A Policy Framework for the Establishment of Wetland Banking Instruments in Western Australia

DRAFT FOR PUBLIC COMMENT

Environmental Protection Authority
Perth, Western Australia
June 2001

Foreword

The Environmental Protection Authority (EPA) is an independent statutory authority and is the key provider of independent environmental advice to Government.

The EPA's objectives are to protect the environment and to prevent, control and abate pollution. The EPA aims to achieve this objective, in part, through the facilitation and development of complementary mechanisms. Wetland banking affords one such mechanism.

Mitigation or compensation for wetland impacts is generally required in cases where the EPA determines that unavoidable adverse wetland impacts are likely to arise and that the proponent has taken all appropriate and practical actions to avoid and/or minimize such impacts.

In instances where the EPA considers a loss of wetland area or function to be 'unavoidable', the EPA generally recommends to the Minister for the Environment that the proponent be required to replace wetland areas and functions lost as a result of development through the establishment of (legally-binding) Ministerial Conditions of approval (under section 45 of the *Environmental Protection Act 1986*).

This discussion paper has been developed in light of the EPA's experience with these matters since 1991.

Importantly, it is not intended that the establishment of wetland banks be compulsory, but rather that individuals, non-profit organisations, companies, consortiums, agencies or industries may apply to the EPA to establish a wetland bank as a means to protect the values and functions of wetlands; to streamline the wetland impact evaluation process and provide more effective mitigation for authorized impacts in advance of development.

The establishment of a wetland bank would not remove the need for proponents to comply with the requirements of the *Environmental Protection Act 1986* or other written laws.

The EPA recognizes the need to develop, with the benefit of public consultation, explicit rules, criteria and administrative procedures in the near future to give effect to the establishment and operation of wetland banks.

I invite those with an interest in the development, use, operation and benefits afforded by wetland banking to comment on this framework and supporting materials. Submissions regarding the policy framework should be submitted in writing by 4pm Friday 17 August 2001 to:

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Summary

Wetland loss mitigation refers to the restoration, enhancement, creation or, in exceptional circumstances offsetting adverse wetlands impact through the conservation (preservation) of other wetlands so as to compensate for the impacts which are anticipated. Mitigation may be considered to be a valid management approach only after options to avoid and/or minimize the wetland impacts have been rigorously explored (termed 'sequencing').

In instances where the EPA considers a significant loss of wetland area or function to be 'unavoidable', the EPA generally recommends to the Minister for the Environment that the proponent be required to replace wetland areas and functions lost as a result of development through the establishment of (legally-binding) Ministerial Conditions of approval (under section 45 of the *Environmental Protection Act 1986*). This has generally been the case since 1991.

The purpose of these conditions has been to protect and maintain the area and functions of wetlands which provide valuable public benefits, such as flood storage, water quality protection, flora and fauna habitat and aquifer recharge.

Wetland banking can facilitate the replacement of wetland area and function by providing a mechanism for the restoration, enhancement, conservation or creation of wetlands, principally through the establishment of "banks," in advance of anticipated losses. Wetlands established in a mitigation bank provide "credits" which can then be sold, or drawn upon by the bank sponsor (owner), to fulfil the requirements of Ministerial Conditions relating to the replacement of wetland areas and functions.

The EPA recognizes the potential for wetland banking to:

- ensure successful replacement of wetland area and function since offsets are undertaken in advance of actual development impacts and wetland loss;
- minimize the temporal (interim) loss of wetland values and functions that typically occur when mitigation is initiated during or after a wetland has been impacted by a development;
- facilitate the consolidation of small, isolated or fragmented wetland impacts into larger, better designed and managed units which may have greater ecological and/or management benefits;
- benefit the State's wetland resources by encouraging the integration of wetland mitigation requirements with the implementation of resource and/or catchment management plans.
- create the option for land owners and authorities needing to mitigate for authorized impacts to wetlands associated with development activities of purchasing credits from an EPA-approved wetland bank rather than enhancing, restoring, conserving or creating wetlands themselves;
- provide an economy of scale relating to the planning, implementation, monitoring and management of wetland loss mitigation projects, generally;
- streamline the wetland impact evaluation and/or authorization process and provide more effective mitigation for authorized impacts in advance of development.
- reduce uncertainty and delays for proponents wishing to fulfil legally-binding conditions relating to authorized developments (impacting upon wetlands); and
- benefit a proponent by streamlining the wetland impact evaluation and/or authorization process and by increasing certainty regarding the ecological outcomes of wetland replacement actions;

(Note: 'Authorized' refers to authorization in accordance with provisions of the *Environmental Protection Act 1986*.)

Wetland banking would allow for the use of credits from established mitigation banks to fulfil requirements associated with authorized wetland impacts prior to the impacts occurring. The EPA emphasizes that the establishment and operation of such banks would not, in itself, discharge the EPA's statutory responsibilities to review the acceptability of proposals and/or wetland impacts, generally. Moreover, the availability of wetland bank credits would not ensure environmental approval for such impacts. However, wetland banking does offer an alternative, and potentially more effective means of complying with wetland replacement requirements and Ministerial conditions established under the *Environmental Protection Act 1986*.

The establishment of a wetland bank would not remove the need for proponents to comply with the requirements of the *Environmental Protection Act 1986* or other written laws.

The EPA itself would not be the sponsor, custodian or operator of a wetland bank. Rather the EPA would 'authorize withdrawals' and help define the rule sets which would need to be developed to ensure the successful establishment and operation of a wetland bank.

A wetland to be included in a 'bank' should be one that would otherwise not be conserved, eg:

- a wetland in an approved area of development and the wetland is conserved rather than developed;
- a degraded wetland that is enhanced to achieve more ecological functions; and/or
- a created wetland that did not exist before.

1. Introduction

The EPA places great importance on protecting wetlands and expects that proponents will conduct a thorough appraisal of all development options, particularly site selection, that would avoid direct or indirect wetland impacts in the first instance, prior to presenting a proposal for environmental impact assessment. To achieve this objective, the EPA will apply two complementary tests which provide context when assessing proposals which may impact upon wetland habitat:

(a) all reasonable and practicable options to avoid and/or minimise direct or indirect wetland impacts have been explored, irrespective of the nature of the proposed development, the size or type of the wetland likely to be impacted or the magnitude of the wetland impact (see 'Sequencing', section 2.2); and

(b) in such instances that the EPA considers a loss of wetland area or function to be 'unavoidable', the Authority will recommend to the Minister for the Environment that the proponent be required to undertake action to mitigate against, or offset, any loss of wetland area or function.

This *Framework for the Establishment of Wetland Banking Instruments in Western Australia* should be read in conjunction with the following EPA documents:

- *EPA Position Statement No. 4 - Wetlands Protection*; and
- *Guidance for the Assessment of Environmental Factors No. 48 (Groundwater Environmental Management Areas*),

which outline the general principles and considerations the EPA will apply when considering proposals that may impact on wetlands and proposals for the establishment of wetland banks.

These documents can also be accessed from the EPA website at:

www.environ.wa.gov.au/publications/contents.asp

1.1 Background

In the past, little regard has been given to the value of wetlands, with many viewing these habitats as 'swamps' and refuges for disease, to be drained or filled so that they may be converted into land suitable for farming, housing or roads. The EPA has estimated that some 80% of wetlands on the Swan Coastal Plain have been lost and most of the remainder heavily modified (EPA, 1991a).

Wetlands are widely recognised as important wildlife habitats and among the most biologically productive and biologically diverse habitats on the planet. Wetlands directly and indirectly supply food to a broad range of animals including micro-organisms, invertebrates, fish, birds, mammals and reptiles. Wetlands also serve to purify water by filtering out suspended matter and utilising dissolved nitrogen and phosphorus for plant growth. They also provide flood control by storing and detaining storm water (Appendix 1).

The EPA has published numerous assessment reports advising the Minister for the Environment of development proposals likely to impact wetlands; the likely environmental acceptability of such impacts; and recommended compensatory action (wetland replacement) to be undertaken by proponents to mitigate against wetland loss which would otherwise occur as a consequence of development (Appendix 2).

This document draws upon the abovementioned reports and develops further the concept of wetland loss mitigation and the establishment and operation of formalised wetland banking in Western Australia.

1.2 Key Definitions

1.2.1 Wetland

For the purposes of wetland banking, wetlands are defined in accordance with the "Ramsar" Convention on Wetlands of International Importance, to which Australia and 99 other nations are signatories:

> **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)

1.2.2 Wetland Loss Mitigation (Replacement)

> **Wetland loss mitigation** refers to 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.

Further explanation of 'sequencing' is provided in section 2.2 of this document.

1.2.3 Wetland Banking

> **Wetland banking** is 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).

(Note: 'authorized' refers to authorization in accordance with provisions of the *Environmental Protection Act 1986*.)

Wetland banking typically involves the consolidation of small, fragmented wetland mitigation projects into one large contiguous site or programme. Thus wetland banks can also provide an economy of scale relating to the planning, implementation, monitoring and management of wetland loss mitigation projects, generally.

A bank may have its own unique credit system based upon the values and functions of the wetlands unique to an area. The banking system does not, in itself, involve the acceptance of money by Government in lieu of actual wetland impacts. Furthermore, it is desirable that a bank be in operation prior to allowing any project to use it as compensation for unavoidable impacts.

1.2.4 Wetland Bank

> A **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.

A wetland bank may be created when a government agency, industry, corporation or non-profit organization undertakes such activities under a formal agreement with the Department of Environmental Protection. The 'balance' of the bank must always remain positive (in credit).

1.2.5 Bank sponsor

A **'bank sponsor'** is any public or private body or individual responsible for proposing the establishment of (and in most circumstances, operating) a wetland bank.

1.3 Potential Benefits of Wetland Banking

Wetland Banking can:

- reduce uncertainty and delays for authorized developments impacting upon wetlands;
- ensure successful mitigation since wetland offsets are undertaken in advance of actual development impacts and wetland loss (Figure 1);
- minimise the temporal loss of wetland values and functions that typically occur when mitigation is initiated during or after a wetland has been affected by a development;
- facilitate consolidation of numerous small, isolated or fragmented wetland impacts into a single large bank or programme that may have greater management and/or ecological benefit; and
- provide land owners, who may be required to replace authorized wetland losses, with the option of purchasing credits from an EPA approved wetland bank rather than restoring, enhancing, conserving or creating wetlands themselves.

1.4 Status of Wetland Banking in Western Australia

The EPA supports, in principle, the concept of wetland banking and has developed this framework to seek public comment on the establishment, use, operation and potential benefits afforded by wetland banking for the purposes of replacing wetland area and functions otherwise lost as a result of authorized activities and developments.

1.5 Wetland Banking in the USA

Under federal and various state and local regulatory programs in the USA, development activities which may adversely impact wetlands require approval through the issuance of permits. Under the Federal Clean Water Act (section 404(b)(1)) the US Army Corps of Engineers is obliged to require mitigation for unavoidable impacts on a wetland as a condition of permit approval.

(This is somewhat analogous to the Western Australian practice of requiring proponents to undertake wetland loss mitigation through the establishment of legally-binding conditions issued by the Minister for the Environment.)

Wetland loss mitigation has been occurring in the United States since 1977, the implementation and success of which has varied greatly from jurisdiction to jurisdiction. In a 1992 review of wetland loss mitigation it was found that a lack of adherence to permits and project design and lack of monitoring was pervasive across mitigation projects (Kentula et al., 1992). Similarly, a study of 40 mitigation projects in Florida reported the failure of incomplete creation of 60% of projects, causing a 50% loss of wetland area (Erwin, 1991). Failure was judged to be a result of inappropriate hydrology in all cases.

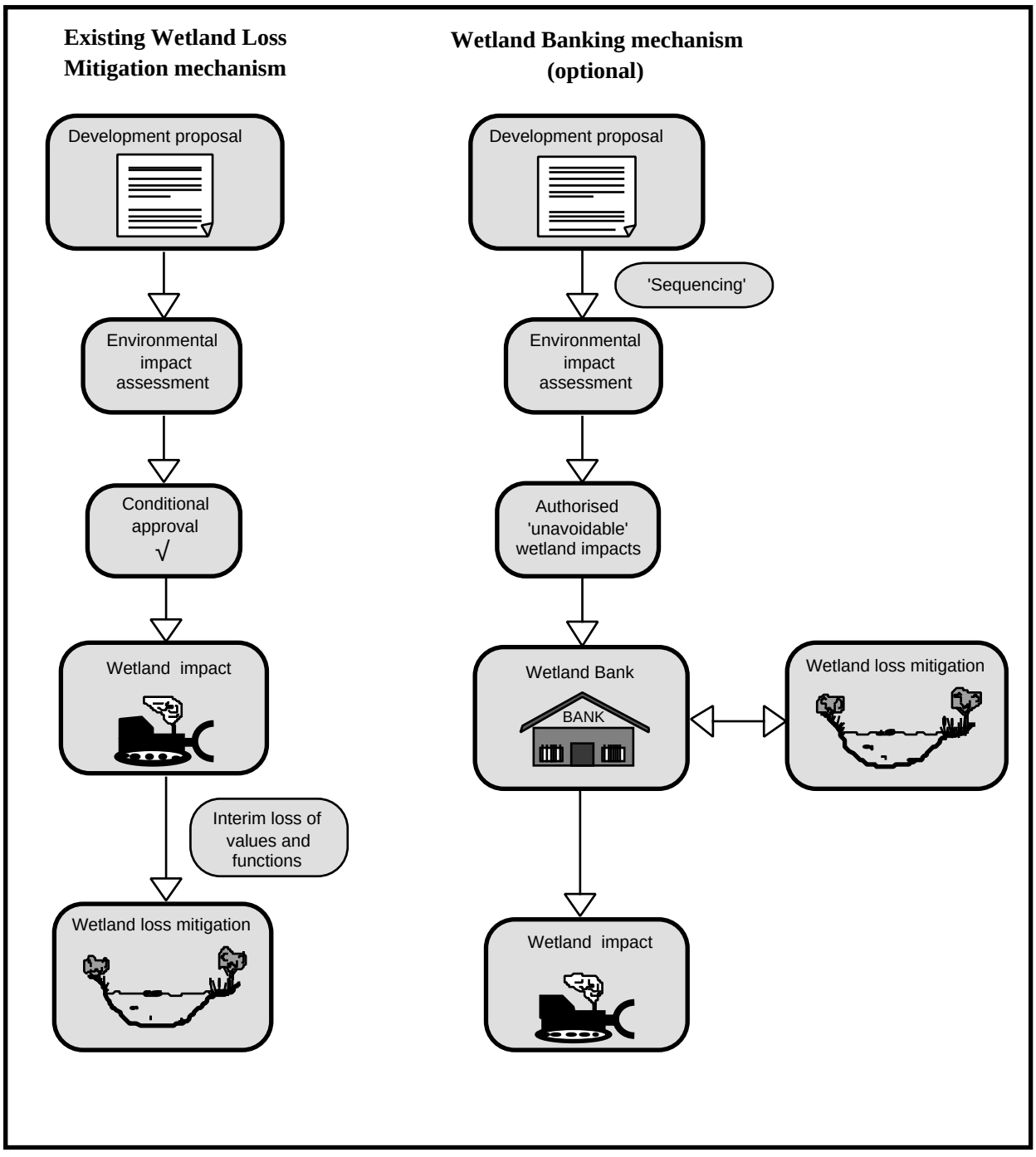

Figure 1. Wetland banking can afford benefits through the application of 'sequencing' (including impact avoidance considerations) and as a means to mitigate (offset) wetland impacts in advance of actual development and on-ground wetland loss.

In 1992, there were 46 wetland mitigation banks in existence across 17 states and more than 60 proposed banks at that time. Notably, 75% of those existing banks were state highway banks, port authority banks, or local government banks providing mitigation for public works projects. Indeed, 22 of the 46 banks were being operated to mitigate for highway construction (IWR, 1994).

Lessons have been learnt from these earlier attempts at wetland loss mitigation. In the USA, permit applicants must now include wetland design objectives, detailed design drawings and targeted functions and values. However, successful wetland creation and major restoration projects still involve a great deal of uncertainty, particularly those that attempt to create or restore difficult wetland types (Kusler and Kentula, 1990). Accordingly, many projects now recognise the importance of adaptive monitoring and management of wetland projects to facilitate 'mid-course corrections' for individual mitigation projects.

Today there are some 156 wetland banks operating across 31 States.

The following internet sites provide further reading on mitigation banking in the United States:

www.water.nr.state.ky.us/dow/wetguide.htm

http://h2osparc.wq.ncsu.edu/info/wetlands/mitsucc.html

www.epa.gov/region04/water/wetlands/legal/mitigation.html

www.sac.usace.army.mil/permits/94wmb6.pdf

www.wrsc.usace.army.mil/iwr/pdf/wmb_tp2_Dec95.pdf

www.wrsc.usace.army.mil/iwr/pdf/wmb_tp1_May96.pdf

www.sac.usace.army.mil/permits/sop96-01.pdf

www.sac.usace.army.mil/permits/fr_95nov.pdf

www.dep.state.fl.us/water/slerp/mitigation/mitbanking.htm

2. Concepts and Considerations for Mitigating Wetland Losses

2.1 The 'Wise Use of Wetlands' Concept

Article 3.1 of the United Nations Convention on Wetlands of International Importance Especially as Waterfowl Habitat (commonly referred to as the Ramsar Convention), to which Australia is signatory, states that the contracting parties:

"shall formulate and implement their planning so as to promote the conservation of the wetlands .... and as far as possible the wise use of wetlands in their territory".

(UNESCO, 1971)

The following definition of 'wise use of wetlands' was adopted by the Contracting Parties to the (Ramsar) Convention in 1987 and has been applied by the EPA during its preparation of this framework:

*"The **wise use of wetlands** is their sustainable utilization for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem"*

(UNESCO, 1987)

Further, the Contracting Parties defined 'sustainable utilization' 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".

'Natural properties of the ecosystem' was also defined as:

"Those physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them".

(Note: The term 'wise use' is now considered to be synonymous with 'sustainable use' and closely related to 'sustainable development'. Further details of the Ramsar Convention and the 'wise use of wetlands' concept may be viewed on the internet at www.ramsar.org)

Many human practices or activities are ecologically unsustainable and cause degradation and loss of wetlands. The Ramsar Convention has developed guidelines for the wise use of wetlands. This concept of wise use seeks to modify human use of wetlands so that there is continuous benefit to present generations while at the same time maintaining the natural values, functions and ecological processes of wetlands for future generations.

Accordingly, it is recommended that this framework be read in conjunction with the following EPA documents which outline the principles and considerations the EPA will apply to proposals that impact on wetlands, generally:

- *Position Statement No. 4 - Wetlands Protection;* and
- *Guidance for the Assessment of Environmental Factors No. 48 (Groundwater Environmental Management Areas*).

2.2 'Unavoidable' Wetland Loss and 'Sequencing'

Mitigation or compensation for wetland impacts is generally required in cases where the EPA determines that unavoidable adverse wetland impacts are likely to arise and that the proponent has taken all appropriate and practical actions to avoid and/or minimize such impacts.

In instances where the EPA considers a significant loss of wetland area or function to be 'unavoidable', the EPA generally recommends to the Minister for the Environment that the proponent be legally required to undertake compensatory action to mitigate against (offset) any loss of wetland function or area. This has generally been the case since 1991.

Wetland Banking provides a mechanism whereby proponents may themselves undertake compensatory action to mitigate the loss of wetland area or functions likely to occur prior to a development commencing. This does not discharge the EPA's role or ability to undertake environmental impact assessment under Part IV of the *Environmental Protection Act 1986*. Indeed, it is by referral of projects to the EPA that the matter of 'avoidability' of wetland impacts will be determined.

In developing this framework the EPA seeks to preserve wetland values and functions and ensure that these are not unnecessarily or 'unavoidably' lost or diminished, irrespective of the type of the proposed development, the size or type of wetland likely to be impacted or magnitude of the wetland impact.

Accordingly, prior to drawing upon credits from a wetland bank, a proponent will need to demonstrate to the EPA that wetland 'sequencing' considerations have been adequately addressed.

'Sequencing' involves consideration of the following, listed sequentially:

- avoiding the wetland impact altogether, including that site suitability and site selection and design options have been explored which could avoid direct or indirect impacts to wetland habitats or ecosystems in the first instance (the need for the development to be wetland-based);
- minimizing wetland impacts by limiting the degree of magnitude of the activity and its implementation;
- rectifying the impact by repairing, rehabilitating or restoring the affected wetland (on-site);
- reducing or eliminating the wetland impact over time by preservation, monitoring and maintenance during the life of the activity;
- compensating for the wetland impact by restoring, enhancing, creating or, in exceptional circumstances, conserving other wetlands; and
- that the impacts are demonstrably 'unavoidable' and conducive to long-term (that is, intergenerational) public health, public safety, public welfare or public amenity.

2.3 Types of Wetland Loss Mitigation

Wetland restoration

Wetland restoration refers to the re-establishment of a wetland in an area where it historically existed but now performs no or few wetland functions (Kruczynski, 1990). Once restored, the wetland is likely to require protection to prevent degradation.

Restoration should be the first mitigation option considered because it would re-establish wetlands on a regional scale. Restoration is also more likely to succeed relative to other options because the hydrology and soils are conducive to the establishment and maintenance of wetland functions.

Wetland creation

Wetland creation refers to the construction of a wetland in an area which was not a wetland in the past (Kruczynski, 1990).

Wetland creation adds to the total wetland area, whereas enhancement may only provide one or more additional functions to an existing wetland. Consideration should always be given to the long-term threats and management of wetlands (and their buffers) when appraising the merits of wetland creation versus enhancement or conservation.

Wetland enhancement

Enhancement refers to increasing one or more of the functions of an existing wetland, such as increasing the productivity or habitat value by modifying environmental parameters, such as bathymetry, open water and emergent vegetation (Kruczynski, 1990). Enhancement can take many forms, and may be in the form of limiting access by humans or feral animals, weed eradication or establishing buffer zones.

Enhancement of an existing wetland to yield some net benefit should outweigh the loss of another wetland. The enhancement may occur within the wetland being affected by the development or in other wetlands suitable for enhancement.

Enhancement often reflects little more than a preference for certain wetland values and functions over others. Consequently, this option should be viewed with caution and care taken to consider the role and diversity of wetlands in the region. There is a risk that although some functions will be improved, other currently existing functions could be degraded (Kruczynski, 1990).

Wetland conservation (preservation)

The conservation (preservation) of wetlands involves buying equivalent amounts of high quality wetland to mitigate for degradation or destruction of others. The acquired wetland is usually of considerably greater value than the wetland which is being affected by a development (Kruczynski, 1990). However, preservation of existing wetlands through acquisition results in a net loss of wetland area and function hence this is often the last option in the choice of mitigation types. For wetland banking the offsetting wetland must change in status from likely to be affected by future development to being conserved.

In exceptional circumstances the ecological benefits of acquisition may greatly outweigh the net loss, in which case preservation through acquisition may be considered. Preservation of healthy wetlands in secured reserves may be more productive and ecologically sustainable than attempting to mitigate for wetland degradation due to urban expansion or similar gross changes in landuse which may disrupt regional processes (for example, hydrology). Wetland preservation will, by its nature, necessitate consideration of the risks and threats to management and protection of wetland values and functions within an area of concern.

3. Operational Aspects of Wetland Banking

3.1 Assessment of Wetland Values and Functions

Should the EPA determine that the wetland impacts associated with a project proposal are indeed 'unavoidable', the development proposal may be subject to formal environmental impact assessment at which time the proponent will be required to provide details of compensatory actions to mitigate the loss of wetland area and functions likely to occur should the project proceed.

When providing wetland loss mitigation, proponents will be required to consider the multipurpose functions (social, ecological and hydrological) of the wetland and the likely ensuing interim loss of wetland functions (see Appendix 1). This will necessitate appraisal of both the area and functions of the wetland and habitat likely to be impaired or lost and the importance of such losses on the functional values of residual wetland areas. Further guidance on appraising these values and environmental management objectives for wetlands may be obtained from EPA Bulletin 686, *A Guide to Wetland Management in the Perth and Near Perth Swan Coastal Plain Area* (EPA, 1993a).

Environmental management objectives have been nominally determined by the Water and Rivers Commission for most of the wetlands of the Swan Coastal Plain, consistent with the methodology described in EPA Bulletin 686. Accordingly, Water and Rivers Commission should be contacted for a preliminary determination of the environmental values of a particular wetland. This determination, however, is dependent on delineation of the wetland feature; the conservation significance of wetland types at a regional level (and hence dependent on the preservation of similar wetlands); changes and trends in the quality, functions and area of the wetland resource; our improving knowledge of biological diversity conservation needs; and verification and declaration of environmental values and environmental management objectives by the EPA.

Clearly, these determinations will change should the State's wetland resource continue to be diminished and/or our knowledge of these diverse habitats improve (particularly through biological surveys).

Preliminary determinations of environmental values and environmental management objectives for wetlands should include consideration of the following sources of information, where they relate to wetland habitat:

- Wetlands of the Swan Coastal Plain Volume 2B: Wetland Mapping, Classification, and Evaluation and Wetland Atlas (Hill et al, 1996b);
- A Directory of Important Wetlands in Australia (ANCA, 1996);
- Western Swamp Tortoise Recovery Plan (Burbridge & Kuchling, 1994);
- Wetlands Conservation Policy for Western Australia (Government of Western Australia, 1997);
- known occurrence of endangered, rare, threatened or priority flora and fauna (CALM database);
- the presence and location of any geographically restricted communities and threatened ecosystems or threatened communities (CALM database);
- *Environmental Protection (Swan Coastal Plain Lakes) Policy* (Government of WA, 1992a);
- *Environmental Protection (South West Agricultural Zone Wetlands) Policy* (Government of WA, 1998);
- Conservation Reserves for Western Australia as Recommended by the EPA (Systems 1-12) (EPA, 1975, 1976, 1981, 1983);
- wetland management objectives identified in (approved) CALM Regional Plans and Park Management Plans;
- wetland management objectives identified in the Forest Management Plan: 1994-2003 (LFC, 1994);
- Bush Forever (WAPC, 2000);
- Statements of Planning Policy (WAPC, various);
- A Systematic Overview of Environmental Values of the Wetlands, Rivers and Estuaries of the Busselton-Walpole Region (WRC, 1997); and
- *Environmental Protection (Peel Inlet-Harvey Estuary) Policy* (Government of WA, 1992b).

Further discussion of the evaluation of environmental values and wetland management objectives are provided by Hill et al (1996a) and the Water and Rivers Commission (1997).

3.2 Ensuring Accountability

The establishment of wetland banking in Western Australia would require the development of complementary methods and mechanisms that ensure all parties comply with their banking/mitigation requirements. With established protocols for monitoring, reporting and independent auditing and enforcement, participating parties can measure and communicate successes and feedbacks associated with wetland banking. Several components comprise the accountability element of wetland banking:

1. "Balancing the Bank Account" – a tracking process that summarises the evaluation of wetland functions and values actually replaced compared to the impacts authorized.

2. Assessing Performance – the synthesis of different types of monitoring (environmental quality, overall bank performance and bank specific actions) to determine the efficacy of the banking framework in achieving its goal.
3. Ensuring Compliance and Assigning Responsibility – inspection and enforcement programs.

The EPA recognizes the need to develop, with the benefit of public consultation, explicit rules, criteria and administrative procedures to give effect to the establishment and operation of wetland banks.

3.3 Wetland Banking Policy

The establishment of a wetland bank will not be used as a substitute for an analysis of alternative design options or site selection. Moreover, it is important to recognize that there are circumstances where the impacts of a project are so significant that even if alternatives are not available, the impact may not be environmentally acceptable regardless of the mitigation proposed.

Wetland banking may be an appropriate form of mitigation for the following projects and/or under the following circumstances:

- projects that have met the avoidance and impact minimization criteria (see section 2.2, 'Sequencing') and can be clearly demonstrated by the proponent to have:
  - (a) no practicable on-site mitigation opportunities and off-site mitigation has been determined to be appropriate;
  - (b) limited on-site mitigation opportunities; or
  - (c) off-site mitigation which would clearly be more environmentally beneficial than the use of on-site mitigation;
- linear projects, such as highways, pipelines or powerlines, that generally result in numerous impacts which individually or cumulatively could be considered to have a significant environmental impact;
- wetland banking must demonstrate full compliance with applicable laws, regulations and policies including, but not limited to requirements under:
  - (a) the *Soil and Land Conservation Act 1945*;
  - (b) the *Rights in Water and Irrigation Act 1914*;
  - (c) the *Town Planning and Development Scheme Act 1928*;
  - (d) the *Water and Rivers Commission Act 1995*;
  - (e) the *Waterways Conservation Act 1976*;
  - (f) the *Wildlife Conservation Act 1950*;
  - (g) the *Conservation and Land Management Act 1984*;
  - (h) the *Land Administration Act 1997*;
  - (i) the *Health Act 1911*;
  - (j) the *Land Drainage Act 1925*;
  - (k) the *Main Roads Act 1930*;
  - (l) the *Metropolitan Region Town Planning Scheme Act 1959*; and
  - (m) the *Environmental Protection Act 1986*.

- EPA authorization for wetland alteration is a requirement of conducting a transaction (debit or credit) with a wetland bank;
- if there is a shortfall in available credits it may be necessary to suspend bank operation and for the sponsor to identify the causes for retarded development of the bank and take appropriate corrective action; and
- where wetland impacts from an activity will be offset by a wetland bank, either in whole or in part, the EPA will recommend the purchase of bank credits as a Ministerial (legally-binding) condition of approval.

Prior to any withdrawal of credits from a wetland bank, the following must be satisfied:

- wetland impact has been authorized by the EPA;
- banking instrument and final mitigation plans have been approved;
- sufficient credits are available and wetland bank approves debit; and
- the tenure of the bank site has been secured through real estate transaction, agreement, caveat or vesting, as appropriate.

The EPA acknowledges the need to further develop explicit rules, criteria and administrative procedures necessary to give effect to wetland banking.

3.4 Types of Wetland Banks

The basic types of wetland banks are identified according to the nature of their sponsorship and clientele. Four categories of banks are recognized.

Single-client banks

The sponsor (that is, the individual or body that proposes establishment of the bank and produces its credits) is also the principal credit user or client. Typically, single-client banks are most likely to be those established by state departments for the principal purposes of mitigating wetland losses attributed to transport and/or infrastructure development associated with their own activities.

Joint-project banks

This type of bank is established for purposes of mitigating wetland losses attributed to the activities of two or more departments or combination of public and private bodies. The pooling of resources provides for the more efficient production of banking credits than would be possible separately and also allows wetland management efforts to be better coordinated with local and regional landuse plans and catchment plans.

General use (area specific) banks

The objective of this type of bank is the mitigation of wetland losses caused by a broad range of activities taking place within a particular area or region, usually in accordance with a strategic plan or catchment plan. The area is most likely to be peri-urban and subject to development (or redevelopment) pressures. General use banks are usually sponsored by departments for mitigation of wetland losses caused by a combination of public works projects and/or private development.

Private (commercial) banks

These are sponsored by private bodies for the express purpose of making wetland banking credits available for sale on the open market. The market (or clients) for such credits may include public or private interests and extend to bodies which, by themselves, may not be constitutionally, financially or technically capable of establishing and operating a wetland bank.

4. Further definitions

biological diversity - the variety of life forms: the different plants, animals and microorganisms, the genes they contain, and the ecosystems they form. It is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity (Commonwealth of Australia, 1996).

conservation - 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.

ecologically sustainable development - development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (Commonwealth of Australia, 1992).

ecosystem - a defined community of organisms, their interaction, and their physical surroundings.

environmental value - means a quality, characteristic or attribute of the environment, or any portion of the environment, which is conducive to ecological health or beneficial use. Several environmental values may be designated for a specific wetland.

intergenerational equity - 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 (Commonwealth of Australia, 1992).

5. Bibliography

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APPENDIX 1

Wetland Values and Functions

Primary production

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

The complexity, efficiency, evolution and adaptation of wetland ecosystems is no more apparent than on the Swan Coastal Plain, where the naturally infertile sandy soils host 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.

Recreation and landscape amenity

In Western Australia's arid climate, wetlands offer a refuge for both wildlife and humans alike from the hot summers. Wetlands have an intrinsic natural beauty which provides recreational opportunities for such activities as boating, swimming, hiking, photography and birdwatching. The benefit of these wetland-dependent activities is threatened by continued wetland loss and degradation. Wetlands contribute to landscape, amenity and open space, especially in developed areas.

Wetlands often have cultural and ethnic significance for indigenous and non-indigenous people.

Hydrological balance (including flood control)

Controlling flood waters is an important natural hydrological function of wetlands. Potentially damaging volumes of fast-flowing floodwaters are temporarily stored in wetlands. Wetlands increase the detention time of floodwaters and the gradual release of these waters from wetlands serves to reduce flow velocity, erosion and flood peaks thereby minimising erosion and pollutant transmission and property and infrastructure damage.

Conversely, the diversion of storm waters into wetlands and increased groundwater recharge (through land use change in a catchment) may elevate wetland water levels to the detriment of fringing vegetation and the ecological values of a wetland.

Water quality protection

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

The capacity of a wetland to trap and retain pollutants is, however, finite and constrained by the necessity to protect the environmental values and beneficial uses of that wetland.

Wildlife habitat

Wetlands provide a diverse habitat for fauna, including waterfowl, fish, mammals and unique flora and communities, including many rare, threatened and endangered species. Wetland habitat provides a multitude of ecological functions, including feeding, breeding, loafing, roosting and drought refuge for native fauna.

Wetlands are among the most biologically productive and biologically diverse habitats on the planet.

APPENDIX 2

The EPA has previously issued the following assessment reports which have called for compensatory action (wetland replacement) to be undertaken by proponents to mitigate against wetland loss which would otherwise occur as a consequence of development:

- construction of the Kwinana Freeway (Forrest Rd to Thomas Rd extension), Main Roads (EPA, 1992a);
- Jandakot Groundwater Scheme Stage II, Water Authority of Western Australia (EPA, 1991b);
- widening of the Mitchell Freeway at Lake Monger, Main Roads (EPA, 1990b);
- relocation (re-creation) of the Cedric Street Wetland, City of Stirling (EPA, 1992b);
- Reid Highway - Beechboro Road to Great Northern Highway, Main Roads (EPA, 1994a); and
- Kemerton silica sand mining proposal, Gwalia Consolidated Ltd (EPA, 1994b).