ENVIRONMENTAL PROTECTION OF WETLANDS

Position Statement No. 4

November 2004

Environmental Protection Authority

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Foreword

The Environmental Protection Authority (EPA) publishes Position Statements, from time to time, as a means of informing the public about the EPA's views on matters of environmental importance. They also provide a basis for the development of the associated series of statements entitled *Guidance for the Assessment of Environmental Factors*.

This Position Statement provides the public and other key stakeholders with a summary of the aspects regarding environmental protection of wetlands in Western Australia that the EPA considers to be important in guiding its decisions and advice to government on matters of environmental protection.

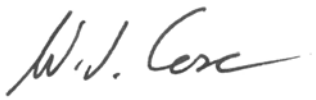
In the past little regard has been given to our wetlands. The Authority has estimated that some 80% of wetlands on the Swan Coastal Plain have been lost and many of the remainder have been heavily modified. Today there is an increased public appreciation for wetlands and the Authority places considerable importance on the protection of these remaining areas. Wetlands are now widely recognised wildlife habitats and are among the most biologically productive and biologically diverse habitats on the planet. They are key indicators of environmental health of ecosystems

Through the publication of this Position Statement, the Authority defines important environmental values and functions of wetlands and why they are worthy of protection. A set of principles to assist natural resource managers, decision makers, landowners and managers, to enable them to restore, maintain or enhance the environmental values and functions of wetland ecosystems are also detailed.

The Authority has long been concerned about the environmental consequences of wetland loss and it holds the view that as an aspirational goal there should be no net loss of wetland functions in the State.

The EPA received a number of useful comments on the preliminary document and acknowledges with gratitude this assistance.

I commend this Position Statement for your reading.



Dr Wally Cox
CHAIRMAN
ENVIRONMENTAL PROTECTION AUTHORITY

8 November 2004

Contents

EPA Position Statement No 4
Environmental Protection of Wetlands

Keywords: wetland, environmental protection, ecologically sustainable development (ESD), "wise use", biodiversity, biological diversity, inter-generational equity, ecosystem management, precautionary principle.

1. INTRODUCTION

The EPA has been actively involved in wetland protection throughout the State since 1972.

This Position Statement on wetland protection defines important environmental values and functions of wetlands and establishes principles for the environmental protection of wetlands in general.

In particular, the EPA has articulated a number of principles to provide guidance for the restoration, maintenance and enhancement of wetlands.

The Wetlands Conservation Policy for Western Australia (Government of WA, 1997a) is an important step forward in wetland conservation in Western Australia. This Position Statement should be read in the context of ecologically sustainable development consistent with the principal objectives outlined in the State Wetland Conservation Policy and environmental best management practice.

The EPA recognises the continued pressure to expand and develop urban, industrial and agricultural activities in the State and is mindful that land use zoning should be applied so as to achieve sustainable water resources management and protect the beneficial functions performed by wetlands as part of that process.

Wetlands are widely recognised as important wildlife habitats and as being among the most biologically productive and biologically diverse habitats on the planet. They support specialised plant assemblages and restricted plant species. They directly and indirectly supply food to a broad range of animals including micro-organisms, invertebrates, fish, birds, mammals and reptiles. Wetlands serve to purify water by removing suspended matter (settling of particles), reducing numbers of faecal micro-organisms and using dissolved nitrogen and phosphorus for plant growth. They also provide flood control by storing and detaining storm water although this function (and that of water purification) may naturally not always be beneficial to the wetlands.

The continued degradation and loss of wetland habitat in Western Australia, particularly on the Swan Coastal Plain, threatens the conservation of biodiversity of wetland species and communities and the ecological processes upon which the maintenance of these ecosystems depend. Many species of waterbirds depend on migrating between wetlands

hundreds (and even thousands) of kilometres apart both seasonally and as conditions change. The ecological functions of many of the remaining wetlands on the Swan Coastal Plain have been severely altered to the extent that they now bear little resemblance to their original state. Eutrophication, inundation of wetland vegetation, introduced fauna and weeds are widespread and are indicators of wetlands that are stressed and under threat.

The health of many of Western Australia's aquatic ecosystems, such as rivers and estuaries, is inextricably linked to the abundance and health of wetlands in the catchment and in this regard, wetlands function as the "kidneys of the catchment". Where vegetation linkages (corridors) between wetland vegetation and other native vegetation have been reduced and fragmented, further threats to ecosystem processes at the whole system level occur. Some of the important benefits (values and functions) wetlands provide are outlined in Section 3 of this Statement.

In the past little regard has been given to the value of wetlands, with many people having viewed these habitats as swamps (and refuges for disease) that would benefit from being drained or filled and converted into land suitable for farming, housing or roads.

Table 1 lists some of the activities that may degrade wetlands.

TABLE 1 - EXAMPLES OF ACTIVITIES THAT CAN DEGRADE WETLANDS

- filling
- draining
- clearing
- addition of water (eg from stormwater, from de-watering)
- dryland salinity in the South West
- change in flow regime in riverine wetlands
- use as detention basins
- removal of water (eg for stock or horticultural use)
- excessive abstraction of water from aquifers upon which many wetlands are dependent
- introduction of exotic plants and animals within and adjacent to wetlands
- grazing of stock
- removal of wetland vegetation (either directly or indirectly)
- fire
- spraying
- various kinds of development, particularly those resulting in increased numbers of people living nearby
- threatening processes such as climate change, weeds and plant diseases

Note: these activities may in some circumstances be managed to avoid unacceptable degradation.

The EPA has previously estimated that some 80% of wetlands on the Swan Coastal Plain have been lost and most of the remainder have been heavily modified (EPA, 2004). Of the remainder, an estimated 15% of the wetland area has retained high ecological values. These are conservation category wetlands (WRC, 2001)

The EPA places great importance on the protection of the remaining wetlands and expects that in the first instance proponents will conduct a thorough appraisal of all development options, including proper consideration of site selection, that would avoid direct or indirect impacts on wetlands. As well, the EPA plays a role in the protection of wetlands through the preparation and implementation of Environmental Protection Policies and the environmental assessment of development proposals and Planning Schemes.

In 1993, to assist proponents and others with responsibility for wetlands the EPA published "A Guide to Wetland Management in the Perth and Near Perth Swan Coastal Plain Area" (EPA Bulletin 686, 1993a). This Bulletin provided a methodology for wetland evaluation.

The Department of Environment is currently preparing a guideline for classification and evaluation of wetlands on the Swan Coastal plain. Once endorsed by the EPA, this guideline will effectively replace Bulletin 686.

2. SCOPE OF THIS POSITION STATEMENT

Wetlands are:

> *areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres*
>
> (UNESCO 1971)

This definition is from the Ramsar Convention on Wetlands of International Importance (to which Australia is a signatory) and which has been adopted in the Wetland Conservation Policy for Western Australia (Government of Western Australia, 1997a).

Although rivers, creeks, estuaries, caves, and shallow marine areas fall within this definition, their special attributes, values, protection and management requirements fall outside the scope of this Position Statement and will be addressed primarily through other position statements, guidelines or policies. This Position Statement focuses on terrestrial wetlands with permanent or temporary inundation and excludes constructed wetlands.

The purpose of this Position Statement is to define those environmental values and functions of wetlands that the Authority considers important, and to explain why they are worthy of protection. It also provides a set of principles for the protection of wetlands. Natural resource managers, decision makers, land owners and managers can use these when addressing wetland impacts and management. They should be considered by those submitting proposals for environmental impact assessment. They are also valuable for guiding the ongoing management of wetlands and adjacent activities.

3. SIGNIFICANT ENVIRONMENTAL VALUES AND FUNCTIONS OF WETLANDS

3.1 Primary production

The food web of wetlands is dependent upon their ability to provide nourishment for many vertebrates and invertebrates. Through the process of photosynthesis, plants produce organic matter from carbon dioxide, water and nutrients, using sunlight for energy. This organic matter is then available as food, to be consumed either directly or through the breakdown of plant material, to animals higher up the food chain.

The complexity, efficiency and adaptation of wetland ecosystems is evident and no more apparent than on the Swan Coastal Plain, where the naturally infertile sandy soils support wetlands which display a high degree of biological diversity and an equally impressive level of primary production, despite the naturally nutrient-poor landscape within which they occur.

High nutrient content and productivity in wetlands may seem unique but on the Swan Coastal Plain it is not quite the case. The nutrients contained in the wetlands are there through accumulation over eons and the vast majority is not available to plants and animals but stored in sediments and under decomposed organic matter. While rates of productivity of these wetlands are high compared to surrounding Banksia and Tuart forests, standing biomass is lower than the terrestrial ecosystems.

3.2 Recreational and landscape amenity

In Western Australia's arid climate, wetlands offer a refuge for both wildlife and humans during hot weather. Wetlands have an intrinsic natural beauty and, if properly managed, can provide recreational opportunities for boating, swimming, hiking, photography and bird-watching.

The opportunity to enjoy these wetland-dependent activities is threatened by continued wetland degradation and loss. Wetlands contribute to landscape, amenity and open space, especially in developed areas. Wetlands often have cultural and ethnographic significance for indigenous people.

3.3 Hydrological balance

Addressing water levels through hydrological balance when wetlands are subjected to human-induced pressures is a key element of their management. Flood control and stormwater detention can be important hydrological functions of wetlands. Potentially damaging volumes of fast-flowing floodwaters are temporarily stored in wetlands. The wetlands increase the detention time of floodwater and provide a mechanism for reducing flow velocity, erosion and flood peaks. This in turn reduces erosion and damage to property and infrastructure.

Clearing and urbanisation disrupt the natural hydrological regime in many wetlands and their groundwater capture zones, particularly those on the Swan Coastal Plain. Many

wetlands now reach a higher level in winter, inundating more vegetation and keeping fringing vegetation covered for a longer period, to the detriment of ecological values. On the other hand, groundwater abstraction can lower water tables leading to the drying up of wetlands.

3.4 Water quality protection

Wetlands may greatly influence the water quality of rivers and streams by removing pollutants such as sediments, nutrients, organic and inorganic matter and some pathogens. Runoff and drainage water which pass through such wetlands are essentially 'filtered'. This improvement in water quality comes from the wetland's ability to retain nutrients such as nitrogen and phosphorus, to intercept other pollutants, and to trap sediment and reduce suspended solids.

However, the capacity of a wetland to trap pollutants is not infinite. This natural capacity is reduced by the need to ensure better water quality is maintained in the wetland to protect the environmental values and beneficial uses within the wetland itself.

The natural nutrient cycle in many coastal plain wetlands has been disturbed by the addition of nutrients from urban stormwater and horticultural activities. This nutrient enrichment can lead to water quality problems such as blue-green algal (cyanobacterial) blooms and increased numbers of midges and mosquitoes, which can reach nuisance levels.

3.5 Wildlife habitat

Wetland habitats contain a multitude of ecological niches and support a wide variety of flora and fauna with different ecological functions. Wetlands provide a diversity of habitats for wildlife, such as waterfowl, fish, mammals and specialised vegetation complexes and assemblages, which may include many rare, threatened and endangered species. Australia has obligations under the Ramsar Convention and the JAMBA and CAMBA bilateral migratory birds agreements to conserve waterbird habitat.

The value of wetlands is enhanced through interaction with surrounding terrestrial ecosystems and the biota they contain. Indeed, for the effective protection of some wetland values it is essential that adjacent native vegetation is also retained. The EPA has endorsed the need for wetland buffers in its Guidance Statements. In addition, a guideline for determining wetland buffer requirements is currently being developed by the Wetlands Coordinating Committee as part of its task to implement the State Wetlands Conservation Policy.

Overall, wetlands are considered to be among the most biologically productive and diverse habitats in the State.

4. EPA PRINCIPLES FOR ENVIRONMENTAL PROTECTION OF WETLANDS

This Position Statement contains principles to assist natural resource managers, decision makers, land owners and managers, to enable them to restore, maintain or enhance the environmental values and beneficial uses of wetland ecosystems within the context of an overall goal of no net loss of wetland values and functions.

The following principles, set out in the form of high level statements, underpin the environmental protection of wetlands.

4.1 Overarching Statement of Goals

The EPA seeks to:

- protect the environmental values and functions of wetlands in Western Australia;
- protect, sustain and, where possible, restore the biological diversity of wetland habitats in Western Australia;
- protect the environmental quality of the wetland ecosystems of Western Australia through sound management in accordance with the concept of "wise use" (see section 4.3), as described in the Ramsar Convention, and ecologically sustainable development principles, regardless of land use or activity; and
- have as an aspirational goal no net loss of wetland values and functions.

4.2 Ecologically Sustainable Development

Ecologically sustainable development (ESD) means:

> *using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased.* (Commonwealth of Australia, 1992, p.6).

In recent years, ESD has become an explicitly stated goal of natural resource management agencies. In practice, however, management approaches have often focused on maximising short-term benefits and economic gain from wetlands, rather than any consideration of their long-term sustainability.

A lack of understanding of or interest in wetlands in the past has contributed to this situation, in particular through:

- inadequate information on the biological diversity and hydrology of wetlands;
- widespread ignorance of the function and dynamics of wetland ecosystems;
- lack of awareness of the physical and/or biological interconnectedness of wetland systems on scales that cross management boundaries and land tenure; and

- a prevailing perception that resources such as wetlands are renewable or replaceable, or that there are many more that are not under threat, and that immediate pressures to use them economically and socially outweigh the risks of future significant ecosystem removal or damage.

A lack of knowledge should not be used as a reason for not providing for wetland protection and management. There is sufficient knowledge about wetlands, their functions and values, at least for the Swan Coastal Plain where development pressures are greatest, to make sound decisions. See for example, Hill et al (1996). For areas where knowledge is limited, the precautionary principle should be applied (see section 4.6).

The National Strategy for the Conservation of Australia's Bio-diversity (Commonwealth of Australia, 1996) has been prepared under the core objectives of the National Strategy for Ecologically Sustainable Development (ESD). Key goals of ESD are to protect biological diversity and maintain ecological processes and systems, and the Biodiversity Strategy recognises that these goals are usually met best through in-situ protection and management rather than through off-site replacement.

It is generally acknowledged that the major causes of reduced biological diversity are direct habitat loss, degradation, nutrient enrichment and fragmentation. Hence, the EPA considers that modern wetland conservation should be strongly oriented towards the maintenance of hydrological and other processes needed to maintain habitat in the first instance.

4.3 "Wise Use" concept

Wise use of wetlands is a key concept of the Ramsar Convention. The definition was adopted in 1987 as being:

> *The wise use of wetlands is their sustainable utilisation for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem.* (UNESCO 1971)

The EPA interprets 'natural properties of the ecosystem' as their environmental values (which includes ecosystem health).

In this context "sustainable utilisation" is defined as:

> *Human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations.* (UNESCO 1987)

Human use can, of course, include protection for conservation or wilderness purposes.

4.4 Ecosystem Management Approach

In implementing this Position Statement and in assessing the environmental acceptability of development proposals, the EPA will use an ecosystem management (holistic systems)

approach that explicitly recognises the environmental benefits provided by wetlands and wetland processes. Wood (1994) described an ecosystem management approach as being one that achieves:

> *The integration of ecological, economic, and social principles to manage biological and physical systems in a manner that safeguards the ecological sustainability, natural diversity, and productivity of the landscape*

Ecosystem management of wetlands should incorporate environmental objectives, and be implemented through policies, protocols and best management practices. These can be made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain the composition, structure and function of wetland ecosystems for future generations. The focus of ecosystem management is on the sustainability of wetland ecosystem functions, integrity and the processes required to maintain these essential environmental goods and services.

An ecosystem management approach does not mean that wetlands should not be protected for a range of environmental values nor that they cannot support a variety of beneficial uses. It is simply based on the realisation that, in order to meet those wise-use requirements sustainably, we must value our wetland ecosystems for more than just the benefits that will directly generate income. For example, although wetlands are often regarded as potentially useful for agricultural production, for water abstraction or as an attribute of urban development, if the long-term (inter-generational) sustainability of wetland ecosystems is to be a key objective of management, then such uses may have to be modified to ensure that the composition, structure and function of wetlands and wetland systems can be maintained in the long-term.

An ecosystem management approach acknowledges that the current level of knowledge and models of ecosystem function may be incomplete, evolving and subject to change as more information comes to hand. Management approaches must be viewed as hypotheses to be tested by research and monitoring programs. Consequently, management practices should be adaptive and promote continuous environmental improvement.

4.5 Inter-generational Equity

The use of wetlands must have regard to the principle of intergenerational equity, as listed in section 4A of the *Environmental Protection Act 1986*.

A key to practising inter-generational equity is to become more aware of how actions carried out in the environment today might have effects in the future.

Wetland uses that focus primarily on short-term financial gains and do not take account of the future in terms of impacts on wetlands and surrounding areas, may not be ecologically sustainable in the long term. Wetland management needs to embrace an explicit acknowledgment of the importance of biological diversity and the complexity of natural systems. The challenge is to find ways of building on the environmental values

and functions provided by wetlands (e.g. removal of nutrients and sediment from water), some of which may not be easy to see at first.

Inter-generational equity underpins ecologically sustainable development. Public agencies with the stewardship of, and custodial responsibilities for, natural resources are obliged to take this into account.

4.6 Precautionary Principle

In using this Position Statement and in assessing the environmental acceptability of development proposals, the EPA will employ the Precautionary Principle, as listed in section 4A of the *Environmental Protection Act 1986*.

This provides an approach for considering the environmental impacts of a proposal on wetlands, where there is a lack of knowledge, and lack of scientific certainty.

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6. GLOSSARY

For the purpose of this Position Statement:

bio-diversity – means the variety of life forms: the different plants, animals and micro-organisms, the genes they contain, the ecological functions they perform and the ecosystems they form. It is usually considered at three levels: ecosystem diversity, species diversity, and genetic diversity;

conservation – means the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations, while maintaining its potential to meet the needs and aspirations of future generations. Thus conservation is the positive, embracing, preservation, maintenance, sustainable utilisation, restoration and enhancement of the natural environment;

creek – as a type of wetland means a seasonally inundated channel (Semeniuk, 1987).

dampland – as a type of wetland means a seasonally waterlogged (damp) basin of variable size and shape (Semeniuk, 1987)

ecologically sustainable development – means "using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased" (Commonwealth of Australia, 1992, p.6).

ecosystem – means a defined community of organisms, their interaction, and their physical surroundings (Dept Environ. Sport & Territories (1994). State of the Environment reporting: Framework for Australia. 42pp, Canberra).

environmental value - means a beneficial use or an ecosystem health condition (that is, a condition of the ecosystem relevant to the maintenance of ecological structure, ecological function or ecological process).

ecological integrity - means the physical, chemical and biological components of an ecosystem and the interactions between those components, being in a sound, undiminished and unimpaired state.

floodplain - as a type of wetland means a seasonally inundated flat (Semeniuk, 1987).

inter-generational equity – means the principle that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

lake – as a type of wetland means a permanently inundated basin of variable size and shape (Semeniuk, 1987).

palusplain - as a type of wetland means a seasonally waterlogged flat (Semeniuk, 1987).

paluslope - as a type of wetland means a seasonally waterlogged slope (Hill et al, 1996).

river - as a type of wetland means a permanently inundated channel (Semeniuk, 1987).

sumpland - as a type of wetland means a seasonally inundated basin of variable size and shape (Semeniuk, 1987).

wetland bank –consists of lands that contain wetlands that have been restored, created and/or enhanced, or (in exceptional circumstances) preserved, which is approved by the EPA to be set aside to compensate (offset) for future authorized wetland impacts arising from development activities and which would otherwise not be conserved. (EPA, 2001)

wetland banking – means a system through which credits are generated for restoration, creation and/or enhancement of wetlands, and in exceptional circumstances, conservation of wetlands and their buffers in advance of authorized wetland impacts. These credits may then be later withdrawn from the bank to compensate for an actual authorized wetland impact.

The currency of a wetland bank is a combination of area and function (that is, the area of a wetland which has defined values and functions based on its existing, restored or created attributes or features). (EPA, 2001)

wetland loss mitigation – means the restoration, enhancement, creation or, in exceptional circumstances offsetting adverse wetland impacts through the conservation (preservation) of other wetlands expressly for the purpose of compensating for impacts which remain after impact avoidance and minimization ('sequencing') has been achieved. (EPA, 2001)

wetlands – means "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres." (UNESCO, 1971)

7. ACRONYMS

CALM Department of Conservation and Land Management

DoE Department of Environment

EIA Environmental Impact Assessment

EPA Environmental Protection Authority

EPP Environmental Protection Policy

MPI Department for Planning and Infrastructure

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