busily engaged, and fish leaping out of the water in every direction, renders an excursion on the waters of the Macleay pleasant enough”. (p10)

2.4 Current description

The main river and its tributaries are now largely flanked by cleared, grassed levees generally void of vegetation and the banks lined with rock protection works for about 80% of its stream length below Kempsey

Remnant native riparian vegetation is found along hard rock outcrops of the upper reaches and in the lower reaches of the main river, including the Macleay Arm, Andersons Inlet and Clybucca Creek in the remnant channel sections not realigned for flood mitigation purposes.

Extensive backswamp areas once prized for their forage value in dry times now have little productivity as many of the water-tolerant species are now replaced by less tolerant pasture species. However, some farmers are now beginning to manage their backswamps under wetter conditions.

There is a history of fish kills that usually occur after heavy rains following prolonged dry periods. (Naylor 1996).

The Lower Macleay estuary provides significant recreational boating opportunity with abundant diversity of waterways fronting the New Entrance area of South West Rocks.

There are significant commercial and recreational fishing activities and oyster farming in the lower Macleay. Commercial fishermen regularly work the Macleay targeting mullet and mud crabs. Along the coast trawlers catch fish and prawns many of which are ecologically linked to the estuary.

Oysters are cultivated principally around Shark Island, Macleay Arm, Andersons Inlet and` Clybucca Creek.

Recreational fishing is widespread with fish being taken in similar areas to those targeted by commercial fishermen. The Macleay is also acknowledged as providing important habitat for Australian Bass, a significant recreational species. (Webb 1997)

A report by Shields & Ass (2000) indicated that based on the 1997 ABS Agricultural Sensus farm productivity by value (farmgate) produced in the Kempsey Shire totalled \$22.81m annually.

3.0 ESTUARY PLANNING PROCESS

3.1 Coastal & Estuary Management Committee

Kempsey Shire Council has an active Coastal & Estuary Management Committee with membership recently reviewed to ensure all key stakeholders are included. Their role is to facilitate the development of management plans for the estuaries and coastal resources of the Kempsey Local Government Area, largely through funding derived from Council and the NSW Government Estuary and Coastal Programs.

3.2 Planning Process

The Estuary Management Manual (1992) outlines the steps for preparing an estuary management plan. The estuary management planning process is being reviewed as part of the Coastal Protection Package announced by the Premier during 2001. It is intended that both the coastal and estuary planning processes will be combined in a single, comprehensive coastal zone management manual..

The planning process as outlined in the current revision of the Manual involves an 8-stage process as follows:

1. Form an Estuary Committee
2. Identify issues and set goals

3. Carry out data compilation

4. Undertake an estuary processes study
5. Undertake an estuary management study
6. Prepare estuary management plan
7. Adopt and implement estuary management plan
8. Monitor and review management process

This brief is for **Step 3**

Community consultation is an essential component of the estuary management process and must be duly considered by submitting consultants

3.3 Key State Policies & Initiatives

3.3.1 Estuary Policy 1992

The central goal of the Estuary Management Policy is to encourage the integrated, balanced responsible and ecologically sustainable use of all NSW estuaries (NSW Government 1992).

3.3.2 Coastal Policy 1997

The Coastal Policy aims to provide for population growth and economic development using ESD principles without putting the natural, cultural and heritage values of the coastal environment at risk

3.3.3 Wetlands Policy

This policy is a component of the State Rivers and Estuaries Policy. It was adopted by Government to provide clear guidance on the wise use, best management practice and rehabilitation of wetlands. The goal is for ecologically sustainable use, management and conservation of wetlands in NSW for the benefit of present and future generations.

3.3.4 NSW Fisheries Habitat Protection Plans No. 1 – General applies to the habitats and features required for the spawning, nursery, shelter and feeding activities of fish and **No. 2 Seagrasses**. Additionally **Section 193 of the Fisheries Management Act 1994** states; “Public authorities are to have regard to any habitat protection plan that is relevant to the exercise of their functions”.

3.3.5 Catchment Management Authorities

The Mid North Coast Catchment Blueprint (Feb 2003) identifies preparation and implementation of an Estuary Management Plan for the Macleay River estuary as Priority No 29 Action No 1.2.2.

3.3.6 Water Reforms 1997

The Macleay River Estuary Management Plan shall give consideration to Water Management Plans completed by the Water Management Committee and value add to water quality and river flow objectives as established through the water management planning process. Plans completed for the Macleay catchment include Stuarts Point Aquifer Groundwater Management Plan 2003.

3.3.7 Water Management Act 2000

Division 4 Drainage Management

Division 5 Floodplain Management

Division 7 Environmental Protection

3.3.8 Healthy Rivers Commission

The Healthy Rivers Commission completed independent inquiries into North Coast Rivers and Coastal lakes in NSW in Nov 2003 and April 2002 respectively

Apart from Back Creek at South West Rocks, there are no identified coastal lakes within the Macleay River estuary study area though several front the broad Macleay catchment in the coastal dunes and foothills eg Saltwater Creek at South West Rocks, Korogoro Creek at Hat Head, and Killick Creek at Crescent Head.

3.3.9 Stormwater Management

Kempsey Shire Council has developed a Stormwater Management Plan (2000-2005) for areas within the Local Government area including the urban areas of South West Rocks, Fredericton, Grassy Head, Stuarts Point, Kinchela, Gladstone Crescent Head and Kempsey

3.3.10 Acid Sulfate Soils Management

The objectives of the NSW Acid Sulfate Soils Management Committee (ASSMAC) include a review of the current situation in acid sulfate soils and the development of strategies for the remediation of severely affected areas.

DIPNR produced a report titled “Acid Sulfate Soil Priority Management Areas on the Lower Macleay Floodplain” (See Tulau and Naylor, 1999)

These priority areas are areas where land management decisions have contributed to and can lead to further severe soil acidification, poor water quality, reduction in agricultural productivity and capability, loss of estuarine habitat and/or degraded vegetation and wildlife.

Priority areas in the lower Macleay floodplain are made up of the Yarrahapinni, Collombatti – Clybucca, Belmore, Frogmore, Kinchela and Raffertys floodgated drainage systems. Modifications to these systems are currently in progress, with substantial progress being made in reducing the discharge of acid groundwater to receiving estuarine waterways.

3.3.11 Macleay River Floodplain Project Committee

The Macleay River Floodplain Project Committee (MRFP) is a Section 355 Committee of Kempsey Shire Council, chaired by Council, with members including elected and staff members of Council, NSW Government agencies, local landholders, industry, indigenous people and conservation representatives. The MRFP was set up by Council with assistance from NSW Fisheries and DLWC. The objectives are to;

- 1) Develop best practice in floodplain management
- 2) Improve the water quality of the Macleay river and its tributaries; and
- 3) Achieve the above objectives by working with all stakeholders including landholders, state agencies, industry groups and environmental interest groups.

3.3.12 Flood Risk Committee

The Flood Risk Committee was set up by Council to implement and oversee programs that address concerns related to flooding of the Macleay and floodplain.

3.3.13 Water Quality Programs

Following flood events in Feb 97 KSC with assistance from DLWC commenced a telemetry water quality-monitoring program. Currently there are 10 permanent and 2 mobile telemetry station positioned through out the floodplain, sending captured data every 15 minutes to a central computer in Council.

3.3.14 National Parks and Wildlife Service Plans of Management

XXXXXXXXXXXXXXXXX +Please refer DEC's (NPWS) for this information

3.3.15 Crown Reserve Plans of Management

Council has developed a *Caravan Park Management Plan. Oct 2003* that covers all Council owned caravan parks.

3.3.16 Urban Wastewater Management

Kempsey Shire Council has a number of sewerage scheme that adjoin the estuary including;

South Kempsey – West Kempsey – Fredericton – Gladstone – South West Rocks

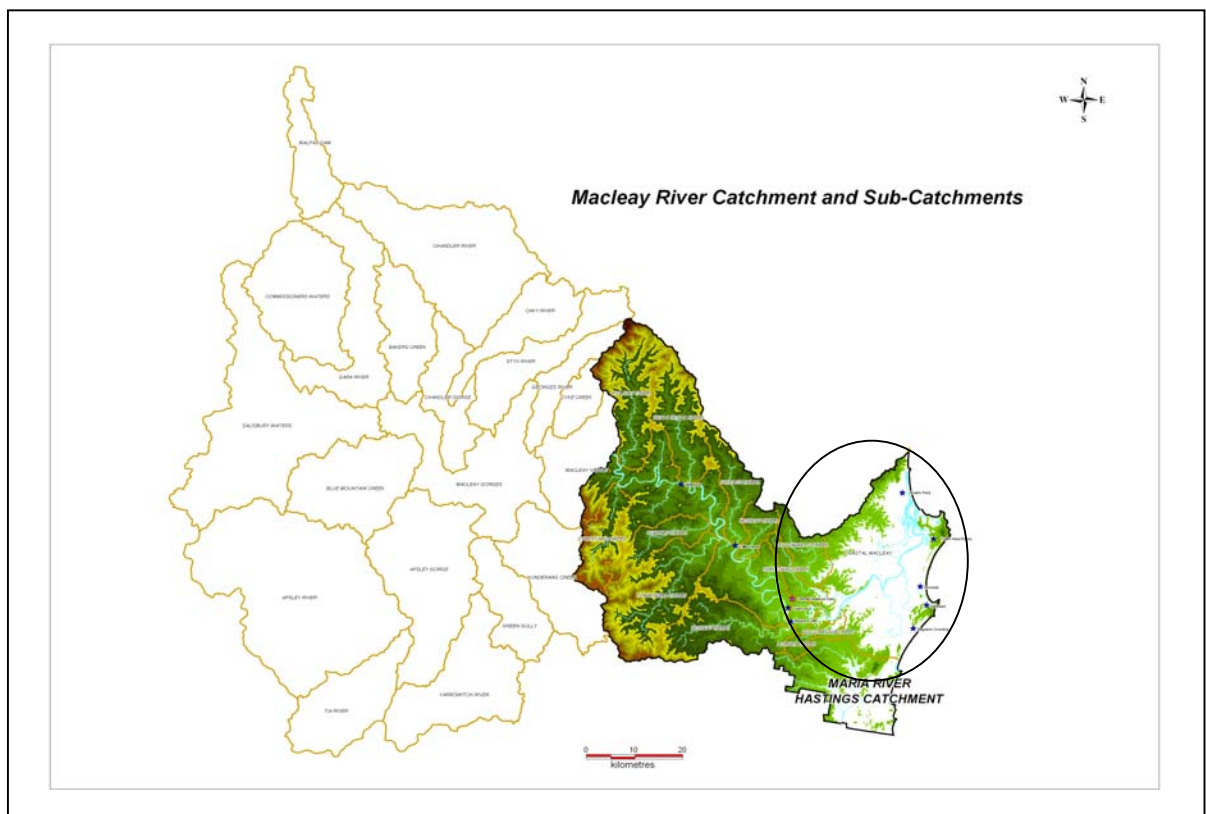


Figure 2. Macleay River Catchment – showing coastal study area

4.0 STUDY AREA (See Fig2).

4.1 Estuary Management Plan Study Area

The study area covers the entire Macleay River estuary and its coastal floodplain. This includes the waterways and all tributaries up to the tidal limit, the entrance, foreshores, floodplain and adjacent land, and coastline. This sub catchment is digitally mapped as the Coastal Macleay # 2060301 (DIPNR 1999 Stressed Rivers), The tidal limit of the main river extends 55 km upstream to Belgrave Falls about 10 km upstream of Kempsey.

The wider catchment must be considered in so far as it may impact on the estuarine environment, especially the coastal floodplain wetlands (salt, brackish and fresh) that interact with tidal and flood flows. Factors such as the heavy metal contamination of river and floodplain sediments emanating from mines in the tablelands warrant a catchment perspective.

5.0 AIMS & OBJECTIVES

5.1 Study Aim

In broad terms the aim of this study is to ;

- 5.1.1 Provide an **electronic register** of projects, reports and information pertinent to the estuary and its floodplain,
- 5.1.2 Collate, review and synthesise existing information commenting on existing plans, reports to establish the **historical context**
- 5.1.3 Create a **comprehensive base map** of essential biological, physical, and geomorphological features of the estuary and its floodplain.
- 5.1.4 Determine need for additional information

5.2 Estuary Management Plan Objectives

In the broader context the Macleay River Estuary Management Plan must provide;

- 5.2.1 **Clear guidance**, direction and implications for management decisions relating to activities and planning decisions that may impact on the estuary and its floodplain.
- 5.2.2 Accurate, **comprehensive mapping** onto suitable GIS format of physical attributes at resolution down to property scale
- 5.2.3 An **electronic register** of all projects and studies both completed and current for inclusion on Council's website
- 5.2.4 A clear description of the **key processes** driving the ecology of the Macleay River estuary
- 5.2.5 A **management framework** to maximise efficient use of available resources.
- 5.2.6 Specific recommendations as to adequacy of **landuse planning controls** and future growth strategies
- 5.2.7 Scheduled list of fully evaluated **costed actions** appropriate for key issues highlighted by Councils Coast & Estuary Committee.

Note This brief is specifically dealing with part, 5.2.2 and 5.2.3. The balance of outcomes will be addressed in the Process Study of Estuary Plan preparation.

6.0 SCOPE OF WORKS

6.1 For the purposes of this brief the tasks will be grouped into three broad areas, namely;

- Stakeholder/community canvassing/consultation,
- Data Compilation/ Mapping and
- Data Compilation Report

7.0 COMMUNITY CONSULTATION

7.1 Communities

The study area comprises the communities of South West Rocks, Jerseyville, Kempsey, Frederickton, Kinchela, Belmore River, Smithtown, Gladstone, Clybucca, Stuarts Point, Grassy Head, Crescent Head and all relevant stakeholder groups that have a vested interest in the management of Macleay River estuary and its floodplain.

7.2 Community Consultation

The consultant is to canvas the community to facilitate local observation knowledge as a component of the Data Compilation Process.

8.0 DATA COMPILATION / MAPPING

8.1 General

The consultant is to undertake those tasks necessary to;

- Provide a list of documents in the form of an **electronic register** of projects, reports and information pertinent to the estuary and its floodplain,
- Review and analyse existing reports and plans in order to describe the **historical context** and to **identify problem areas**
- Define data gaps and data quality
- Prepare a Report on the Data Compilation Process
- Create a **comprehensive base map** of essential biological, physical and geomorphological features of the estuary and its floodplain.

8.1.1 Macleay Estuary Information Register

The consultant shall:

- Establish what **information** is available, describe its quality and identify any information and **data gaps** that relate to the issues of concern in section 10.0
- Create a **register** of active projects, useful references and studies pertinent to and integral to understanding the Macleay estuary, its floodplain and communities
- It is envisaged this register will be created in a suitable **web style format** enabling

ready access to the Macleay River estuary information through access portals such as Council's website.

- The Register shall retain a simple structure eg subject groupings, title, contact details
- Reports and studies integral to improving awareness of the ecology and historical context will be digitised for broader access by community. Some of the flood mitigation reports and various flood studies are pivotal to any understanding of how certain issues have evolved.

- **Historical context**

The consultant shall

describe the historical context of the Macleay River estuary and its floodplain, identifying those events, attributes and areas with important links to the past to place current management challenges in perspective.

- **Mapping Database**

The consultant shall

- Establish an **ortho rectified airphoto base map** with cadastre for the entire Coastal Macleay sub-catchment mapping unit. (digital mapped unit of stressed rivers) using latest air photography 1: 25,000 (available mid January 2004).
- This base map to be scanned at a resolution that enables use down to individual property areas of not less than 1 ha. Base map to be useful for all levels of planning, development, management and assessments.
- All pertinent mapped physical attributes, infrastructure, services and planning layers be collated for incorporation into Council's GIS system. (It is envisaged at a later stage, this will be repackaged to permit ready access for Council, State agencies and community.)
- **Mapping of important physical attributes**
 - Mapping must be sufficiently detailed to allow all features to be readily identified eg individual areas of features such as intertidal mud and sand flats, seagrass, saltmarsh, bank protection works, boat ramp access will be included.
 - Desktop assessment, collation and review of existing datasets held by various State & Federal Agencies, Council and Academic Institutions.
 - Field verification of mapped attributes by boat and on foot
 - Physical attributes will include;
 - **Flora** – identify, map and describe the extent of habitat types, namely Mangrove, Saltmarsh, Macrophytes, Seagrass, Wetlands, riparian vegetation, remnant floodplain forest with statement of current condition
 - **Fauna** - identify map and describe the various habitat types of the major estuarine and riparian faunal communities including migratory birds
 - **Geology** - soil landscapes as well as rocky reefs, rock bar, sand shoals, sediment bars, intertidal sand and mudflats, flood channels, near-shore bathymetry of continental shelf at river entrance
 - **Structures** - floodgates, levees, drains, flood mitigation structures, culverts, stormwater inflows, sewer overflows, boat ramps, jetties, moorings, pontoons, training walls, bank protection works
 - **Dredging** - map areas that have been historically dredged including date of dredging, quantity removed and spoil dump sites

- **Geomorphic Assessment & Mapping** of river channel, bank, bed characteristics - Provide statistical analysis for each mapped unit of the relative extent, representation (% of total locally and regionally), type, condition and significance of key attributes eg backswamp wetlands,

8.2 Suggested Reference Sources would include at least:

- a) Kempsey Shire Council **Ron Kemsley**
- b) Aboriginal Land Council **Andrew Hoholt**
- c) Department of Infrastructure & Natural Resources (Kempsey, Grafton GIS Ray Whitty, Newcastle Coast & Flood Specialist Branch, CNR Coastal Ecology Group **Joanne Wilson**
- d) Environment Protection Authority **Alex Purvis** Grafton
- e) Waterways Authority **Rod McDonagh** SWR
- f) NSW Fisheries Ballina **Marcus Riches**
- g) NSW Agriculture **Rick Whitehead** Alstonville
- h) National Parks and Wildlife Service **Colin Campbell** Port Macquarie
- i) Roads and Traffic Authority – **Peter King**
- j) State Emergency Service – **May Gill**
- k) Community Interest Groups (MASSLAG) **Ivan Sillitoe**
- l) Southern Cross University Lismore **Dr Brad Eyre**
- m) University of New England Armidale **Andrew Boulton, Bob Pressey**
- n) Macquarie University **Gary Brierley**
- o) Commonwealth Environment Protection Authority – **Brett Nudd**
- p) Coastal CRC Brisbane
- q) Local historical services
- r) Local newspapers
- s) North Coast Environment Council John Jeayes Crescent Head

8.3 Data Compilation/Mapping Report

The report outputs will include

- a) Electronic Macleay Information Register
- b) Description of the historical context and overview of problems that require assessment and management
- c) Comprehensive Base Map of Physical Attributes
- d) A report on specific information/data accuracy/gaps with direct relevance to the described issues

9.0 ISSUES TO BE ASSESSED (in preceding Process Study)

Issues raised by the Coastal & Estuary Management Committee, Catchment Management Committee, stakeholders and Mid North Coast Catchment Management Board include;

- 1 Landuse Planning & Development Control
- 2 Riparian land management & bank erosion
- 3 Floodplain wetland management
- 4 Acid sulfate soil management
- 5 Floodgate & drain management
- 6 Boating use
- 7 Sedimentation
- 8 Tourism management
- 9 Habitat protection

- 10 Fish/shellfish management
- 11 Water quality
- 12 River health
- 13 Climate change and sea level rise
- 14 Information availability
- 15 Integration of projects

10.1 Land Use Planning & Development Control

Desired Outcome

That landuse planning instruments and development controls provide a framework for sustainable use of the Macleay River Estuary and its Floodplain

Critical questions

Do current landuse planning, development control and identified future urban release areas adequately protect the ongoing health of the Macleay River estuary and its floodplain?

What measures can be put in place to ensure the zonings, planning rules and guidelines are consistent with the environmental needs of the river and its processes?

What is the issue with Land Use Planning & Development Control

Inappropriately sited and or poorly designed development, as well as more stressful land and water use practices, can adversely impact on the ecology and/or values of this system.

What can the EMP do to help resolve this issue?

Data Compilation/Mapping

- Map projected landuse noting future urban growth strategies of Council
- Map & describe existing environmental planning, development and management controls including, REP, SEPP, LEP, & DCPs urban development strategies, land assessments.
- Define and map those areas vulnerable to sea level increases and climate change

Process Study

- Examine potential foreshore development for recreational type facilities eg training wall walkways, foreshore bike paths etc, examine and describe the processes operating and comment on what considerations are necessary for establishment of facilities within this zone.
- Comment on current and proposed future uses and developments that may threaten or pose a risk to the estuary's structure, health, ecological processes and existing uses.

Management Study

- Highlight conflicts between existing uses
- Examine potential foreshore development especially recreational type facilities, formulate appropriate development controls
- Discuss management options available for current and proposed future uses and developments that may threaten or pose a risk to the estuary's structure, health, ecological processes, and existing uses.

10.2 Riparian Land Management & Bank Erosion

Desired Outcomes

- *retention of the river in its current location*
- *minimisation of induced bank erosion*
- *stabilisation of all riparian lands fronting the estuary*
- *maintenance of intact native riparian and further reinstatement where practicable*
- *create vegetated corridors along and across the estuary and its coastal floodplain*
- *for public lands within villages and towns fronting the river to be appropriately managed and landscaped to set an example of how this type of land is best managed*
- *stream network corridors used to connect areas of significant vegetation*

Critical question

- *What sections of the estuary have similar geomorphic characteristics and how can this be used to assist management approach?*
- *What are the causes and preferred treatment options for a range of typical bank erosion scenarios?*
- *To what extent does boating contribute to bank erosion and how can this be managed?*
- *What sections of river have a high risk of instability posing a threat to infrastructure and productive land*
- *What contribution does bank erosion make to turbidity levels?*

What is the issue with riparian land management?

1. lack of native riparian vegetation corridor along banks of Macleay river estuary and its tributaries for over 50km from Kempsey to entrance
2. extent of rock revetment as treatment option in isolation
3. urban residential lots and their general treatment of river banks
4. ongoing maintenance bank treatment
5. availability of support organisations
6. Eroding riverbanks create problems with water quality, create sediments and result in the loss of valuable riverside land (both public & private).
7. high cost of restoration and ongoing maintenance

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Review 1934 report by Departmental Committee on Macleay River Erosion, Lands Dept analysing the changes over the past 70 years and the management implications
- Map streambank condition

Process Study

- Describe the hydro-dynamic and geomorphic processes contributing to bank instability on representative sections of river.
- Provide a list of appropriate native species for bank revegetation.

Management Study

- Identify mechanisms to overcome the social and financial barriers to helping landholders implement improved riparian land management
- Provide advice about the relative merits of rock and vegetation and combinations thereof
- Identify zones where bank protection is a priority.
- Identify areas of publicly owned river-bank that would benefit from revegetation.

- Examine what work has been done elsewhere that could be beneficial to the Macleay.
- Advise on-going financial requirements for effective maintenance.

Priority for EMP? High

10.3 Floodplain Wetlands Management

Desired Outcome

- reinstate floodplain wetland functions
- rehabilitate degraded wetlands
- integration of floodplain and estuary management (HRC 2002)

critical questions

To what degree do coastal floodplain wetlands influence the health and ecology of the Macleay River Estuary?

Given the plethora of activities and projects underway on the Macleay floodplain through various initiatives. What things can be done to help expedite reinstatement of wetland values and functions?

What lessons have been learnt from the Yarrahapinni Wetland Rehabilitation Project

What is the issue with floodplain wetland management?

Wetlands form a significant component of the Macleay River Estuary occupying some 60% of its coastal floodplain. Wetlands provide important functions in terms of maintaining water quality, floodwater storage and habitat for birds, insects and aquatic fauna. Floodplain wetlands also have a very high biological productivity. Most of the wetlands on the coastal Macleay floodplain are degraded with highly modified vegetation and drainage systems. As a result, many of the important wetland functions have been similarly compromised.

There has been a lot of recent activity and there are many projects trialing better ways of managing local floodplain wetlands. The goals of some programs appear in conflict with other programs underway. There is scope to better coordinate and integrate these activities. NPWS are difficult to engage in wetland management issues. All stakeholders do not necessarily agree on the best way to manage wetland areas.

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Review current wetland mapping examining how it can best be presented and analysed to be of use in management scenario discussions
- Establish criteria to be used for baseline studies to demonstrate improvements. Citing studies exploring change in relation to the Yarrahapinni Rehabilitation Project

Process Study

- Provide elevation mapping of floodplain surface to help predict the changed hydrology from restoration works and changed management of flood and drainage structures
- Identify priority wetland areas for protection and rehabilitation from the Macleay River health perspective

Management Study

- Integrate existing projects and activities, and in particular, ensure that the goals of the various programs are compatible.
- Determine the optimal management of wetland areas so that there is balance between agricultural productivity, flood mitigation and environmental protection.

- Identify ongoing funding requirements and funding sources.

Priority for EMP? High

10.4 Acid Sulphate Soil Management

Desired Outcome

The group decided that this issue is being reasonably dealt with through a range of existing projects, in particular the “Hotspots” program and through the work being done by Ron Kemsley of Macleay River Floodplain Project and the Macleay Acid Sulphate Soils Local Advisory Group (MASSLAG).

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

Process Study

Management Study

- Coordinate and integrate all existing projects and activities on ASS issues throughout the lower Macleay.
- Ensure actions in EMP are consistent with and support ASS activities/projects

Priority for EMP? High

10.5 Floodgate and Drain Management

Desired Outcome

- water quality and water level data readily available
- coordination of projects to ensure consistency of direction
- actively managed floodgates to achieve best outcomes
- clear management regime in both flood events and non flood time

What is the issue with floodgate and drainage management?

- The group acknowledged that the management of floodgates & drains is the main tool for dealing with the previous 2 issues (ASS management and floodplain wetlands) and therefore links strongly with these issues.
- Administrative issues with drains and floodgates have to be resolved before wide scale improvements can be made to the operation of floodgates and drains resulting in improvements to wetlands and ASS.
- the question of ownership, their maintenance and the process for getting approval to modify these structures must be resolved.
- availability of real time water quality and water level data to assist in floodgate management
- public access to WQ data
- lack of tidal process information on salinity and water levels to AHD for informed management of floodgates
- consistency of objectives of floodgate management with broad goals of maintaining the health of the river and its ecology

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Provide elevation mapping of floodplain surface

Process Study

- Investigate the ownership issue.
- Determine the feasibility of Council and/or the State taking ownership (and therefore management responsibility) for floodgates and drains.

Priority for EMP? High

10.6 Boating Use

Desired Outcome

planned provision of facilities commensurate with increased recreational and commercial boating use from population increase and tourism pressures.

critical questions

Are additional planning controls warranted for increased waterway usage???

How is increased recreational and commercial boating use best managed?

What boat ramps facilities exist, what should they have and where?

Which boat ramps and foreshore areas are in public ownership?

Are the amenities, building, carparks and river access points in the right spots?

What is the issue with boating use?

Ever increasing numbers of boats places pressure on existing boating infrastructure such as moorings, boat ramps and fuelling facilities, particularly at the Maddy's Flat area at South West Rocks.

Some conflicts between estuary users, suggested speed restrictions, possibly limiting access to certain areas of the estuary to protect sensitive habitat.

The Back Creek area at South West Rocks has issues that include poor entrance conditions, concerns with the existing dredging program, recreational fishing issues, public access, derelict structures etc.

Waterways are proposing to prepare a "Boating Management Plan" for the entire Macleay River estuary and would like to involve the Estuary Management Committee in preparing the Plan.

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Identify & map all public foreshore land and key access points to the river.
- Map all foreshore structures and identify those that are public facilities.

Process Study

- Investigate hydrological issues associated with Back Creek and its catchment (ref Water Research Laboratory assessment 2003)
- Identify areas suitable for boating facilities in relation to currents habitats etc
- Describe the critical processes and ecological considerations in vicinity of Maddys Flat boat ramp

Management Study

- Develop a concept plan for Back Creek and Maddys Flat area.
- Investigate options for upgrading boat facilities at Maddy's Flat, with a particular focus on providing for small boats (ie capable of handling the Macleay River entrance.)
- Opportunities to provide strategically located network of public waterfront structures
- Provide guidance to Waterways in relation to the development of a Boating Management Plan for Macleay estuary.
- Clearly define the role and relationship each area contributes to the overall boating and recreational needs of the Macleay
- Undertake community consultation in relation to Back Creek and Maddy's Flat.

Priority for EMP? High

10.7 Sedimentation

Desired Outcome

1. understand the role of sedimentation in river processes and its ecology
2. maintain navigable waterways between Kempsey and the river entrance
3. reduced rate of sedimentation
4. sustainable river based gravel extraction operations upstream of tidal limit
5. detailed hydrographic survey of the estuary
6. Ensure no health risk is derived from presence of heavy metal contaminants

critical questions

- *What role is sedimentation from upstream playing with estuarine processes? – where is it, what is happening to this material. and is it of consequence?*
- *Does the heavy metal contamination in the river sediments and across the floodplain pose a health risk?*

What is the issue with sedimentation?

The Macleay River, Macleay Arm and Clybucca Creek appear to be getting shallower over time.

The entrance to Back Creek is constantly shallow, regardless of the amount of dredging going on.

Heavy metal contamination of estuary sediments and its coastal floodplain from mining operations up river and its health risk implications to primary production systems based on the floodplain

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Map extent type sedimentation (refer Paterson Britton Report to DLWC 2003)
- Produce base map of shoals, highlighting areas problematic to boaters eg Kemspey Boat Ramp, Frederickton, Stuarts Point caravan park
- Review UNE research to assess the risk potential of heavy metal contamination to food cycle.
- Review conditions of Crown License for Back Creek Entrance Dredging

Process Study

- Describe the type and distribution of sediments within the estuary
- Describe processes causing shoaling of entrance to Back Creek , Macleay River, Macleay Arm and Clybucca Creek to improving understanding of natural processes

- Investigate the source of sediment, and determine role in river processes and river ecology especially its role during floods.
- Estimate sediment transportation rates and deposition location/rates and their sources (build on Macleay Extractive Industry study commissioned by DIPNR 2003)

Management Study

- Re-examine the role of Back Creek, as a boat harbour, recreational area, swimming, fishing, walking, snorkelling, given the difficulty with keeping the channel open.
- Investigate measures to improve community understanding of safety issues associated with crossing entrance bars, in the context of prevailing coastal processes.
-

Priority for EMP? Medium

10.8 Tourism Management

Desired Outcome

1. range of well spaced, and located public access reserves with well designed facilities where required along the waterway foreshores

What is the issue with tourism management?

1. increased population and recreational pressures and demands/impacts on habitat
2. increased demand for facilities
3. lack of toilet facilities particularly Fisherman Reach and Back Creek
4. boat ramp facilities and public access along Macleay River estuary generally poor
5. lack of boat wash facilities
6. primitive camp site impacts on eg Renwick Island, Golden Hole and Fisherman Reach areas

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Map location of all river access points and facilities

Process Study

- Assess the quality of the toilet amenities and waste facilities in public reserves fronting the estuary, in terms of environmental impact risk.

Management Study

- Opportunity for provision of recreational walkways, cyclepaths etc
- See points raised under issues Water Quality, Boating Use, Habitat Protection and Sedimentation.

Priority for EMP? High

10.9 Habitat Protection

Desired Outcome

- critical habitat appropriately managed and protected within the planning framework
- full knowledge of extent, type, condition and threats

***What are the key habitat areas of the Macleay River estuary?
Which areas require improved management or protection?***

What is the issue with habitat protection?

1. level of protection over significant habitat value on the Macleay Arm and Clybucca Creek and small remnant tracts of high value coastal floodplain vegetation
2. poor documentation of extent type condition and threats to key habitat
3. what is key habitat? and how does it relate to functioning of ecology of Macleay
4. role of coastal floodplain wetlands and backswamp country in Macleay river health
5. no recognised database of fauna existing in macleay coastal floodplain wetlands
6. failure to value rivers and streams as economic, ecological and aesthetic community assets (HRC 2002)
7. treatment of waterways as the residual in the landuse decision making process (HRC 2002)
8. Increased use of the lower river has the potential to impact on critical estuarine habitat. Critical habitat areas provide sanctuary, a food source and shelter for fish and other aquatic species.
9. Uncontrolled commercial and recreational fishing and boating has the potential to damage habitat.
10. Existing landuse practices may degrade

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Map all key habitat of the estuary and its coastal floodplain its extent, type, condition and any threats to its ongoing functioning. Key habitat are those types listed in **NSW Fish Habitat Plan No1 General**. and will include saltmarsh, intertidal flats and shallow water areas important for rare, endangered, vulnerable species including migratory shorebird species.
- Consultant to liase with Rob Williams NSW Fisheries Port Stephens, to discuss mapping already undertaken &/or underway as part of Bass Habitat project. It is envisaged that NSW Fisheries project outputs will form the basis upon which further work can be added. Any opportunity to value add must be explored.

Process Study

- describe the role of important habitat in the ongoing maintenance of estuary ecology, eg look at the abundance of river bed aquatic vegetation its role, function and relationships

Management Study

- Examine options for protecting these areas, including looking at the option of marine reserves and no take (fish sanctuary) zones.
- Investigate opportunities for aquatic reserves, including the concept of “no take” fish sanctuary zones.
- Identify activities that may threaten important habitat values
- Investigate ways to protect the sea grass meadows upstream of the foot bridge at Stuarts Point on the Macleay Arm.
- Examine the issue of habitat rehabilitation throughout the lower estuary. Set priorities for rehab.
- Develop a wetland management strategy for all key backswamp/wetland areas of the Macleay River estuary.

- Identify opportunities for improving the management of high conservation value areas on private lands and Public Lands
- Identify opportunities for re-establishing healthy corridor of native riparian vegetation.
- Investigate opportunities for land purchase (through NPWS) of areas with high conservation values
- Identify opportunities for Ramsar wetland declarations on the coastal floodplain.
-

Priority for EMP? High

10.10 Fish & Shellfish Management

Desired Outcome

1. sustainable use and management of fish resources
2. fish breeding grounds be protected
3. selected parts of estuary designated “no take areas” (HRC 2002) during important periods of lifecycle
4. maintenance of lease areas suitable for healthy oyster production be considered a fundamental estuary management objective

critical question

What strategies need to be in place to ensure our fisheries continue to be productive.

Where does management effort have to focus to reduce the amount of river closures imposed on the Shellfish industry in this estuary?

What is the issue with fish and shellfish management?

- 1 exploitation of fish stock within estuary
- 2 habitat damage from commercial netting practices
- 3 too many commercial operators
- 4 recreational fishing pressures
- 5 most stocks are classified as fully fished or fully exploited (HRC 2002) though NSW Fisheries firmly deny that this is the case
- 6 no estuarine areas reserved as fish havens protected from all fishing activities, traditional owners were known to protect “keep areas”(HRC 2002)
- 7 threat of acidic discharge and low DO black water from backswamps areas
- 8 human faecal contamination of oyster growing areas
- 9 continued decline in oyster production, the States most valuable agricultural enterprise per unit area.
- 10 history of faecal bacterial contamination, with the source of contamination unknown. affecting the Shellfish industry
- 11 conflicts between recreational and professional fishers – often through the media.

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Collate mapping of existing and abandoned oyster leases in consultation with NSW Fisheries Pt Stephens.
- Summarize existing information on the issue of closing the estuary to commercial fishers.

Process Study

- Describe key factors that contribute to Macleay River closures.
- Analyse existing Shellfish Quality Assurance Program water quality information. to assess effectiveness of current water quality monitoring
- Identify water quality hot spots that are contributing to oyster closures.
- Identify those areas of estuary and its floodplain and time of year critical to breeding and development cycle of fishes

Management Study

- Assess option of “no take zones” to protect key habitat or nursery areas in certain times. See “habitat protection” issue above.
- Investigate the bacterial contamination issue, and make recommendations to resolve.
- identify a water quality monitoring strategy that provides industry and managers with clear understanding of problem areas that pose high risk to safe food production
- establish links with Safe Food authority to help generate an integrated approach to water quality analysis, reporting and review of estuarine water quality health
- describe the current status of habitat conservation areas in this area by Dept. Environment and Conservation and NSW Fisheries

Priority for EMP? High

10.11 Water quality

Desired Outcome

1. Improve quality of waters discharging from the backswamps
2. Access to regular analysis of real time water quality and water level data
3. Integrated water quality monitoring network providing managers, commercial operators and community effective management tool

critical question

What strategies must be put in place to ensure compliance with desired guidelines?

What measures will help reduce the amount of river closures for sale of shellfish produce?

How is water quality best monitored

What is the issue with water quality

- 1 Nno overall water quality monitoring strategy that is integrated and routinely analysed to provide all users with access to current information
- 2 deterioration of flood structures and related wetland impacts
- 3 water quality problems (often at times of high or low flow):
- 4 discharge of acid water into estuary from ASS high risk areas
- 5 ‘blackwater’ discharge of low dissolved oxygen into estuary from backswamp drainage networks after / during storm events
- 6 high level turbidity during flood events and its impact on estuary and marine habitat areas
- 7 faecal coliform inputs and associated public health risks to waterway and beach users from unsewered villages, caravan park and urban stormwater;
- 8 flood water management
- 9 heavy metal contamination of estuary sediments and its coastal floodplain from mining operations up river and its health risk implications to primary production systems based on the floodplain

- 10 salinity incursion into productive backswamp country
- 11 problems understanding and obtaining data plus public access to data
- 12 ongoing ability to fund and maintain water quality monitoring
- 13 tidal processes, levels and salinity level interactions with drain outlets inverts

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

- Describe current water quality monitoring network and data management and use practices of key user groups.

Process Study

- Assess water quality of Macleay River Estuary with respect to ANZECC guidelines and the interim water quality and river flow environmental objectives (NSW Gov 1999)
- Estimate stormwater loadings to the River from the diffuse and point source sources during average & peak holiday time (rural residential septics, Sewerage Treatment Plants, urban area stormwater outlets)
- Describe how these loads impact on the river highlighting those areas posing greatest threat

Management Study

- Examine the adequacy of stormwater management and runoff quality and quantity control within planning controls LEPs, DCPs and development guidelines. Document where improvements can be made.
- Review Councils current water quality monitoring regime with a view to developing a monitoring strategy that provides Council, key players, community and industry with a cost effective means of knowing how the estuary is performing, highlighting those areas that need some management action. (eg coastal crc work in SE Qld has some useful approaches)
- Examine how data collection for the Shellfish Water Quality Assurance Program under the Safe Foods system can be further enhanced / integrated with Councils and the States data collection programs.
- Assess likelihood of uptake of heavy metal contaminants within the bed sediments into the food cycle, eg fish, shellfish or dairy products.

10.12 River health

Desired Outcome

The Committee has endorsed a vision that states;

A clean healthy and productive estuary, managed sustainability to benefit present and future generations.

10.13 Climate change and sea level rise

Desired Outcome

1. implications of sea level rise and climate change fully acknowledged within the landuse planning framework
2. appropriate landuse of floodplain and backswamp country

critical questions

What are the implications of sea level rise

- ***geomorphic processes of estuary evolution?***
- ***on current landuse of coastal floodplain, saltmarsh and backswamp country?***
- ***impacts on infrastructure roads, stormwater, sewer, and drainage systems?***

- *tidal flushing characteristics?*

Do current planning controls adequately address this scenario?

What is the issue with climate change and sea level rise?

International acceptance by the scientific community that sea level rise and climate change are realities to be planned for

implications of sea level rise on current landuse of floodplain and backswamp country

impacts on infrastructure, saltmarsh, mud flats

implications of changed hydrology on floodplain drainage and wetlands

increases in sea level and its effect on tidal flushing and tidal velocities in the estuary

Whilst there is still some debate about the rate of change, it seems that there is little doubt that low lying coastal lands will be subject to greater risk of inundation from storm surge and extreme tides.

Understanding the risk associated with sea level rise will have ramifications for land-use planning.

What can the EMP do to help resolve this issue (low-medium priority)?

Data Compilation / Mapping

- Map projected inundation levels for climate change scenarios and assess implications for current planning and development controls of Council.
- Map surface elevation of coastal floodplain lands

Process Study

Discuss the implications of sea level rise and climate change on

- current landuse of floodplain and backswamp country
- impacts on infrastructure,
- key habitats
- implications of changed hydrology on floodplain drainage and wetlands
- its effect on tidal flushing and tidal velocities in the estuary

Management Study

-
- Investigate if the Local Environmental Plan and Development controls are adequate.

Priority for EMP? Medium.

10.14 Information availability

Desired Outcome

What is the issue with information availability?

Whilst there has been a substantial amount of scientific work done in the Macleay River estuary, it is not generally easily accessed or known about. This is particularly true for the general community. This can result in “re-invention of the wheel” which is a waste of time and resources.

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

Establish a central registry of information that relates to the Macleay estuary and floodplain. This registry to include literature/reports, projects and contact details.

Process Study

Management Study

- Package and` make readily available Macleay River Estuary and its coastal floodplain

Priority for EMP? High

10.15 Integration of projects

Desired Outcome

Improved coordination and communication of projects active on the Macleay and its floodplain

Integration of landuse planning and natural resource management outcomes

What is the issue with integration of projects?

There are lots of natural resource management activities and projects underway on the Macleay coastal floodplain and estuary working to a mix of goals and objectives

There is no clear mechanism to ensure consistency, integration and efficiency across a wide number of activities.

What can the EMP do to help resolve this issue?

Data Compilation / Mapping

Create central register of projects and reports

Process Study

Management Study

- The central register discussed in the “information availability” issue will assist with integration as well as improved communications.
- Examine opportunity for integration through Councils Coast & Estuary Management Committee estuary planning process.
- Investigate scope for integrating Councils EMC and Macleay Floodplain Projects Committee (Ron’s Committee, not the flood risk Committee).

Priority for EMP? High

11.0 REPORTING AND TIMETABLE

11.1 Project Management

Brief and concise progress reports to Council & DIPNR on the study findings and progress are required **monthly**.

Any aspects of the study that may not have been identified in the brief but could add value to the end product or improve on the process be clearly communicated to Council with details of specific tasks, outcomes envisaged with an estimate of time and costs

Written confirmation amending the scope of works to accommodate such tasks must be obtained from the Council contact officer before proceeding.

11.2 Timetable

The successful consultant will be expected to complete the project **26weeks** from the date of notification of successful tender, including all the research, progress reporting and Final Data Compilation Report.

Councils preferred timetable works is as followed:

- 1) Initial focus meeting

- 2) Presentation of DRAFT Data Compilation Study
- 3) Committee and peer review
- 4) Final Data Compilation Study and Report

11.3 Final Report

Following consideration of community comments and review by the Committee of proposed amendments, and written Council approval, the Consultant shall

- Print ten (10) copies of the final Macleay River Data Compilation Study to allow for distribution to Council, libraries, key stakeholder groups and State Agencies
- 10 CD Rom copies of the final reports in pdf format

In addition the Consultant shall supply to Council and DIPNR an unbound printing quality master copy (including artwork) of the Estuary Management Plan plus a copy in the following electronic form:

- textual data (report) - Word 6.0 for Windows or later version
- format suitable for web listing eg pdf file format
- graphical data - Mapinfo.TAB format or Autocad.DXF format, Mapinfo version 4.6 Autocad Version 14 **Kempsey Council GIS check!!**
- Tabular data - Excel 6.0 format or later version

The final report including figures must be published in format for distribution on CD ROM and by a web site.

The Consultant shall supply a realistic timeframe and program timetable for completion to draft study report and time required from receipt of community comments to final study report stage.

12.0 DATA AND REFERENCE DOCUMENTS

12.1 The Consultant will be responsible for collecting adequate information for review to fulfil the requirements of the brief. There will be no charge to the Consultant for access to reports held by DIPNR offices or Kempsey Shire Council.

12.2 All spatial data and relevant metadata must be forwarded to Kempsey Council and DIPNR Kempsey office upon completion of the project on CD-ROM.

12.3 Data must comply with the requirements as set out in “DIPNR North Coast Region Spatial Information Management Manual Nov 2003” All data obtained or developed through project funding are regarded as Department deliverables, including relevant license documents.

12.4 For reference contacts refer sec8.5

13.0 CONTACT OFFICER

The Council officer responsible for briefing and liason

Mr Ron Kemsley

Environmental Officer (KSC)

Ph 6566 3244

Fax 6566 3245

DIPNR Officer
John Schmidt
Ph 65620707
Fax 65629729
john.schmidt@dipnr.nsw.gov.au

14.0 FEES

- 14.1** The fee shall be a lump sum as accepted by Council with the exception of hourly rates for attendance at Committee or other public meetings that are additional to the meetings and community consultation identified in the Brief.
- 14.2** The lump sum fee shall include final printing of the Study specified meeting attendance, field surveys and data collection, and all costs associated with the community consultation process.
- 14.3** A fee proposal shall be submitted on the Lump Sum Fee Schedule at **Schedule 1**.
- 14.4** An upper lump sum budget of \$40,000 shall apply for tasks outlined in this brief. Should the Consultant consider the budget inadequate for the scope of work required, an alternative fee proposal can also be submitted. Any additional field data deemed necessary by the Consultant to fulfil the requirements of the brief should be detailed in the fee proposal.
- 14.5** For work that may arise which is beyond the original engagement, the Consultant is required to provide hourly rates for professional and technical staff from which a time based fee for additional work can be negotiated.
- 14.6** Progress payments shall be made in accordance with an agreed payment schedule that reflects completion of tasks and/or achievement of milestones. The consultant shall submit as part of its proposal a proposed time based progress payment schedule.

15.0 QUALITY ASSURANCE

- 15.1** All work under this engagement, including work by sub-consultants, secondary consultants and service providers, shall be carried out under a quality system based on AS/NZ ISO 9001:1994 (or AS/NZS ISO 9002 : 1994 if applicable).
- 15.2** The proposal must be prepared as a Quality Assurance document.

16.0 COMPLETION OF PROPOSAL

The Consultant is to submit the following information in writing within the time allowed. Four (4) copies of the Consultant's proposal are required.

- a) Consultant's capabilities with respect to methodology, understanding of the brief, experience, team to be used and community consultation program. The Consultant must demonstrate that the disciplines of hydrologic and hydrodynamic engineering, marine biology, estuarine & wetland ecology, natural resources/town planning, community consultation are adequately

- b) Consultant's fee proposal, itemised as per **Schedule 1**.
- c) Name of the Project Manager for the commission, key staff employed on the work, and persons empowered to accept direction from Council.
- d) Name of proposed sub-consultants
- e) A detailed program showing:
 - start and finish dates for each project task,
 - milestones and critical dates for specialist input,
 - proposed meetings with the Committee and/or council,
 - key personnel working on each project task and allocated time in hours;
 - progress payments schedule; and
 - time allowances for reviews and exhibitions.
- f) Confirmation of required professional indemnity and public liability insurance cover.
- g) Details of the Consultants quality system.
- h) Details of recent and relevant work performed by the Consultant.
- i) Any pecuniary or possible conflict of interest associated with the Commission

13.0 SELECTION CRITERIA

17.1 Proposals shall be assessed by a sub-committee of the Macleay Coast & Estuary Management Committee. The sub-committee is likely to be comprised of representatives from Council, DIPNR and the community.

17.2 Proposals will be assessed on an objective basis in general accord with the following selection guidelines. Factors to be considered in the assessment process will be:

- a) methodology;
- b) demonstrated level of understanding of what is required to produce a quality outcome;
- c) the quality of the Consultant's team in terms of demonstrated experience in the field. Proven track record. Of particular importance is the presence of sufficient depth of experience to cover the broad range of skills needed to address the issues and formulate objectives and strategies;
- d) community consultation proposal and skills;
- e) overall fee;
- f) project timetable; and
- g) understanding of the Estuary Management Process.

18.0 ACCEPTANCE

Written acceptance and agreement from the Consultant that the work will be undertaken in accordance with the Brief is required before the Commission can begin.

19.0 COUNCILS CONSULTANCY AGREEMENT

**SCHEDULE 1 LUMP SUM FEE SCHEDULE MACLEAY RIVER ESTUARY
DATA COMPILATION/ MAPPING AND REPORT**

ITEM	AMOUNT \$
Stage 1 Data Compilation Study	
Collate & analyse existing information	
Compile historical & geomorp context	
Create Information Register	
Report	
Sub total	
Stage 2 Mapping	
Prepare ortho rectified air photo base map and mapped data	
Map physical attributes	
Statistical analyses	
Sub total	
Stage 3 Consultation	
Community consultation/canvassing	
Sub total	
Stage 4 Data Compilation Study and Report	
Undertake Data Compilation Study	
Prepare Data Compilation Report	
Sub total	
OTHER	
Disbursements (all Stages).	
Additional data requirements – (detail if required).	
Work in the brief not covered by the above items.	
TOTAL FEE	
Additional Meetings	
Attend any additional meetings as directed (per meeting).	

