WALLIS LAKE
WETLANDS STRATEGY

VISION, GUIDING PRINCIPLES AND ACTIONS

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Great Lakes
COUNCIL

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List of Acronyms Used

CAMBA	China – Australia Migratory Bird Agreement
DA	Development Application
DEC	Department of Environment and Conservation (now DECCW)
DECC	Department of Environment and Climate Change (now DECCW)
DECCW	Department of Environment, Climate Change and Water
DIPNR	Department of Infrastructure, Planning and Natural Resources
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
GLC	Great Lakes Council
HCRCMA	Hunter/ Central Rivers Catchment Management Authority
JAMBA	Japan – Australia Migratory Bird Agreement
LEP	Local Environmental Plan
LGA	Local Government Area
LPMA	Land and Property Management Authority
NSW	New South Wales
ROKAMBA	Republic of Korea – Australia Migratory Bird Agreement
SEPP	State Environmental Planning Policy
TSC Act	*Threatened Species Conservation Act 1995*

1 PART A: INTRODUCTION AND BACKGROUND

1.1 Background - The Need for a Wallis Lake Wetland Strategy

The need for a Wetland Strategy for the Wallis Lake catchment stemmed from a recognition that:

- Wetlands provide ecosystem services and functions that are vital to the quality and integrity of natural systems;
- Wetlands contribute significantly to the biodiversity, aesthetics and economy; and
- Most wetland communities are under-represented in the reserve system in New South Wales and are of high conservation value and significance.

Consequently, a number of adopted Council plans and strategies identified the need for a Wallis Lake Wetland Strategy. The Catchment Action Plan of the Hunter/ Central Rivers Catchment Management Authority has also identified wetland management as a priority issue.

With regards to adopted plans, a summary of the wetland management actions set-out in those plans is provided below:

The Wallis Lake Estuary Management Plan

The Wallis Lake Estuary Management Plan 2005 (adopted) has a Management Objective (E1) to "*protect and enhance existing natural wetlands*."

The Plan documented the following actions:

- *E.1.1 Progress the development and implementation of a Wallis Lake wetland management strategy and ensure that it embraces the recommendations from the wetlands action plan of the Wallis Lake Catchment Management Plan, including:*
  - *Applying for Ramsar listing;*
  - *Conducting an inventory and assessment of wetlands;*
  - *Acquire or conserve wetlands of high ecosystem services value or where threatened by cumulative deterioration on private land;*
  - *Adopting and implementing best practice wetland management guidelines;*
  - *Developing and implementing revegetation and rehabilitation programs;*
  - *Monitoring wetland health (at mangrove and saltmarsh key habitat sites);*
  - *Developing and implementing community education and awareness programs; and*
  - *GLCs Vegetation and Biodiversity Conservation and Management Framework should recognise the Wallis Lake wetland management strategy.*

- *E.1.2 Continue to encourage voluntary property agreements for the conservation of significant areas of wetland on private property.*

- *E.1.3 Explore agreements with DEC and DIPNR (now DECCW and HCRCMA) to acquire and manage areas of wetland with significant conservation and ecosystem services value.*

The Wallis Lake Estuary Management Plan further noted that:

> "*wetlands of high ecosystem services value or where threatened by cumulative deterioration or development on private land identified for conservation and/ or acquisition include Big Island, Frogalla Swamp, Duck Swamp, Peach Tree Point, West Swamp, Bullock Swamp and Minimbah Creek.*
>
> *Opportunities for acquisition will be limited by funding availability. Development offset and incentive schemes for the acquisition of these areas of wetland should be investigated.*
>
> *Threats to natural wetlands that should be considered in the Wallis Lake wetland management strategy include weed invasion, hydrology, filling, grazing pressure from livestock and*

> *development. Appropriate strategic planning and development assessment tools should be utilised in this plan*."

The Wallis Lake Estuary Management Plan also recognised the value of education within Management Objective C.3, which states:

> "*increase awareness of the role of estuarine habitats such as mangroves, saltmarshes, seagrasses, wetlands and riparian vegetation and the link provided by groundwater*".

West Swamp on the Wallamba Floodplain – a priority for wetland conservation (as identified by the adopted Wallis Lake Estuary Management Plan 2005)

The Wallis Lake Catchment Management Plan

The Wallis Lake Catchment Management Plan 2003 (adopted) recognised the importance and values of wetlands in the Wallis Lake catchment. It identified that:

> "*pressures on wetlands in the Wallis Lake catchment include altered hydrological regimes, infilling due to sedimentation, declining water quality due to elevated nutrient loads, weed invasion, land reclamation and physical disturbance due to grazing*."

It documented a specific wetlands action plan, citing key issues as habitat loss, habitat degradation, loss of species and potentially irreversible impairment of catchment functioning.

The Wallis Lake Catchment Management Plan, in relation to wetlands, documented the following management objectives:

- *To protect wetlands in the catchment;*
- *To manage the processes which are degrading and threatening wetlands; and*
- *To promote recovery of wetlands and the species and populations dependent upon them.*

The Wallis Lake Catchment Management Plan identified priority areas for wetland action as:

> "*saltmarsh communities surrounding Wallis Lake and riverine wetlands*."

The actions identified in the Wetlands Action Plan comprised:

- *2.1 Apply for listing of Wallis Lake wetlands and* [certain specified parts of the] *lakebed under the Ramsar International Convention on Wetlands and implement the management criteria under this convention;*
- *2.2 Complete the inventory and assessment of wetlands focussing on lowland wetlands. Assessment should include ecological status and identification of threatening processes;*
- *2.3 Purchase wetlands on private lands that are threatened or have high conservation values. Link the purchase of wetlands to the continued development of the NSW Reserve System;*
- *2.4 Adopt and implement best practice wetland management guidelines to maintain hydrological, habitat and biodiversity values including:*
  - *Provisions in statutory instruments;*
  - *Maintain natural hydrological regimes (including groundwater);*
  - *Retain buffer zones around wetlands;*
  - *Prevent grazing in wetlands;*
  - *Fence off wetlands on public lands;*
  - *Manage aquatic weeds;*
  - *Ensure water entering wetlands is of good quality (including groundwater);*
  - *Minimise use of herbicides and pesticides in the vicinity of wetlands and use* [non-chemical] *alternatives, wherever possible;*
  - *Ensure that legislation and guidelines are adopted in water and land management plans and strategies.*
- *2.5 Develop and implement programs for regeneration and rehabilitation of degraded wetlands, including:*
  - *Restoring original hydrological cycles;*
  - *Revegetation (with an emphasis on assisted natural regeneration); and*
  - *Managing noxious and environmental weeds.*
- *2.6 Monitor wetland health with specific reporting on saltmarshes.*
- *2.7 Develop and implement a community education and awareness program highlighting the value of wetlands including:*
  - *Landholder education regarding best practice wetland management;*
  - *Distribution and support of wetland management guidelines; and*
  - *Appoint community/ landholder education and awareness officer.*

The Water Quality Improvement Plan

The Water Quality Improvement Plan 2009 (adopted) identified that wetland protection was a very important action. It stated:

> "*wetland protection involves the acquisition of wetlands and undertaking management and or rehabilitation as is required (eg fencing, establishing property vegetation plans, management plans, re-instating natural hydrology). The program also involves assisting landholders to protect natural wetlands with advice, training and on-ground works to control stock access. More generally, the program involves partnerships with the community including raising the profile of wetlands and their environmental services as well as encouraging participation in management and restoration*".

Further, it recommended that natural wetlands be protected from grazing pressures and that wetlands' natural abilities to filter nutrients and sediments be supported by the following recommendations:

- *Collate relevant information on the benefits of maintaining natural wetlands (economic and environmental examples);*

- *Identify the most effective locations to protect and rehabilitate freshwater and coastal wetlands for water quality improvement including identifying wetlands at risk or with high nutrient loads;*
- *Undertake research on wet pasture management to determine if wetlands can be used as a paddock when managed appropriately (taking into account wetland type, species composition, stocking rates, timing of use);*
- *Develop a case to the Department of Lands to establish a lease condition to fence off wetlands on crown land;*
- *Develop and implement a training package that promotes the benefits of maintaining natural wetlands and outlines appropriate management (field days, information sessions, establish sub section to existing programs such as pro-graze, landscan and sustainable grazing program). Target field days and training to different wetland types;*
- *Provide one-on-one advice to landholders on how to manage their wetlands including avoiding the exposure of acid sulfate soils and the use of buffer areas;*
- *Provide one-on-one advice on how to incorporate wetland management into whole farm planning to increase uptake of wetland rehabilitation;*
- *Establish wet pasture management trials to support research findings on wet pasture management;*
- *Protect wetlands by establishing a specific funding source for Property Vegetation Plan's so they don't have to compete with other remnant vegetation in the assessment process;*
- *Provide incentive funding to landholders to fence wetlands (only to be used as for system grazing / crash grazing);*
- *Priority fund rehabilitation of wetlands that are at risk of high nutrient levels;*
- *Protect and rehabilitate estuarine wetlands and mangroves as the 'last frontier' of nutrient management; and*
- *Fund rehabilitation and protection of natural wetlands by fencing out stock, providing alternate watering points and shade, revegetation* (and) *reinstating natural flow regimes*

Eastern grey kangaroo (*Macropus giganteus*) in coastal saltmarsh and mangrove woodland at Coomba Park

The Hunter/ Central Rivers Catchment Management Authority Catchment Action Plan

The HCRCMA Catchment Action Plan 2006 – 2015 (adopted 2007) intends to provide a coordinated plan for all natural resource work in the region through partnerships and collaborations.

The Catchment Action Plan has established intent and guiding principles specifically to maintain or improve the condition of freshwater wetlands and estuaries.

In this regard, the Catchment Action Plan states:

- "*Guiding Statement 25 Wetland protection:*
  - *Buffer areas should be established around wetlands to minimise impacts from surrounding land uses.*
  - *Development in environments upstream of wetlands should also put in place measures that protect wetlands.*
  - *If wetland habitat is degraded or disturbed by development, even where that impact is not on the development site, offset areas should be protected or enhanced by developers.*
  - *Education programs should be developed to increase community awareness of the importance of protecting wetlands.*
- *Management Target MT06 Protect Wetlands seeks to, by 2016, protect an additional 4,600-hectares of wetlands across the Hunter/ Central Rivers catchment management area.*
- *Management Target MT07 Enhance Wetlands seeks to, by 2016, enhance 2,600-hectares of wetlands across the Hunter/ Central Rivers catchment management area*."

1.2 Council's Response to the Need for a Wallis Lake Wetland Strategy

Great Lakes Council has been the key driver of this Wetlands Strategy and has benefited from the support of key Commonwealth and State Government agencies and local stakeholders.

The preparation of the Wetland Strategy is a direct response to the past loss and destruction of functioning wetland resources of the area and the negative consequences of such.

The Strategy recognises that despite some legislative protection, wetlands continue to be subject to episodes of inappropriate clearing and modification and some of the remaining wetland systems continue to be degraded or altered through inappropriate land uses and activities. Furthermore, wetland habitats are likely to be seriously impacted by global sea level rise associated with anthropogenic climate change.

Consequently, knowledge of wetland location, status and condition and research into management needs and priorities needs to be gathered. This information should form the basis of a decision-support tool for effort and investment in appropriate and effective management, conservation and, where required, restoration of wetlands.

Effective wetland management must be underpinned by adequate spatial data and scientific knowledge to assist develop and define the detailed management actions that are required for all wetlands regardless of their tenure and to facilitate communication and engagement with key and relevant stakeholders and the community. In the absence of that scientific knowledge, wetlands need to be precautionarily managed in accordance with sound principles in an adaptive manner. This Strategy seeks to set-out those management principles.

A draft of this Strategy was prepared by Great Lakes Council and was publicly exhibited for a period of six weeks, between the 1 July 2009 and 12 August 2009. A total of seven (7) submissions were received. A summary of the issues raised in each submission and the response in the final strategy has been provided in **Appendix 1**. The Strategy was subsequently revised and updated with reference to the submissions and associated consultations.

The Strategy has now been finalised and will be implemented to achieve the stated vision, principles and objectives such that the environmental benefits of wetlands can be maintained and enhanced well into the future.

1.3 What is a Wetland?

Various authors and reports adopt different definitions of what constitutes a wetland. The NSW Government (1996) reported that

> "*due to the diverse range of wetlands and the fact that most wetlands have been subject to some degree of modification, there may be some problem in defining wetlands. Many experts have attempted to precisely define wetlands, but no definition has been universally accepted*."

The NSW Wetlands Policy (DECCW 2010) defines wetlands as: "*areas of land that are wet by surface water or groundwater, or both, for long enough periods that the plants and animals in them are adapted to, and depend on, moist conditions for at least part of their lifecycle. They include areas that are inundated cyclically, intermittently or permanently with fresh, brackish or saline water, which is generally still or slow moving except in distributary channels such as tidal creeks which may have higher peak flows… Many wetlands are ephemeral, that is, they are not always wet. As a result, the temporary absence of water will not necessarily be used to exclude particular areas of land from the definition of 'wetland' under this policy… Under this policy, areas of the floodplain that pond with water after the passage of major flood peaks are included in the definition of a wetland. Areas of the floodplain which drain naturally and continuously following a major flood and do not have distinctive wetland plants or soils, are excluded from the definition of 'wetland' for the purposes of this policy*."

For this Strategy, "*wetland*" is defined as:

- Land, including marshes, mangroves, backwaters, billabongs, swamps, sedgelands, wet meadows or wet heathlands, that is naturally, permanently or seasonally inundated or waterlogged by shallow, static or flowing, fresh, brackish or saline surface or ground water (up to 2-metres in depth) and which such inundation or saturation occurs at a frequency or duration sufficient to influence the ecological processes and support habitat that is characterised by indicative soils and hydrophytic and aquatic (wetland) plants, but excluding seagrasses and open saline water bodies.

It is recognised that the definition adopted would also include most rivers and streams and parts of the coastal lakes as "*wetlands*".

However, this Strategy does not seek to direct specific stream, riverine or estuarine lake management actions, preferring to defer such management to the relevant catchment, estuary or water quality improvement plan. As such, it does not apply to the permanently inundated beds of rivers or lakes.

The term wetland in this Strategy also excludes structures and systems constructed and maintained for the over-riding purpose of water quality treatment (ie. "*constructed wetlands*").

In defining the upper (terrestrial) edge of wetland systems across the Great Lakes LGA, Council has used a system put forward by Hunter Wetlands Research (1999).

In this system, the upper, terrestrial limit of a wetland is that line where the understorey and/ or groundstorey vegetation is composed chiefly (>50%) of plants that typically occur in terrestrial habitats (ie. plants that are not adapted to life in waterlogged or inundated soil conditions).

This approach allows a physical limit of any wetland to be defined and plotted in the field, even across the zone (gradient) of transition from wetland to terrestrial systems (and which in some circumstances can be relatively wide). Wetlands usually do not have a natural, sharp, discrete or defined upper edge. As such, the above method should adopt an error range (a

measure of the sharpness of the delineated boundary – eg. +/- 5-metres) and which should be based on quantitative data collected across the surveyed wetland edge at an appropriate number of points. This wetland edge is the natural defined limit, to which suitable buffers should then be reasonably applied.

In defining wetland systems, there is also a need to consider that the extent of wetlands may change over time in response to seasonal fluctuations and variability in water levels. Therefore, the boundary of a wetland delineated during a drought year may be substantially different from a boundary delineated in a wet year. Hunter Wetlands Research (1999) notes that "*while it may be possible in a drought year to infer the wet year extent of the wetland by amphibious vegetation that may survive the drying, it would be preferable to ensure that the delineation was undertaken during a wet year*." All such wetland delineation needs to be precautionarily defined.

1.4 Existing Mapping of Wetlands of the Wallis Lake Catchment

In 2003, Great Lakes Council prepared a Draft Vegetation Map for the eastern two-thirds of the LGA.

While the boundaries of most wetland systems could be generally discerned from this mapping, the vegetation classification system used did not enable satisfactory differentiation between separate wetland types (eg. coastal saltmarsh, sclerophyll shrublands, reed-beds) or type (freshwater, brackish, etc). The mapping was based on the classification system of Research Note 17 (Forestry Commission of NSW 1989).

During the preparation of this Strategy it was recognised that more detailed data on the spatial distribution, representation and biology of all of the individual wetland systems was required.

More recently, in 2007, WetlandCare Australia prepared a composite wetland map of the NSW north coast region. This mapping relied upon existing data sources and was of a relatively large (regional) scale.

At the local scale, Griffith (2007) has investigated and described the specific wetland vegetation types of the Wallis Lake catchment. Griffith (2007) identified that:

- There are clear floristic differences between wetlands in different habitats across the Wallis Lake catchment.
- Existing conservation reserves contain wetlands associated with Aeolian/ barrier, estuarine and swamp soil landscapes however wetland conservation is currently inadequate. Effective conservation of wetland vegetation within the Wallis Lake catchment requires the protection of representative samples across the full range of vegetation formations and habitats.
- Nine (9) vegetation associations were identified within wetlands in the Wallis Lake catchment.
- Thirty-two (32) separate wetland vegetation types were identified within the Wallis Lake catchment. These are listed in **Appendix 2**.

The nine vegetation associations identified within wetlands in the Wallis Lake Catchment by Griffiths (2007) are listed on **Figure 1** and a photograph of a representative community of each association has been provided.

The Griffiths (2007) study did not include any detailed spatial mapping of wetland systems across the Wallis Lake catchment.

Detailed wetland community mapping has been produced at a suitable scale for discrete areas of the Wallis Lake catchment, including, but not limited to, Griffiths *et al* (2000) for Booti Booti National Park and Yahoo Nature Reserve, Griffiths & Wilson (2009) for Wallis Lake estuarine islands and for parts of the Minimbah sandplain (Griffiths & Wilson, unpublished).

Figure 1. Plates of Examples of the Wetland Vegetation Associations of Wallis Lake

Mangrove forest and woodland (Coomba foreshore)

Swamp sclerophyll shrubland (*Melaleuca ericifolia* at Darawakh Creek/ Frogalla Swamp wetland

Sedgeland (Baumea/ Eleocharis sedgeland at Darawakh Creek/ Frogalla Swamp Wetland)

Swamp sclerophyll forest/ woodland (Darawakh Creek/ Frogalla Swamp)

Wet heathland (Minimbah wetland)

Rushland at centre of frame (mainly *Phragmites australis* at Darawakh Creek/ Frogalla Swamp)

Swamp sclerophyll mallee woodland (Minimbah)

Chenopod shrubland/ tussock grassland (Coomba Park) with Mangrove Woodland and Swamp Sclerophyll Forest and Woodland in the background

Sod grassland - foreground (*Paspalum distichum* at the Wallamba River floodplain)

1.5 The Values of Wallis Lakes Wetlands

It is widely accepted that wetlands perform very important environmental, social and economic functions (Field 2002; NSW Government 1996). For instance, they:

- Improve and manage water quality (eg. sediment control, nutrient uptake, etc);
- Regulate water levels, recharge groundwater and maintain stream flows;
- Provide significant and important plant and wildlife habitat and support biodiversity conservation (wetlands in NSW provide habitat for at least 550 native plant species, 52 fish species and 194 animal species, including rare, threatened and migratory species – NSW Government 1996);
- Provide flood mitigation and control;
- Assist shoreline stabilisation and protection;
- Contribute to biological productivity and nutrient cycling;
- Contain cultural values and provide for cultural activities, including Aboriginal values;
- Contribute significantly to the economy (fish, crab and prawn nurseries and breeding grounds, tourism);
- Assist climate change adaptation by providing significant carbon sinks and flood outwash areas;
- Provide for recreation and aesthetic values;
- Facilitate research and education; and
- Provide a range of other ecosystem services functions and processes, some of which are not well-described or understood.

For this reason, it is essential that wetlands are protected via effective management and restoration.

While even partially degraded wetland systems can be of significant conservation value (Paul 2002), the restoration and reinstatement of the highest possible condition and function of wetland systems is very important. The costs of repair and remediation that reinstates a wetlands' function are often less than the economic burden and loss of production caused by that damaged and degraded wetland.

While some of the wetlands of the Great Lakes LGA remain in good and functioning condition and are conserved in the national reserve system other wetlands are held in private tenure and/ or are degraded or modified. For instance, the 910-hectare Darawakh Creek/ Frogalla Wetland has been subject to clearing and over 22-kilometres of artificial drains constructed, which has led to the establishment of a severe acid sulfate landscape with associated water quality impacts.

The wetlands of the Wallis Lake catchment are of recognised national, state, regional and local conservation significance.

The Darawakh Creek/ Frogalla Swamp wetland has been highly modified by a constructed drainage network (shown in red)

Those parts of Wallis Lake extending from the junction of Minimbah Creek and the mouth of the Wallamba River to the Pacific Ocean, including the estuarine islands, have been listed as a Wetland of National Importance in The Directory of Important Wetlands in Australia (first published in 1993). It is regarded as an outstanding example of an estuarine wetland, with large areas of seagrass in healthy condition, important habitat for fish, crustacean and molluscs and extensive habitat for shorebirds. The Directory of Important Wetlands in Australia is available at http://www.environment.gov.au/water/publications/environmental/wetlands/pubs/directory.pdf and which outlines the criteria and implications of the listing of Wallis Lake on the Directory of Important Wetlands in Australia.

The wetlands of Wallis Lake also provide habitat for listed international migratory bird species (CAMBA, JAMBA) and threatened communities, populations and species listed under Commonwealth and NSW legislation, as well as regionally significant vegetation community types. Such species and communities are listed in **Appendix 3**.

1.6 The Status and Protection Framework of Wallis Lake Wetlands

At the national and state level, there have been a number of statutes, policies, initiatives and strategies prepared to assist in and guide wetland recognition and conservation.

The NSW State Plan Priority E4 aims to deliver better outcomes for native vegetation, biodiversity, land, rivers and coastal waterways and the Natural Resources Commission has recommended a target for improving the condition of important wetlands, namely: *That by 2015, there is an improvement in the condition of important wetlands, and the extent of those wetlands is maintained*.

The statutes, policies, strategies and plans that influence wetland management include, but are not limited to:

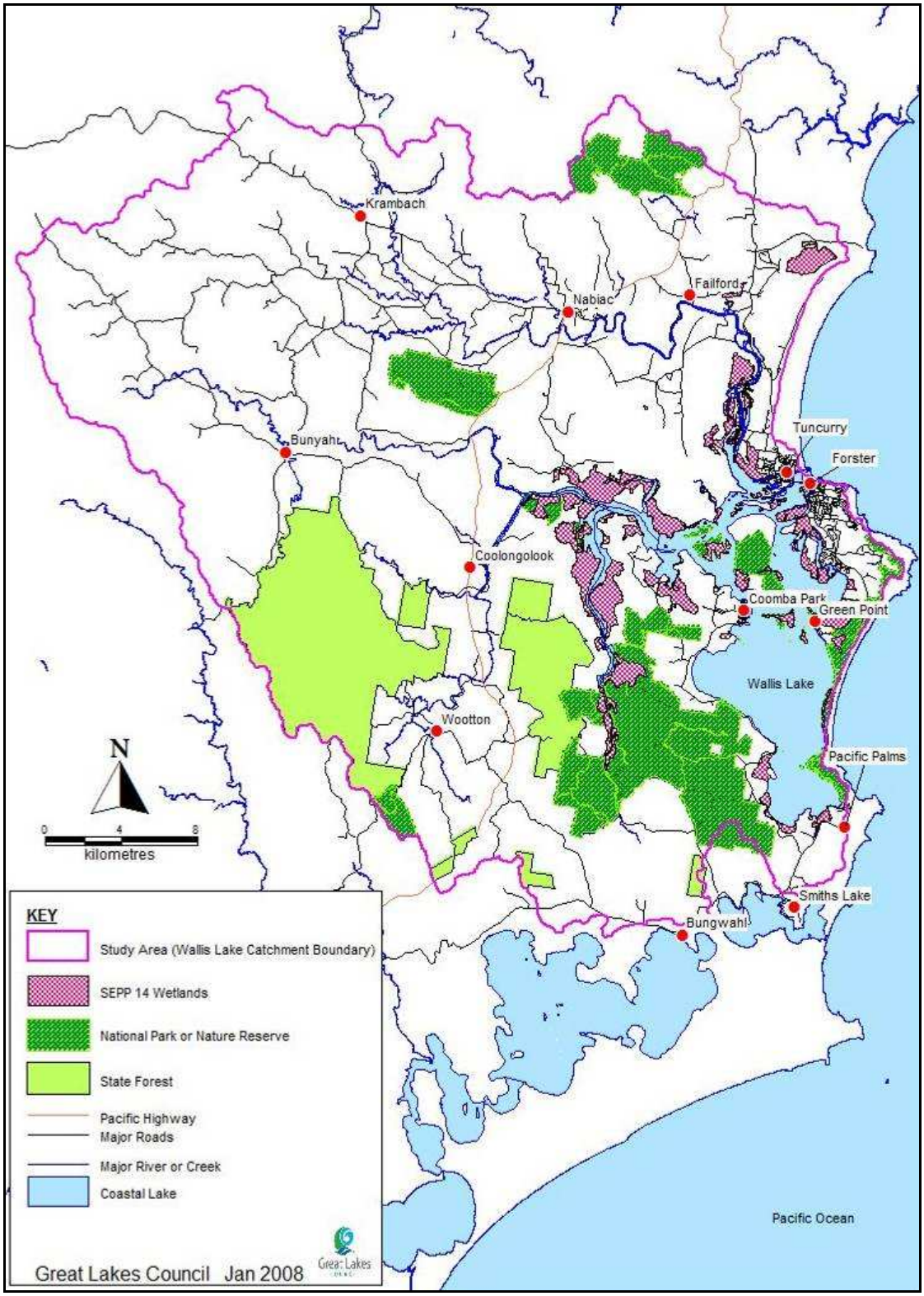
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- NSW *Environmental Planning and Assessment Act 1979*
- State Environmental Planning Policy No. 14 – Coastal Wetlands
- State Environmental Planning Policy No. 71 – Coastal Protection
- NSW *Native Vegetation Act 2003*
- NSW *Fisheries Management Act 1994*
- NSW *Threatened Species Conservation Act 1995*
- NSW *National Parks and Wildlife Act 1974*
- NSW *Crown Lands Act 1989*
- NSW *Local Government Act 1993*
- NSW Coastal Policy 1997
- NSW Biodiversity Strategy 1999
- NSW Wetlands Policy 2010
- NSW National Parks Establishment Plan 2008

Some of the wetlands of the Wallis Lake catchment are afforded a level of protection by State Environmental Planning Policy 14 Coastal Wetlands (SEPP14). A plan of the location of gazetted SEPP14 Coastal Wetlands of the Wallis Lake catchment is provided in **Figure 2**.

With regards to SEPP14, the Wallis Lake Catchment Management Plan (2003) reports that whilst SEPP14 restricts certain new development and activities, it may not protect wetlands from poor or unsustainable land management permitted through existing use provisions, particularly for agricultural purposes. Further, many wetland systems have not even been mapped as, or protected by, SEPP14 coastal wetlands.

SEPP14 does not therefore provide for the adequate protection and conservation management of the wetland systems of the Wallis Lake catchment.

Figure 2. SEPP14 Coastal Wetlands of the Wallis Lake Catchment



Some wetland systems of the Wallis Lake catchment are conserved within parts of the existing public conservation system, including areas of Booti Booti National Park, Wallingat National Park, Coolongolook Nature Reserve, Wallis Island nature reserves and the Minimbah Nature Reserve. Wetlands in these reserves are protected and managed in accordance with the *National Parks and Wildlife Act 1974*.

While there is insufficient data available to fully describe the conservation status and level of representation of all of the wetland vegetation communities within the public conservation estate across the Wallis Lake catchment, it is clear that many wetland systems are not adequately represented in conservation reserves at the present time.

***Asperula asthenes* – a threatened plant found in local swamp sclerophyll forests**

The NSW National Parks Establishment Plan 2008 has identified wetlands, floodplains, lakes and rivers as one of seven key themes for private, freehold land acquisition over the next 10-years. It specifically targets habitats on coastal floodplains and estuaries. It identifies that reserve establishment will focus on consolidation of existing reserves and specifically on consolidation around coastal lakes identified by the Healthy Rivers Commission (which included the Wallis Lakes). Acquisition of private land for reservation as National Parks or Nature Reserves is directed by the *National Parks and Wildlife Act 1974* (NP&W Act) and other statutory processes. As mentioned, the NP&W Act also provides for the management of wetlands on gazetted parks, reserves and state conservation areas.

The *Crown Lands Act 1989* also provides a statutory framework for the protection and management of high conservation value lands, including wetlands. It provides for the formation and management of regional reserves, reserve trusts and State Parks, which can protect, conserve and manage wetland systems, including estuarine islands and lake and riverine frontages.

The *Local Government Act 1993* provides a legal framework for the management, protection and conservation of Council bushland reserves, including wetlands.

The NSW Wetlands Policy 2010 (pg. 11) states that: "*the Government's emphasis for coastal wetlands is on conservation, land use planning and rehabilitation. Managing high conservation value coastal wetlands and lowlands through reservation programs and private land conservation will be vital. Cooperation between state and local government will be essential for identifying these wetlands for their ongoing management… Further work needs to be done to more comprehensively document the location, extent and biodiversity values of valuable coastal wetlands, particularly endangered ecological communities, and then conserve them*." This Policy seeks to protect and sustainably manage a state-wide network of wetlands.

This Strategy recognises the current legal wetland management and conservation framework.

***Melaleuca quinquenervial Casuarina glauca* swamp sclerophyll forest and woodland – an Endangered Ecological Community where it grows on coastal floodplains and thus a State priority for conservation and reservation**

1.7 Risks and Threats to Wetlands

Within the literature, a range of risks and threats to the presence, condition and/ or function of wetlands have been identified. Such risks and threats are summarised and listed below. Some of these threats have been legally recognised on the *Threatened Species Conservation Act 1995*, *Fisheries Management Act 1993* and/ or the *Environmental Protection and Biodiversity Conservation Act 1999*. Such threats are notated with an * below and listed in **Appendix 4**:

- Altered freshwater hydrology (flood mitigation, drainage, drowning/ excessive inundation, river regulation and groundwater extraction)*;
- Altered tidal/ estuarine hydrology (sea walls, sea level rise)*;
- Dredging, reclamation, sandmining, urban/ industrial development and canal estates;
- Vegetation clearing*;
- Pollution and eutrophication;
- Environmental cycle extreme events (drought, storms, floods);
- Altered fire frequency and intensity (wetland vegetation and associated peat soils)*;
- Invasion by exotic plants and animals*;
- Grazing, vegetation trampling and soil pugging;
- Vehicular and human access;
- Rubbish dumping*; and
- Acidification in acid-sulfate soil landscapes caused by artificial drainage.

The loss and modification of wetlands is an issue of international, national, regional and local importance (Field 2002).

It has been reported that globally, humans have destroyed about half of the world's wetlands in the last 200-years (Dugan 1993). Finlayson & Rea (1996, cited in DECCW 2010), estimated that in Australia, approximately 50% of wetlands have been lost since 1788. Kingsford *et al* (2003) reported that wetlands are amongst the most threatened ecosystems in the world and indicated that 3% of all wetlands in New South Wales (including inland wetlands) occur in public conservation reserves. Of this, only 5 to 8% of the remaining coastal wetlands occur in conservation reserves (Ashley Love, DECCW, *pers. comm*.).

Goodrick (1970) identified that on the mid north coast of New South Wales, as much as 76% of high value waterfowl wetland habitat has been destroyed or significantly impaired. This loss may have increased further since that 1970 assessment. New South Wales north coast wetlands "*remain poorly studied and surveyed despite long standing recognition of their conservation importance and highly threatened status*" and the "*poor conservation status of coastal floodplain and estuarine wetlands has improved little since the 1980's*" (Griffith 2005). Griffith (2007) further noted that a substantial proportion of wetland plant communities are poorly represented in existing conservation reserves.

Recently, seven (7) coastal floodplain and coastal saltmarsh wetland habitat types have been listed as Endangered Ecological Communities (EECs) on the *Threatened Species Conservation Act 1995* in recognition of their status and level of loss/ degradation. These comprise:

- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-east Corner Bioregions
- Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion
- River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-east Corner Bioregions
- Subtropical Coastal Floodplain Forest of the NSW North Coast Bioregion
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South-east Corner Bioregions
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-east Corner Bioregions
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and SE Corner Bioregions

The Wallis Lake wetlands is known to contain at least five (5) and may contain pockets of all seven (7) of these EECs.

1.8 Wetland Conservation, Management and Rehabilitation

For many years, the values of wetlands and the need for their protection and management has been recognised in the published literature.

For instance, the Australian Marine Sciences Association (1977) identified that wetlands of significant size, special features or other values should be designated as public conservation areas. It argued that there should be no further reduction in the area of estuarine wetlands, except in cases of compelling public need.

This Strategy endorses these principles.

Angel & Hayes (1983) recommended the following for wetland conservation and management:

- All wetlands be protected and zoned for environmental protection
- The clearing of wetland vegetation and infilling of wetlands be avoided
- Buffer zones around wetlands be established to prohibit or restrict development and protect vegetation
- Point source impacts to wetlands be avoided
- Clearing of slopes above wetlands be minimised
- Wetlands should be unilaterally zoned for protection
- Decision-making authorities establish wetland buffer zones at every possible opportunity, such as when making a LEP, during development application (DA) assessment or through remedial actions (including buying wetlands)

Despite being over 25-years since Angel & Hayes (1983) was published, their recommendations form the foundation for sound wetland conservation and management today.

There is now an increasing acceptance among wetland scientists that land use change to conservation is the key to wetland rehabilitation, particularly for successful remediation of acid sulfate soil landscapes.

Land use change should entail:

- The exclusion of grazing livestock and other damaging land use practices;
- The reinstatement of natural hydrology (infilling drains/ constructed levees, removal of floodgate structures); and
- The rehabilitation and restoration of natural wetland vegetation.

In this regard, information published on the website of WetlandCare Australia advises that restored and functioning wetlands "*require almost no ongoing maintenance/ management*" and "*minimal ongoing expense*". It is recognised however that there is often a need for the ongoing management of the interface between wetlands and adjoining land uses.

Hence, wetland remediation and repair can be seen to be an economic investment in the productivity and function of the natural landscape, when the full range of benefits of functioning wetlands is considered. This underpins the need for strategic and targeted wetland conservation, management and rehabilitation.

The protection of wetlands assists the conservation of native biodiversity – eastern dwarf tree frog (*Litoria fallax*) in Booti Booti National Park

1.9 The Costs of Wetland Loss and Degradation

The environmental, social and economic costs of degraded wetlands include, but are not limited to, toxic discharges of acid sulfate material, reduced or impaired ecosystem services function, loss of stored carbon to the atmosphere and to the estuarine food chain, loss of estuarine fish and prawn nursery and breeding grounds, etc. As mentioned, the benefits of wetland protection can significantly outweigh the costs of restoration and associated management.

Various authors have investigated and determined the economic value of wetlands. For instance, the Water Quality Improvement Plan for Wallis Lake identified that wetland conservation (increasing the area of healthy wetlands) in Wallis Lake had an economic value of $13,700 per hectare.

Further, it reported a significant and positive benefit cost ratio for the benefit to water quality from wetland protection of 2.2, which was ranked as the fifth most important program action for improving water quality in Wallis Lake (behind riparian rehabilitation, riparian protection, mitigation and groundcover management).

Many local wetlands have been affected by altered hydrology, especially drainage. Drains such as this (in the Darawakh Creek / Frogalla Swamp) degrade natural wetlands and can cause serious economic and environmental impacts through acid generation and discharge.

1.10 Prioritising Wetlands for Investment

Prior to the commencement of this strategy, there had been no formal inventory or systematic analysis of wetlands in the Wallis Lake catchment. This is despite it being widely recognised that wetlands are very important, if not, critical to the economic, social and ecological well-being of the Great Lakes LGA. Various authors, including Australian Marine Sciences Association (1977) and Angel & Hayes (1983) have recognised the value of preparing wetland inventories as a basis for management.

Kingsford *et al* (2003) reported that "*it is difficult to manage any natural resource without knowing its distribution and wetlands are no exception. Without a spatial context, effective conservation measures are difficult to implement because they should be contingent on the identification of threats and their operating scale. It follows that without this information, priorities for wetland protection or rehabilitation cannot be derived nor regional rates of wetland loss determined nor conservation priorities set for particular types of wetlands*."

Jacobs (2002) reported that "*when making predictions from, or comparing categories in, wetland classification it is essential that like things are being compared. Because of the interdependence of any wetland to other wetlands in its own catchment, it is important to base management decisions and predictions from information obtained within that catchment. Comparisons between catchments can only be made at a coarse level. Comparisons within a catchment can be made at a much finer level than comparisons between catchments. Fine classifications within catchments are best made to suit the purpose*."

It is within this context that this Strategy has been prepared. While this Strategy has not benefited from a suitable body of knowledge that permits the attributing of priorities for wetland conservation and management across the Wallis Lake catchment, it does recognise that a prioritisation system needs to be developed and deployed within individual Wetland Management Area Strategy documents in the future.

1.11 Wetland Protection requires Catchment Management

Wetland preservation and rehabilitation relies not only on the protection of the wetland from physical disruption but also protection of the quality and quantity of water supply feeding it (Department of Conservation and Environment 1980). In this regard, Australian Marine Sciences Association (1977) recognised the ecological concept of linkages in wetland management, suggesting that no part of such a system operates independently of any other, with water acting as the essential linkage between the wetland and surrounding terrestrial and aquatic systems.

Effective management of wetland systems thus requires the control of activities that are likely to affect water quality and quantity in its catchment and the need for protection through the establishment and management of wetland buffers.

The value and significance of riparian and other land within the catchment surrounding wetlands is recognised by Pressey (1981), who found that the habitat surrounding wetlands has an important bearing on the faunal value of the wetland itself because:

- Waterfowl and other wildlife depend on suitable surroundings for food, roosting and nesting sites;
- Surrounding habitat types determine which terrestrial species are likely to use wetlands and aquatic species that are able to use terrestrial areas;
- The habitat may act as a buffer to reduce disturbance from adjoining human activity reducing impacts and degradation;
- Diversity in the surrounding habitat increases the possibility of wildlife diversity within the wetland;
- Vegetated uplands near wetlands generally contribute to wetland species diversity;
- Wetland scrubs and forests may lack the terrestrial component of a degree of their fauna, if they separated from aquatic habitats on which elements of that fauna's lifecycle depends; and
- Mammals and reptiles may need to find flood refuge in buffer areas.

As such, this Strategy recognises that wetland management depends upon the management of the wetland catchment.

Wet heathland community - Booti Booti National Park

2 PART B: VISION AND GUIDING PRINCIPLES

2.1 Wallis Lake Wetland Strategy Vision

The vision adopted by this Strategy is that:

- Relevant and appropriate scientific data, where available, forms the basis for effective and appropriate decision-making concerning the management and protection of wetlands[1]
- Wetlands are widely recognised for their far-reaching environmental, social and economic values
- Wetlands are protected, managed and restored such that historic and current degradation processes that impair their environmental services function and condition are identified, controlled and reversed and that wetland condition, values and functions are maintained or reinstated[2]
- Wetlands are managed such that they are as resilient as practically possible in the face of global sea level rise caused by anthropogenic climate change and that, where possible, areas are maintained and protected to allow for altitudinal retreat of wetland systems
- Actual and potential acid sulfate landscapes that threaten the health of the estuary are identified, remediated and restored
- Significant areas of high conservation value wetlands (and their inherent biodiversity) are added to and managed within the public conservation estate.
- Sustainable, utilitarian uses and appreciation of wetlands occurs in a manner that does not harm, degrade or impair the condition or function of such wetlands

1 Where detailed scientific information is not available, wetlands should be precautionarily and adaptively managed in accordance with the principles set-out in this Strategy and should be monitored.

2 In some instances, the complete reversal of some previous wetland degradation and reinstatement of wetland function may not be practically achievable. In these circumstances, specific management objectives and targets should be adopted that achieve the highest and best practical outcomes relating to the condition and function of the restored and managed wetland.

Functional mangrove woodland and swamp oak forest protecting the waters of Wallis Lake

2.2 Specific Guiding Principles

The following guiding principles have been adopted. These principles have referred to and generally follow the principles set out in the NSW Wetlands Policy 2010:

Principle 1 Wetlands are to be valued as significant and important parts of the catchment landscape. Only through the recognition that wetlands provide vital water quality protection and management and other services to our rivers, estuaries and lakes can they be managed in accordance with their values. In particular, the value of wetlands to water quality maintenance and improvement is to be specifically recognised. In this manner, wetlands are to be conserved and restored to assist deliver the targets and outcomes of the adopted Water Quality Improvement Plan for the Wallis Lake catchment.

Principle 2 Wetlands are to be recognised as places with important cultural and social values, especially as an important part of "*Country*" for Aboriginal people.

Principle 3 Wetlands are to be protected, managed and, where required, restored and not be knowingly destroyed or degraded. If significant social or economic imperatives that in the wider public interest result in a wetland being degraded or destroyed, the establishment and protection of a wetland offset area that supports equivalent or greater biodiversity and ecological outcomes is to be provided. Wetlands that possess very high or unique conservation values that cannot be compensated or offset must be preserved and protected free from any harm or degradation.

Principle 4 Land use and management practices that maintain or rehabilitate wetland habitats, ecosystem services and cultural values are to be adopted for wetlands of all tenures.

Principle 5 General and specific risks and threats are to be identified, evaluated and managed for wetland systems. This relies on adequate skills, knowledge, expertise and capacity of those entrusted with the care and management of the natural environment. It also relies on effective communication, research and adaptive management.

Principle 6 It is essential that degraded and damaged wetlands are rehabilitated and that their ecological processes are reinstated, as far as is possible. The priority for wetland restoration is to be directed to impaired or damaged wetlands that:

- Are of high conservation value;
- Discharge acid sulfate outflows;
- Are very important in strategically protecting or providing estuarine or riverine assets or values;
- Have a high degree of stakeholder support; and/ or
- Adjoin existing conservation areas.

Principle 7 Management and conservation depends upon actions that establish, protect, manage and (where required) restore adequate buffers and wildlife corridors into and out of wetland systems.

Principle 8 The conservation and management of wetlands must include and consider the management of the wetland catchment.

Principle 9 Developments and activities upstream of wetlands are to be designed and operated so as to exert no net biological, physical, chemical or hydrological impact on any wetland.

Principle 10 Water quality and quantity regimes and hydrological processes that provide for the natural condition and ecological resilience of wetland systems are to be maintained or, where altered, reinstated.

Principle 11 Floodplains are to be managed in a manner that maintains or restores the natural distribution of water to and from floodplain wetlands.

Principle 12 An effective wetland conservation framework is essential for the protection and management of wetlands. Thus:

- Wetlands and their buffers that occur on public lands are to be effectively protected, conserved, managed and (where required) restored;
- Priority private, freehold wetlands and their buffers that are of high conservation value are to be acquired or transferred to public ownership for public conservation, at every possible opportunity and using every available means and particularly where:
    - The wetland is of state, national or international significance;
    - The wetland is of a type that is poorly reserved in the public conservation estate;
    - The wetland is in an acid sulfate hotspot and its current function causes damage to downstream aquatic environments; and/ or
    - The wetland consolidates or expands current or proposed public conservation areas or reserves.
- All privately-owned wetlands are to be protected, conserved, managed and (where required) restored to the highest standard possible using all relevant mechanisms, assistance and incentives that are available. This is to include those wetlands identified for and awaiting public acquisition in accordance with this Principle as well as wetland systems that are not expected to be publicly acquired.

Principle 13 The potential impact of climate change is a significant threat to many wetland systems, especially those of coastal and estuarine landscapes. Wetlands are to be managed in a manner that considers and, where possible, responds to the risks associated with climate change and global sea level rise. This includes actions that enhance the natural resilience of wetlands and, wherever possible, provides for spatial retreat of wetlands in the face of sea level rise

Principle 14 Research into wetlands is essential to inform adaptive planning and management of wetlands and their conservation. Only through scientific investigation and the publishing and dissemination of the results of such can a sufficient body of knowledge be compiled that ensures adequate wetland management into the future.

Principle 15 Partnership arrangements are essential for effective wetland management. Only through cooperation and shared effort by land managers, government authorities, catchment management authorities, non-government organisations and the general community can wetlands continue to supply environmental benefits into the future.

Principle 16 The regular reporting of wetland extent and condition is to be used to assess performance, to understand wetland dynamics and to contribute to adaptive management systems for wetlands in the future.

3 PART C: WETLAND MANAGEMENT AREAS

3.1 Wetland Management Areas of Wallis Lake Catchment

Given the size, complexity, diversity and variation in tenures and land uses of wetland areas across the Wallis Lake catchment, it has been determined that specific and focussed individual wetland management plans need to be prepared for identified individual wetland landscapes (management areas) across the catchment.

The overall Wallis Lake Wetland Strategy will take the form of a vision and guiding document (this document) as well as specific, individual strategies for each of thirteen (13) specific wetland management areas that have been identified for this Strategy. These individual management areas are shown herein at **Figure 3**.

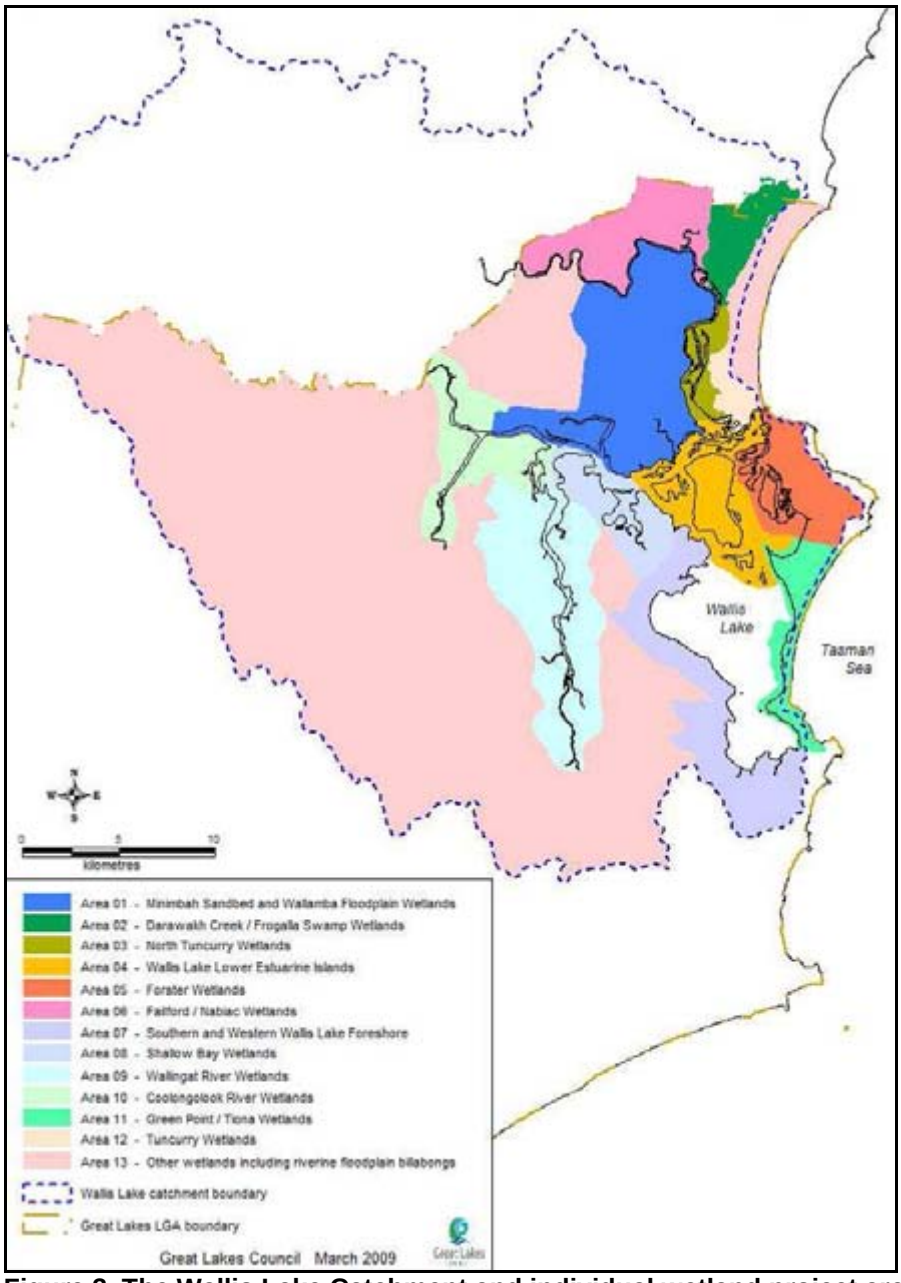


Figure 3. The Wallis Lake Catchment and individual wetland project areas

Each individual wetland management area strategy will seek to:

- Identify individual discrete wetland systems;
- Undertake assessments for each individual wetland system that describes the type, area, tenure, ownership, condition, degree of threat, integrity, value (socio-economic, biological) and national, state, regional and local conservation status of each wetland;
- Rank individual wetlands across the management area in terms of their priority for conservation, restoration and management;
- Assist deliver targets and outcomes of the adopted Water Quality Improvement Plan through identifying and managing wetlands for water quality protection and improvement;
- Evaluate the current wetland protection mechanisms available including zoning, SEPP 14, etc and discuss the need for greater or additional protection mechanisms. A focus of the mapping program should be to identify discrepancies in SEPP14 coastal wetland mapping;
- Use specialist scientific and planning input to identify the means and opportunities to rationally, appropriately and effectively conserve and manage wetlands through all available means across the Wallis Lake catchment; and
- Document a formal action plan and prioritised schedule of actions to enact wetland conservation and management of wetlands in the Wallis Lake catchment.

3.2 Format of Individual Plans for Wetland Management Areas

It is proposed that each individual wetland area strategy/ management plan will adopt a standard format/ template (refer **Appendix 5**).

The standard template may not be used for Area 2 Darawakh Creek/ Frogalla Swamp Wetland. The wetlands of this management area already have a Draft Restoration Management Plan prepared for it, which responds to an executed Memorandum of Understanding between Great Lakes Council and DECCW.

4 PART D: ACTIONS

This part of the Strategy sets-out the over-riding actions that are to be implemented generally for wetlands across the Wallis Lake Catchment and within the individual wetland management area strategies that are scheduled to be prepared and implemented.

Thirteen (13) actions have been identified to achieve this and are set-out in the headings outlined below.

A1. Manage and Protect Wetlands using a Partnership Approach

It is essential that a partnership approach be established and proactively applied to the strategic management, protection, restoration and conservation of wetlands across the Wallis Lake catchment. A successful partnership in this regard will depend upon:

- Effective, transparent, timely and honest communication;
- A unity of purpose and effort;
- Shared and specific goals and objectives;
- Focus on achieving measurable on-ground outcomes; and
- Sharing of knowledge in an adaptive management framework

The partnership is to be inclusive of, but not limited to:

- Great Lakes Council;
- The Commonwealth Government;
- NSW State Government agencies (particularly the Department of Environment, Climate Change and Water and the Land and Property Management Authority);
- Land owners and managers;
- Industry;
- The community and wetland stakeholders;
- Non-government organisations;
- Funding providers;
- Relevant neighbouring Local Government; and
- Research and education institutions.

Inspection of the Darawakh Creek/ Frogalla Swamp Wetland by the HCRCMA Board conducted in February 2008

A2. Zone Wetlands and Wetland Buffers for Environmental Protection

It is very important that wetlands and their buffers are zoned for environmental conservation within the operating Local Environmental Plan.

While some wetlands are zoned for environmental protection, many wetlands (including mapped SEPP14 coastal wetlands) are currently inappropriately zoned, often in Rural, Residential or Open Space zones. The progressive rezoning of wetlands and wetland buffers is needed to recognise as well as to protect and manage wetland systems. The zoning of areas of land for landward expansion/ migration of wetlands affected by the impacts of climate change is also a very important management and land use planning consideration.

The highest possible level of environmental protection is to be achieved through the progressive rezoning of wetlands across the Wallis Lake catchment. In this regard, wetlands are to be zoned Environmental Conservation Zone (E2) (or the equivalent Environmental Protection (7(a1)).

Wetlands held in National Parks or Nature Reserves would be appropriately zoned in LEP updates as National Parks and Nature Reserves (E1) or (National Parks and State Recreation Areas Zone (8a)).

It is proposed that wetland buffers are zoned either Environmental Protection (E2) or Environmental Management (E3) (or equivalent) depending on the condition, quality and importance of the buffer. This is to reflect the functional importance of these areas.

Foreshore reserves and Crown Roads fronting lakes, rivers and streams should also be zoned either E2 or E3 (or equivalent), with intact functional riparian vegetation and areas of frontages where native vegetation restoration is desired afforded the highest environmental conservation zoning. Frontage areas supporting sustainable use and sustainable industry (such as land-based oyster farming operations), should be considered for E3 designation. Zoning wetlands in foreshore reserves for environmental conservation may assist to preclude the grazing of stock, which is known to damage and degrade wetlands and exacerbate foreshore erosion and riparian decline.

The rezoning of wetlands and their buffers depends upon adequate spatial and biological information (ie. detailed vegetation community mapping and description). This is to be compiled during the continuation of the wetland vegetation mapping project for the Wallis Lake wetlands and the individual wetland management area strategies.

The NSW Wetlands Policy (DECCW 2010, pg. 9) reinforces the value of zoning wetlands for environmental protection, stating "*there have already been innovative solutions to improve planning provisions for wetlands under threat from development, such as where wetlands on the NSW Coast have been rezoned as environmental protection zones. These positive planning outcomes are recognised as a model for future land use planning and local planning mechanisms will be encouraged to protect, conserve and rehabilitate wetlands*."

A3. Apply for Ramsar Listing of Key Wallis Lake Wetlands

With reference to Action E.1.1 of the adopted Wallis Lake Estuary Management Plan and Action 2.1 of the adopted Wallis Lake Catchment Management Plan, it is proposed that:

a) An assessment of whether Wallis Lake meets the '*Criteria for Identifying Wetlands of International Importance'* is to be prepared, and if so, then,
b) GLC or a relevant consultant on behalf of GLC is to prepare and submit an application to list the wetlands and certain nominated parts of the lakebed of Wallis Lake as a Ramsar wetland. In this respect, the first stage of any such application would involve the documentation of an ecological character description and mapping of the Wallis Lake wetlands and the lakebed.

The Ramsar listing of nominated areas requires key criteria to be clearly satisfied. The document entitled "*NSW Ramsar Plan 2006 – 09*" needs to be referenced in any

consideration of the nomination of certain parts of Wallis Lake and its wetlands as a Ramsar site. The advice and assistance of DECCW should also be sought during the preparation of any such Ramsar nomination.

The Ramsar assessment and possible nomination would need to be a consultative process between GLC and all relevant stakeholders and the community. A key element of any Ramsar listing is the concept of "*wise use*" and any future Ramsar listing would be designed in such a manner as to not interfere or interrupt important social and economic values, such as tourism, oyster-farming, commercial and recreational fishing and sustainable domestic water extraction from the Minimbah aquifer. As such, any listing would probably avoid oyster leases and navigation channels and would recognise the sustainable extraction of domestic water from the Minimbah aquifer.

Wallis Lake may contain values that address the criteria for identifying wetlands of international importance

A4. Protect Wetlands and Offset Unavoidable Damage or Loss of Wetlands

Wetlands of the Wallis Lake catchment are to be protected, managed and, where required, restored. Natural wetlands are not to be knowingly destroyed or impaired.

Where significant social or economic imperatives in the wider public interest result in a wetland being damaged, degraded or destroyed, the establishment, protection and management in perpetuity of a wetland offset that supports equivalent or greater wetland habitat, biodiversity and ecological functions is to be provided.

Wetlands that possess very high or unique conservation values or ecosystem functions (water quality treatment, irreplaceable biological values) that cannot be adequately or practically compensated or offset are to be preserved and protected free from any harm or degradation from any land use, activity or development.

The mechanisms of this action are described in Principle 10 of the NSW Wetlands Policy (DECCW 2010) and this Strategy adopts the details of that Principle 10. In summary, Principle 10 of the NSW Wetlands Policy (pp. 26 – 27) states:

- "*The clear priority is to avoid wetland destruction and degradation altogether, particularly the construction of artificial wetlands on the site of viable natural wetlands.*
- *If the conservation value of a wetland is very high, or has unique qualities that are impossible to compensate for, the wetland should not be subject to development that will compromise its values.*
- *Many impacts on wetlands can be avoided by finding an alternative site, or by adopting best practice design measures.*
- *There will be instances when social and economic imperatives require wetland modification or even destruction. Some of the more obvious instances that invoke the concepts of social and economic imperatives in the public interest are:*
    - *Service corridors (road, rail, power, gas, water, communication);*
    - *Military defence installations;*
    - *Airport and harbour facilities;*
    - *Power stations;*
    - *Major water supply and flood storage infrastructure; and*
    - *Essential enhancement of other infrastructure.*

  These imperatives should only be operative when the costs of not proceeding with the development outweigh the costs arising from the destruction of the wetland.
- *Where a project is overwhelmingly in the public interest and no feasible alternative to destroying or degrading the natural wetland exists, wetland offsets should be pursued to counterbalance the impact of the project.*
- *Offsets can include rehabilitation, purchase and protection of a similar wetland, and, in exceptional cases, construction of a new wetland.*
- *Offset wetlands will be funded by the proponent of the development.*
- *As wetland offsets need to replace what has been destroyed, they must provide equivalent values, functions and services. Due to the difficulties of wetland rehabilitation, the destruction of the wetland to be lost should only be permitted if it has been conclusively demonstrated that the offset has 'worked'.*
- *Offset ratios may also need to be applied to help to maintain net regional biodiversity, habitat and catchment functions.*
- *Wetland offsets will be calculated, approved and managed by the most applicable legislation, which will vary according to the type of wetland and the values being compensated for.*
- *Constructed wetlands are increasingly being used for a number of purposes, particularly as a means of waste and storm water treatment. They also help to control water pollution by filtering out harmful nutrients, provide wildlife habitat, and have aesthetic, recreational and educational value. While constructed wetlands may fulfil an important role in improving water quality, unlike compensatory wetlands, they are not designed to replace all the values of natural wetlands. For this reason, they should be seen as enhancing existing wetland systems, not replacing them. They also require different management strategies, such as periodic de-silting to conserve their main functions over time*."

Constructed wetlands for water quality do not replicate all values of natural wetlands and are managed for a specific purpose – Bramble Parade Wetland prior to refurbishment

A5. Protect, Restore and Reinstate Wetland Function

In order to maximise their benefits and values, all wetlands are to be managed for protection, restoration and reinstatement of wetland function. This requires the adoption of management frameworks that apply actions within wetland systems that:

a) Reinstate, as far as is possible, pre-disturbance and natural hydrology (i.e. infilling or otherwise de-commissioning of constructed drains, removing levees, reinstating upland in-flows into and across wetlands and facilitating tidal movements by identifying existing floodgates and levees and developing strategies to remove them);
b) Prevent inflows of polluted surface and groundwater to and from wetlands, including sediments, nutrients, toxic material, acidic drainage, etc;
c) Protect wetlands from direct and indirect degrading or damaging activities associated with developments and activities including dredging, mining, clearing and logging;
d) Protect wetlands from drainage, dredging or infilling;
e) As far as is possible, prepare for the impacts of climate change. This should be achieved by establishing and managing buffer strips around wetlands, enhancing the natural resilience of wetlands, providing a zone of migration/ landward expansion to account for future sea level rise and extreme climate events and active management;
f) Avoid the grazing of wetlands by livestock;
g) Encourage the adoption of sensitive and sympathetic land use practices above wetlands including control and management of the use of herbicides and pesticides in the vicinity of wetlands;
h) Control and, where possible, eradicate noxious weeds, weeds of national significance and damaging invasive exotic flora;
i) Control and, where possible, eradicate exotic fauna including free-ranging domesticated cats and dogs;
j) Manage and monitor the wetland to minimise the risks of new incursions or outbreaks of invasive exotic flora and exotic fauna and controls/ eradicates any such outbreaks and incursions as a matter of urgency;
k) Manage appropriate fire regimes to avoid both under-frequent or over-frequent high intensity fires and fires that damage the peat layers in wetlands;
l) Regulate and manage human access to wetlands in a manner that facilitates community education and monitoring but avoids damage or degradation of wetlands (especially that damage caused by recreational vehicles and motorbikes), precludes access to sensitive or significant parts of wetlands and restores areas degraded by inappropriate access;
m) Remove any accumulation of materials and wastes and unnatural flotsam and jetsam from wetlands and manage wetlands to minimise and avoid future unauthorised dumping and stockpiling on wetlands and wetland buffers; and
n) Where possible, reconnect wetlands fragmented by previous development.

Protecting, restoring and reinstating wetland function is essential for the health of Wallis Lake

As is clearly documented in Principle 7 of the NSW Wetlands Policy (DECCW 2010), "*degraded wetlands and their habitats should be rehabilitated and their ecological processes improved as far as is practicable*." In this regard, the NSW Wetlands Policy notes, in summary:

- Many wetlands need rehabilitating, though resources to undertake rehabilitation works are limited;
- Wetland rehabilitation projects require careful planning to optimise outcomes, including investigation of biophysical condition, assessed threat, recovery potential, strategic value and resource availability;
- Wetland rehabilitation should be focussed on areas of greatest need and where the greatest benefit would be derived; and
- Successful rehabilitation requires integrating a number of approaches. Restoring or partially restoring the original hydrological cycle of wetlands is often crucial and the control of pest plants and animals may also be a priority.

A6. Prioritise Wetland Management Expenditure

The funds available for natural resource management are limited. Therefore it is important that available wetland expenditure is maximised and is directed to priority outcomes and sites.

Wetland management funding is to be sought from all relevant and available sources, including government grants and funds, Council funds, special rates and levies, development industry contributions, other grant funding streams and private contributions.

In general, prioritisation of wetland management expenditure should be directed to the following:

- Wetlands of demonstrated unique or high conservation value;
- Wetlands in acid sulfate hotspots and degraded wetlands that discharge acid sulfate outflows or products (ie. Darawakh Creek, Bungwahl Creek);
- Wetlands that strategically protect the quality or productivity of estuarine or riverine assets or values (i.e. high assimilative capacity; fish and prawn breeding grounds);
- Wetlands that adjoin, consolidate or extend existing public conservation reserves; and/ or
- Wetlands that have strong stakeholder support.

The further prioritisation of wetland management expenditure is to be based on the recognition of a matrix of three values:

- Pressures, risks and threats affecting that wetland;
- Availability of additional or supporting resources to manage that wetland; and
- The condition and value of that wetland.

That is, wetland management expenditure is to be directed as a priority to wetlands of high conservation value and good condition in which there are risks of immediate or short term threats or pressures and where resources from other relevant stakeholders are available for use in wetland management.

Wetland management expenditure must also reference and consider existing programs, management plans and strategies that facilitate the implementation and finalisation of existing projects (eg. Darawakh Creek/ Frogalla Swamp wetland restoration project, etc).

The nominated priority wetlands identified in the adopted Wallis Lake Estuary Management Plan include the environs of "*Big Island, Frogalla Swamp, Duck Swamp, Peach Tree Point, West Swamp, Bullock Swamp and Minimbah Creek*". The adopted Wallis Lake Catchment Management Plan identified priority areas for wetland action as "*saltmarsh and riverine wetlands*". Recognition of the information in these adopted plans is important with regard to the prioritisation of wetland management expenditure.

A7. Conserve Wetlands

Principle 12 of this Strategy states that:

An effective wetland conservation framework is essential for the protection and management of wetlands. Thus:

- *Wetlands and their buffers that occur on public lands are to be effectively protected, conserved, managed and (where required) restored;*
- *Priority private, freehold wetlands and their buffers that are of high conservation value are to be acquired or transferred to public ownership for public conservation, at every possible opportunity and using every available means and particularly where:*
  - *The wetland is of state, national or international significance;*
  - *The wetland is of a type that is poorly reserved in the public conservation estate;*
  - *The wetland is in an acid sulfate hotspot and its current function causes damage to downstream aquatic environments; and/ or*
  - *The wetland consolidates or expands current or proposed public conservation areas or reserves.*

All privately-owned wetlands are to be protected, conserved, managed and (where required) restored to the highest standard possible using all relevant mechanisms, assistance and incentives that are available. This is to include those wetlands identified for and awaiting public acquisition in accordance with this Principle as well as wetland systems that are not expected to be publicly acquired.

This follows Actions E.1.1 and E.1.3 of the adopted Wallis Lake Estuary Management Plan and Action 2.3 of the adopted Wallis Lake Catchment Management Plan.

Therefore:

1. Wetlands owned by public conservation agencies (DECCW, LPMA, GLC) shall be managed for conservation within the relevant statutory framework.
2. This Strategy proposes that the relevant agencies (GLC, DECCW, LPMA and HCRCMA, MCW) act proactively, strategically and in partnership and utilise all appropriate means available to acquire and/ or transfer the ownership to the public conservation estate of identified wetlands that are of high conservation value. The means to achieve such may be through direct acquisition at market rate, acceptance of dedication, development incentives for conservation schemes, development consent, deed of agreement, joint management agreements (Aboriginal land) or any other relevant means. Acquisitions should be linked to a pool of funds to maintain these areas to protect their wetland values in perpetuity. Acquired lands are to be publicly conserved and managed in a statutory, binding framework (such as the NP&W Act, the Crown Lands Act of the Local Government Act). Detailed analysis is to be the basis for the prioritisation of funding to determine those wetlands that are of the highest conservation value and appropriate for public acquisition. Preference for acquisition should be directed to existing programs (such as Darawakh Creek/ Frogalla Swamp Wetlands and wetlands of the Minimbah Sandplain and Wallamba Riverine Floodplain).
3. Those wetlands awaiting acquisition and all wetlands which are not expected to be publicly acquired are to be protected, conserved, managed and (where required) restored to the highest possible standard using all relevant mechanisms and assistance that are available. This requires commitment and support directed to the private wetland landholders from the relevant agencies, including DECCW, HCRCMA and GLC. It also requires the application within development consents and strategic planning to the identification of wetlands and the application of statutory controls, covenants and restrictions. There is a range of conservation mechanisms available to permanently recognise, protect and manage wetlands on private lands. Some of these mechanisms provide for incentives, stewardship payments and tax concessions for the private landholder. The range of mechanisms includes, but is not limited to:

a. PVP - Property Vegetation Plans (*Native Vegetation Act 2003*), administered by the HCRCMA;
b. VCA - Voluntary Planning Agreement (*National Parks and Wildlife Act 1974*), administered by DECCW;
c. Local natural resource management incentive programs (administered by HCRCMA);
d. s88B Restrictions as to User and s88E public positive covenants under the *Conveyancing Act 1919* (administered within development consents);
e. Community Land under the *Community Land Development Act 1989*;
f. Executed Deeds of Planning Agreements (typically administered during rezoning proposals and development consents);
g. Joint Management Agreements, Management Contracts or Conservation Agreements (NP&W Act, EPBC Act);
h. Mechanisms applied through non-government organisations including conservation trusts (conservation trust agreements with the Nature Conservation Trust); and
i. Enforceable undertakings.

Private landholders should be encouraged to seek the advice of the relevant agencies or GLC with regards to private conservation and incentive mechanisms that might be available to conserve and manage wetlands on their holdings.

Landholding in the middle Darawakh Creek/ Frogalla Swamp Wetland acquired by Great Lakes Council and to be transferred to National Park Estate via an adopted Memorandum of Understanding

A8. Protect and Manage Wetlands on Crown Land

The Land and Property Management Authority (formerly Department of Lands), under the *Crown Lands Act 1989*, typically maintains a mixed use objective of its landholdings. The objectives of the *Crown Lands Act 1989*, and in particular, the Principles of Crown Land Management (sec. 11 CL Act) ensures the Authority's commitment to protect and manage lands of high conservation value, including wetlands. As such, the LPMA possesses a statutory framework, as well as adequate skills, knowledge and capacity to participate in an

appropriate partnership with GLC that delivers sound wetland protection, restoration, conservation and management across wetlands held in its tenure.

Within the Wallis Lake catchment, the LPMA owns and manages significant wetland habitats, particularly on estuarine islands and on lake and riverine frontages (over 70% of Wallis Lake frontage is Crown Foreshore Reserve or Crown Road), but also on individual holdings in the North Tuncurry, Darawank and Minimbah areas.

The LPMA can adopt a number of local management strategies for Crown Lands including reserve trusts or its own direct management. In 2006, the LPMA established the Great Lakes Regional Crown Reserve covering Wallis Lake wetland areas as well as the bed of Wallis Lake, its tributaries and its Crown islands. The *Crown Lands Act 1989* further provides for the establishment and management of State Parks, which can include the appointment of Park Rangers to manage compliance, day to day responsibilities and to protect and manage high conservation value areas, including wetlands. The Act provides for the preparation and implementation of Plans of Management for Crown Reserves and State Parks. Further, the LPMA can accept donations and dedications of lands containing high conservation value habitats, especially where such dedications consolidate their existing parks and reserves. As such, the LPMA can function, individually or, more preferably, in partnership, as a conservation land management authority and can work to effect sound wetland conservation and management on lands of its tenure.

It is also noted that the multiple objective regional reserves program can identify relevant economic (commercial development) opportunities on unconstrained Crown Land, which can, in some circumstances, then provide a funding stream for local environmental initiatives, potentially including wetland conservation and restoration. Departmental Trusts can be established for the management of such funds.

In this regard, this Strategy recommends that the LPMA, in partnership with and with assistance from GLC:

- Map, identify and describe wetland habitats on Crown Land, including Crown Foreshore Reserves and Crown Roads;
- Identify and implement a management model for moderate and high conservation value wetlands on Crown Land to be accommodated in the establishment of a State Park or State Parks within the Wallis Lake Regional Crown Reserve. The establishment of a State Park Trust, appointment of Trust Managers and the development of a Management Plan and Community Advisory Committee will enable input and assistance from GLC, stakeholders and the community and provide funding opportunities from internal and external sources.
- For smaller wetlands and wetlands of lower conservation value, identify and implement safeguards to protect those wetlands from damaging land uses and activities. This may involve fencing (such as the fencing of land-based oyster lease that is already in progress), conservation instruments and other applied management.
- Develop and implement a model that may facilitate the negotiated transferral to the ownership of GLC or DECCW, those Crown Roads and Foreshore Reserves, or parts thereof, that adjoin or are enclosed by larger wetland holdings that have been acquired or owned by these agencies. This would permit the rationalisation of existing reserves into one ownership and management framework.

With regards to wetlands on Crown Road and Foreshore Reserves, the adopted Wallis Lake Catchment Management Plan (Action 2.4) identified that wetlands on public lands should be fenced off and protected where impacted by grazing livestock. The Draft Water Quality Improvement Plan stated that a case should be developed and put to the Department of Lands to "*establish a lease condition to fence off wetlands on Crown Land*." However, consideration in any fencing of wetland needs to be given to the possibility that fencing in isolation may potentially facilitate weed growth, so there may be a need for additional management and financial inputs to such areas for weed control in the long term. Fencing should only be established where it protects wetlands from impacts associated with an adjoining land use.

A9. Protect and Manage Wetlands Owned by Great Lakes Council

This Strategy proposes that GLC ensure that wetlands held on Council Bushland Reserves are appropriately managed to afford protection, conservation and restoration (where required) to those wetland systems. As such, Council is to undertake a program to:

1. Map, identify and describe all wetland habitats on Council land, including a disturbance/ condition assessment;
2. Ensure that wetland habitats on Council land are adequately zoned for environmental conservation and are designated as Community Land in accordance with the *Local Government Act 1993*; and
3. Prepare and implement specific Plans of Management for wetland systems on Council land to ensure proper management, protection, conservation and restoration of the wetland systems.

In order to effect proper and efficient wetland administration and management, high conservation value wetlands owned by Great Lakes Council that adjoin current or future National Parks or Nature Reserves should be transferred to the Minister for the Environment/ DECCW for gazettal in that Park or Reserve. This would require the approval of the Minister for the Environment and regional/ local DECCW staff. A model for such transfer has been developed for the Darawakh Creek/ Frogalla Swamp Wetlands, whereby restored and functional wetlands with minimal management burden/ costs, are to be transferred to DECCW and dedicated as part of the adjoining Darawank Nature Reserve. This model may also be applied to Council-owned wetlands at Minimbah, North Tuncurry and at Green Point (eg. Lot 316 DP774361, located to the north of Green Point village, could be restored and transferred to the existing Booti Booti National Park).

Any such transferrals would need to be subject to the explicit approval of Council and the agreement of DECCW.

In the event that a Wallis Lake Wetlands State Park is developed, Council could also consider dedications of land to that management framework in a similar manner.

A10. Manage Floodplains and Wetland Catchments and Establish Wetland Buffers and Corridors

The protection, management and restoration of all wetlands in the Wallis Lake catchment is to consider and protect wetland buffers, faunal corridors, fish passage as well as the management and protection of the floodplain and the wetlands' catchment.

Floodplains are to be managed to maintain or restore the natural distribution of water to and from wetlands and the management of the wetland catchment is to consider activities that may directly and indirectly impact on the wetland.

<u>Buffer Width and Condition Criteria</u>

For this Strategy, wetland buffers are principally defined as "*zones of land where management is used to minimise or avoid the deleterious impacts of adjoining land uses on conservation assets or values and to assist manage and protect the function and resilience of that asset*".

This Strategy does not identify a standard wetland buffer width or condition. Instead, it is proposed that vegetated buffers be applied to wetland protection and management of sufficient width and vegetation type to:

- Reflect the needs of the wetland, considering the specific type, size, position, nature and surrounding land use of the wetland;
- Protect the wetland from any measurable and overt indirect or direct effect, influence or harm from upstream land use, activity or development;

- Allow the wetland margins to expand and contract in a natural manner and in accordance with seasonal and climatic conditions;
- Where the circumstances permit, allow the wetland to adapt to the predicted effects and influences associated with sea level rise and extreme climatic events to year 2100 planning levels (0.91-metres AHD is the currently adopted planning standard of Great Lakes Council); and
- Incorporate habitat resources (e.g. riparian vegetation) peripheral to the wetland that contributes to the function and lifecycle of plant and animal communities and nutrient inputs and cycles of the wetland.

As such, specific wetland buffer width and vegetation condition must be selected and implemented on a case-by-case basis using the principles set-out above.

Corridors

Corridors are herein defined as "*an area of land or water and associated native vegetation across the landscape through which faunal or floral species habitats or ecological processes are connected and which provide essential, spatial elements of habitat for movement, dispersal, re-colonisation, breeding and other ecological processes, with the primary overall intent being to facilitate fauna movement within and between predicted or known assemblage habitats*".

Corridors between wetlands are to be identified and managed to allow specifically for the emigration and migration of all wetland species, including providing for wetland re-colonisation and in-passage habitat.

This strategy has not identified standards for wetland corridor widths. Corridors between wetlands are to be identified and managed on a case-by-case basis and with reference to relevant regional or local corridor strategy or project (ie. DEC Key Habitats and Corridors Project, Great Lakes Council biodiversity or corridor strategy). Corridors are also to be consistent with the criteria described above for "*Buffer Width and Condition Criteria*".

A11. Regulate Developments and Activities so as to Protect Wetlands

Principles 9 and 10 of this Strategy require that developments and activities upstream of wetlands cause no impact to the biological, physical, chemical or hydrological conditions of the wetland and that water quality and quantity regimes and hydrological processes needed to maintain, protect or restore the ecological resilience of wetlands are maintained, improved or reinstated.

Therefore, all applications for developments and activities upstream of wetlands in the Wallis Lake catchment must identify all wetlands that may be affected and demonstrate the following outcomes:

- Surface and groundwater quantity and quality from developments and activities that flow to any wetland are to meet the requirements of the Water Quality Improvement Plan (adopted 2009) and any other relevant water management strategies or plans;
- Surface water discharge volume and frequency to any wetland do not significantly differ from natural discharge frequency, mimic predicted natural conditions of wetting/ drying and avoid waterlogging or water deprivation to the wetland;
- Groundwater inflow volume and frequency to any wetland do not significantly differ from and mimic predicted natural groundwater inflow;
- Surface water quality (water chemistry) to any wetland mimics predicted natural water quality conditions/ composition;
- Groundwater quality (water chemistry) and quantity entering any wetland mimics natural groundwater conditions/ composition for groundwater-fed wetlands;
- Developments and activities must not alter the natural hydrology of the wetland;
- Developments and activities must not pollute the wetland or generate sediments that contribute to infilling or smothering of the wetland;
- Developments and activities must not drain or infill any part of the wetland;

- Developments and activities must not clear, harm, damage or impair the wetland or wetland buffer;
- Developments and activities must not cause or perpetuate the grazing of stock in the wetland or wetland buffer;
- Developments and activities must not serve as a source of propagules of exotic flora or serve as a source of exotic fauna (whether free-ranging domestic or feral);
- Developments and activities must not cause any increase in the incidence of fire ignition in the wetland or wetland buffer and corridors or alter natural fire frequencies or intensities;
- Developments and activities must not serve as a source of inappropriate human access to the wetland; and
- Developments and activities must not serve as a source of solid or liquid waste to the wetland.

Developments and activities adjacent to wetlands that may exacerbate access and physical damage to that wetland are to be associated with the erection and maintenance of suitable and appropriate fencing. This is to include developments on foreshore lands, where fencing is to be mandated to protect foreshore wetlands and riparian zones.

In order to determine adequate water quantity and quality performance levels, the provision of appropriate and relevant information, plans and data is required as part of the development application or proposal and which would include accurate and relevant hydraulic and nutrient surface and groundwater modelling.

Consent authorities are to apply the precautionary principle in assessing development applications and activities upstream of wetlands including the likely cumulative impacts. Decisions concerning developments and activities upstream of wetlands that are contrary to the guiding principles and actions of this Strategy are to be avoided. The only exception would relate to the application of Action A4 of this Strategy.

A12. Conduct Research and Adaptively Manage Wetlands

Given the inherent gaps and limitations in knowledge in wetland processes and the complexities of wetland systems, relevant and appropriate research with respect to wetland status, protection, management and restoration is to be sought, published and compiled.

The results of investigation and research are to be utilised as part of an adaptive management system for wetland protection, management and restoration across the Wallis Lake catchment.

In this regard, it is very important that partnerships with non-government organisations and tertiary and research institutions are established and maintained as part of wetland management.

In accordance with Action E.1.1 of the adopted Wallis Lake Estuary Management Plan and Action 2.6 of the adopted Wallis Lake Catchment Management Plan, a focus of wetland research is to be directed to wetland health (and particularly the health of saltmarsh communities).

Increasingly, there is a need to investigate and report on the effects and impacts of climate change and sea level rise and extreme climatic events on wetland systems. This research should focus on sensitive and significant ecosystems. It is highly beneficial that the data and results arising from any such research and investigation are proactively applied within an adaptive management framework.

In particular, if and when significant loss of wetlands has been detected by monitoring programs, activities which have caused the impacts should be identified and curtailed.

Outcomes and recommendations arising from wetland management research in the Wallis Lake catchment should be published in relevant scientific journals as well as websites, media

and general publications at every possible opportunity to contribute to the science of wetland management and restoration generally and to provoke further research and discussion. Data should be archived by Council and relevant State agencies and research institutions as a baseline measure for future comparative analysis.

A13. Educate about Wetlands and their Importance

The adopted Wallis Lake Estuary Management Plan (Management Objective C.3 and Actions C.3.1, C.3.2 and C.3.3) and the adopted Wallis Lake Catchment Management Plan (Action 2.7) recognised the need for ongoing education and awareness of wetlands and their importance.

Therefore, this Strategy proposes a genuine commitment to the development and deployment of community education and awareness programs. This should include but not be limited to:

- Wetland open days/ field days at significant local wetlands;
- Publication of guidelines;
- Case studies and landholder education on best practice wetland management;
- Workshops
- Schools programs;
- Education information packages;
- Media; and
- Community newsletters

The outcomes of the education and awareness program should be that the environmental, social, cultural and economic values of wetlands are more widely recognised and appreciated.

Private landholders with wetland systems on their holdings should be targeted for education and awareness programs to ensure that effective private wetland conservation frameworks are developed and private wetland conservation is effected.

Wetlands Open Day at the Darawakh Creek/ Frogalla Swamp wetland - World Wetlands Day 2008

5 PART E: USING THIS STRATEGY

It is proposed that this Strategy be used in the following manner:

- The continuation of the detailed mapping of the vegetation communities of the Wallis Lake catchment will refer to this Strategy and respond to the requirements set-out herein, particularly in relation to the need for spatially accurate mapping of all wetlands across the study area. Wetland mapping is to be prepared to function as an environmental study to support possible amendments to the local environmental plan (rezoning).

- Any future individual wetland management area strategy is to recognise and adopt the principles and actions documented in this Strategy and recognise the *pro forma* template published in Appendix 5.

- Wetlands across the Wallis Lake catchment that do not have a current, adopted, over-riding individual management plans or strategies are to be managed in accordance with the principles and actions set-out in this Strategy.

- Decision-making authorities are not to make any decision or determination that is in conflict with the principles and actions set-out in this Strategy.

Ultimately, the implementation of this Strategy would seek to manage, protect and, where required, restore wetlands across the Wallis Lake catchment such that their values and functions are maximised for the benefit of the natural environment, the community and the local economy.

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7 ACKNOWLEDGMENTS

This strategy was prepared by principal author, Mat Bell (Senior Ecologist) of Great Lakes Council.

The Draft Strategy was reviewed internally by Gerard Tuckerman (Manager – Natural Systems) of Great Lakes Council.

The Draft Strategy was also subject to external expert review by Bob Smith (Associate) of WetlandCare Australia. The input of Bob Smith to the quality, accuracy and veracity of the document is recognised.

All figures were prepared by Mike Smith (GIS Coordinator) of Great Lakes Council.

Photographs were provided by Great Lakes Council staff, particularly Andrew Staniland (Natural Areas Officer), Mat Bell (Senior Ecologist) and David Hopper (Assistant Environmental Officer).

The Draft Strategy was publicly exhibited and submissions received and consultations during this exhibition process greatly enhanced the finalisation of the Strategy. Council hereby acknowledges the submissions received and the time and effort involved in providing constructive comments.

An amended Strategy was distributed internally within Great Lakes Council and was re-submitted to those parties that made submissions during the exhibition period.

Further amendments and revisions based on the above review were then made as part of the finalisation of the Strategy.

8 APPENDICES

Appendix 1. Summary of Issues Raised in Submissions to the Exhibition of the Draft Strategy

Written Submissions

Author of Submission	Issue(s) Raised	Response
Mr Carl Atchison	With regards to Content, this submission noted: o The lack of any map of the actual wetlands covered by the Strategy (other than the SEPP14 map) is a draw-back. The lack of locational information makes it "*less meaningful to the layperson and therefore apparently less relevant to their activities*." The average landholder needs to be made aware that the Strategy may be relevant to them and does not just apply to "*major*" or named wetlands. It suggested that one Management Area be selected and all of the wetlands of this area be mapped and provided as an example of wetlands covered by the Strategy. This map should indicate that buffers are not included unless they are already known/ described.	Such a map has not been provided in the Strategy, however wetland mapping outputs are in preparation and will be publicly exhibited in the near future to address this concern.
	o Principle 13 is ill-advised because: 1. it relies on DECC principally and also Council to have both the interest and finances to acquire and manage all such wetlands. This is unlikely, 2. it promotes the idea that active management of all wetlands will and can be postponed to a later date when acquisition occurs, 3. it negates the view that wetlands and buffers on private property can and should be actively managed for their wetland values by existing landholders, and 4. it ignores the funding and other incentives available for landholders to actively manage private wetlands. Principle 13 is not entirely consistent with Principle 16 or Actions A1, A7 or A12. In Action A12, one of the target audiences should be private wetland owners. The submission then made detailed suggestions with respect to Principle 13.	Principle 13 has been revised to reflect the issues raised. It is re-numbered as Principle 12 in this document.
	o Just how the Strategy is to be used is not well explained and its intended and potential use as a planning tool is poorly addressed. It suggested that the Strategy has far stronger potential use as a planning tool and this should be recognised in an enhanced Action dealing with planning. As it stands, the Actions do not address the issue of the zoning of wetland buffers.	A new section (s5) is provided that sets-out the intended use of this Strategy for planning, assessment and management.
	The submission also criticised the writing style, choice of words and overall readability of the Draft Strategy, particularly with respect to language and sentence structure, verbosity and the use of the word "*shall*". Then submission provides constructive suggestions for resolving these perceived limitations.	The constructive suggestions relating to writing style, word choice and readability have been adopted through revisions to the text. Inadequate resources did not permit the engagement of a contracting professional writer to edit this document.
	A second submission following the revision of the Draft Strategy recognised and accepted the changes that had been made to the document and included some further minor constructive suggestions.	All of the further suggestions were adopted within the final draft document.
Mrs Margaret Blackwood *Green Point on Wallis Lake Community Association Inc.*	Stated the Association's support and appreciation of the Draft Strategy and particularly its intent to recognise, protect, restore, conserve and manage wetlands.	Noted.
	Referenced statements by Prof Bruce Thom concerning the predicted impacts of climate change on low-lying lands and the purported re-evaluation of land uses within 4 to 5-metres above the high water mark. The Association recommended a 5-metre high water mark be considered and adopted for all new coastal development.	This comment is noted. It relates moreso to Council's Strategic Planning (Urban Release), which already precautionarily considers sea level rise implications and applies such on a case by case basis.
	Suggested that current land management (regular slashing of a 15-20-metre wide strip) is degrading the natural values of land at Lot 316 DP774361, being the area zoned for conservation to the north of Green Point Village and south of Booti Booti National Park. The Association suggested that this area should be consolidated within the National Park by transferring the ownership of the land.	A new Action A9 has been added which relates to wetlands on Council-owned land and which recognises that, in some circumstances and with the consent of the parties involved, that transferral of Council owned wetlands to the National Park estate may be appropriate.

Author of Submission	Issue(s) Raised	Response
Mr Richard Dunning *Land and Property Management Authority – Crown Lands Division*	The submission expressed concern that the Draft Strategy established a position that relevant Crown Lands should be transferred to other Government agencies for conservation management without adequate consultation. It states that the Department of Lands is considered a conservation authority with the ability to manage areas of high conservation either in its own right or in partnership with Council. The submission objected to any transfer of Crown Land estate. The submission advised that the Department adopts a number of management strategies for its Crown Lands including reserve trusts (Council and private) and through direct management through its Land Management Program.	Action A8 has been significantly revised and amended to reflect the comments of the LPMA.
	It noted that in 2006, the Department established the Great Lakes Regional Crown Reserve covering many of the lands referred to in the Draft Strategy as well as the bed of Wallis Lake, its tributaries and many islands. In neighbouring LGA's, where regional reserves have been created, the Department has further established State Parks and appointed Rangers to manage day to day responsibilities and protect and manage high conservation areas including major wetlands. The Department can also accept gifts of land containing lands of high conservation value on the basis that their ongoing protection and management is assured by the Department.	Action A8 has been significantly revised and amended to reflect the comments of the LPMA.
	The objectives of the *Crown Lands Act* and the principles of Crown Land Management ensure that the Department is committed to responsibly managing all aspects of the Crown estate including lands of high conservation value. The submission noted that this should be recognised. Further, it suggested that the Department was willing to work with Council to ensure the protection and management of important wetlands on Crown Lands (including the bed of Wallis Lake) so that the revised Final Strategy can be implemented.	Action A8 has been significantly revised and amended to reflect the comments of the LPMA.
	*A meeting between Council staff and LPMA staff was held to discuss and resolve issues raised in this submission. Details of the outcomes of this meeting are described below.**	The Draft Strategy has been amended to reflect the discussions undertaken during the meeting.
	A second submission was received from Bob Birse of the LPMA and which comprised minor wording amendments to respect to Action A8	These suggested wording amendments were adopted in the text

Author of Submission	Issue(s) Raised	Response
Mr Brendan Guiney *MidCoast Water*	Stated that MidCoast Water supports overall objectives of wetland protection and has demonstrated its commitment to wetland conservation. However, it indicated that some matters need to be clarified with respect to the future management of the Minimbah aquifer as a sustainable water supply:	Noted.
	o The definition of wetland in the Draft Strategy is too broad and may categorise land as "*wetland*" that is not indicative of such on the ground.	The adopted definition is consistent with scientific standards and relevant experts. If correctly applied in the field, it would not mistakenly identify non-wetland as wetland.
	o It is unclear how much of the Minimbah Aquifer is classified as wetland. MidCoast Water's vegetation mapping identifies that the majority of the aquifer is not wetland, but comprises mined sandplain, dry heath and dry sclerophyll woodland.	This document does not seek to spatially define wetland vs non-wetland systems of the Minimbah sandplain. Such information would be collated in a specific strategy for the Minimbah Sandplain and Wallamba Floodplain Wetlands. It is recognised herein that the Minimbah sandplain does contain wetland and non-wetland (dry heath, woodland, open forest) communities. This is identified in the mapping of Griffiths & Wilson, commissioned by MCW. The management of wetlands of the Minimbah Sandplain should be achieved in that management area by the GLC, MCW and DECCW partnership currently being developed, and with reference to the FLALC. This should seek outcomes that effect sustainable water extraction as well as nature conservation and cultural outcomes.
	o Ramsar listing of the Minimbah Aquifer may jeopardise the use of the aquifer for a community water supply.	Any Ramsar nomination of the Minimbah sandplain wetlands would be based on extensive stakeholder consultation. Ramsar recognises the "wise-use" of sustainable resources and would not threaten domestic water extraction from this aquifer in any way.
	o Requested that Council clarify its position on the Minimbah Aquifer lands before finalising the strategy and that Council acknowledge the sustainable extraction of domestic water from this important supply source.	Council recognises the need and importance of the Minimbah aquifer water supply and supports and endorses sustainable water extraction for domestic purposes from this source.
	The submission also indicated that any education program associated with the Strategy could potentially be supported by MidCoast Water's Catchment Officer.	This is noted.
Hon Tony Kelly MLC *Minister for Lands*	Expressed concern that Council prepared the Draft Strategy and placed it on public exhibition without adequate prior reference to the LPMA. The submission suggested that the Draft Strategy gave no recognition to the statutory responsibilities of the Minister for Lands or the LPMA have under the *Crown Lands Act 1989* and did not acknowledge the skills, knowledge and capacity of the LPMA to be part of an appropriate multiple objective partnership aimed at sound wetland management and protection.	It is noted that Council had on a number of occasions informed the Wallis Lake Estuary Management Committee of the preparation of the Draft Strategy, on which the LPMA are represented. Action A8 and other relevant parts of the Draft Strategy have been amended to reflect the issues raised.
	The submission stated that the recommendations of the Draft Strategy were incomplete and constrained a vision for alternative use considerations (and indeed limited the future management of wetlands to the inclusion within the National Parks estate or managed under VCA), which denied the broader range of multi-objective uses possible under the *Crown Lands Act 1989*.	Actions A7 and A8 have been revised and amended to reflect the comments in this submission.
	The submission recognised fruitful discussions that took place between LPMA and Council staff conducted on the 26 August 2009.	The Draft Strategy has been amended to reflect the discussions undertaken during the meeting.
	The LPMA sought an opportunity for further review of the revised Final Strategy prior to any formal adoption by Council.	The revised Strategy has been submitted to the LPMA prior to any finalisation.
Ms Fiona Miller *NSW National Parks and Wildlife Service – Booti Booti Area Office*	Raised issues relating to how the Strategy would assist deliver outcomes identified in the Water Quality Improvement Plan for Wallis, Smiths and Myall Lakes. Suggested that the "Guiding Principles" and "Actions" could more specifically identify that wetlands will be conserved/ rehabilitated to protect/ improve water quality in Wallis Lake and that such issue deserves special mention. The submission stated that this issue is also important in the future specific Wetland Management Plans and that the WQIP could help guide the prioritisation of the preparation of these specific plans.	The text of the report has been slightly updated to reflect the points that were raised.
	It also suggested that it would be beneficial to have a Wetland Strategy for the entire LGA and suggested that the principles and actions could be easily transferred to an all of LGA Strategy.	This point is noted. It is intended to work towards an all of LGA Wetland Strategy, using this Wallis Lake strategy as a model.

Author of Submission	Issue(s) Raised	Response
Mr Andrew Paget	This submission considered the draft document contains "*a lot of good guiding principles*" but did not to satisfy the requirements of a "*strategy*" as it failed to include: o Any description, identification and mapping of specific wetlands, including locations, reservation, EEC and specific priorities. o Any assessment of wetlands including a ranking and prioritisation of all wetlands based on their characteristics and level of significance. Spatial analysis should reference the distribution and range of specific wetland types and their relevance and relation to regional wildlife corridor mapping. o Any identification of which high priority wetlands should be purchased and added to the national reserve system, which wetlands are not appropriate for purchase, what buffers should be afforded to each and what risks and catchment inputs need to be avoided for specific wetlands.	As is stated in the Strategy, this document sets out a Vision, Guiding Principles and Objectives for general wetland management and provides a framework for the subsequent and more detailed, strategic management and planning that is to be applied to the specific wetland management units. As such, it is beyond the scope of this part of the Strategy to describe and map individual wetlands, conduct inventories and assessments and conduct a prioritisation process. All such detailed investigation is scheduled for the individual management areas strategy and action plan development as described in s2 and Appendix 3 of the Strategy. The issues raised are noted and will be considered in the preparation of those individual management area plans and strategies.
	The submission stated that a strategy to purchase all wetlands and transfer these to public ownership as expressed in Principle 13 is not realistic or rational. Detailed analysis should be the basis for prioritisation of funding to determine which are of the highest conservation value and thus are appropriate for purchase. Other mechanisms may be adequate and appropriate for lesser levels of conservation value, such as PVP and other forms of covenants.	This is noted and Action A7 and Principle 13 have been duly revised and amended to reflect the issues raised.
	There are no details on standard buffer widths. The following buffer widths were suggested: local significance –10m, regional –25m, state –50m, national–100m and international –250m.	It is not the intention of this Strategy to identify and define standard buffer widths. It instead suggests that buffers need to be applied on a case by case basis (refer A10).
	Specific comments: o Pg. 3, point 2.4 says all wetlands should be fenced; this seems inappropriate for all situations.	The point is noted, but this is a direct quote from an existing adopted plan (WLCMP).
	o Pg. 3, under the WQIP, suggests that wetland protection requires acquisition, yet talks about the use of PVPs, which do not involve acquisition. PVP can be applied over Crown Land, but only with the consent of the LPMA. The LPMA should be encouraged to endorse PVPs over Crown Land wetlands.	The information is a direct quote from an existing adopted plan (the WQIP).
	o Principle 13 should be altered to high to moderate conservation value (international, national or state significant) wetlands. Other methods of protection should be applied for lower conservation value wetlands (local or regional).	This is noted that Action A7 and Principle 13 have been duly revised and amended to reflect the issues raised.
	o Key threatening processes listed on pg. 2, 5th paragraph should be referenced to listings on the TSC Act and EPBC Act.	S1.9 of the Strategy has been amended to recognise listed key threatening processes on the TSC Act and EPBC Act.
	o Pg. 4 talks about a specific source of funding being dedicated to wetlands for PVPs. This has already been established. The recommendation is redundant.	The point is noted, but this is a direct quote from an existing adopted plan (WQIP).
	o Pg. 4 talks of wetlands that are at risk to high nutrient inputs. This needs to be subject to detailed assessment and mapping.	Such mapping will be undertaken as part of the development of individual management area strategies and action plans
	o Pg. 8 s1.5, 1st dot point, while the use of scientific data is fine, there should be expanded reference to include how to manage wetlands if such detailed information is not available (i.e. reliance on general principles) and should include reference to monitoring and adaptive management principles.	This is noted and the Strategy has been amended to reflect this point.
	o Maps on pp. 12 and 18 are of poor resolution.	Resolution on hard copies is deemed satisfactory for this Strategy.

Author of Submission	Issue(s) Raised	Response
Mr John Patten *Department of Environment and Climate Change – Water for the Environment Branch*	With regards to Action A3, the document entitled "NSW Ramsar Plan 2006-09" and available on the Department's website provides information on the Ramsar nomination process in NSW. The submission recommended that Council contact the Department early in any future Ramsar nomination process to ensure a good exchange of information.	Action A3 has been amended to reflect this comment.
	With regards to Actions A7 and A8 (and with reference to Principle 13), the submission advise that the options outlined in A7 and A8 are not exhaustive and that there are a number of additional options available to Council that could achieve the same conservation goals without transferring current ownerships.	Actions A7 and A8 and Principle 13 has been amended to reflect alternate public and private conservation mechanisms available for the management and protection of wetland systems.
	Specific comments: o Pg. 1, paragraph 6 – change DECC to DECCW o Pg. 3, 8th dot point in 2.4 – insert the words "non-chemical" before the word "alternatives" o Pg. 8, s1.5, 3rd dot point – Whilst the stated vision is to reverse degraded wetland conditions and to reinstate functions, such reversal may not be possible in all cases. Setting management objectives and targets may be preferable. o Pg. 11, last paragraph – it would be helpful to highlight those communities, populations or species of the Wallis Lake wetlands that are listed under the EPBC Act 1999.	 Amended as per comment. Amended as per comment. Amended as per comment. Amended as per comment.

Meetings

Attendees	Matters Discussed	Response
Mr Richard Dunning and Mr Bob Birse (LPMA) Mr Gerard Tuckerman and Mr Mat Bell (GLC) *Land and Property Management Authority* Taree, 26 August 2009	The meeting discussed the content of the submission of Mr Richard Dunning of the Department of Lands (LPMA) and particularly the issue in the Draft Strategy of the recommendation to transfer vacant Crown land to the National reserve system. The LPMA staff indicated that the LPMA was a bona fide conservation authority in its own right, with the staff, ability and statutory mechanisms to manage wetlands in their ownership, either on their own or in strategic partnership.	All attendees read through the Draft Strategy and notated agreed amendments. These amendments have been reflected in the Final Strategy.
Mr Tim Kelly (CEO) *Forster Local Aboriginal Land Council* Forster, 8 July 2010	The Draft Wetland Strategy report was presented, in summary, to Mr Tim Kelly. Mr Kelly advised that, in his opinion, the Draft Strategy was reasonable and appropriate and no changes/ revisions were suggested, but that he wished to provide the Draft Strategy to relevant FLALC members for their review and input. No further comments were received from FLALC members.	No modifications or revisions required

It is noted herein that the Wallis and Smiths Lake Coast and Estuary Management Committee (and formerly the Wallis Lake Estuary Management Committee) have been regularly informed with regards to the progress of the development and content of this Strategy and feedback from this Committee has been sought and incorporated in the Strategy.

The Draft Wallis Lake Wetland Strategy – Vision, Guiding Principles and Actions was presented to Great Lakes Council on the 9th June 2009, at which time the Council resolved to exhibit the Strategy for a period of six-weeks.

During the finalisation of the Draft Strategy, the NSW Government, in March 2010, adopted the NSW Wetlands Policy. The Draft Wallis Lake Wetland Strategy was revised accordingly.

Appendix 2. Vegetation Associations and Vegetation Community Types of the Wallis Lake Catchment

Mangrove forest and woodland
- *Avicennia marina* subsp. *australasica* mangrove forest and woodland

Swamp sclerophyll forest and woodland
- *Casuarina glauca* swamp sclerophyll forest and woodland
- *Eucalyptus robusta* swamp sclerophyll forest and woodland
- *Melaleuca quinquenervia* swamp sclerophyll forest and woodland
- *Melaleuca quinquenervia*/ *Casuarina glauca* swamp sclerophyll forest and woodland
- *Eucalyptus robusta*/ *Melaleuca quinquenervia* swamp sclerophyll forest and woodland
- *Eucalyptus grandis* swamp sclerophyll forest and woodland
- *Eucalyptus resinifera* swamp sclerophyll forest and woodland
- *Eucalyptus tereticornis* swamp sclerophyll forest and woodland
- *Casuarina glauca/ Melaleuca quinquenervia/ Eucalyptus robusta/ Livistona australis* swamp sclerophyll forest and woodland

Swamp sclerophyll mallee woodland
- *Eucalyptus robusta* swamp sclerophyll mallee woodland

Swamp sclerophyll shrubland
- *Banksia ericifolia* subsp. *macrantha* swamp sclerophyll shrubland
- *Melaleuca ericifolia* swamp sclerophyll shrubland
- *Melaleuca quinquenervia* swamp sclerophyll shrubland
- *Melaleuca sieberi* swamp sclerophyll shrubland

Wet heathland
- Wet heathland

Chenopod shrubland/ tussock grassland
- *Sarcocornia quinqueflora* subsp. *quinqueflora* chenopod shrubland/ *Sporobolus virginicus* tussock grassland
- *Sarcocornia quinqueflora* subsp. *quinqueflora* chenopod shrubland
- *Suaeda australis* chenopod shrubland
- *Sporobolus virginicus* tussock grassland

Sedgeland
- *Baumea articulata* sedgeland
- *Baumea juncea* sedgeland
- *Bulboschoenus caldwellii* sedgeland
- *Eleocharis equisetina* sedgeland
- *Eleocharis sphacelata* sedgeland
- *Lepironia articulata* sedgeland
- *Schoenoplectus subulatus* sedgeland
- Mixed sedgelands of beach ridge barriers and dunefields

Rushland
- *Juncus kraussii* subsp. *australiensis* rushland
- *Phragmites australis* rushland
- *Typha domingensis* rushland

Sod grassland
- *Paspalum distichum* / *Eleocharis equisetina* sod grassland

Appendix 3. Significant Communities, Populations and Species of the Wallis Lake Wetlands

International migratory bird species of the Wallis Lake Wetlands

The information provided below has been extracted from the Draft Wallis Lake Wader-bird Study (in preparation):

The Great Lakes area receives visitation from a variety of species that are international migrants and listed on international management agreements. The national List of Migratory Species consists of those species listed under the following International Conventions:

- Japan-Australia Migratory Bird Agreement (JAMBA);
- China-Australia Migratory Bird Agreement (CAMBA);
- Republic of Kore-Australia Migratory Bird Agreement (ROKAMBA); and
- Convention on the Conservation of Migratory Species of Wild Animals - (Bonn Convention).

The following migratory bird species are known or considered possible inhabitants of the Wallis Lake catchment. These birds can be divided into four sub-groups: migratory shorebirds, near-shore seabirds, offshore seabirds, waterfowl and terrestrial birds. These are listed below and have been sourced from the DEWHA website:

Migratory shorebirds

Scientific Name	**Common Name**
Actitis hypoleucos	Common Sandpiper
Arenaria interpres	Ruddy Turnstone
Calidris acuminata	Sharp-tailed Sandpiper
Calidris alba	Sanderling
Calidris bairdii	Baird's Sandpiper
Calidris canutus	Red Knot
Calidris ferruginea	Curlew Sandpiper
Calidris mauri	Western Sandpiper
Calidris melanotos	Pectoral Sandpiper
Calidris ruficollis	Red-necked Stint
Calidris subminuta	Long-toed Stint
Calidris tenuirostris	Great Knot
Charadrius dubius	Little Ringed Plover
Charadrius hiaticula	Ringed Plover
Charadrius leschenaultii	Greater Sand Plover
Charadrius mongolus	Lesser Sand Plover
Charadrius veredus	Oriental Plover
Glareola maldivarum	Oriental Pratincole
Limicola falcinellus	Broad-billed Sandpiper
Limosa lapponica	Bar-tailed Godwit
Limosa limosa	Black-tailed Godwit
Numenius madagascariensis	Eastern Curlew
Numenius minutus	Little Curlew
Numenius phaeopus	Whimbrel
Phalaropus fulicaria	Grey Phalarope
Phalaropus lobatus	Red-necked Phalarope
Philomachus pugnax	Ruff
Pluvialis squatarola	Grey Plover
Rostratula benghalensis	Painted Snipe
Tringa glareola	Wood Sandpiper
Tringa nebularia	Common Greenshank
Tringa stagnatilis	Marsh Sandpiper
Tringa totanus	Common Redshank
Tryngites subruficollis	Buff-breasted Sandpiper
Xenus cinereus	Terek Sandpiper

Waterbirds

Scientific Name	Common Name
Anas clypeata	Northern Shoveler
Anas querquedula	Garganey
Ardea ibis	Cattle Egret
Ardea alba	Great Egret
Egretta sacra	Eastern Reef Egret
Gallinago hardwickii	Latham's Snipe
Plegadis falcinellus	Glossy Ibis

Near-shore Sea-birds

Scientific Name	Common Name
Puffinus pacificus	Wedge-tailed Shearwater
Sterna albifrons	Little Tern
Sterna caspia	Caspian Tern
Sterna hirundo	Common Tern

Other birds

Scientific Name	Common Name
Acrocephalus stentoreus	Clamorous Reed-warbler
Chalcophaps indica	Emerald Dove
Haliaeetus leucogaster	White-bellied Sea-eagle
Hirundapus caudacutus	White-throated Needletail
Merops ornatus	Rainbow Bee-eater
Monarcha melanopsis	Black-faced Monarch
Myiagra cyanoleuca	Satin Flycatcher
Pandion haliaetus	Osprey
Rhipidura rufifrons	Rufous Fantail
Xanthomyza phrygia	Regent Honeyeater

Endangered ecological communities (TSC Act) of the Wallis Lake Wetlands

- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South-east Corner Bioregions
- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-east Corner Bioregions
- Subtropical Coastal Floodplain Forest of the NSW North Coast Bioregion
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South-east Corner Bioregions
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-east Corner Bioregions

Endangered populations (TSC Act) of the Wallis Lake Wetlands

- None presently listed

Threatened flora species (TSC Act) known from the Wallis Lake Wetlands

- *Allocasuarina defungens*^
- *Allocasuarina simulans*^
- *Asperula asthenes*^
- *Lindernia alsinoides*
- *Maundia triglochinoides*
- *Melaleuca biconvexa*^

^ - denotes species is also listed as threatened on the Commonwealth EPBC Act

Threatened fauna species (TSC Act) known from the Wallis Lake Wetlands

- Spotted-tailed Quoll *Dasyurus maculatus*^
- Brush-tailed Phascogale *Phascogale tapoatafa*
- Koala *Phascolarctos cinereus*

- Eastern Pygmy Possum *Cercartetus nanus*
- Squirrel Glider *Petaurus norfolcensis*
- Rufous Bettong *Aepyprymnus rufescens*
- Long-nosed Potoroo *Potorous tridactylus*^
- Eastern Blossom Bat *Syconycteris australis*
- Grey-headed Flying Fox *Pteropus poliocephalus*^
- Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*
- Eastern Freetail Bat *Mormopterus norfolkensis*
- Golden-tipped Bat *Kerivoula papuensis*
- Little Bent-wing Bat *Miniopterus australis*
- Eastern Bent-wing Bat *Miniopterus schreibersii*
- Eastern False Pipistrelle *Falsistrellus tasmaniensis*
- Southern Myotis *Myotis macropus*
- Greater Broad-nosed Bat *Scoteanax rueppellii*
- Eastern Chestnut Mouse *Pseudomys gracilicaudatus*
- Wallum Froglet *Crinia tinnula*
- Green and Golden Bell Frog *Litoria aurea*^
- Stephen's Banded Snake *Hoplocephalus stephensii*
- Magpie Goose *Anseranas semipalmata*
- Blue-billed Duck *Oxyura australis*
- Black Bittern *Ixobrychus flavicollis*
- Australasian Bittern *Botaurus poiciloptilus*
- Black-necked Stork *Ephippiorhynchus asiaticus*
- Osprey *Pandion haliaetus*
- Black-tailed Godwit *Limosa limosa*
- Terek Sandpiper *Xenus cinereus*
- Comb-crested Jacana *Irediparra gallinacea*
- Bush Stone-curlew *Burhinus grallarius*
- Beach Stone-curlew *Esacus neglectus*
- Pied Oystercatcher *Haematopus longirostris*
- Sooty Oystercatcher *Haematopus fuliginosus*
- Sanderling *Calidris alba*
- Lesser Sand Plover *Charadrius mongolus*
- Greater Sand Plover *Charadrius leschenaultii*
- Little Tern *Sterna albifrons*
- Wompoo Fruit-dove *Ptilinopus magnificus*
- Rose-crowned Fruit-dove *Ptilinopus regina*
- Superb Fruit-dove *Ptilinopus superbus*
- Glossy Black Cockatoo *Calyptorhynchus lathami*
- Swift Parrot *Lathamus discolor*^
- Eastern Ground Parrot *Pezoporus wallicus wallicus*
- Powerful Owl *Ninox strenua*
- Barking Owl *Ninox connivens*
- Masked Owl *Tyto novaehollandiae*
- Grass Owl *Tyto longimembris*
- Regent Honeyeater *Xanthomyza phrygia*^

^ - denotes species is also listed as threatened on the Commonwealth EPBC Act

Regionally significant vegetation of the Wallis Lake Wetlands

According to the Comprehensive Regional Assessment (CRA) of the Department of Environment and Climate Change, all of the vegetation communities of the Wallis Lake Wetlands as identified and described by Griffith (2007) are considered to be of regional conservation significance:

Regionally Rare Vegetation Communities:

- *Avicennia marina* subsp. *australasica* mangrove forest and woodland
- *Eucalyptus resinifera* swamp sclerophyll forest and woodland
- Wet heathland
- *Sarcocornia quinqueflora* subsp. *quinqueflora* chenopod shrubland/ *Sporobolus virginicus* tussock grassland
- *Sarcocornia quinqueflora* subsp. *quinqueflora* chenopod shrubland
- *Suaeda australis* chenopod shrubland
- *Sporobolus virginicus* tussock grassland
- *Baumea articulata* sedgeland
- *Baumea juncea* sedgeland

- *Bulboschoenus caldwellii* sedgeland
- *Eleocharis equisetina* sedgeland
- *Eleocharis sphacelata* sedgeland
- *Lepironia articulata* sedgeland
- *Schoenoplectus subulatus* sedgeland
- Mixed sedgelands of beach ridge barriers and dunefields
- *Juncus kraussii* subsp. *australiensis* rushland
- *Phragmites australis* rushland
- *Typha domingensis* rushland
- *Paspalum distichum* / *Eleocharis equisetina* sod grassland

Regionally Vulnerable Vegetation Communities:

- *Casuarina glauca* swamp sclerophyll forest and woodland
- *Melaleuca quinquenervia* swamp sclerophyll forest and woodland
- *Melaleuca quinquenervia*/ *Casuarina glauca* swamp sclerophyll forest and woodland
- *Eucalyptus robusta*/ *Melaleuca quinquenervia* swamp sclerophyll forest and woodland
- *Eucalyptus tereticornis* swamp sclerophyll forest and woodland
- *Casuarina glauca*/ *Melaleuca quinquenervia*/ *Eucalyptus robusta*/ *Livistona australis* swamp sclerophyll forest and woodland
- *Banksia ericifolia* subsp. *macrantha* swamp sclerophyll shrubland
- *Melaleuca ericifolia* swamp sclerophyll shrubland
- *Melaleuca quinquenervia* swamp sclerophyll shrubland
- *Melaleuca sieberi* swamp sclerophyll shrubland

Vegetation Communities that are Priorities for Private Land Conservation:

- *Eucalyptus robusta* swamp sclerophyll forest and woodland
- *Eucalyptus robusta* swamp sclerophyll mallee woodland
- *Eucalyptus grandis* swamp sclerophyll forest and woodland

Appendix 4. Listed Key Threatening Processes in Legislation that Apply to Wetlands

Threatened Species Conservation Act 1995

	Key Threatening Process	Threat Abatement Plan
1	Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	-
2	Anthropogenic Climate Change	-
3	Clearing of native vegetation	-
4	Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus*	-
5	Competition and habitat degradation by Feral Goats, *Capra hircus*	-
6	Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	-
7	High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	
8	Herbivory and environmental degradation caused by feral deer	-
9	Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	-
10	Invasion and establishment of exotic vines and scramblers	-
11	Invasion and establishment of the Cane Toad *Bufo marinus*	-
12	Invasion and establishment of Scotch Broom *Cytisus scoparius*	-
13	Invasion, establishment and spread of Lantana (*Lantana camara*)	-
14	Invasion of native plant communities by *Chrysanthemoides monilifera*	Final
15	Invasion of native plant communities by exotic perennial grasses	-
16	Loss of hollow-bearing trees	-
17	Predation and hybridisation by Feral Dogs (*Canis lupus familiaris*)	-
18	Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)	Final
19	Predation by the European Red Fox, *Vulpes vulpes*	Final
20	Predation by the Feral Cat, *Felis catus*	-
21	Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa*	-
22	Removal of dead wood and dead trees	-

Fisheries Management Act 1993

	Key Threatening Process	Threat Abatement Plan
1	The introduction of fish to fresh waters within a river catchment outside their natural range	-
2	The removal of large woody debris from NSW rivers and streams	Final
3	The degradation of native riparian vegetation along New South Wales water courses	-
4	Instream structures and other mechanisms that alter natural flow	-

Environmental Protection and Biodiversity Conservation Act 1995

	Key Threatening Process	Threat Abatement Plan
1	Competition and land degradation by rabbits	Final
2	Competition and land degradation by unmanaged goats	Final
3	Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*)	Final
4	Infection of amphibians with chytrid fungus resulting in chytridiomycosis	Final
5	Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris	Final
6	Land clearance	-
7	Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases	-
8	Predation by European red fox (*Vulpes vulpes*)	Final
9	Predation by feral cats	Final
10	Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs	Final
11	The biological effects, including lethal toxic ingestion, caused by Cane Toads (*Bufo marinus*)	-

Appendix 5. Standard Template for Individual Strategies for Specific Wetland Management Areas

The standard format for each individual wetland area management plan is based on the following table of contents:

1. General Description:
    a. Location and extent
    b. Physical character, geology and soils
    c. Land use history
    d. Land zoning and tenure – current
2. Description of wetland vegetation communities
3. Description of wetland faunal assemblages
4. Wetland values and attributes:
    a. Conserved land
    b. Endangered ecological communities
    c. Threatened species
    d. High conservation value vegetation
    e. Regionally or locally significant species
    f. Key regional habitats
    g. Regional or local wildlife corridors
    h. SEPP14 wetlands
    i. Environmental services provisions
    j. Cultural values
5. Audit/ Inventory of individual wetlands:
    <u>Wetland details</u>
    - Code/ number
    - Name
    - General location

    <u>Wetland attributes</u>
    - Size
    - SEPP14
    - Land zoning
    - Tenure
    - Reservation status
    - Geomorphology
    - Acid sulfate soils risk
    - Surface and groundwater Hydrology (estuarine, riverine, localised)
    - Salinity (fresh, fresh/ brackish, saline/ brackish, saline)
    - Water quality
    - Degree of natural stream flow
    - Water depth
    - Permanence
    - Vegetation communities
    - Faunal habitats
    - Significant biota

    <u>Wetland conditions</u>
    - Land use
    - Disturbances
    - Connectivity (fragmentation)
    - Surrounding land use
    - Buffers/ margins
    - Overall Condition
6. Current Management Actions
7. Wetland Management Plan
    a. Vision, objectives and guiding principles
    b. Actions
    c. Management responsibilities and arrangements
    d. Projected costing
    e. Targets
    f. Monitoring, evaluation, review and adaptive management
8. Implementation Schedule and Action Plan
9. References
10. Appendices