

Contents

1	Wetland values	3
1.1	Ecological & functional values	3
1.2	Cultural values.....	3
1.3	Economic values.....	4
2	Sydney wetland types	5
2.1	Wetland types.....	5
2.2	Implications for management.....	6
3	Sydney wetland locations	8
3.1	Background studies	8
3.2	Location by LGA	8
4	Background mapping studies	10
4.1	SREP 20: Hawkesbury Nepean River	10
4.2	Adam & Stricker: Wetlands of the Sydney Region.....	10
4.3	Benson & Howell: The Natural Vegetation of Sydney.....	11
4.4	NSW Fisheries: An Estuarine Inventory for NSW	11
4.5	DUAP et al: Georges River Catchment Biodiversity Study	12
4.6	Wilton & Saintilan: Protocols for Mangrove & Saltmarsh Mapping ..	12
4.7	NPWS: Statewide wetland mapping	13
5	Mapping improvements	14
6	Background to buffer zones	15
7	Development assessment	16
7.1	DUAP: Guiding Development: Better Outcomes	16
7.2	Australian Business Centre: Making the NSW Planning System Work for You.....	17
7.3	Sample DA checklist.....	18
7.4	Sample report pro-forma.....	22
8	Preparing a wetland management plan	24
8.1	Step 1: Gather information.....	24
8.2	Step 2: Identify values and threats	25
8.3	Step 3: Decide on actions.....	25
8.4	Step 4: Monitor performance	26
9	Wetland management & land tenure	27
10	Commonwealth responsibilities	28
10.1	EPBC Act.....	28
10.2	Commonwealth Wetlands Policy	29
10.3	Commonwealth Coastal Policy	29
10.4	Biodiversity conservation strategies.....	29
10.5	International treaties	30
11	State responsibilities	32
11.1	Department of Land & Water Conservation	32
11.2	State Wetlands Advisory Committee	34
11.3	Environment Protection Authority	35

11.4	Department of Urban Affairs and Planning	35
11.5	NSW Fisheries.....	36
11.6	National Parks and Wildlife Service	37
11.7	Sydney Water	37
12	Local government responsibilities	38
13	Other stakeholders	39
14	Table of legislation, plans & policies	41
14.1	Commonwealth legislation.....	41
14.2	State legislation	41
14.3	Commonwealth wetland policies.....	44
14.4	State wetland policies	44
14.5	State Environmental Planning Policies	45
14.6	Regional Environmental Plans.....	46
14.7	International agreements	47
15	References.....	48
15.1	Key	48
15.2	Mapping & inventories	49
15.3	Commonwealth.....	50
15.4	State	51
15.5	Local.....	52
15.6	Management plans	52
15.7	Hydrology	55
15.8	Water quality.....	55
15.9	Ecology & habitat.....	56
15.10	Education	57
15.11	Constructed wetlands.....	57
15.12	Development assessment.....	57

1 Wetland values

The following is adapted from Hawkesbury Nepean Catchment Management Trust (1996a) and Department of Land & Water Conservation (1996).

1.1 Ecological & functional values

Plant & animal habitat: Wetlands provide habitat and food for large variety of plants, birds, fish, mammals, invertebrates, amphibians and reptiles. Many species are distinctive to wetlands and survive nowhere else, while others rely on them for part of their life cycles. Wetlands become strategic refuge areas in times of drought.

Biological diversity: It is estimated that 550 native plant species, 52 fish species and 194 animal species (birds, amphibians and reptiles) are found in NSW wetlands, with 11 being rare or endangered. Most of the migratory bird species listed under international conservation agreements within Australia are found in wetlands.

Flood regulation & erosion control: Wetlands have the capacity to store water. They absorb large quantities of water in times of high flow and release it slowly during times of low flow. Thus they can reduce peak flood flows, thereby reducing erosion and flood damage, and during drier times they provide a source of water.

Groundwater recharge: Wetlands can provide a valuable link between surface water and groundwater. Some wetlands slowly release water the groundwater supply, while others are replenished from groundwater sources.

Water filtering and nutrient recycling: Wetlands receive runoff following rain in a catchment. Because of their high productivity, ability to recycle nutrients and the time it takes water to move through them, wetlands enable bacterial decay to occur, as well as silt deposition, re-oxygenation and some nutrient stripping of waste. Wetlands are sometimes described as "nature's kidneys".

Breeding and nursery areas: The high productivity of wetlands contributes to their crucial role as habitats at some stage of the life cycle of many species, including many commercially valuable species. Both estuarine and inland wetlands provide nursery areas essential for the survival of many important fish, crustaceans and other species. Many commercial and recreational fisheries depend upon wetlands for their existence.

1.2 Cultural values

Nature conservation: Wetlands are increasingly recognised as places worthy of protection in their natural state. Formalised nature conservation is a

practical expression of a concern for natural values and ethical responsibility to conserve other forms of life.

Recreation: Wetlands provide inspiring landscapes and opportunities for a wide range of recreational activities, particularly in Australia where water, and especially the coast, is such a dominant part of the national psyche. Active pursuits include boating swimming, fishing and bushwalking. Passive pursuits include bird watching and nature photography. Wetlands may also have wilderness values and they provide quiet, solace and spiritual rejuvenation.

Landscape quality: The diverse wetlands vegetation, with its structural complexity and associations with water bodies, often creates striking visual contrasts both internally and with the surrounding environment. This gives wetlands high visual appeal.

Indigenous and non-indigenous cultural significance: Some wetlands have traditionally been, and some still are, of great importance to indigenous Australians as places of spiritual or ceremonial significance as well as a water supply and food resource. Some wetlands have high value to non-indigenous Australians for their sociological, anthropological, historic or literary significance.

Environmental research and education: Wetlands provide a wide range of educational and research opportunities in fields such as geology, hydrology, biology, ecology, catchment management, archaeology and climatology.

1.3 Economic values

Overall environmental quality: All of the abovelisted natural and social values of wetlands contribute to the overall environmental quality of an area and indirectly its economic quality. For example, wetlands with abundant bird life can play an important role in insect control on adjoining agricultural lands. They may provide water supply, help maintain water quality for commercial use, and may provide essential breeding habitat for commercial fisheries.

Foreshore protection: Wetland vegetation growing along the fringes of lakes, estuaries and river banks helps to protect them from erosion.

Tourism: Wetlands themselves may become tourist attractions, or may contribute to the uniqueness, diversity and interest of an area and thereby contribute to the area's tourism potential.

2 Sydney wetland types

2.1 Wetland types

Estuarine wetlands: These are tidally influenced and their flora adapted to saline conditions. They occur along river and estuarine margins up to the limit of tidal influence and are dominated by the Grey Mangrove and the River Mangrove. Other important flora in saline wetlands include seagrasses, halophytic herbs, sedges, rushes and reeds. At the landward boundary of reedswamps and saline marshes, Swamp Oak and Paperbark form forest communities in some areas.

Cliff-top marshes: These comprise the communities found in rock crevices and ephemeral pools along cliff-tops, and the peat bogs that develop in seepage lines. Common species found in tidal marshes are also found in cliff-top crevices and pools, such as *Sarcocornia quinqueflora*, *Triglochin striata* and *Suaeda australis*. Peat bogs contain small herbs such as *Eriocaulon scariosum* (now uncommon in the region) and sphagnum moss.

Freshwater wetlands: A number of geomorphic types of freshwater wetlands occur in the Sydney region, each with a variety of plant communities. However, using the classification adopted by Adam and Stricker (1989 & 1993), there are no freshwater wetlands in the LGAs of SCCG member councils. Perceived 'freshwater wetlands' are classified by Adam and Stricker as dune swale swamps.

Dune swale swamps: Located in swales of coastal dunes, vegetation communities here are dominated by reeds, rushes and sedges. Peat layers can form here due to accumulation of detritus. Emergent species include *Baumea*, while small trees such as *Kunzea ambigua* and *Melaleuca* species occur along drainage lines.

Floodplain wetlands: These can be either ephemeral (wet meadows) or perennial (open lagoons), depending on geomorphic setting. *Melaleuca* species occur in wet meadows and around lagoons, as does the emergent *Lepironia articulata*. This wetland type is scarce in SCCG LGAs, though it does occur in pockets around the Warriewood wetlands and at Middle Creek, a tributary of Narrabeen Lagoon.

Upland swamps: These are wetlands located in upper catchment areas. According to Adam and Stricker, this wetland type only occurs in areas of the Woronora Plateau in the Sutherland LGA. Dominant plants are sedges and rushes, with small herbs and shrubby heath occasionally intruding into the flora mix. Sedge swamps are dominated by Button-grass, Swordgrass and *Lepidosperma* species. This type of wetland also includes headwater and hanging swamps, with plant species composition similar to other upland swamps.

2.2 Implications for management

Different wetland types vary in their sensitivity to impacts from human activities. For example, saline wetlands are more susceptible to degradation from Nitrogen than Phosphorus, while freshwater wetlands are more susceptible to increased Phosphorus loads. Hence, diversity of wetland types is mirrored by a diversity of requirements needed to maintain their ecological integrity.

The table below summarises the different characteristics of each of the wetland types and suggests measures to be taken to control the impacts of development on each type. It is important that the need for different management approaches to development affecting different wetland types is recognised.

Wetland type	Susceptibility	Impact	Management approach
Estuarine	Changes in freshwater:saltwater ratio.	Decrease in saltmarsh 'health'; intrusion of Cumbungi &/or Common Reed into saltmarsh.	Manage stormwater inflows in a way that reduce freshwater influxes eg. Stormwater detention areas on development sites.
	Increased nitrogen.	Changes species composition favouring introduced species.	Education regarding use of fertiliser in the catchment.
	Sedimentation. Changing tidal inundation due to increased land height.	Smothering of seagrass and saltmarsh, increasing habitat of mangroves. Changes to niche habitats and species composition.	Better sediment control during the development process. Sediment traps at source and in-line.
Cliff-top	Excess nitrification and sedimentation.	Excessive weed growth Wetlands infill and cease to be wetlands.	Maintain or re-instate buffer zones of vegetation.
Dune swale	Excess nitrification from groundwater seepage or stormwater.	Excessive weed growth.	Stormwater management and stopping pollutants entering groundwater.
Floodplain	Changes to water regime, usually associated with flood management activities. Including opening lagoons to the sea.	Areas that were once periodically flooded are now rarely flooded those that are flooded experience a shorter period of inundation. Terrestrial species now out-compete WL species.	Take into account the water requirements of floodplain wet lands when determining Floodplain Management Plans.
Upland swamp	Receive polluted stormwater from upslope urban development	Excessive weed growth Wetlands may infill.	On-site stormwater detention facilities for all new developments, eg. Rainwater tanks.

Any in-line wetland	Increased stormwater discharge and associated increased velocity.	Excessive weed growth Wetlands may be scoured out and channelised.	On-site detention of stormwater Better management of sealed surfaces.
---------------------	---	---	--

Summary of different management approaches for different wetland types in the SCCG LGAs (Sainty (2000))

3 Sydney wetland locations

3.1 Background studies

The most comprehensive prior wetland mapping study for the Sydney region is reported in Adam and Stricker (1993). It includes an inventory which identifies over 300 wetlands in the Sydney region, with around 90 occurring within SCCG LGAs.

Wetlands are described according to their type, size, viability and degree of impact. Viability is measured using an ordinal scale and represents the degree of disturbance relative to the wetland's original (pre-European settlement) condition. The degree of impact is coded according to generic impact descriptions. The codes were designed to give a quick overview of each wetland's conservation capability, rather than an assessment of natural values.

A wetland inventory was also collated from information collected from SCCG councils. This information is included with the data from Adam and Stricker (1989 & 1993), which lists the aforementioned characteristics for wetlands that occur in the SCCG region. Following is a summary of the status of wetlands in each of the LGAs, based on this information. Note that the Model DCP maps represent a significant expansion of this inventory, and should be consulted to identify all wetlands.

3.2 Location by LGA

Botany LGA has eight wetlands ranging in size from 1.2 - 43.2ha. Four are dune swale swamps, three estuarine and one is artificial. Disturbance ranges from low to high, with four having low disturbance. Impacts are predominantly from stormwater inputs, weed invasion and mining impacts. The Botany Wetlands provide habitat for migratory waterbirds listed under JAMBA and CAMBA are listed on the *Register of the National Estate* and in *A Directory of Important Wetlands in Australia* (Environment Australia (1996)).

Manly LGA has one relatively undisturbed estuarine wetland (4.8ha).

Randwick LGA has at least seven wetlands, five dune swale swamps, one upland swamp and one artificial wetland, ranging in size from 0.2 - 18.9ha. All are freshwater. Viability is moderate to high for four of the wetlands. Impacts are primarily from weed invasion, stormwater input of nutrients and sediment, and construction activities.

Rockdale LGA has three wetlands. All are dune swale swamps, ranging in size from 0.4 - 21.4ha. There is a mix of estuarine, saline and estuarine/freshwater wetlands. Viability is low for all wetlands and impacts are from weed invasion, clearing of vegetation, urban development, drainage and

reclamation and motorway construction. The Eve Street Wetlands provide habitat for migratory waterbirds listed under JAMBA and CAMBA and are listed in Environment Australia (1996).

Sutherland LGA has 45 - 50 wetlands ranging in size from 0.2 - 327.9ha. They comprise 23 estuarine wetlands, 16 dune swale swamps and eight upland swamps. The majority of wetlands have high viability with low impacts, though weed invasion and clearing are the dominant factors where impacts do occur. Other issues include pollution, grazing and reclamation/filling. Towra Wetlands are Ramsar listed and provide important habitat for migratory waterbirds listed under JAMBA and CAMBA.

Pittwater LGA has eight wetlands, comprising five estuarine wetlands, two upland swamps and one floodplain wetland, ranging in size from 0.3 - 28.1ha. Most have high viability, though some are affected by weed invasion, stormwater input and reclamation. Warriewood wetlands are potentially threatened by an upstream residential land release.

Warringah LGA has eight wetlands, comprising three estuarine wetlands, three floodplain wetlands and two upland swamps, ranging in size from 1.9 - 33.5ha. Viability ranges from medium through to high, with impacts in low viability wetlands being primarily weed invasion, excess stormwater and catchment urbanisation. Dee Why Lagoon is included on the *Register of the National Estate*.

Willoughby LGA has three estuarine wetlands and one saline wetland, ranging in size from 1.4 - 7.4ha. Viability is medium in all three, while impacts are primarily from weed invasion, runoff, sediment, litter, sewage and boating activities.

4 Background mapping studies

Following is a description of each of the mapping projects that were used for preparation of the Model DCP maps.

4.1 SREP 20: Hawkesbury Nepean River

P& J Smith prepared wetlands information for the Hawkesbury-Nepean Valley for Sydney Regional Environmental Plan (SREP) 20. Most aerial photography used for the survey was the Central Mapping Authority's Sydney 1986 1:16,000 colour series which was the most recent and largest scale photography available. The photos were taken at a time when all wetlands were full of water.

In order to map the ephemeral sections of some wetlands, the 1991 1:25000 series was used, which were taken at a drier time. Wetlands types mapped were: mangroves, saltmarsh, tree swamp, shrub swamp, open herb swamp, dense herb swamp and ephemeral herb swamp (Smith, P & J. (undated)).

Wetlands identified as significant were those that satisfied one or both of two criteria. The first criteria was wetlands that support extensive areas of native wetland vegetation. Introduced species are uncommon in these sections but may be more common in other parts of the wetland, such as higher ground around the edges. The second criteria was wetlands that frequently support about 50 waterbirds or more. This was assessed on the basis of field inspections, personal knowledge of wetlands and waterbirds, and information from other observers.

Wetlands that have been created artificially were excluded from consideration. However, natural wetlands that have been substantially modified, for example by partial drainage construction of levees, clearing of surrounding vegetation, stock grazing, seepage from sewage treatment works, were included if they satisfied one or both of the above criteria.

Wetlands less than 1ha in area were not mapped, nor were herb swamps less than 1.5ha in area. Wetland types and significance were assessed from the aerial photographs and from field inspections. The boundaries of the significant wetlands were marked on the aerial photographs under a stereoscope and later transferred to 1:25000 base maps using a zoom transfer scope.

4.2 Adam & Stricker: Wetlands of the Sydney Region

Paul Adam and Jay Stricker have mapped wetlands of the Sydney Region according to wetland types which are broadly classified according to their geomorphic setting. The classifications are: estuarine wetlands; cliff-top marshes; and freshwater wetlands (dune swale swamps, floodplain wetlands and upland swamps).

4.3 Benson & Howell: The Natural Vegetation of Sydney

A number of Sydney Coastal Councils have digitised their wetlands maps using the Benson & Howell 1:100 000 map sheets. In 1994, Benson & Howell prepared maps by identifying areas of vegetation with similar structure and floristics and grouped them to form map units on the basis of aerial photo-patterns and recognisable geological and landscape characteristics. Aerial photography from the then NSW Department of Lands (Sydney 1982: 1:16 000 colour) was used (Benson & Howell (1994)).

The vegetation maps are a diagrammatic attempt to simplify, over an extensive region, the distributional patterns of an often rich and varied flora. They are scale-dependent, and map units will almost invariably include unmapped areas of other map units too small to be shown separately. Similarly, most plant communities do not have clear-cut boundaries, but grade into each other, often over a broad ecotone. For mapping purposes such boundaries have to be approximated to a line.

Warringah Council commissioned air photos, flown in 1996, at 1:4,000 scale. An ecological consultant described all the vegetation types excluding seagrass as per the Benson & Howell nomenclature. This data was then digitised and forms a layer on Warringah's Geographic Information Systems. The wetlands vegetation communities were extracted and sent in electronic format to DUAP for inclusion in the Model DCP project.

4.4 NSW Fisheries: An Estuarine Inventory for NSW

The distribution of estuarine wetland plant communities was mapped by NSW Fisheries between 1981 and 1984. Base maps for each estuary were traced from Central Mapping Authority 1:25 000 topographic maps. Draft vegetation-type boundaries, interpreted from recent aerial photos, were drawn onto these maps using zoom transfer scope. Final estuarine maps were produced after field surveys to confirm boundaries and identify plant species.

Vegetation types identified on these maps were saltmarsh (all species combined), mangroves (all species combined) and seagrasses. The following species and families were mapped as seagrasses: *Zosteraceae*, *Posidonia australis*, *Halophilla* species and *Ruppia* species. Areas of each vegetation type and the surface water area of each estuary were estimated from the 1:25000 estuarine wetland maps using millimetre graph paper. The authors noted significant changes in wetland distribution since the preparation of maps, particularly in the case of seagrass (West et al (1985)).

NSW Fisheries, with the assistance of NPWS have digitised the majority of these maps. Updates to the 1985 maps have been done for Botany Bay and the Hawkesbury River (including Pittwater and Brisbane Water), and are being undertaken for Port Hacking, the Georges River and Lake Macquarie.

Although not used to produce the Model DCP maps, the following studies are nonetheless relevant to wetlands management in NSW.

4.5 DUAP et al: Georges River Catchment Biodiversity Study

DUAP commissioned NSW Fisheries to undertake this biodiversity study, which included fish sampling and habitat mapping. NSW Fisheries subcontracted NPWS to assist with the production of wetland maps.

The mapping is of the aquatic vegetation for south-western Sydney using 1:16,000 aerial photographs of the Georges River from Towra Point to the Liverpool Weir. Areas greater than 0.1ha were mapped and the following terrestrial vegetation identified: Mangrove Dominant; Casuarina Dominant; Melaleuca Dominant; Saltmarsh Dominant; Rush/Sedge Dominant; Littoral Rainforest; Heathland; Allocasuraina Dominant; and Plantation. The maps identify the following aquatic vegetation: Zostra Dominant; Posidonia Dominant; Halophila Dominant; and Ruppia Dominant.

The attributes of vegetation codes were also graded according to: no vegetative cover; scattered vegetative cover; dominant vegetation species partial code; and dominant vegetative species full code for the densest pattern. A disturbance coding was also given to each polygon to indicate ecological condition.

4.6 Wilton & Saintilan: Protocols for Mangrove & Saltmarsh Mapping

Wilton & Saintilan (2000) recommend that a common mapping protocol be established to facilitate comparisons between mapping programs. The report assesses the ranges of methods currently being implemented in mapping methodologies of mangrove and saltmarsh habitats and proposes six key recommendations for future mappings.

The recommended protocols refer to mangrove and saltmarsh and exclude seagrasses. The protocol focuses on delineating the different habitats, which provides more detail than the Model DCP mapping. The Model DCP mapping identifies only 'wetlands' rather than the specific types of wetlands. However, the lessons learnt from this study may be useful for mapping wetlands in general.

Wilton and Saintilan recommend that mapping of mangroves and saltmarshes for habitat change should occur at a scale of 1:10,000 or larger. Ideally, a scale of 1:5,000 or larger should be used to differentiate mangrove and saltmarsh habitats in the ecotone. They note that aerial photographs exist at a number of scales, and this introduces an intrinsic error when comparing surveys. They suggest that distortion errors inherent in aerial photographs be corrected using georectification, and a minimum of six Ground Control Points should be used to rectify each photo image.

The report argues that the classification of vegetation units or communities is the most significant source of variation in mapping processes. This is due to the absence of an acknowledged classification system for coastal wetlands. The report notes that often the mangrove *Avicennia marina* woodlands and saltmarsh communities have a distinct boundary, even though in some an ecotone may develop between them.

The authors suggest that *Casuarina glauca* communities be mapped as a distinct vegetation unit if it occurs in the saltmarsh and mangrove communities. Image processing software, which interprets vegetation community types from aerial photographs, can be used, where particular pixel values are associated with vegetation types. This avoids boundary definition problems. Extensive ground truthing is also required to verify the accuracy of the classifications given to the pixel values.

The authors suggest that when delineating vegetation community boundaries, photographs should be at least 1:5,000 scale, and a sharp pencil be used to draw the boundary. Where photographs are digitised with a scanner, 300 dpi gives an acceptable resolution. On-screen digitising also removes errors associated with hand drawn boundaries.

4.7 NPWS: Statewide wetland mapping

The NSW National Parks and Wildlife Service (NPWS) is currently leading the Statewide mapping of wetlands. This project aims to map wetlands in remaining 20% of NSW to give total coverage of wetlands for NSW. The project uses the same methodology developed for the mapping of wetlands across the Murray-Darling Basin.

This first the Statewide project includes satellite imagery and other GIS mapping of wetlands along the coast and in the far west of NSW. The products will ensure that a sound basis of knowledge of all wetlands in NSW to contribute to an ecological approach to river management. Maps can be produced for wetland areas within each of the catchments in NSW. It will also allow identification of different wetlands within each of the catchments.

5 Mapping improvements

Prior to the production of the Model DCP maps, mapping of Sydney's wetlands was inconsistent. There was much variation between councils on the extent, accuracy and method of mapping. Some councils had no mapped areas, while others had hand-drawn maps, and others had maps in relational databases such as Mapinfo. It is important that the initial consistency provided by the Model DCP maps be retained by subsequent mapping updates by the councils being carried out in a consistent manner.

The main criteria for consistency are as follows:

- approximately equal resources devoted to mapping updates by each of the councils
- synchronised timelines for mapping updates by each of the councils
- adoption of mapping improvement processes suggested above
- use of GIS software compatible with that used by the Model DCP

- Further improvements to the mapping by councils would result from development of an associated inventory which includes the following information:
 - international treaties, e.g. CAMBA, JAMBA and The Ramsar Convention
 - Commonwealth property e.g. Department of Defence lands
 - State controls where an agency may be the consent authority, e.g. NPWS for any land where species, populations or communities that are listed on the *Threatened Species Conservation Act 1995* may occur, or NSW Fisheries
 - State controls where a council is the consent authority
 - environmental constraints such as flood liability and connection to sewerage

The addition of new WETLANDS ZONES or boundary adjustments for these zones resulting from the mapping updates would require that councils amend their LEPs within which these zones are defined. All such amendments should be effected simultaneously as amending the LEP incrementally would administratively onerous for each council.

6 Background to buffer zones

Although technical information on wetlands buffer zones is lacking, it remains that there can be no one ideal buffer width for all wetlands. The standard width of 100m was chosen for the Model DCP as examination of other similar instruments revealed buffer distances within the range of 20m to 100m. 100m metres was considered an appropriate default width, which councils could reduce wherever appropriate. Note that a *minimum* distance of 40m is recommended by Sainty (2000).

The following rationale for wetlands buffer zones is provided by Angel & Hayes (1993):

- the habitat surrounding wetlands has an important bearing on the faunal value of the wetland, e.g. water birds and other wetland wildlife depend on suitable surroundings for food and nest sites
- the surrounding habitat types determine which species are likely to use the wetland
- the buffer zone reduces disturbance from adjoining human activity
- diversity in the surrounding habitat increases the possibility of wildlife diversity within the wetland
- buffer zones provide areas of flood refuge for fauna

Councils are encouraged to consult with wetland scientists and refer to the following information whenever buffer zone variations are being considered :

- geological and soils topographic maps (available for all LGAs)
- soil surveys, including electromagnetic induction surveys, which may be necessary to pick up anomalies in the underlying sediments
- groundwater movement and water table levels, and expected fluctuations under different flow regimes
- soil type and depth to bed rock
- actual or proposed surrounding landuse including expected pollutant loads
- location of aquifers, including old stream beds

7 Development assessment

7.1 DUAP: Guiding Development: Better Outcomes

For general information on the development application process, refer in the first instance to DUAP's *Guiding Development: Better Outcomes* 1999. This is available in folder format from the DUAP information centre for \$49.50. This document includes much information on development assessment, including:

BASIC FRAMEWORK

- different categories of development
- the development approval process in NSW
- complying development

ADMINISTERING THE SYSTEM

- the roles of the public and private sectors
- the role of accredited certifiers
- savings and transitional provisions

DEVELOPMENT APPLICATIONS

- when a development application is required
- different types of development applications
- approvals processes for houses
- submission requirements for development applications
- assessment of development applications
- conditions of development consent
- contents of development consents
- integrated development applications
- modifications of development consents
- procedures for Crown development applications

DETAILED DESIGN & DOCUMENTATION

- construction certificates for building work
- construction certificates and the BCA
- construction certificates for subdivision

CONSTRUCTION STAGE

- pre-construction checklist
- the role of the principal certifying authority
- the use of compliance certificates
- liability issues

MONITORING & ENFORCEMENT

- issuing orders

7.2 Australian Business Centre: Making the NSW Planning System Work for You

Refer also to Australian Business Centre (1999) *Making the NSW Planning System Work for You* for information on the NSW planning system. This document also includes general DA checklists. It is available from the Department of Urban Affairs and Planning Information Centre for \$40.65. The contents of this document are as follows:

GENERAL MATTERS

- When is a DA necessary?
- When is a rezoning necessary?
- What are Existing Use Rights?
- What are Development Control Plans?
- What other instruments may apply?
- What is Designated Development?
- What is Integrated Development?
- How can I ensure all agencies identify their requirements at the beginning of the process?
- Where can I get help?

PREPARING AN APPLICATION

- What information is required for a DA?
- What is a Statement of Environmental Effects?
- What is an Environmental Impact Statement?
- How can I minimise time delays?
- What is a Development Standard?

SUBMITTING AN APPLICATION

- What responsibilities does an applicant have?
- Where do I lodge my application?
- What costs are involved?
- What happens to my application once it is submitted to Council?
- What is the process for development that is likely to have a significant effect on the environment?

FOLLOW UP

- How to follow up
- What is Public Participation?

- Is a positive Council Planner's report enough? (Lobbying council)
- Procedures at council meetings

THE FINAL DECISION

- What does my development consent mean?
- What are developer contributions?

WHAT HAPPENS NEXT

- Who can appeal a decision?
- Can consent conditions be varied?
- What do I do if my DA is refused?

7.3 Sample DA checklist

Following is a summary of a council checklist for assessment of non-designated Part IV development applications (Warringah Council (2000a)).
Criteria for

Applicants for Part V and designated developments should consult council and DUAP for guidance. Further information is available in the DUAP's *Guiding Development: Better Outcomes* (1999) and the Australian Business Centre's *Making the Planning System Work for You* (1999).

General: Overall check that form completed correctly; names and signatures (with date) of property owner(s); lodgement date; check estimated cost of construction is accurate; and DA property address.

Fees: DA fee; Construction Certificate fee; Kerb & Gutter Inspection fee; Long Service Levy; Long Service Levy Income; Advertising; and Other (specify).

Site plan to include: location, boundary dimensions, site area and north point; existing vegetation and trees; location and uses of existing buildings; existing levels of the site in relation to buildings and roads; and location and uses of buildings on adjoining sites.

Development plans: four (4) sets of architectural plans and site plan at 1:100 scale (fully dimensioned) indicating existing and proposed buildings and indicating (where relevant):

- the location of proposed new buildings or works (including extensions or additions to existing buildings or works) in relation to the site's boundaries and adjoining development
- floor plans of proposed buildings showing layout, partitioning, room sizes and intended uses of each part of the building
- elevations and sections showing proposed external finishes and heights, side boundaries and relevant side boundary envelope
- proposed finished levels of the land in relation to buildings and roads

- building perspectives, where necessary, to illustrate the proposed building
- proposed parking arrangements, entry and exit points for vehicles, and provision for movement of vehicles within the site (including dimensions where appropriate)
- proposed landscaping and treatment of the land (indicating plant types and their height and maturity) also showing areas of landscaped open space and relevant percentage calculations

A4 reductions: six sets of A4 reductions indicating the location of the proposal relative to the site boundaries (site plan) and elevations for notification purposes.

Height of buildings: Existing and proposed height of buildings relative to a nominated fixed datum (preferably Australian Height Datum)

Ground levels: Plan detailing existing ground and proposed finished levels including methods of retaining soil.

Statement of Environmental Effects: which must: show that the environmental impact of the development has been considered, including a site analysis assessment and plan; set out steps to be taken to protect the environment or mitigate the harm.

Stormwater drainage Plan: in accordance with Council's specification (including on-site stormwater detention if required)

Geotechnical report: where applicable.

Tree preservation: Application for the removal of any trees protected by Council's Tree Preservation Order.

Construction: Details of the methods of securing the site during the course of construction.

Residential developments: Landscape plans, as per above, prepared by a Landscape Architect; Shadow diagrams for 22 December and 22 June at 9:00am, 12noon and 3:00pm; proposed material, finishes and colours including driveways; streetscape elevations /perspectives; and preliminary Building Code of Australia assessment.

Subdivision: The plan to include:

- at a reduction ratio, preferably 1:200: existing and finished ground levels:
- the location, boundary dimensions, site area and North point of the land
- the existing vegetation and trees on the land
- the location and uses of existing buildings of the land and adjoining properties
- contours based on existing levels of the site

- any natural feature so the site, including rock formations or cliffs, watercourses, flood levels, wetlands, forest areas, slip areas and bush fires risk
- any existing drains, easements or right-of-way affecting / benefiting the site
- the description of land / existing and finished ground levels
- details of existing and proposed subdivision pattern (including the number of lots and location of roads/access ways
- any heritage items (buildings and items) or relic defined by the *Heritage Act* or considered of local significance
- the location of all structures with distances from the proposed/existing boundaries, indicating whether these structures are to be removed or retained
- the location of existing underground services and overhead lines
- engineering plans detailing location of all proposed roads, rights of way including long sections and cross-sections in accordance with Council's specifications.
- details of consultation with public authorities: responsible for provision, alternation or amplification of utility services required by the proposed subdivision - these details may be discussed the appropriate council state members prior to or at the time of lodgement of the application - the inclusion of the details itemised will assist in the processing of the application

Integrated development: sufficient information for the approval body to make an assessment of the application; and additional copies of plans as determined by the consent authority

Shops, offices commercial or industrial development: to include: details of hours of operation; plant and machinery to be installed; type, size and quality of goods to be made, stored or transported; and loading and unloading facilities

Change of building use: (where no alterations or additions are proposed): a list of any fire safety measures in the building or on the land on which the building is situated in connection with the proposed change of building use; and a separate list of those measures as are currently implemented in the building or on the land on which the building is situated

Demolition: Details of age and condition of buildings or works to be demolished.

Advertisements: Details of the size, type, colour materials and position of the sign board or structure on which the proposed advertisement is to be displayed.

Existing uses: details of the existing use.

Other developments: Depending on the nature and scale of the development, the following information may also be required: traffic reports; acoustic reports; arborists reports; Species Impact Statements; Flora/Fauna Impact under Section 5A of the *EP&A Act*; archaeological report; bush fire control report; flood/hydrological analysis; and heritage/conservation report

Development applications captured by the Model DCP within WETLAND ZONES must also satisfy the following information requirements:

- **a description** of proposal
- **a map** showing location of proposal, WETLAND ZONE and WETLAND PROTECTION AREA
- **the aims** of proposal
- **compliance with DCP Wetland Management Objectives** (wetland ecology & habitat; hydrology; water quality; bushfire hazard; social & cultural values; and compensatory wetlands)
- **a description of wetland type**
- **a vegetation** survey
- **a fauna** survey
- **a water quality and hydrology** description
- **an acid sulfate soils** analysis
- **compensation** measures
- **cultural and social** values
- **a management plan**
- **a list of other relevant legislation, plans and policies**

(NB: this is an abbreviated list. Further detail is included in the Model DCP itself).

Development applications captured by the Model DCP within WETLAND ZONES must also satisfy the following information requirements:

- **a description** of the proposal
- **a description of the type of the nearby wetland**
- **compliance with DCP wetland management objectives:** wetland ecology & habitat; hydrology; water quality; bushfire hazard; social & cultural values; and compensatory wetlands
- **the social and cultural values** of nearby wetlands
- **the predicted impacts** and means of mitigating impacts
- **a management plan**
- **a list of other relevant legislation, plans & policies**

NB: this is an abbreviated list. Further detail is included in the Model DCP itself.

7.4 Sample report pro-forma

Following is a checklist of considerations for inclusion in a DA assessment report pro forma, based on Warringah Council (2000b). Further information is available in DUAP's *Guiding Development: Better Outcomes* (1999) and the Australian Business Centre's *Making the Planning System Work for You* (1999).

DA and site information: Development application No.; date lodged; file No.; Site Lot No.; Site DP No.; Council Officer initials; Site address; Applicant's name; Applicant's address; Owner's name; Owner's address; Zone under LEP.

Recommendation: consent; modification; or refusal.

Description of development proposal

Building class BCA

Report type: consent by officer under delegation; modification via team leader; consent by officer/team leader; DA issued modification of consent; DA issued consent/refusal; DA favoured; and report to council.

LEP land use category

Compliance with the Zone's objectives: Yes/no

Section 79C EP&A Act heads of consideration:

- the provisions of: any environmental planning instrument; any draft environmental instrument that is or has been placed on public exhibition and details of which have been motivated to the consent authority; any Development Control Plan; and any matters prescribed by the regulations that apply to the land to which the development application relates
- the likely impacts of that development, including environmental impacts on both the natural environments and social and economic impacts in the locality
- the suitability of the site of the development
- any submissions made in accordance with this Act or the Regulations
- the public interest

Tree Preservation Order: Will the proposal impact on trees? Yes/No
Comment

Does the proposal require removal of trees? Yes/No Comment

Has an application for tree removal been submitted? Yes/No Comment

Referrals: The application was referred to: development engineers; social planners; neighbouring council(s); State agencies (list); Commonwealth agencies (list)

Notification: The application was notified to ___ adjoining owners and occupiers by letter dated ____. A total of ___ submissions were received, of which ___ objected for various reasons which have been addressed in this report.

Matters raised in submissions plus development assessment comments (list issues):

Where the proposal does not comply with one or more of the Wetland Management Objectives listed in the LEP and DCP, list the relevant standard and provide reasons why such a standard is proposed to be varied and the likely issues arising from any variation..

Recommendation: consent; or refusal.

Signed by development assessment officer, with date

Conditions to apply if recommended for approval

Reasons for refusal if recommended for refusal

8 Preparing a wetland management plan

The following information is based on Hawkesbury Nepean Catchment Management Trust (1996b).

8.1 Step 1: Gather information

The first step is to contact anyone who would have an interest in the area or could be of help. Contact neighbours, the council and local environment groups and tell them why the wetland is important and what the main issues are about its current state and potential threats. Then organise a meeting or site inspection so that the issues can be discussed. A working group of interested people should be established.

The following categories of information should be collected.

Background information: This includes information on historical and current uses of the wetland, its geology and climate, natural water flow, water quality and current biological condition - to understand the wetland in the context of its catchment. A good understanding of the overall health of the wetland is needed before any actions are decided.

For different types of site details, possible sources of information could include :

- *site climate and geology:* local observations, maps, past investigations
- *hydrology:* topographic maps, council drainage plans, site inspection
- *biological condition:* site inspection, past research, ornithologist clubs
- *current uses:* local knowledge, environment groups, council
- *historical information:* local residents, councils, historical societies, old photographs
- *water quality:* council, Streamwatch, site inspection and measurements

Current uses: This includes how the wetland is being used at present. For example, it may be identified as important for flood mitigation.

Historical information: This will assist in an understanding of the current state of the wetland and its catchment and in identifying threats to wetland values. Historical information could include land use changes, flood heights and frequency, changes in the plants and animals present, whether or not the area has been drained, filled or dammed, the extent and effect of bushfires etc. Information could be available from local residents, councils, State agencies and research organisations such as universities.

Biological condition: Determine which plant and animal species currently inhabits or make use of the wetland. It is important to establish which species

are present before deciding on management actions. The wetland may be home to rare or protected species and this could influence the type of actions to be taken.

Local climate and geology: This information is important in determining the types of plant and animal communities that could survive in the area and are important considerations for any remediation or rehabilitation work.

Hydrological analysis: This must be considered carefully before any water management activities are undertaken and it may be necessary to seek professional advice. Develop an understanding of the relationship between the wetland and the catchment water cycle. This includes the effect that any structures such as weirs, culverts, dams and stormwater drains have on the wetland and the effect of any previous draining, filling or extraction works.

Water quality: Investigate the current state of water quality within the wetland as well as pollutant sources and sinks throughout the catchment. Knowledge of water quality can be built up by inspecting the sources of flow into the catchment and by using physio-chemical and biological indicators. A local Streamwatch group may be able to help, or the local council may monitor water quality in the local streams.

8.2 Step 2: Identify values and threats

The information gathered in Step 1 must be analysed so that the existing and potential values and use of the wetland can be identified. Causes and symptoms should not be confused - for example, weed invasion may be identified as a problem, but it may be a symptom of weed invasion across the entire catchment, with seed being transported downstream. The long-term solution to this problem would involve reducing weeds across the entire catchment, rather than just in the wetland.

Identify the ecological, cultural and economic values of the wetland and desirable future uses. This list can include current values as well as potential values and uses which could be achieved with appropriate management. These values provide the guidance for the rest of the planning process and should be organised into a preliminary set of conservation and management objectives for the plan.

Identify direct and indirect threats to the wetland's values and uses. This includes existing threats (sedimentation, nutrients, weeds, etc.) and potential threats such as those resulting from possible future development and land use changes in the catchment. One way to do this is to try and predict what would happen to the wetland if there was no intervention.

8.3 Step 3: Decide on actions

Once the threats have been identified, it is possible to determine the best course of action. This can be anything from simply monitoring the health of

the wetland to undertaking remediation works, constructing a boardwalk or rezoning the land as a reserve. Think carefully about the implications of the actions for the overall ecology of the wetland. For example, weeds may currently be providing some habitat for birds. Timing and assigning responsibilities of each of actions should be planned and listed.

8.4 Step 4: Monitor performance

To ensure that resources are not wasted on ineffective actions, the performance of these actions needs to be monitored. Performance measures should be chosen which reflect the objectives of the plan. Some examples of performance measures which can be used for monitoring the success of a plan in meeting objectives include:

Objectives	Performance measures
Enhance and maintain the plant habitat value of the wetland	Type of plant communities present and changes in their size
Maintain hydrological functioning of the wetland	Frequency and extent of flooding and dry periods
Maintain animal populations	Range of species and number of animals in the area, both transient and permanent populations

Performance measurements for wetlands management (Hawkesbury Nepean Catchment Management Trust (1996b)).

Other performance measures which could be used are increases in the size of particular plant communities, a measure of the decrease in pollution load or an increase in the area of the wetland.

Factors which need to be considered in the monitoring program include the time-scale and frequency of monitoring and the resources available. State the performance measures to be used and who will be doing the monitoring. Design the monitoring program so that it is a pleasure, not a burden. The most satisfying and enjoyable part of the management process is watching the actions take effect.

9 Wetland management & land tenure

Responsibilities for wetland protection and management between the three tiers of government differ according to land tenure.

The Commonwealth generally has responsibility for wetlands on Commonwealth-owned land, State governments on State owned (Crown) land and councils on council-owned land. These differing responsibilities introduce some complexity into public sector wetland protection and management processes.

As an example of this complexity, NSW Fisheries is responsible for all marine habitats and flora and fauna up to high tide limit under the *Fisheries Management Act 1994*. Above this point, protection of flora and fauna is the role of NPWS. These agencies are at present clarifying responsibilities for habitats above high tide that are considered part of fish breeding habitat.

Responsibility for wetlands protection and management can be passed on from one tier of government to another. For example, Botany Council has been appointed a reserve trustee of Sir Joseph Banks Park according to the *Crown Lands Act 1999*. Classification of the park as “community land” according to the *Local Government Act 1993* has allowed Botany Council to prepare a plan of management for the land.

There are however no such provisions between the Commonwealth and other tiers of government. If a wetland is on Commonwealth land and Council receives a development application that may affect a wetland, councils are obliged to refer the matter to the Commonwealth. Under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the matter is referred to Environment Australia.

The Commonwealth can enter into a bi-lateral agreement with the States, which recognises the State’s assessment system. No such bilateral agreements have been developed to date.

10 Commonwealth responsibilities

10.1 EPBC Act

Commonwealth legislation of greatest relevance to wetlands management is the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*).

The *EPBC Act* commenced on 16 July 2000 and introduced a new assessment and approvals system for:

- actions that significantly affect matters of national environmental significance
- actions that have a significant effect on the environment of Commonwealth land
- actions carried out by the Commonwealth Government.

The *EPBC Act* replaces the following Commonwealth statutes:

- *Environment Protection (Impact of Proposals) Act 1974*
- *Endangered Species Protection Act 1992*
- *National Parks and Wildlife Conservation Act 1975*
- *World Heritage Properties Conservation Act 1983*
- *Whale Protection Act 1980*

It focuses Commonwealth interest on matters of national environmental significance, puts in place a streamlined environmental assessment and approvals process, and establishes an integrated regime for biodiversity conservation and the management of important protected areas.

There are six matters of national environmental significance contained in the *EPBC Act*:

- World Heritage properties
- Ramsar wetlands of international significance
- nationally threatened species and ecological communities
- listed migratory species (including waterbirds listed under JAMBA and CAMBA)
- Commonwealth marine areas
- nuclear actions, including uranium mining

The *EPBC Act* provides that actions which have, may have or are likely to have a relevant impact on a matter of national environmental significance may be taken only:

- in accordance with a bilateral agreement (which may accredit a State approval process) or a declaration (which may accredit another Commonwealth approval process) or

- with the approval of the Commonwealth Minister for Environment and Heritage under Part 9 of the *EPBC Act*

The *EPBC Act* also applies to actions taken on Commonwealth land or actions that will have a significant impact on the environment on Commonwealth land. Moreover, the Act provides that the Commonwealth, its agencies, and corporations, must not take an action that will have, or is likely to have, a significant impact on the environment anywhere in the world.

DUAP and Environment Australia have developed guidelines to advise councils, government departments, industry and the community of how the *EPBC Act* could be implemented in NSW. Further information is available from the DUAP website, www.duap.nsw.gov.au and the Environment Australia website, www.environment.gov.au/epbc/index.html.

10.2 Commonwealth Wetlands Policy

Also of relevance to wetland management is the 1997 *Commonwealth Wetlands Policy*. An *Implementation Plan* for the policy was released in 1999. The policy covers a range of strategies that provide specific direction for the Commonwealth's actions that either directly or indirectly affect wetlands.

Six strategic areas were identified in the policy:

- management of wetlands on Commonwealth lands and waters
- implementation of Commonwealth policies, legislation and programs
- community involvement in wetlands management
- local and state government partnerships
- developing a scientific basis for policy formulation and management
- international actions

The strategy indicates that the Commonwealth will provide assistance to local government efforts in raising community awareness of the value of wetlands and for increasing capacity building in the area of wetland management.

10.3 Commonwealth Coastal Policy

The *Commonwealth Coastal Policy* outlines the Commonwealth's vision for integrated management of the coastal zone. Of relevance to wetlands management is "recognition of the role of state and local governments in coastal management" ...where... "Commonwealth agencies and authorities will, wherever possible, seek to work co-operatively with these other spheres of government to achieve Commonwealth coastal management objectives".

10.4 Biodiversity conservation strategies

The *National Strategy for the Conservation of Australia's Biodiversity* sets out a blueprint for conserving biodiversity in Australia. It addresses a variety of

priority areas that aim to facilitate the objectives of the policy, such as bio-regional planning and management, protected areas, wildlife conservation and threatened biological diversity.

The *National Local Government Biodiversity Strategy* provides for assistance to local councils for the protection of biodiversity through a range of initiatives such as training, increased resource allocation, and regional partnerships and planning.

10.5 International treaties

The Commonwealth Government is a signatory to the following international treaties relating to wetlands:

- *Convention on Biological Diversity* 1992
- *Convention for the Protection of the World Cultural and Natural Heritage* 1972
- *Convention on Wetlands of International Importance (Ramsar Convention)* 1971
- *China-Australia Migratory Birds Agreement (CAMBA)* 1986
- *Japan-Australia Migratory Birds Agreement (JAMBA)* 1974
- *Convention on Conservation of Nature in the South Pacific* 1976
- *Convention on the Conservation of Migratory Species of Wild Animals* 1979
- *Convention on the International Trade In Endangered Species of Wild Flora and Fauna (CITES)*

Of these treaties, those that are most relevant to local wetlands management are the CAMBA and JAMBA agreements and The Ramsar Convention.

The CAMBA agreement provides for the establishment of “sanctuaries and other facilities for the management and protection of migratory birds and also of their environment” as well as obliging each country to “take appropriate measures to preserve and enhance the environment of migratory birds”. Each party to the agreement must also “prevent damage to migratory birds and their environment” and “restrict or prevent the importation and introduction of animals and plants which are hazardous to the preservation of migratory birds and their environment.”

The Ramsar Convention on Wetlands is an intergovernmental treaty adopted in 1971 in the Iranian city of Ramsar. The Convention covers all aspects of wetland conservation and wise use, recognising wetlands as important for biodiversity conservation and for the well-being of communities. The treaty includes four main commitments that the contracting parties are obliged to implement. These are listing of sites, wise use, reserves and training and international cooperation.

Applicants for development must refer actions that may have a significant impact on a Ramsar wetland or listed threatened or migratory (waterbird)

species to the Commonwealth, pursuant to the *EPBC Act*. Requirements for Commonwealth environmental assessment and approval may apply regardless of local and State development approval requirements.

11 State responsibilities

The NSW Government has a stated whole-of-government objective to work with councils, industry, scientific bodies and the community for the ecologically sustainable management of wetlands in NSW. State agencies share responsibility (either directly or indirectly) for wetland protection through legislation that applies to their day to day operations.

The major organisations include:

- Department of Land and Water Conservation
- NSW Fisheries
- National Parks and Wildlife Service
- NSW Environment Protection Authority
- Sydney Water Corporation
- Department of Urban Affairs and Planning
- Ports Corporations
- NSW Waterways Authority
- Roads and Traffic Authority
- Bicentennial Park Trust
- Centennial Park and Moore Park Trusts

11.1 Department of Land & Water Conservation

As the lead agency responsible for the sustainable use of the State's natural resources, the Department of Land and Water Conservation is the organisation with primary responsibility for wetland management in NSW.

The *Catchment Management Act 1989* recognises the need for a catchment-based approach in managing water bodies. Supporting this Act are numerous policies relating to management of different facets of the catchment. One of these, the 1991 *State Rivers and Estuaries Policy* has the 1996 *NSW Wetlands Management Policy* as a component policy.

The *Wetlands Management Policy* is designed to ensure that the Government gives "explicit consideration to the biophysical requirements of wetlands with the goal of ensuring their sustainable management" as part of its decision-making process. The 2000/2003 *Action Plan* has been prepared by the NSW State Wetland Advisory Committee to effectively implement the *Wetlands Management Policy*. The aim of the document is to put the principles of the policy into practice.

According to the policy, the NSW Government's common goal to guide decision-making on wetlands is: "The ecologically sustainable use, management and conservation of wetlands in NSW for the benefit of present and future generations."

It is the policy of the NSW Government to:

- *encourage the management of the wetlands of the State so as to halt and where possible reverse:* loss of wetland vegetation; declining water quality; declining natural productivity; loss of biological diversity; and declining natural flood mitigation
- *encourage projects and activities which will restore the quality of the State's wetlands,* such as: rehabilitating wetlands; re-establishing areas of buffer vegetation around wetlands; and ensuring adequate water to restore wetlands habitats

The Government will achieve this goal by adopting the following nine principles:

- water regimes for restoration require must be recognised
- implementation of land use and management practices which rehabilitate wetland habitats and processes
- new developments must allow suitable water distribution to & from wetlands
- water into wetlands must not degrade the site
- constructed wetlands on the site of viable natural ones is discouraged
- natural wetlands should not be destroyed - where it is absolutely necessary compensation is required
- degraded wetlands should be rehabilitated
- regionally and nationally significant wetlands must be conserved
- stewardship and cooperative action is necessary

The policy is to be implemented through applying principles to decision, making, co-ordinating wetland work of agencies, providing support to community and preparing an annual *Wetland Action Plan*.

DLWC is also responsible for administration of the State's Estuary Management Program. The program is embodied in the *Estuary Management Policy*, which is part of the *NSW Rivers and Estuaries Policy*. This policy focuses on tidal waterways and coastal water bodies and hence is applicable to seagrass, mangroves, saltmarsh and other tidally inundated wetlands.

Objectives of this policy are:

- protection of estuarine habitats and ecosystems in the long-term
- long-term management plans for the sustainable use of each estuary and its catchment, in which all values and uses are considered

To achieve these objectives the policy provides for:

- preparation of *Estuary Management Plans*
- financial and technical assistance to councils
- implementation of the *Estuary Management Manual* to facilitate implementation of the Policy

- statutory protection of the behaviour and nature conservation values of river estuaries, coastal lakes and associated tidal wetlands
- stewardship of estuary assets by all responsible authorities

Estuary Management Plans are intended to provide a coordinated planning approach between local and State government that creates a framework for the objective assessment of development proposals, nature conservation and remedial works. Estuarine wetlands, mangroves, seagrass and saltmarsh communities are important components of estuarine areas.

While the *Estuary Management Manual* does not specifically refer to wetland areas, it does indirectly provide for their inclusion in the planning process through generic discussion of a wide range of related processes and issues that require consideration in preparing an *Estuary Management Plan*.

Associated with *Estuary Management Plans* are *Floodplain Management Plans*. These are part of the *NSW Flood Policy*, which requires councils to produce *Floodplain Management Plans* for flood prone areas within their LGA. Areas of land that are flood affected are zoned accordingly and have restrictions placed upon them with respect to development controls. Restrictions are outlined in Local Environmental Plans.

Floodplain Management Plans need to address the aims of this policy, which are to reduce the impact of flooding and flood liability on individual owners and occupiers and to reduce private and public losses resulting from flooding. A *Floodplain Development Manual* has been produced by the State Government to provide guidance for councils in developing their *Floodplain Management Plans*.

A major recent Department of Land & Water Conservation initiative has been the passing of the *Water Management Act 2000*. This Act replaces several water management statutes, including *the Rivers and Foreshores Improvement Act 1948*, the latter having implications for management of wetlands. Further information on the *Water Management Act* is available from <http://www.dlwc.nsw.gov.au/care/water/wml/index.html>.

11.2 State Wetlands Advisory Committee

The State Wetlands Advisory Committee (SWAC), formerly the State Wetlands Action Group (SWAG), was established under the *NSW Wetlands Management Policy* by the Minister for Land and Water Conservation in 1996. SWAC is currently developing guidelines to assist with the development of local wetland management plans.

Terms of reference for SWAC are:

- develop and review targets, outcomes and milestones for the *Wetland Action Plan*
- provide advice on State priorities for wetland management

- promote wetland management and protection
- provide advice on wetland funding priorities
- monitor funding of wetland projects across all programs
- determine the allocation of funds
- monitor, review and report on the implementation of the policy objectives

The purpose of the *2000/2003 Wetland Action Plan* is to provide a focus for the implementation of the *NSW Wetlands Management Policy* by prioritising wetland issues. The priorities aim to provide strategies for SWAC and encourage community-based wetland projects around NSW.

SWAC's key strategies are:

- to coordinate the development of guidelines for preparing local wetland management plans
- to co-ordinate the development of guidelines for wetland rehabilitation and compensatory guidelines
- to ensure wetlands are adequately considered in the NSW Water and Vegetation Reforms
- to continue to support the community through the provision of Wetland Action Grants

11.3 Environment Protection Authority

As a result of a formal Section 12 Direction under the *Protection of the Environment Administration Act 1991* by the NSW Environment Protection Authority (EPA), all councils in NSW are required to produce *Stormwater Management Plans* for urban areas. Stormwater Management Plans are required for each LGA on a catchment by catchment basis. The aim of these reports is to identify major stormwater problems and formulate options to address the issues.

Note that stormwater and point source pollution from sewerage overflow points are identified as the main contributors to pollution of waterways and a major contributor to the decline of wetland health and long-term viability.

11.4 Department of Urban Affairs and Planning

The NSW Department of Urban Affairs and Planning (DUAP) comprises a range of agencies that deal with planning, policy and regulation of the State's natural and built environment, rural and urban management (including urban growth, renewal and consolidation) and the development of housing policies. DUAP manages land use planning in NSW in accordance with the *EP&A Act*. The Act sets out a process for the making of environmental planning instruments and assessing development applications.

A list of planning instruments made by DUAP, i.e. State Environmental Planning Policies (SEPPs) and Sydney Regional Environmental Plans

(SREPs), of relevance to wetlands management in Sydney is included in the *Table of legislation, plans and policies* section of this Appendix.

11.5 NSW Fisheries

NSW Fisheries is responsible for managing fish (including aquatic invertebrates), fish habitat and aquatic biodiversity throughout NSW under the *Fisheries Management Act 1994*. The Department has jurisdiction over all aquatic animals, except aquatic mammals, reptiles, birds and amphibians, and all marine vegetation including seagrasses, mangroves and macroalgae. This applies to all waters whether fresh or salt, private or public, or permanent or intermittent. NSW Fisheries also has responsibility for threatened aquatic fauna and marine vegetation, populations and ecological communities. The Act also allows for the protection of fish passage and the protection of key habitats, both in freshwater and saltwater, where fish spawn or are likely to spawn, such as gravel beds.

NSW Fisheries jointly administers the *Marine Parks Act 1997* with the National Parks and Wildlife Service and under this Act, the Marine Parks Authority is responsible for the management of all biodiversity within the marine park. Any developments proposed which may impact on the park area must be referred to the Authority.

The main mechanism by which impacts on the aquatic environment are controlled is the requirement for proponents, including local councils, to obtain approvals from NSW Fisheries, in the form of a permit, for any dredging or reclamation in any waters and for any damage to marine vegetation. These approvals are triggers for Integrated Development under the EP&A Act, as well as the requirement for an aquaculture permit. Under Regulations of the *Fisheries Management Act*, a permit is also required to use explosives in the aquatic environment.

NSW Fisheries also conserves specific fish habitat by the creation of Habitat Protection Plans, aquatic reserves and intertidal protected areas. The threatened species provisions within Part 7A of the *Fisheries Management Act* allow for the protection and conservation of threatened fauna and marine vegetation. It also provides for the preparation and implementation of recovery and threat abatement plans for endangered species, populations and ecological communities, and the designation of habitats as 'critical' for their survival. If a proposal may have a significant impact on aquatic threatened species than an eight-part test is required for each species. If the test identifies a significant impact, then a species impact statement must be prepared under Section 5C of the EP&A Act. The concurrence of the Director of Fisheries is required prior to granting development approval.

11.6 National Parks and Wildlife Service

The NSW National Parks & Wildlife Service (NPWS) has direct responsibility for the management of any wetland area within a national park or nature reserve. Plans of management for these sites are subject to approval by the Minister administering the *Fisheries Management Act 1994*.

NPWS is also responsible for administration of the *Threatened Species Conservation Act 1995*. Where a DA may have a significant effect on a threatened species, population, ecological community or habitat listed under this act in a wetland area, the consent authority is required to undertake an eight-part test in order to determine if there is likely to be a significant effect on the aforementioned biota.

If the eight-part test identifies a likely significant effect, then, a species impact statement must be prepared according to the *EP&A Act*. Concurrence of the Director-General of NPWS must be sought prior to granting of development consent. Further information on the *Threatened Species Conservation Act* is available at <http://www.npws.nsw.gov.au/wildlife/threaten.htm#1Listing>.

In December 2000, the Sydney Coastal Estuary Swamp Forest Complex was listed as an Endangered Ecological Community in Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995*. Further information on this listing is available at <http://www.npws.nsw.gov.au/news/tscdets/f001222a.htm>.

11.7 Sydney Water

Wetlands on Crown land are under the jurisdiction of the relevant State authority. For example, Sydney Water assumes responsibility for wetlands on its own land and prepares plans of management according to its Wetlands Policy. There is no legal obligation according this policy or the *Sydney Water Act 1994* for Sydney Water to liaise with councils on wetland management.

There is however an obligation for liaison under Sydney Water's operating licence for the Botany Wetlands. Consequently, Sydney Water has established a committee to oversee the management of the Botany Wetlands that includes Botany Council, NPWS, RTA, Environment Protection Authority, Sydney Airport Corporation, and the local catchment management committee.

12 Local government responsibilities

As consent authorities for most development applications according to the *EP&A Act*, councils have the major role in implementing wetland management practices. Councils are also responsible for managing developments upstream of wetlands whose cumulative impacts indirectly affect wetlands.

Councils are responsible for the management of all land under their ownership and for some land they do not own. For example, some intertidal areas are Crown Land and are partly owned by DLWC. Yet it is often council's responsibility for the care, control and management of these areas. Councils may also operate and manage structures in wetlands on land they do not own. In other cases, wetlands may be on council-owned land, but controlled and managed by a State agency. For example, Botany Wetlands are on land owned by Botany Council, but are managed by Sydney Water.

Local Councils in NSW are required to incorporate ESD principles into all their activities according to the *Local Government Amendment (Ecological Sustainable Development) Act 1997*. This provides an imperative, as part of a wider ESD agenda, for councils to protect wetlands in order to preserving biodiversity for current and future generations.

Councils also have specific statutory responsibilities under the *Local Government Act* to ensure wetland protection, regeneration and community education. This is the only Act that specifically outlines the roles and responsibilities of councils in relation to wetland management. Note that The Act does not refer to controls on potential threats to wetland areas from development activities outside the immediate wetland area.

Other instruments used by councils to protect and manage wetlands include:

- DCPs for individual wetlands
- State of the Environment Reports - can provide an overview of the status of wetlands in the LGA
- Estuary Management Plans (EMPs) - can provide for protection and management of estuarine wetland areas
- SREPs - can provide for further consideration of wetlands in the planning process
- LEPs - can provide statutory support for wetland DCPs
- Tree Preservation Orders

13 Other stakeholders

Individuals: can help look after wetlands when they visit them by:

- avoiding disturbing birds, particularly during the breeding season
- making sure that domestic pets are not allowed to wander into wetland areas
- avoiding destroying native vegetation
- not dumping garden water or other refuse into wetland areas
- and bringing important wetland areas to the attention of councils and State agencies

Community groups: Based on the response of community groups to the questionnaire distributed by the SCCG in September 1999, key organisations with an interest in wetland conservation are identified as:

- university research centres, e.g. Centre for Research on Ecological Impacts of Coastal Cities (CREICC) - University of Sydney
- volunteer Bushcare groups, e.g. Bundock Bushcare Group
- volunteer wetlands groups, e.g. Taren Point Wetland Group
- Coastcare groups
- residents action groups, e.g. Snails Bay Residents' Group
- precinct groups
- catchment management boards
- environment groups, e.g. Botany Environment Watch and Natural Allies
- flora and fauna societies, e.g. Malacological Society of Australia
- Greening Australia
- Sydney Metropolitan Wildlife Service

Community groups can help conserve wetlands by:

- caring for local wetlands and taking action to maintain or improve wetland areas
- helping local organisations gather environmental information and monitor the state of the local wetland and their catchments
- identifying wetlands that should be dedicated as nature reserves and informing authorities about them
- encouraging all levels of government to place controls on development affecting wetland areas
- alerting authorities to the importance of the local wetlands and the threats they face
- working with other organisations and councils to prepare management plans for local wetlands
- seeking technical help and grants to support wetland management activities

University research centres: are primarily concerned with understanding the mechanisms of wetland functions from a scientific perspective to ensure a more informed approach to wetland management and preservation.

Volunteer groups: are usually focused on maintaining the ecological and recreational amenity value of local wetlands. They may also assist councils and agencies by acting as wetland “watchdogs”. These groups may receive government funding to undertake regeneration and data collection.

Resident groups: play a similar role as the volunteer groups, but usually form in response to a particular local issue.

Environment groups: are generally an umbrella organisation to which volunteer and resident action and groups belong. They often undertake lobbying on behalf of their smaller member groups.

Catchment management boards: bring together government, other organisations and the community to develop strategic plans and strategies for integrated catchment management.

14 Table of legislation, plans & policies

14.1 Commonwealth legislation

Act	Responsibility	Notes
<i>Australian Heritage Commission Act 1975</i>		Relates to land included on the national estate and the protection of the National Estate. This includes 15 wetland area listed on the Register of the National Estate.
<i>Environment Protection & Biodiversity Conservation Act 1999</i> www.environment.gov.au/epbc	Environment Australia	Requires approval for activities that significantly affect matters of national environmental significance. These include Ramsar wetlands, threatened species and migratory species.
<i>Native Title Act 1993</i> http://www.austlii.edu.au/au/legis/cth/consol_act/nta1993147/	Commonwealth Government	Native Title is the name Australian law gives to the traditional ownership of land and waters that have always belonged to Aboriginal people according to their traditions, laws and customs.
<i>Telecommunications Act 1991</i>		Enforces consideration of the environmental impact of telecommunications operations on Ramsar and other listed wetland areas.

14.2 State legislation

Act	Responsibility	Notes
<i>Aboriginal Land Rights Act 1983</i> http://www.austlii.edu.au/au/legis/nsw/consol_act/ala1983201/index.html	Department of Land and Water Conservation	Vacant Crown land not required for essential purposes or residential land is returned to Aboriginal people. Aboriginal land rights aim to redress past injustices when Aboriginal people were dispossessed of their land by colonisation.
<i>Catchment Management Act 1989</i> http://www.austlii.edu.au/au/legis/nsw/consol_act/cma1989182/index.html	Department of Land And Water Conservation	Provides a framework for catchment management. Allows for more community involvement.
<i>Coastal Protection Act 1979</i> http://www.austlii.edu.au/au/legis/nsw/consol_act/cpa1979210/index.html	Department of Urban Affairs and Planning	An Act to constitute the Coastal Council of New South Wales and to specify its functions; to make provisions relating to the use and occupation of the coastal region; and to facilitate the carrying out of certain coastal protection works.

<p><i>Coastal Protection Amendment Act 1988</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/cpa1979210/index.html</p>	<p>Department of Urban Affairs and Planning</p>	<p>Provides a new definition of the coastal zone defined by map references outlining the coastal zone, and extends three nautical miles out to sea.</p>
<p><i>Contaminated Land Management Act 1997</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/clma1997238/index.html</p>	<p>Environment Protection Authority</p>	<p>Where site contamination is considered to pose a significant risk of harm to human health or the environment, the EPA has powers to direct the investigation / remediation of polluted land and water.</p>
<p><i>Crown Lands Act 1989</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/cla1989134/index.html</p>	<p>Department of Land and Water Conservation</p>	<p>Provides a regime for the ownership and management of Crown Land.</p>
<p><i>Environment Planning and Assessment Act 1979</i></p> <p>http://www.austlii.edu.au/cgi-bin/disp.pl/au/legis/nsw/consol_act/epaaa1979389/index.html</p>	<p>Department of Urban Affairs and Planning</p>	<p>Specifies environmental impact assessment requirements and procedures for some developments and activities.</p> <p>Allows for creation of policies and plans, including SEPP 14, which protects coastal wetlands.</p>
<p><i>Fisheries Management Act 1994</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/fma1994193/index.html</p>	<p>NSW Fisheries</p>	<p>Establishes responsibility for management and protection of fish and fish habitats. Requires permits for fish habitat destruction, including dredging and reclamation in any waters and damage to marine vegetation. Provides for the development of habitat protection plans and creation of habitat reserves.</p>
<p><i>Heritage Act 1977</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/ha197786/index.html</p>	<p>Department of Urban Affairs and Planning</p>	<p>Protects natural heritage features.</p>
<p><i>Local Government Act 1993</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/lga1993182/index.html</p>	<p>Local Government</p>	<p>Requires approval for building, waste management and sewerage and stormwater drainage.</p> <p>Council responsibility for the management of wetland areas in "Core Objectives."</p> <p>Directives for plans of management of community lands.</p>

<p><i>Marine Parks Act 1997</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/mpa1997135/index.html</p>	<p>NSW Fisheries and National Parks and Wildlife Service</p>	<p>Where a wetland forms part of Marine Park, any DA is subject to the <i>EP&A Act</i> and consultation with the Marine Parks Authority is required.</p>
<p><i>Mining Act 1992</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/ma199281/index.html</p>	<p>Department of Mineral Resources</p>	<p>Creates responsibility for development, management and use of mineral resources. Would apply to mining leases in wetland areas.</p>
<p><i>National Parks and Wildlife Act 1974</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/npawa1974247/index.html</p>	<p>National Parks and Wildlife Service</p>	<p>Relates to all areas reserved as national parks, historic sites, nature reserves, Aboriginal areas, state recreation areas and regional parks.</p> <p>Licence required to destroy protected plants or to take or kill any protected fauna.</p>
<p><i>Native Vegetation Conservation Act 1997</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/nvca1997337/index.html</p>	<p>Department of Land and Water Conservation</p>	<p>Manages Native Vegetation clearing through the development consent and planning process.</p>
<p><i>Noxious Weeds Act 1993</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/nwa1993182/index.html</p>	<p>Department of Land and Water Conservation NSW Agriculture Local Councils</p>	<p>Specifies landholder responsibilities to control noxious weeds.</p> <p>Outlines licence requirements for herbicides and their use.</p>
<p><i>Ports Corporation and Waterways Management Act 1995</i></p>		<p>Specifies protection of the marine environment (including wetlands) through provision of emergency environment protection services for dealing with pollution incidents. The Harbour master has powers to impound dangerous vessels that may threaten the marine environment.</p>
<p><i>Protection of the Environment Administration Act 1991</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/poteaa1991485/index.html</p>	<p>Environment Protection Agency</p>	<p>The EPA is given general environmental responsibilities – ie to protect, restore and enhance the quality of the environment in NSW, having regard to ecologically sustainable development (ESD).</p>
<p><i>Protection of the Environment Operations Act 1997</i></p> <p>http://www.austlii.edu.au/au/legis/nsw/consol_act/poteoa1997455/index.html</p>	<p>Environment Protection Agency</p>	<p>The EPA has powers to license activities that pollute water. There are heavy penalties for unlicensed pollution.</p>

<i>Soil Conservation Act 1912</i>	Department of Land & Water Conservation	Regulates activities that may result in soil erosion.
<i>Threatened Species Conservation Act 1995</i> http://www.austlii.edu.au/au/legis/nsw/consol_act/tsca1995323/index.html	National Parks and Wildlife Services	Establishes a process for classifying and protecting endangered species and critical habitats.
<i>Water Act 2000</i>	Department of Land and Water Conservation	Enacted on 1 st January 2001, covers all water resources in the State.

14.3 Commonwealth wetland policies

Policy	Responsibility	Notes
<i>Commonwealth Wetlands Policy 1997</i> http://www.environment.gov.au/water/wetlands/policy.htm	Environment Australia	National wetlands policy for managing wetlands on Commonwealth land, implementing Commonwealth policy, working with states, territories and local governments, acting as a scientific basis for policy & management and international action.

14.4 State wetland policies

Policy	Responsibility	Notes
<i>NSW Coastal Policy 1997</i>	Department of Urban Affairs & Planning	Ecologically sustainable development of the coast through water quality management, regulation, protection, restoration, SEPP14, SEPP26, conservation, reserve systems, ASS management, planning, cultural heritage protection, monitoring research & management.
<i>NSW Estuary Management Policy 1992</i>	Department of Land & Water Conservation	A component policy of the NSW State Rivers and Estuaries Policy 1993 for the protection and management of estuaries.
<i>NSW Fisheries Policy and Guidelines - Aquatic Habitat Management and Fish Conservation 1999</i> http://www.fisheries.nsw.gov.au/index.htm	NSW Fisheries	Provides background material and description of fish habitats and resources, relevant policies and legislation. Identifies activities that affect aquatic habitats, compliance activities, guidelines for mitigating impacts, conservation activities and appropriate environmental assessment.

<i>NSW Groundwater Dependent Ecosystems Policy - draft</i>	Department of Land & Water Conservation	Protection of groundwater dependent ecosystems, including groundwater dependent wetlands. Applies five management principles covering values, extraction, quality, precautionary principle and appropriate use and development.
<i>NSW Weirs Policy 1997</i> http://www.dlwc.nsw.gov.au/care/water/wr/pdfs/weir.pdf	Department of Land & Water Conservation	Aimed at halting and where possible reducing and remediating the environmental impact of weirs. Eight management principles outline construction, removal, modification, regulation, maintenance, riparian protection, rehabilitation and respect for the impact of weirs.
<i>NSW State Rivers and Estuaries Policy 1993</i> http://www.dlwc.nsw.gov.au/care/water/wr/pdfs/wr_fs04.pdf	Department of Land & Water Conservation	Developed for the improved management of rivers and estuaries and their floodplains. The policy sets out six principles for sustainable management.
<i>NSW Wetlands Management Policy 1996</i>	Department of Land & Water Conservation	Sets out the objectives and nine management principles for the management of wetlands. Overseen by the NSW State Wetland Advisory Committee (SWAC), a whole-of-government committee.

14.5 State Environmental Planning Policies

SEPP	Responsibility	Notes
<i>State Environmental Planning Policy No. 14 (SEPP14) - Coastal Wetlands</i> http://www.duap.nsw.gov.au/sepplists.pdf	Department of Urban Affairs and Planning	Protects mapped wetlands in the coastal zone of NSW (outside the Sydney metropolitan region). Requires development consent for the clearing, draining or filling of wetlands, or levee construction.
<i>State Environmental Planning Policy No. 19 (SEPP19) - Bushland in Urban Areas</i> http://www.duap.nsw.gov.au/sepplists.pdf	Department of Urban Affairs and Planning	Protection of natural bushland in local government areas listed in the schedule, which are reserved for public open space purposes. Development consent must be obtained before bushland is disturbed.
<i>State Environmental Planning Policy No. 44 (SEPP44) - Koala Habitat</i> http://www.duap.nsw.gov.au/sepplists.pdf	Department of Urban Affairs and Planning	Protection of Koala habitat, including Swamp Mahogany, commonly associated with wetlands. The policy applies to the local government areas within the known geographic range of Koalas. Councils may not issue development consent without investigating core Koala habitat.

14.6 Regional Environmental Plans

Sydney Regional Environmental Plan (SREP)	Responsibility	Notes
<i>SREP 14: Eastern Beaches:</i>	Department of Urban Affairs & Planning	Includes a policy on environmental protection and enhancement. Minor reference is made to previous destruction of wetland areas, the small and scattered remaining wetland areas and the need for further information on wetlands. General reference is made to protecting and enhancing the natural coastal environment (including wetlands) and the preparation of LEPs.
<i>SREP 17: Kurnell Peninsula</i>	Department of Urban Affairs & Planning	Includes controls on development in and around wetland areas. Conservation of the natural environment (including wetland areas) is one of the aims of the plan. Wetland areas are defined under the "Special Development Zone" (7b1) category and are protected under the objectives of the Zone. Some of these wetlands are also afforded protection under the National Parks and Nature Reserves (existing and proposed) Zone. The plan prevents Council, as the consent authority, from approving development applications that "are likely to have a significant impact on wetland areas". Under the plan, wetlands of the Towra Point Nature Reserve are controlled by the National Parks and Wildlife Service. Activities such as clearing, draining, filling and levee construction in wetland areas require DUAP approval. A 10 m buffer zone between wetland areas and any development (including the clearing or filling of land) must be provided.
<i>SREP 20: Hawkesbury Nepean River</i>	Department of Urban Affairs & Planning	Provides for wetland protection as a specific strategic consideration of 'environmentally sensitive areas'. Flora and fauna protection objectives include wetland communities, with specific strategies given. The plan also outlines controls on development in mapped wetlands, such as clearing, draining, filling and levee construction.
<i>SREP 22: Parramatta River</i>	Department of Urban Affairs & Planning	Provides for wetland protection as an aim of the plan. It provides guidelines for wetland protection. Draining, filling and levee construction in wetland areas requires development consent, though dredging for maintenance of navigation channels does not. All DAs that may impact upon wetlands require DUAP concurrence.

<i>SREP 23: Sydney and Middle Harbour</i>	Department of Urban Affairs & Planning	Includes an aim to protect “flora and fauna habitats, including wetland areas”. Although there is no specific mention of wetland areas in the plan, though it is assumed that they are included in Zone W3 - Environmental Protection. The zone allows certain development without consent (flora and fauna enclosures and aids to navigation), prohibits other development (eg. boating facilities, entertainment facilities), while all other development is subject to the development consent process.
<i>SREP 2: Georges River Catchment:</i>	Department of Urban Affairs & Planning	Aims to protect the water quality of the Georges River and its tributaries and the environmental quality of the whole catchment. The objectives of the plan are to be achieved through co-ordinated land use planning and development control. The plan establishes the framework within which local, State and Commonwealth agencies will consult so that there is a consistent approach to planning and development within the catchment.
<i>SREP 24: Homebush Bay Development Area</i>	Department of Urban Affairs & Planning	Brings all wetland areas in the Homebush Bay area into an “environmental conservation area”. Wetland communities include mangroves, saltmarshes and rushbeds. The plan requires the development of an ecological plan of management for the conservation area.

14.7 International agreements

Agreement	Responsibility	Notes
<i>Convention on Wetlands of International Importance - The Ramsar Convention</i>	Environment Australia at Commonwealth level and NPWS at State level.	The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an inter-governmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are currently 9 Ramsar sites in NSW. Ramsar wetlands are now protected under the <i>Environment Protection & Biodiversity Conservation Act 1999</i> .
<i>China-Australia Migratory Birds Agreement (CAMBA) 1986</i>	Environment Australia	Aims to ensure that the governments involved recognise the value of migratory birds by protecting those birds that migrate between Australia, Japan and China. Every second year, meetings are held to develop cooperative projects under the agreements.
<i>Japan-Australia Migratory Birds Agreement (JAMBA) 1974</i>	Environment Australia	Aims to ensure that the governments involved recognise the value of migratory birds by protecting those birds that migrate between Australia, Japan and China. Every second year, meetings are held to develop cooperative projects under the agreements.

15 References

15.1 Key

Adam P & Stricker J (1993) *Wetlands of the Sydney Region, Nature Conservation Council of NSW Project No.51, Final Report, Second Edition*, Sydney

Commonwealth of Australia (1997) *Wetlands Policy of the Commonwealth Government of Australia*, Canberra

National wetlands policy of Australia for:

- managing wetlands on Commonwealth lands and waters
- implementing Commonwealth policy, legislation and programs
- working with state, territory & local government
- acting as a scientific basis for policy & management
- international action

Department of Land & Water Conservation (1996) *NSW Wetlands Management Policy*, Sydney

Whole of Government policy for the ecologically sustainable use, management and conservation of wetlands. Nine principles of management:

- water regimes for restoration require must be recognised
- implementation of land use and management practices which rehabilitate wetland habitats and processes
- new developments must allow suitable water distribution to & from wetlands
- water into wetlands must not degrade the site
- constructed wetlands on the site of viable natural ones is discouraged
- natural wetlands should not be destroyed. where it is absolutely necessary compensation is required
- degraded wetlands should be rehabilitated
- regionally and nationally significant wetlands must be conserved
- stewardship and cooperative action is necessary

Department of Land & Water Conservation (1997) *NSW Wetland Management Policy: Management Guidelines*, Sydney

Department of Land & Water Conservation (1998a) *NSW Wetlands Management Policy Action Plan 1998/99*, Sydney

Department of Land & Water Conservation (1998b) *NSW Wetlands Management Policy Action Plan 2000/03*, Sydney

Produced under the *NSW State Wetlands Management Policy*. Sets out four key strategies and associated actions for the NSW State Wetland Advisory Committee to promote the implementation of the policy. These strategies are:

- development of guidelines for preparing local wetland management plans
- development of guidelines for rehabilitation as well as compensatory guidelines for situations where social and economic imperatives require wetlands be destroyed
- consideration of wetlands in the NSW Water and Vegetation reforms
- administration of the NSW Wetland Action Grants Program

Department of Urban Affairs & Planning (1997) *Circular No.B10: State Environment Planning Policy No. 14: Coastal Wetlands*, Sydney

Preserves & protects coastal wetlands. Gazetted in 1985. Major features:

- land managers or landowners require a permit under the EP&A Act to clear, drain, fill or construct levees within a SEPP14 area
- breach of SEPP14 may require rehabilitation be carried out with a restoration plan

Department of Urban Affairs & Planning (1999) *Guiding Development: Better Outcomes*, Sydney

Environment Australia (1999) *Implementation Plan for the Commonwealth Wetlands Policy*, Canberra.

Hawkesbury Nepean Catchment Management Trust (1996a) *Focus on Wetlands: The Natural Wetlands of the Hawkesbury Nepean Catchment*, Sydney

Hawkesbury Nepean Catchment Management Trust (1996b) *Focus on Wetlands: Guide for Preparing a Wetland Management Plan*, Sydney

Sainty & Associates (2000) *Protecting Wetlands in Sydney's Coastal Councils, Stage 1 Background Information & Literature Review Report*, Sydney

Sydney Coastal Councils Group (1998) *Sydney Regional Coastal Management Strategy*, Sydney

Guide for coastal management and planning in the Sydney coastal region. Management outcomes relate to water cycle management, nature conservation, public access, role of government, climate change, and cultural heritage.

Wyong Council (1999) *Wyong Shire Wetland DCP No.30*, Wyong

Wyong Council (1999) *Wyong Local Environmental Plan 1991 Amendment No.98*, Wyong

15.2 Mapping & inventories

Adam P & Pressey RL (1995) *A Review of Wetland Inventory and Classification in Australia* in *Vegetatio* Vol.118 pp.81-101, Belgium

Adam P (1992) *Wetlands and Wetland Boundaries; Problems, Expectations, Perceptions and Reality* in *Wetlands (Australia)* Vol.11

Lists all the wetlands in Australia identified by Environment Australia as of significance. Lists locations, values, tenure and management issues.

Benson D & Howell J (1994) The natural vegetation of the Sydney 1:100,000 map sheet, *Cunninghamia* Vol. 3(4) p 677-688

Department of Urban Affairs & Planning et al (in progress) *Georges River Catchment Biodiversity Study No 2: Aquatic Biodiversity*, Sydney

Department of Land and Water Conservation (in progress) *Wetlands Management Technical Manual*, DLWC Environmental Studies Unit, Sydney

Technical chapters on wetland classification and groundwater management relating to wetlands. It is intended that chapters will be eventually added for hydrology, monitoring, flora and fauna.

- Environment Australia (1996) *A Directory of Important Wetlands in Australia*, Canberra, <http://www.environment.gov.au/water/wetlands>
- Inventory of important national wetlands including Eve Street Marsh Arncliffe, Botany Wetlands and Towra Point estuarine wetlands. It includes useful information about wetland values, threats and conservation measures.
- Environment Australia (2001) *Technical Specifications for A Directory of Important Wetlands of Australia* Geographic Information System (GIS) Version 1.1, January 2001
- Sainty G and Jacobs S (1997) *Hawkesbury-Nepean Saltmarsh Assessment: Rapid Scientific Assessments Methods for Assessing Saltmarsh in the Hawkesbury Nepean Area*, Hawkesbury Nepean Catchment Management Trust
- Smith P & J (undated) *Significant Wetlands of the Hawkesbury-Nepean River Valley*, Sydney
- West RJ et al (1985) *An Estuarine inventory for NSW, Australia*, Fisheries Bulletin 2. September 1995, NSW Department of Agriculture
- Wilton, K.M. and Saintilan, N. (2000) *Protocols for Mangrove and Saltmarsh Habitat Mapping*, ACU Coastal Wetlands Unit Technical Report 2000/01, for the Estuaries Branch, NSW Department of Land and Water Conservation, Australian Catholic University
- Assesses the range of methods currently being implemented in mapping methodologies of mangrove and salt marsh habitats and proposes recommendations relating to mapping.
- Winning G (1991) *Some Problems in Determining the Boundaries of SEPP 14 Wetlands in Wetlands Australia*, Vol.11
- Winning G et al (2000) *How Wide is a Wetland Boundary?* in *Wetlands (Australia)* Vol.18(2) p.64

15.3 Commonwealth

- Department of Foreign Affairs and Trade, Canberra (1986) *Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment*, Australian Treaty Series 1988 No. 22, Australian Government Publishing Service, Canberra
- Lists all bird species covered by this treaty
- World Wide Fund for Nature (1999) *Ramsar Listings: A Discussion Paper for Landholders and Land Managers*, Sydney
- Discusses information on the Ramsar nomination process in NSW, especially for wetlands on private land.
- Environment Australia's wetlands page:
<http://www.environment.gov.au/water/wetlands/>
- Includes information on: National Wetlands Program; Migratory Waterbird Conservation; Ramsar Convention; National Wetlands Research & Development Program; A Directory of Important Wetlands in Australia; What's New; Other Links; and Publications.

Ramsar Convention on Wetlands: <http://www.ramsar.org>

Ramsar database: www.environment.gov.au/ramsar

Environment Australia / Ramsar Bureau Ramsar database contains copies of Ramsar Information Sheets (RIS) for listed wetlands describing the ecological character of the wetland, threats and conservation measures. Ramsar Wise Use Handbooks provide guidelines to assist implementation of the Convention.

Ramsar 'Toolkit': *Handbooks for the Wise Use of Wetlands* :
http://www.ramsar.org/wurc_handbook_index.htm.

The 'Ramsar Toolkit' embodies nearly all of the various guidelines that have been adopted by the Conference of the Contracting Parties to assist wetland managers, national authorities, and others in implementing the Convention's mission and objectives. The Handbook's nine brochures are organized along the lines of the three "pillars" of the Convention: 1) The wise use of wetlands; 2) Wetlands of International Importance; and 3) International Co-operation.

Towra Point Nature Reserve (Sutherland Shire Environment Centre):
<http://ssec.org.au/towra/>

Includes information on the Towra Point Nature Reserve Management Plan and Towra International Wetlands Strategic Plan 2000, virtual tour and volunteer activities.

Wetlandcare: <http://wetlandcare.com.au/res-map.htm>

What work is being done to map wetlands in Australia.

15.4 State

Department of Urban Affairs & Planning (2000) *The Future of Wetland Management and SEPP 14 - Coastal Wetlands*, Draft Discussion Paper, Sydney

Department of Land and Water Conservation (1996) *The Importance of Wetlands in Water Resource Management - A Literature Review*, Sydney

Discusses values and biophysical functions of wetlands in relation to water resource management. It includes hydrology, chemistry, biology, biodiversity, wildlife corridors, socio-economic functions, recreation, education, cultural heritage, and aesthetics.

Hawkesbury Nepean Catchment Management Trust (1997) *Focus on Aquatic Environments of the Hawkesbury-Nepean Catchment*, Sydney

NSW Government (1992b) *NSW State Rivers & Estuaries Policy*, Sydney

Protects all rivers and estuaries through the following principles:

- river uses which are non-degrading are encouraged
- non-sustainable uses should be progressively phased out
- degrading practices need to be replaced with more efficient / less degrading practices
- degraded areas should be rehabilitated & biophysical functions restored
- remnant areas with significant environmental values should be protected
- an ethos for sustainable management of rivers and estuaries should be adopted

NSW Government (1997) *NSW Coastal Policy 1997 - A Sustainable Future for the New South Wales Coast*, Department of Urban Affairs & Planning, Sydney

Ecologically sustainable development of the coast through:

- conservation of biological diversity & ecological integrity
- inter-generational equity
- improved valuation, pricing & incentives mechanisms
- use of the precautionary principle

Actions under the policy relate to water quality, outfalls, protection, restoration, SEPP14, SEPP26, conservation value, reserve systems, acid sulfate soils, planning, aesthetics, cultural heritage, research, monitoring, mapping.

Sydney Water (1996) *Wetlands Policy*, E-guide

Department of Land & Water Conservation estuaries website:

<http://www.dlwc.nsw.gov.au/care/water/estuaries/estuaries.html>

Department of Land & Water Conservation wetlands website:

<http://www.dlwc.nsw.gov.au/care/wetlands/index.html>

NSW Healthy Rivers Commission publications and issues papers, available at <http://www.hrc.nsw.gov.au>

Particularly relevant are the recent Independent Inquiry into Coastal Lakes, October 2000; Independent Inquiry into the Georges River - Botany Bay System, October 2000; Independent Inquiry into the Woronora River System, June 1999; Securing Healthy Coastal Rivers: A Strategic Perspective, June 2000; Independent Inquiry into the Hawkesbury Nepean River System - Supplementary Report, April 1999; and Independent Inquiry into the Hawkesbury Nepean River System, August 1998.

The NSW Healthy Rivers Commission is an independent Commission set up by the NSW Government in 1996 (as part of the Government's Water Reform Program) to make public Inquiries into selected NSW river systems, and to make recommendations to the Government on appropriate long-term approaches and strategies to achieve environmental, social and economic objectives for the systems.

SWAC website: <http://www.dlwc.nsw.gov.au/care/wetlands/swac>

15.5 Local

Eurobodalla Council (1994) *Eurobodalla LEP No.88*, Moruya

Liverpool Council (1999) *DCP No.8: Natural Assets*, Sydney

Pittwater Council (1998b) *DCP for the Conservation of Biodiversity in Pittwater*, Sydney

Rockdale Council (1999) *Rockdale LEP No.116 - North Arncliffe*, Sydney

Woollahra Council (1999) *Woollahra LEP 1995*, Sydney

Wyong Council (1999) *Flora & Fauna Guidelines for Development*, Wyong

15.6 Management plans

Angel J & Hayes R (1983) *A Guide to Planning for Coastal Wetland Protection in NSW*, Sydney

Bicentennial Park Trust (1998) *The Wetlands 2000 and Beyond: Management Strategy for the Bicentennial Park Wetlands*, Sydney

- Botany Wetlands Ministerial Taskforce (1991) *Botany Wetlands Rehabilitation: Directions for Management*, for NSW Minister for the Environment, Sydney
- Brock M (1997) *Are Their Seeds in Your Wetland?* Project Funded by the Land and Water Resources Research and Development Corporation, University of New England, Armidale
- A guide to working out whether remnant seeds can be found in wetlands for rehabilitation purposes.
- City of Montezuma (1999) *City of Montezuma Wetland Protection Ordinance*, USA
- Coates B and Hanslow D (1997) *Monitoring Coastal Wetland Ecosystems, Department of Land and Water Conservation Conference and Workshop*, Sydney
- Looks at assessment and understanding of coastal & estuarine processes. This paper looks at photogrammetry as a tool in coastal management.
- Department of Land & Water Conservation (1997) *Manly Lagoon Floodplain Management Plan*, Sydney
- Department of Urban Affairs and Planning (1999) *Guidelines: Wetland Restoration Plans*, Sydney
- Sets out the guidelines developed by DUAP to prepare and implement wetland restoration plans required under SEPP14.
- Dixon S & Chambers J (2000) *Technical Report No. 50: Indicators of Ecological Development for Created Wetland Systems*, Capel Wetlands Centre, Capel, WA
- Field A et al (1993a) *Eve Street Wetland Management Action Plan: Volume 1 Summary*, for Eve Street Wetland Urban Runoff Taskforce, Sydney
- Field A et al (1993b) *Eve Street Wetland Management Action Plan: Volume 2 Task Group Reports*, for Eve Street Wetland Urban Runoff Taskforce, Sydney
- Georgia Department of Community Affairs (1997) *Model Wetland Protection Ordinance*, USA
- Gosford Council (1989) *Wetland Management Study*, Gosford
- Hawkesbury-Nepean Catchment Management Trust (1994) *Draft Code of Practice for Development in Wetlands Which Requires the Concurrence of the Trust*, Sydney Regional Environmental Plan No. 20: Hawkesbury-Nepean River Amendment No. 2, Windsor
- Land & Water Resources Research & Development Corporation (1999) *Riparian Land Management Technical Guidelines - Volume One. Part A: Principles of Sound Management, Part B: Review of Legislation relating to Riparian Management*, LWRRDC, NSW
- Land and Water Resources Research and Development Corporation Guidelines for riverine areas, specifically:
- control of pest aquatic plants
 - managing snags and large woody debris
 - erosion control

- use of buffers
- rehabilitation of riparian vegetation
- managing riparian land for wildlife
- managing riparian zones for stock

Land Systems P/L (1989) *Rockdale Wetlands & Recreation Corridor Draft Plan of Management*, for Rockdale Council & Department of Planning, Sydney

Longworth J (1988) *Mawson Park Wetland Management Recommendations*, Sydney

Mitchell McCotter (1992) *Narrabeen Lagoon Floodplain Management Study*, for Warringah Council

Mossop D (undated) *Coastal Wetland Protection Law in NSW*

Northern Beaches Stormwater Management Plan Committee (1999) *Northern Beaches Stormwater Management Plan*, Sydney

NSW Department of Public Works & Manly Hydraulics Laboratory (1998) *Warriewood Wetland Plan of Management Part 2*, for Pittwater Council, Sydney

NSW Government (1992) *Estuary Management Manual*, Sydney

Patterson Britton & Partners (1995) *Manly Lagoon Estuary Management Study*, for Manly & Warringah Councils, Sydney

Pittwater Council (1996) *Irrawong Reserve Plan of Management*, Sydney

Pittwater Council (1998) *Careel Bay Wetlands Plan of Management*, Sydney

Rockdale Council (1999b) *Rockdale Wetlands & Recreation Corridor Management Strategy, Draft, Issue No.2*, Sydney

Sainty and Associates Pty. Ltd. (1999) *Guidelines to Manage Wetlands in the Lower South Coast of NSW*, A Report Prepared for the Eurobodalla Landcare Wetlands Committee

Community guide to the development of management plans, especially those on the south coast. Looks at biophysical and planning considerations needed to manage wetlands.

Total Environment Centre (1996) *Urban Wetlands - Pilot National State Protection Study*, Sydney

US Environmental Protection Agency (1991) *Guidance on Developing Local Wetlands Projects: A Case Study of Three Countries and Guidelines for Others*, USA

US EPA (1995) *Volunteer Estuary Monitoring: A Methods Manual* United States Environment Protection Authority, Office of Water, Report No. EPA842-B-93-004, November 1995, <http://earth1.epa.gov/OWOW/monitoring/volunteer/estuary/index.html>

Water Resources Consulting Services (1997a) *Addendum to Warriewood Wetland Draft Plan of Management 1997: Recommended Guidelines and Field Study Results*, for Pittwater Council, Sydney

- Water Resources Consulting Services (1997b) *Warriewood Wetland Draft Plan of Management*, for Pittwater Council, Sydney
- Watkinson, K. (1998) *Design of a Program Monitoring Wetland Vegetation At Minnamurra River, NSW*
- A research report submitted in partial fulfilment of the requirements for the award of the degree of Honours Bachelor of Environmental Science, Environmental Science Program, Faculty of Science, The University of Wollongong.
- Whitaker M (1998) *Issues Relating to Wetland Rehabilitation in NSW, Discussion Paper*, Report Prepared for the NSW State Wetland Advisory Committee, Sydney
- Reviews constraints to wetland rehabilitation and provides recommendations on becoming more effective. Specifically, deals with wetland status and rehabilitation in NSW, legislation and policy relevant to wetlands, and constraints such as site selection, compensation, communication and education, objectives setting, research, funding and implementation.
- Winning G (1990) *A Scheme for Assessment of the Nature Conservation Value of Wetlands*
- Young A et al (1996) *Developing a Management Framework for Wetlands: The Illawarra Experience in Australian Journal of Environment Management*, Vol.3

15.7 Hydrology

- Environment Protection Authority (1996) *Managing Urban Stormwater: Construction Activities*, Sydney
- Environment Protection Authority (1997a) *Managing Urban Stormwater: Council Handbook*, Sydney
- Environment Protection Authority (1997b) *Managing Urban Stormwater: Treatment Techniques*, Sydney
- Environment Protection Authority (1998) *Managing Urban Stormwater: Source Control*, Sydney
- Hornsby Council (1997) *Sustainable Water Best Practices*, Sydney
- Hornsby Council (1998) *Sustainable Water DCP*, Sydney
- Pittwater Stormwater Management Plan Committee (1999) *Pittwater Stormwater Management Plan*, Sydney
- Southern Sydney Regional Organisation of Councils (1998) *Soil & Water Management Program Materials*, Sydney

15.8 Water quality

- Anderson J (ed.) (1998) *Urban Creek Management*, seminar proceedings, 2 July 1998
- ANZECC (1998) *Interim Ocean Disposal Guidelines*, Canberra

- ANZECC (1999) *Draft Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Overview and Guidelines*, Canberra
- Boncardo (1999) *Recent Developments in Sewerage System Technology*
Department of Public Works and Services Workshop, June 1999,
Sydney
- Department of Local Government et al (1998) *Environment & Health Protection Guidelines: On-site Sewage Management for Single Households*, Sydney
- Department of Urban Affairs & Planning (1998) *Acid Sulfate Soil Manual*, Sydney
- Kelly I (1998). *Management of Wetland Landscapes, Shallow Groundwater and Nutrient Processes—Proposed wetland for Blue Haven*, unpublished report to Wyong Council, Wyong
- Middle Harbour Catchment Management Trust et al (1999) *Draft Middle Harbour Catchment Stormwater Management Plan*, Sydney
- SCCG (1992) *Stormwater Pollution Control Code for Local Government*, Sydney
- SCCG (1995) *On-site Stormwater Detention Guidelines for Urban Councils*, Sydney
- Sim R et al (1993) *Eve Street Wetlands Urban Runoff Task Force Water Quality / Environmental Task Group Final Report*, Sydney
- Stormwater Industry Association (2000) *Bulletin*, January, 2000.
- U.S. Bureau of Reclamation (1987) *Design of Small Dams*. 3rd edition, U.S. Department of Interior, Denver
- Wong (2000) *Water Sensitive Road Design: Design Options for Improving Stormwater Quality of Road Runoff*, CRC for Catchment Hydrology

15.9 Ecology & habitat

- Addendum to Warriewood Wetland Draft Management Plan 1997 (Pittwater Council (1997))
- NSW Fisheries & Hawkesbury Nepean Catchment Management Trust (undated) *Status Report on the Key Fish Habitats in the Hawkesbury-Nepean Catchment, Background Document to Habitat Protection Plan No.3*, Sydney
- NSW Fisheries (1998) *Habitat Protection Plan No.3: The Hawkesbury-Nepean River System*, Sydney
- NSW Fisheries (1999a) *Fish Habitat Protection Plan No.2: Seagrasses*, Sydney
- NSW Fisheries (1999b) *Policy & Guidelines for Bridges, Roads, Causeways, Culverts and Similar Structures*, Sydney
- NSW Fisheries (1999c) *Policy & Guidelines for Aquatic Habitat Management & Fish Conservation*, Sydney

- NSW Health (1998) *Warning: Mosquitoes are a Health Hazard*, Sydney
- NSW Health (undated) *Fact & Information Sheet, Epidemic Polyarthritis (Ross River Virus)*, Sydney
- NSW Health (undated) *Mosquito Control: To Prevent Australian Encephalitis and Epidemic Polyarthritis*, Public Health Unit, Sydney
- Roads and Traffic Authority (1998) *Options for Compensatory Habitat for Migratory and Local Wader - M5 East* RTA, Sydney
- Russell R (1993) *Mosquito and Mosquito-Borne Disease in Southeastern Australia*, University of Sydney and Westmead Hospital, Sydney

15.10 Education

- Maddoc, M and Markwell K (eds) (1992) *Evaluation of Educational Values of Selected National Estate Wetlands, Hunter Region, NSW*, Shortland Wetlands Centre, Newcastle

15.11 Constructed wetlands

- Department of Land and Water Conservation (1998) *The Constructed Wetlands Manual*, Sydney
- Payne R & Duncan S (1998) *Statement of Environmental Effects for Constructed Wetland for Stormwater Treatment at Wallarah Wetland*, for Wyong Council, Wyong
- Payne R & Duncan S (1998) *Statement of Environmental Effects: Constructed Wetland for Stormwater Treatment at Wallaras Wetland*, report to Wyong Council, Wyong

15.12 Development assessment

- Australian Business Centre (1999) *Making the NSW Planning System Work for You*, Sydney
- Department of Urban Affairs & Planning (1999a) *Is an EIS Required? Best Practice Guidelines for Part V of the Environmental Planning & Assessment Act 1979*, Sydney
- Department of Urban Affairs & Planning (1999b) *State Significant Development: A Guide to Making a Development Application*, Sydney
- Department of Urban Affairs & Planning (2000) *State Environmental Planning Policy No.60: Exempt & Complying Development, Explanatory Notes prepared by the Policy & Reform Branch*, Sydney
- Green Games Watch (2000) *Draft SEPP: ESD in the Greater Metropolitan Region*, Sydney
- Warringah Council (2000a) *Development Application Lodgement Checklist*, Sydney

Warringah Council (2000b) *Development Application Assessment Pro-forma*,
Sydney