

Environmental Offsets Received by DEC

Project	Organisation	2008-09 \$	2009-10 \$
State Offsets:			
Land purchase - State offsets	Main Roads & Western Power	400,000	828,250
Understanding Mulga	Fortescue Metals Group	64,000	50,000
Fire- Mulga Study: Post Burn Monitoring.	Rio Tinto Iron Ore (Robe River Mining)	20,000	43,600
Taxonomic studies on the flora of the Burrup Peninsula and surrounding areas	Woodside Energy	120,000	117,000
Acacia woodmanioum	Karara Mining Ltd	170,720	159,930
Karratha to Tom Price - Millstream Link Road	Main Roads WA		420,000
Barrow Island On Island Management	Chevron Australia Pty Ltd		493,018
Gorgon Dredging Audit and Surveillance Program	Chevron Australia on behalf of the Gorgon Joint Venture		2,939,228
Gorgon Threatened and Priority Species Translocation and Reintroduction Program	Chevron Australia on behalf of the Gorgon Joint Venture		1,528,399
Gorgon North West Shelf Flatback Turtle Conservation Program	Chevron Australia on behalf of the Gorgon Joint Venture		1,763,537
South Lake Rehabilitation	LandCorp	20,000	
Portman Mining Conservation Officer	Cliffs Asia Pacific Iron Ore Pty Ltd	185,000	185,000
Wetland Mitigation Strategy	Main Roads WA	1,000,000	
Benger Swamp Offset (Southern Seawater Desalination Project)	Water Corporation		300,000
Commonwealth Offsets:			
Land purchase - Commonwealth - Environment Protection and Biodiversity Conservation Act (EPBC)	Various		1,640,000
Community Care and Rehabilitation for Carnaby's Black Cockatoo	Department of Health (Fiona Stanley Hospital)	75,000	
Healthy Parks Healthy People	Department of Health (Fiona Stanley Hospital)	40,000	40,000
Wildcare Helpline	Department of Health (Fiona Stanley Hospital)	30,000	30,000
Regional Parks Community Grants Scheme	Department of Health (Fiona Stanley Hospital)	30,000	30,000
Northern Quoll - Wodgina	Atlas Iron Pty Ltd		50,000
	Total	2,154,720	10,617,962



Guide to developing a Clearing Permit Offset Proposal

- The following table is an example of how (as a minimum) to demonstrate your 'Offset Proposal' to DEC for assessment
- If you provide more information and attachments this will increase the ease of assessment
- If insufficient information is provided you may be requested to provide more detail
- For more information access the Native Vegetation Fact Sheet 11 'Direct and Contributing Offsets' or contact the Native Vegetation Conservation Branch on 9334 0333

This column provides tips on what to include under headings/principles etc (and is not required in your version)	This column is a suggested range of headings (Black writing) The blue writing is an example of how a proponent could demonstrate their offset proposal
Section 1: Contact Details	
	Date: 07/07/2007
Person responsible for compliance with permit & implementation of the Offset Proposal following approval.	Purpose permit holder contact person: Name Joe Bloggs CEO Shire of Somewhere Phone numbers 1234 5678 Email somewhere@somewhere.wa.gov.au
This person will have contributed technical information in this proposal.	Environmental specialist contact person: Name : Fred Smith, Environmental Analyst, Environmental Impact Assessment Pty Ltd Phone numbers 9876 5432 Email fredsmith@EIA.com.au Environmental specialist's qualifications or equivalent, and relevant experience: Bachelor of Science (Biology) University of Nowhere 15 years experience as a consultant conducting flora and vegetation surveys and environmental impact assessments with Environmental Impact Assessment Pty Ltd. All survey experience obtained within Western Australia.
Section 2: Information within your Clearing Permit	
This information is obtained from the first page of your clearing permit.	Purpose permit Number: CPS 000/1
	Permit holder: Shire of Somewhere
	Purpose of clearing: Road upgrades and gravel extraction
	Land on which clearing is to be done (including number of hectares): The clearing of up to 3.5 hectares is to occur within the Shire of Somewhere: <ul style="list-style-type: none"> • Nowhere Road (2.3 hectares) on north side of the road only; and • Fence Road (1.2 hectares) both sides of the road in most parts.

Section 3: Information within your Decision Report (Assessment of application against Clearing Principles)

This information is obtained from the 'Decision Report' that accompanied the Clearing Permit.

State the clearing principle/s your clearing is at, or may be at, variance to:

Clearing is at variance with clearing principle (e) "it is significant as a remnant of native vegetation in an area that has been extensively cleared; Beard vegetation type 946 which has only 17.9% of its original extent remaining.

Clearing may be at variance with clearing principle (a) "it comprises a high level of biological diversity". The Shire of Somewhere has been extensively cleared with some trees remaining comprising habitat suitable for nesting birds.

Detail the impact of the clearing: e.g. vegetation extent, fauna habitat, rare flora, wetlands/ watercourse etc (if needed discuss with Native Vegetation Conservation Branch).

Impact of the clearing on the environment:

Nowhere Road: approximately 2.3 hectares comprising 19 saplings and 4 mature Wandoo (*Eucalyptus wandoo*) some with hollows, and several York Gum (*Eucalyptus loxophleba*) and Jam (*Acacia acuminata*).

Fence Road: 1.2 hectares comprising the removal of 7 mature Marri (*Eucalyptus calophylla*) some with hollows, 5 mature Wandoo (*Eucalyptus wandoo*) and several Jam (*Acacia acuminata*), over native understorey in degraded to good condition. The areas that are degraded have extensive weed invasion.

Section 4: Developing Your Offset Proposal

Tips on what to consider before you determine appropriate sites to propose as offsets:

Have you:

- Selected offset site/s (with the help of your Environmental specialist) that are:
 - the same or similar in landform and soil type/s as found within the site to be cleared;
 - able to support the same or similar indigenous (pre-European) vegetation association/s as that present within the site to be cleared; and
 - likely to be successfully recreated as the habitats that are to be lost through clearing – note that if weeds or introduced plants occur in the site to be cleared you must identify what indigenous species you will be clearing and what indigenous species you will use in your offset planting.
- Noted that contaminated site/s classified under the *Contaminated Sites Act 2003* (past refuse disposal facilities, maintenance yards) are not considered to be suitable offset sites.
- Noted that the revegetation of gravel pits, in addition to those already required to be revegetated under this permit, may be suitable as offset sites.
- Ensured that all laws are complied with (e.g. *Native Title Act 1993*) and that necessary approvals are obtained (e.g. from landowner/s on which the offset will occur in the event that the subject land is not vested with the applicant, *Conservation and Land Management Act 1984*, *Rights in Water and Irrigation Act 1914*, etc).

You have previously stated the location and described the land to be cleared from the information in your permit and decision report (this can be in written or table format). Describe the vegetation at these sites.

Describe the vegetation within the site to be cleared:

Botanical name	Common name	Nowhere Road	Fence Road
Acacia acuminata	Jam	Y	Y
Acacia pulchella	Prickly Moses		Y
Allocasuarina huegeliana	Rock Sheoak	Y	
Astroloma pallidum	Kick Bush		Y
Astroloma serratifolium	Kondrung		Y
Austrostipa elegantissima	Feather Speargrass		Y
Avena sp. *	Wild Oats	Y	Y
Dryandra spp.			Y
Ehrharta sp. *	Veldt Grass	Y	Y
Eucalyptus accedens	Powderbark	Y	
Eucalyptus calophylla	Marri		Y
Lepidosperma spp.			Y
Lomandra effusa	Scented Matrush		Y
Xanthorrhoea sp.	Grass Tree	Y	Y
* denotes an introduced/weed plant species			

Detail the location, the amount of hectares and what it looks like (including soil type) prior to revegetation (structure; upper, middle, lower storey, density(%), ecological function and any other values).

Describe the proposed offset site prior to revegetation (location, area, species composition) and why it is suitable to offset the vegetation that will be lost due to the above clearing:

The offset (approximately 8 hectares in total) is to occur within the Shire of Somewhere (refer to aerial photograph attached). Offset sites were selected on the basis of their landscape position and soil type being similar to that within the area to be cleared:

- four gravel pits within Lot 123 on Plan 45678 and Lot 987 on Diagram 65432 (totalling approximately 6 hectares); this land was cleared in the 1950s for extraction of gravel for road construction, and is vested in the Shire of Somewhere;
- approximately 2 hectares of private property (being Lot 456 on Plan 98123) adjacent to a Nature Reserve, for which the owner of the proposed site has signed an agreement (see attached) to allow this work to be undertaken, and in addition the site will be fenced by the Shire and managed with advice from DEC's Land for Wildlife program; and
- in addition, nest boxes will be constructed and appropriately mounted in large trees located on the same side of the sealed surface and within 100 metres of the mature trees containing hollows that to be removed.

How will you achieve the offset? How many of what species will be planted per hectare? How does your proposal consider possible failure (e.g. drought, weeds, disease)?

Description of proposed process of achieving the offset and what you expect the offset will consist of when completed:

Prior to planting, the sites will be ripped and mounded using a dozer, and weed and pest control will be undertaken and continued as necessary to ensure the establishment of the revegetation until 2010. Planting will be done using a tractor with a tree planter. After twelve months the sites will be infill-planted with seed or seedling (where necessary) by hand, using a "Potti Putki" or similar tool. It is anticipated that over the next 10 years the areas will have a species composition and structure similar to that of the surrounding vegetation. Extra planting and/or seeding will occur where required to ensure successful revegetation.

The method of revegetation will provide for a minimum of 1500 stems per hectare, comprising of at least five species from the tables below.

Gravel Pits - species to be planted

Botanical name	Common name	Plant form
Acacia acuminata	Jam	Tree / shrub
Acacia pulchella	Prickly Moses	Shrub
Allocasuarina huegeliana	Rock Sheoak	Tree
Astroloma pallidum	Kick Bush	Shrub
Astroloma serratifolium	Kondrung	Shrub
Austrostipa elegantissima	Feather Speargrass	Sedge / grass
Borya nitida	Pincushions	Ground cover
Enneapogon sp.		Sedge / grass
Eucalyptus calophylla	Marri	Tree
Eucalyptus loxophleba	York Gum	Tree
Eucalyptus rudis	Flooded Gum	Tree
Eucalyptus wandoo	Wandoo	Tree
Gastrolobium crassifolium	Thickleaf Poison	Shrub
Hypolaena pubescens		
Lomandra effusa	Scented Matrush	Sedge / grass
Lomandra spp.		Sedge / grass
Xanthorrhoea sp.	Grass Tree	Tree / shrub

The seedlings will be grown from seed collected within the local area (i.e. within 20 kilometres of the revegetation site); most seed will be collected from the surrounding bushland. Seed will also be collected prior to clearing under the Shire's purpose permit. In accordance with current best practice, seed will be collected at appropriate times during 2007-08 and stored appropriately until May 2008 when it will be grown into tube stock by a local nursery with dieback-free accreditation.

Private Property – species to be planted

Botanical name	Common name	Plant form
Astroloma pallidum	Kick Bush	Shrub
Eucalyptus accedens	Powderbark	Tree
Eucalyptus astringens	Mallet	Tree
Leptospermum erubescens	Roadside Teatree	Shrub
Xanthorrhoea sp.	Grass Tree	Shrub

The seedlings will be grown from seed collected within the local area (i.e. within 20 kilometres of the revegetation site); if approved by DEC seed will be collected from the adjacent Nature Reserve.

To achieve the target diversity and density, some quantities of seed will be sourced from ABC Seed Supply Pty Ltd (a commercial seed supplier) if they have seed sourced from the area. Where seed needs to be specifically collected for the project, this will be collected under supervision of the environmental specialist.

Section 5: Verification that all Twelve Offset Principles have been Addressed

Direct offsets generally occur away from the area cleared and are designed to counterbalance the adverse environmental impact, with the aim of achieving no environmental difference (i.e. no net loss) (refer to Native Vegetation Fact Sheet 11 for more details).

1. Direct offsets should directly counterbalance the loss of the native vegetation.

The revegetation of four gravel pits plus 2 hectares of private property (totalling 8 hectares) to Beard vegetation association 946 using the species listed in the tables above at a minimum of 1500 stems per hectare will directly offset the loss of 3.5 hectares of vegetation in predominantly degraded condition.

Contributing offsets may include protection of areas of native vegetation, removal of threatening processes, management of areas of native vegetation and developing education awareness programs (refer to Native Vegetation Fact Sheet 11 for more details).

2. Contributing offsets should complement and enhance the direct offset.

The Shire of Somewhere will fence the 2 hectares of revegetation on private property to ensure long-term security from stock grazing and unwarranted access.

Nest boxes will be constructed and appropriately mounted in large trees located on the same side of the sealed surface and within 100 metres of the mature trees containing hollows that to be removed. This will occur approximately four weeks prior to the removal of the trees.

Explain why the vegetation must be cleared, detailing how it was not possible to avoid, minimise or reduce environmental harm.

3. Offsets are implemented only once all avenues to avoid, minimise, rectify or reduce environmental impacts have been exhausted.

The upgrading of Nowhere Road and Fence Road is a long-awaited and necessary project that has resulted from considerable community pressure to eliminate “black-spot” areas within the Shire of Somewhere. These roads have a non-restricted speed limit, and over past years at least two serious accidents have occurred as a result of impaired visibility (especially at night) due to vegetation close to the sealed surface.

A balance between the safe functioning of roads as transport corridors, and the value of roadside vegetation for tourism and wildlife, is required. The Shire of Somewhere has consulted with the Roadside Conservation Committee and other stakeholders in preparing its upgrade design. The areas to be cleared are located predominantly in vegetation of degraded condition and located on one side of the sealed surface to ensure no disturbance to the continuity of vegetation on the opposite side of the sealed surface.

<p>Describe the values that will be removed as a result of the clearing and how your offset will provide equivalent of better replacement for these values (e.g. nesting boxes, fencing the site, other habitat provided etc).</p>	<p>4. The environmental values, habitat, species, ecological community, physical area, ecosystem, landscape, and hydrology of the offset should be the same as, or better than, that of the area of native vegetation being offset.</p> <p>The 3.5 hectares to be cleared is located predominantly in vegetation of degraded condition, with approximately 10-20% in good condition along Fence Road. A spring survey undertaken by Environmental Impact Assessment Pty Ltd in 2006 did not identify any occurrences of Priority or Declared Rare flora within the area to be cleared.</p> <p>The removal of mature trees with nesting hollows will be mitigated through the relocation of any fauna in occupancy (possibility of Brushtail Possum, no evidence reported by Environmental Impact Assessment Pty Ltd during their 2006 survey of these hollows having been used by Threatened fauna Carnaby's Black-Cockatoo) by a suitably qualified fauna consultant to the nearby nesting boxes (contributing offset), or released into nearby bushland as deemed appropriate by DEC. Nesting boxes will provided at a ratio of 8 to each 5 hollows identified within the trees to be cleared. Revegetation of the offset sites will use wholly local species consistent with the expected composition of the vegetation to be re-created, and consistent with the original vegetation occurring within the offset sites.</p>
<p>Detail the size of the site of proposed clearing and why?</p>	<p>5. A ratio greater than 1:1 should be applied to the size of the area of native vegetation that is offset to compensate for the risk that the offset may fail.</p> <p>The 3.5 hectares to be cleared is to be offset by revegetation of four gravel pits plus 2 hectares of private property (totalling 8 hectares), representing an offset ratio greater than 1:1. The loss of 3.5 hectares of vegetation predominantly in degraded condition (with a small percentage in good condition) will be mitigated through the re-creation of 8 hectares of a similar vegetation composition as that to be cleared and with a greater density and diversity than that to be cleared. The installation of nest boxes will mitigate the loss of habitat trees with hollows.</p>
<p>Describe assessment process for your offset proposal. You may need to include an attachment describing best practice methodology and why you used these methods.</p>	<p>6. Offsets must entail a robust and consistent assessment process.</p> <p>Environmental Impact Assessment Pty Ltd undertook an inspection of the area under application in spring 2006. The methodology and results of the survey were provided in a report that was provided to the Department of Environment and Conservation as supporting information to the Shire of Somewhere's clearing application. Subsequently Environmental Impact Assessment Pty Ltd has identified a number of sites suitable as an offset, determined suitable by the nature of their landform, soils and the composition of surrounding bushland, and ongoing monitoring and management will ensure successful establishment of the re-created vegetation types.</p>
<p>Explain how your proposed offset will address the clearing principles that your permit may be or is at variance to (detailed in the Decision Report).</p>	<p>7. In determining an appropriate offset, consideration should be given to ecosystem function, rarity and type of ecological community, vegetation condition, habitat quality and area of native vegetation cleared.</p> <p>The Shire of Somewhere has less than 20% of its native vegetation remaining. This offset aims to re-create 8 hectares of native vegetation in a condition better than that which is to be cleared.</p>

<p>Describe how the net gain in size, quality and quantity when the offset is completed.</p>	<p>8. The offset should either result in no net loss of native vegetation, or lead to a net gain in native vegetation and improve the condition of the natural environment.</p> <p>This offset will result in a net gain of native vegetation in terms of both the spatial area to be revegetated and the density and diversity of the revegetation when compared with the area under application. Ongoing monitoring and management will ensure successful establishment of the re-created vegetation.</p>
<p>Explain any other legislation you have satisfied (e.g. animal removal and relocation and seed collection).</p>	<p>9. Offsets must satisfy all statutory requirements.</p> <p>Appropriate approvals and licenses have been obtained from the Department of Environment and Conservation in relation to the collection of seed and relocation of fauna. Approval has been sought regarding the collection of seed from the Nature Reserve adjacent to the 2 hectare offset site on private property.</p>
<p>Describe how you will define, document and audit your offset.</p>	<p>10. Offsets must be clearly defined, documented and audited.</p> <p>Reporting and auditing will be done in accordance with the requirements of Clearing Permit 000/1. Refer to 'Monitoring Commitments' and 'Management Commitments' below for details of the Shire of Somewhere's commitment to ensuring successful establishment of the re-created vegetation associations.</p>
<p>Explain what management processes you will implement to ensure that there is an environmental benefit achieved for 10-30 years.</p>	<p>11. Offset must a long term (10-30 year) benefit.</p> <p>The tenure of the land on which the four gravel pits occur is with the Shire of Somewhere, is fenced and has restricted access. The revegetation and conservation management of these gravel pits is in accordance with the current Town Planning Scheme.</p> <p>The location of 2 hectares on private property adjacent to a Nature Reserve contributes a number of functions, including a buffer between the reserve and adjacent agricultural land, and extending the area of habitat available to wildlife. The site will be fenced to ensure long-term security from stock grazing and unwarranted access, and will managed in accordance with advice from DEC's Land for Wildlife program.</p>
<p>Describe how the environmental specialist will be involved in the design and at when the environmental specialist with assess and monitor the offset.</p>	<p>12. An environmental specialist must be involved in the design, assessment and monitoring of offsets.</p> <p>Environmental Impact Assessment Pty Ltd has been employed to undertake surveys of the flora and fauna and general environment of the area under application, and to identify suitable offset sites.</p> <p>Environmental Impact Assessment Pty Ltd will be supervising the offset proposal including the seed collecting, planting and monitoring.</p>

Section 7: Commitments and consultation

How will you monitor the success of the offset and over what period?

Monitoring Commitment:

The offset sites will be monitored twice annually until 2010, by way of photographic monitoring points established on the perimeter of the sites, and by way of walking through the sites and identifying the success in terms of density, species survival, and weed invasion. Failure of the revegetation will be determined by calculating the density of surviving seedlings to be less than 1200 stems per hectare (allowing for up to 20% loss). Nest boxes will be monitored for signs of occupancy until 2010.

An annual report will be forwarded to the Department of Environment and Conservation in accordance with CPS 000/1 reporting condition.

What ongoing management activities will be undertaken?

Management Commitment:

Following monitoring twice annually until 2010, management of the sites and remedial actions will be undertaken where required. This will include management of any weeds found to be establishing within the sites, rabbit control if necessary, and manual infill planting where seedlings have not succeeded, to ensure successful establishment of revegetation to the target density and diversity (see 'Offset Description' above).

Include relevant stakeholders, e.g. local environment, catchment, and flora / fauna groups (include contact details).

Agencies consulted and submissions received:

The following stakeholders have been consulted with regards to this proposal:

- Roadside Conservation Committee (RCC);
- private landholders (for revegetation on private property);
- the local community / LCDC; and
- Department of Environment and Conservation (DEC).

Section 8: Supporting information (appendices)

- **Locality plan / aerial photograph/s indicating the offset site and north, legend and scale (one close up A4 page for each site)**
- **Species list for offset**
- **Dominant species list for area of clearing (local to and similar soil and topography)**

Additional Information and References

Determining vegetation condition

Bush Forever Volume 1¹ defines vegetation condition:

“Condition is a rating given to bushland to categorise disturbance related to human activities. This rating refers to the degree of change in the structure, density and species present in the bushland in relation to undisturbed bushland of the same type. Different people have used a series of scales of disturbance. Condition ratings used commonly in the Perth Metropolitan Region are described in Volume 2 (Connell 1995, Government of WA 1995, Keighery 1994).”

Condition Scale (Extract from Table 12 on page 48 of Bush Forever Volume 2 from Keighery B.J. (1994) ²)	
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

¹ *Bush Forever Final Report* (December 2000), Western Australian Planning Commission.

² Keighery, B.J. (1994) *Bushland Plant Survey. A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc), Nedlands, Western Australia.

Useful References

- Baxter, A., and Bicknell, D. (1996). *Toolibin Catchment Revegetation Manual*. Department of Agriculture Western Australia.
- Beard, J.S. (1980) *Vegetation Survey of Western Australia, 1:250,000 Series*. Vegmap Publications, Perth.
- Bradby, K., Morris, V., McEvoy, S. (1997). *Seed Collection from Native Plants*. Land for Wildlife Note 4. Department of Conservation and Land Management, Western Australia.
- Brown, K. and Brooks, K. (2003). *Bushland Weeds – a Practical Guide to their Management*. Environmental Weeds Action Network (Inc), Western Australia.
- Bush Forever Final Report* (December 2001), Western Australian Planning Commission.
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- National Objectives and Targets for Biodiversity Conservation 2001-2005*. Environment Australia, Canberra.
- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) *Native Vegetation in Western Australia, Extent, Type and Status*. Resource Management Technical Report 249. Department of Agriculture, Western Australia.
- Department of Agriculture and Food (WA) 'FarmNotes' series
- FarmNote 37/98: Site preparation for successful revegetation for agricultural areas with less than 600 mm rainfall
 - FarmNote 47/98: Weed control for successful revegetation for agricultural regions with less than 600 mm rainfall



ENVIRONMENTAL OFFSETS



Position Statement No. 9



January 2006



Environmental Protection Authority

Environmental Offsets

Position Statement No. 9

January 2006



Environmental Protection Authority



FOREWORD

Environmental offsets aim to ensure that significant and unavoidable adverse environmental impacts are counterbalanced by a positive environmental gain, with an aspirational goal of achieving a 'net environmental benefit'. In view of the State's recent alignment with the sustainability philosophy, it has potential to be a useful management tool – enabling development to occur, but not at the total expense of the environment. It is important to recognize that environmental offsets represent a 'last line of defense' for the environment, only being used when all other options to avoid and mitigate environmental impacts have been considered and exhausted.



This final Position Statement sets out the EPA's views on environmental offsets. The EPA considers that environmental offsets should be included, where appropriate, as part of approvals for environmentally acceptable projects to maintain and wherever possible enhance the State's environment. To this end, this Position Statement establishes a purpose, scope and principles for environmental offsets that the EPA will consider in future advice and recommendations. I anticipate that this Position Statement will provide the basis for developing a whole of government policy on environmental offsets. The EPA does not propose that this Position Statement be retrospective in its application.

The EPA is also currently preparing a Guidance Statement on environmental offsets which will be tailored directly to the environmental impact assessment process for development proposals.

The EPA wishes to thank those persons who, and organization which, commented on both versions of the Preliminary Position Statement. It has been substantially amended in response and is a much better document as a consequence.

A handwritten signature in dark ink, appearing to read "W. J. Cox". The signature is written in a cursive style.


Walter Cox
Chairman
Environmental Protection Authority

5 January 2006



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1. INTRODUCTION

1.1 Background

In recent decades, there have been several attempts at developing and using environmental offsets as an environmental management tool in Western Australia (WA). For example, in the 1980s and 1990s government agencies attempted to counter adverse environmental impacts to Swan Coastal Plain wetlands by creating, conserving or enhancing wetlands elsewhere.

In more recent years the focus has evolved to using offsets in a broader environmental management context, that is for counterbalancing waste emissions and impacts to conservation reserves, native vegetation, wetlands, habitat and biodiversity. Sustainability has also recently become a key philosophy endorsed by the State and methods are being developed to help achieve this (Government of WA, 2003a). Environmental offsets are one tool being used in this context, providing alternative beneficial environmental outcomes in situations where social and economic growth is sought at some detriment to the environment.

The Environmental Protection Authority (EPA) currently recognises that various offset policies and approaches are being developed and used without common overarching principles and acknowledges that there is the potential for inconsistent messages to be given. In addition, there is some concern from the community about what offsets should and shouldn't be.

The EPA is also concerned about perceptions that negotiated offset and compensation packages are being used to make otherwise 'unacceptable' adverse environmental impacts 'acceptable' within government. It is aware that some environmental offsets, proposed in the guise of sustainability tools, are sometimes over-riding the protection and conservation of our State's most valuable environmental assets. Over time, the cumulative effects of this type of decision-making would contribute to a gradual decline in both the quality and quantity of the State's priority environmental assets. The EPA is of the view that this approach is neither sustainable nor focused on protecting the environment. It is also aware there may be equity issues that need to be addressed by government. The challenge now is to find the means of doing so effectively.

Previous EPA policy has provided the context for using environmental offsets in various applications. One approach currently being used for Environmental Impact Assessment (EIA) is the 'net conservation benefit' approach, having been developed by conservation agencies in collaboration with the EPA (EPA Bulletin 1101, 2003). This approach focuses on offsetting the clearing of conservation estate land with the addition of another area of suitable land into the conservation estate. This approach also extended to making contributions towards environmental research, management and other environmentally beneficial activities.

The EPA has also published a draft policy framework on wetland banking. This document was released for public comment in 2001 (EPA, 2001a). It proposed the development of a wetland credit-trading scheme, regulated through a 'bank', which would issue credits for wetland improvements and debits for wetland degradation. A summary of public comments on this document has been provided in the first version of

this Preliminary Position Statement. Many of the issues identified in this document's public consultation phase were used in the development of this Position Statement.

General EPA offsets policy direction has also previously been provided for native vegetation and wetlands outside of the conservation estate (EPA, 2000; EPA, 2001b), marine benthic habitats where substantial cumulative losses have already occurred (EPA, 2003a) and in general circumstances where 'best practices' are considered inappropriate or inadequate (EPA, 2003b).

State Government agencies have also been developing various offset policies. The Department of Environment (DoE) is preparing a native vegetation offset policy for clearing of native vegetation regulated under the *Environmental Protection Act 1986*. In addition, the Department of Conservation and Land Management (CALM) in consultation with the Conservation Commission has been developing a 'conservation offsets' policy with respect to offsetting adverse impacts to conservation reserves, State forest, threatened flora, fauna and ecological communities. Public consultation is being undertaken on this policy approach as part of the proposed Biodiversity Conservation Act. The Department of Planning and Infrastructure (DPI) is developing an offsets and mitigation policy for impacts to 'Bush Forever' native vegetation sites.

In view of the afore-mentioned issues, the EPA is developing this Position Statement to provide overarching guidance and to establish a consistent policy approach on the matter. This position statement provides some clarification on the options for industry, developers, environmental consultants, specialist scientists and community groups who may be involved in developing or reviewing options for environmental offsets.

Where a proponent for a development is subject to the environmental impact assessment and approval process, and environmental offsets are properly part of those considerations, the EPA expects proponents to put forward commitments for offsets as part of their proposal.

1.2 Why offsets are important

Conservation of the environment is always desirable. However, in a growing society and economy this is not always achievable. Where environmental impacts must occur, environmental offsets represent the 'last line of defence' for the environment. They aim to ensure that any adverse impacts are counterbalanced by an environmental gain somewhere else, so there are no adverse environmental impacts as a result.

Historically, adverse environmental impacts were regarded as an acceptable consequence of economic and social growth. However, it is now well recognised this past thinking was unsustainable. As a consequence, the State is now dealing with significant environmental problems that threaten the condition of the State's environment and also its social and economic integrity. For example, past clearing of native vegetation in the wheat belt has contributed to the current threat of land and water salinisation, which in turn, is contributing to loss of biodiversity, loss of potable water supplies, destabilization of rural communities and reduced primary agricultural production.

Sustainability tools are needed to ensure the protection and *improvement* of the environment whilst allowing for economic and social growth. Environmental offsets are one management tool that has the potential to help achieve sustainable outcomes, as identified in the State Sustainability Strategy (Government of Western Australia, 2003a).

Other similar management tools include credit trading schemes and wetland/bushland banking.

Environmental offsets as a basic concept is well established nationally, having been incorporated into government policies for native vegetation, carbon trading and forestry. Western Australia is also a signatory to national agreements that employ the offset concept. Of particular significance is the National Objectives and Targets for Biodiversity Conservation (Environment Australia, 2001b) which aims to reduce the national net rate of land clearing to zero. The offsets concept has also been integrated into the National and State Greenhouse Strategies through vegetation carbon offsets and carbon credit trading schemes (Commonwealth of Australia, 1998; Government of Western Australia, 2003b); being similar in nature to schemes adopted internationally under the Kyoto Protocol.

Despite global strengthening of environmental policy and regulation, many key aspects of environmental health continue to degrade (Government of Western Australia, 1998; Commonwealth of Australia, 2001; UNEP, 2002). By itself, strict environmental policy and regulation can be a resource and time consuming activity for both regulators and proponents. However, by using environmental offsets as a complementary activity, it may allow a more flexible approach where some minor impacts may be considered if there is an overall net benefit for the environment. This approach may be particularly relevant where there is a minor environmental benefit to be gained by reducing emissions a small amount (beyond that which can be achieved through best available technology) at a large cost to the proponent. In these circumstances, the proponent may use offsets to achieve a greater environmental benefit somewhere else at a much-reduced cost (NSW EPA, 2002). Notwithstanding the above, it is widely recognised that regulatory tools and enforcement still have a very important role to ensure the environment remains protected in the long term.

Emissions appear to be the clearest or easiest application for environmental offsets. This can be attributed, in part, to established methods for quantifying, comparing and assessing pollutants being discharged to the environment. Many examples are available from around the world that show how emission offsets (in particular greenhouse gas emissions and nutrient emissions) can produce positive environmental outcomes, and in some instances, a truly sustainable outcome (for example, US EPA 2002, Climate Trust, World Resources Institute, 2000; EPA Bulletin 945 1999).

In addition to their obvious connection with point source pollution, offsets may also prove to be a remedy for the management of diffuse pollutant sources that have historically proven to be a large and onerous task for government to manage alone. Diffuse pollution offsets may utilise the creation of plantations or re-establishment of ecosystems to act as diffuse pollutant (carbon and other nutrients) sinks (NSW EPA 2002; O'Sullivan, 2002).

Another potential benefit of offsets is their ability to utilise market forces in environmental protection. The incorporation of offsets into programs or schemes (such as wetland banking, credit trading or other market-based incentives) can allow the marketplace to become actively involved in environmental protection and enhancement. Companies can be formed with the sole purpose of generating environmental improvements (via ecosystem restoration, rehabilitation and re-establishment projects) knowing that these improvements can then be on-sold at market price to other companies

wanting to offset environmental impacts. In this way, proactive environmental improvements can be undertaken before impacts occur. Integrating environmental protection into the marketplace represents a further step towards achieving sustainability and a great deal of research is currently being undertaken throughout Australia on this matter (James, 1997; Van Bueren, 2001; Murtough et. al., 2002; Binning et. al., 2002; Robinson and Ryan, 2002; Godden and Vernon, 2003; amongst others).

While environmental offsets can offer a tool for a sustainable approach to environmental protection, the concept is not without its limitations. Long-term studies of environmental offset schemes overseas have shown that implementing offset projects without sufficient data, research, information, available resources, regulation and commitment will only result in a *net loss* of environmental assets and values – the opposite desired effect of environmental offsets (Brown and Lant, 1999; Committee of Mitigating Wetland Losses, 2001; Ambrose, 2000; Johnson et. al., 2002). This has been shown to be especially true for offsets related to natural ecosystems, especially wetlands and complex vegetation types. Therefore it is imperative to ensure that offset-related policies, programs and projects are robustly coordinated, monitored, managed, evaluated and enforced to ensure the environmental offset contributes to successful, long-term environmental outcomes.

In addition, there have been general concerns that the whole offsets concept adopts a ‘reactive’ approach. That is, offsets depend on an adverse environmental impact happening for an environmental improvement to occur. There have also been suggestions that some offset programs in other Australian States have been too narrowly focussed and failed to address broader ecosystem benefits of the impacted ecosystem (Gillespie, 2000; NCC of NSW, 2001; Environment Victoria, 2000).


Offsets may also be perceived as suggesting that all environmental assets are ‘up for grabs’. This perception highlights an important point. There must be clear and unambiguous delineation about the role and use of offsets as an environmental impact management tool, and *not* as a project approval negotiation tool. It emphasises the need to reaffirm the mitigation sequence for environmental impact management and to reaffirm the conservation and protection of ‘critical assets’ that represent our State’s most important environmental assets.

The apparent limitations of environmental offsets highlight the need for the EPA to establish strong principles based on a foundation of environmental protection. It also highlights the need for the State to reaffirm its position on ‘critical assets’ – to provide a scope for the intended use of environmental offsets. It must also be reinforced that offsets are only one tool in the suite of environmental management instruments and that they must be used in conjunction with proactive tools (such as use of best practices and incentives), so as to promote the conservation of the environment first and foremost.

1.3 Offsets go beyond normal environmental management responsibilities

Offsets are not a substitute for normal environmental management responsibilities. These are required as part of normal environmental approvals processes under the Environmental Protection Act 1986.

Offsets are in addition to these and are about maintaining and preferably improving environmental quality. However, different parts of the environment under consideration may require different approaches albeit based upon the common principles. For example, for addressing offsets for emissions to, and loss of benthic habitat in, the marine



environment maintenance of ecological functions should be the focus with ecological linkages and flows important at the ‘bay’ scale rather than the ‘landscape’ scale. Creation of suitable habitat for mangroves and algal mats to colonise to directly offset losses elsewhere would be an example.

Finally, there can be wider potential benefits of offsets (ten Kate et. al. (2004)) which can include: a ‘social license to operate’ for proponents (i.e. community support or no community opposition), the possibility for proponents to influence emerging environmental regulation and policy, reduced cost of compliance with environmental regulation and easier access to capital with associated competitive advantage.

2. PURPOSE

The purpose of this Position Statement is to provide the community, government agencies, industry, developers, consultants, business and other key stakeholders with overarching advice about the intent and appropriate use of environmental offsets.

The EPA considers the purpose, scope and principles in this Position Statement to be important and these will help guide the EPA in future decision-making and in its advice. It must also be reinforced that the EPA's environmental offsets policy position in no way affects the legitimacy of other policy positions related to conservation and environmental protection. The EPA holds the view that environmental offsets should not be considered in isolation, but rather as part of an integrated framework for improved management of the environment that includes regulatory and behavioral incentive programs.

NET ENVIRONMENTAL BENEFIT GOAL

The EPA is of the opinion that environmental offsets should be used with an aspirational goal of achieving a '*net environmental benefit*'. This policy position recognises that the environment has been significantly compromised in the past and that halting and reversing the decline of the environment is now a priority (Figure 1).

Achieving a '*net environmental benefit*' goal means that each offset proposal should address direct and contributing offsets to meet the offset principles in this Position Statement.

Direct offsets are at least one activity selected to help counterbalance the environmental impact, with the aim of achieving no environmental difference, e.g. restoration (offsite*), rehabilitation (offsite*), re-establishment, sequestration. However, direct offsets may not be possible to achieve in every circumstance. Where native vegetation is outside the conservation estate and is subject to threatening processes, its acquisition and inclusion into the conservation estate may be considered a direct offset for the purposes of this Position Statement because of its security of tenure, purpose and management.

Contributing offsets = selected complementary activities (as necessary) which, with the direct offset, meet the offset principles (see Section 3); e.g. protection mechanisms; management; education; research; removal of threats; or other activities having a proven environmental benefit; or contributions to an approved 'bank', credit trading scheme or trust fund (as deemed appropriate by the EPA).

(* 'Offsite' carries the implication that offsets are not substitutable for normal environmental management requirements but in addition to these. That is, restoration and rehabilitation of land directly affected by a development are considered normal environmental management requirements.)

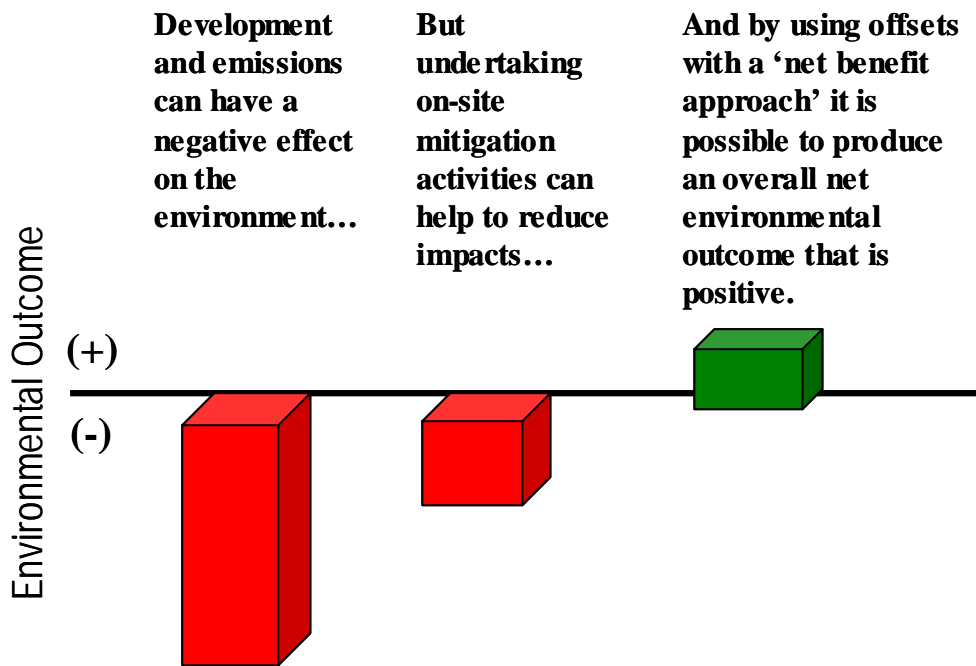


Figure 1: The purpose of a 'net environmental benefit' goal is to achieve a positive environmental outcome from new development or emissions. Adapted from NSW EPA (2002).

3. PRINCIPLES

In its advice and decision making the EPA has regard for a number of environmental principles from s.4A of the *Environmental Protection Act (1986)*, including:

- The precautionary principle
- The principle of intergenerational equity
- The principle of the conservation of biological diversity and ecological integrity
- Principles relating to improved valuation, pricing and incentive mechanisms; and
- The principle of waste minimisation

With reference to environmental offsets, the policies, decisions and advice of the EPA will be guided by the following principles, in accordance with the purpose and scope:

A. Environmental offsets should only be considered after all other reasonable attempts to mitigate adverse impacts have been exhausted.

- On-site adverse environmental impacts must first be addressed using the mitigation sequence (i.e. avoidance, minimise, rectify, reduce, offset in that order – refer Figure 2). Protection and conservation of existing critical environmental assets will always remain a priority above the use of environmental offsets. Offsets are then used to address any significant residual environmental impacts following mitigation considerations. The risk of residual environmental impacts being significant should be addressed early in development planning.
- Proponents wanting to undertake environmental offsets must provide a statement of reasoning to explain what mitigation will occur and why other mitigation options have not been selected to demonstrate that the ‘impact mitigation sequence’ has been fully considered and to provide justification for the environmental offset to be accepted.

B. An environmental offset package should address both direct offsets and contributing offsets.

- Direct offsets counterbalance the adverse environmental impact directly, with the aim of achieving no environmental difference (i.e. no net loss) and aspirationally, a net benefit. An understanding of an appropriate direct offset activity will require research, investigations and a debate of findings with key stakeholders.
 - When relevant to ecosystems, direct offset options may include restoration or rehabilitation of existing degraded ecosystems, re-establishing desirable ecosystems (e.g. re-establishing biodiversity corridors or specific ecosystems in areas of low representation) or implementation of agreed recovery plans for species. Where native vegetation is outside the conservation estate and is subject to threatening processes, its acquisition and inclusion into the conservation estate may be considered a direct offset for the purposes of this Position Statement because of its security of tenure, purpose and management.
 - When relevant to emissions, direct offsets include sequestration activities that permanently remove or ‘lock up’ a pollutant from the environment

(such as establishing new ecosystems, deep well injection and capping, or removing or capturing pollutants from the environment via other approved methods).

For greenhouse gas emissions, the EPA is mindful that there is no agreed international or national position yet regarding the addressing of offsetting of such emissions under the United Nations' Framework Convention on Climate Change. The position in Western Australia, as contained in the Western Australian Greenhouse Strategy (2004), is to promote market-based abatement solutions, to establish a registry for certifying and documenting carbon credit sequestration and to support international and national emissions trading and abatement models. Until these are in place the EPA will continue to ask proponents to address the mitigation of greenhouse gas emissions for levels above a best practicable technology benchmark. The EPA expects that its approach will be subsumed by WA's inclusion in a national approach in the future.

- Contributing offset activities should be considered as part of a combined approach with direct offset activities.
- Contributing offsets can in some cases be preferable because for example, they would lead to a better environmental outcome or direct offsets are not possible. The relative priority of different forms of offsets for biodiversity will vary according to circumstances
 - When relevant to ecosystems, contributing offset options may include conservation activities (covenanting), protection (such as fencing, buffering, or bunding), new research, education, removing threats, or on-going management activities (such as monitoring, maintenance, preparing management plans, evaluation, reporting, etc.). These may be more secure in the long term than, for example, rehabilitation on private property.
 - When relevant to emissions, contributing offsets may include going beyond Best Practicable Measures (as defined in EPA Guidance Statement 55 (Environmental Protection Authority, 2003b), assisting other industries with resource-efficient practices, new research, education or on-going management activities.
 - Where a proponent is unable to undertake restoration, rehabilitation, re-establishment or sequestration activities, they may consider the use of 'banking' or 'credit-trading schemes' to purchase equivalent environmental credits (improvements) to offset their adverse environmental impacts. As an alternative to banking, an appropriate financial amount could be contributed to a statutory trust fund with the sole purpose of being used for an environmental improvement activity.
- Successful integration and application of offset activities should aim to produce a 'net environmental benefit' outcome.

C. Environmental offsets should ideally be ‘like for like or better’.

- ‘Like for like’ ensures that the offset activity counterbalances the same type of impacted ecosystem or emission.
 - When relevant to ecosystems, ‘like for like’ applies to environmental values, vegetation, habitat, species, ecosystem, landscape, hydrology, and physical area. The principle aims to avoid comparable threatened ecosystems, flora and fauna species from being systematically degraded over time through individual and cumulative impacts. Ideally the receiving offset site should be located in the same local vicinity, so as to ensure the offset effect is expressed within the same area of impact. This ensures that offsets are not diluted or concentrated within a specific geographical area or bioregion.
 - When relevant to emissions, ‘like for like’ applies to both the chemical and quantity of emissions. The chemical being offset should be the same as the chemical being emitted. For example, phosphate waste discharge should be offset with phosphate sequestration methods. It is worth noting that offsets should not extend to chemicals that are hazardous to the environment or human health (i.e. toxic or synthetic chemicals such as plastics, pesticides, heavy metals, etc). With reference to quantity of emissions, ‘like for like’ refers to sequestering the equivalent mass or volume of the chemical that is being discharged to the environment. The EPA acknowledges that ‘like for like’ and ‘like for like or better’ for greenhouse gases should be approached in most cases on a CO₂ equivalent basis if the greenhouse gas emitted is other than CO₂.
- ‘Like for like or better’ refers to not only achieving ‘like for like’ but aiming for improvements beyond what is required for ‘like for like’. This may refer to either an enhancement in either the quality or quantity aspects of the offset activity while still considering ‘like for like’ requirements.
 - Where relevant to ecosystems, to achieve ‘like for like or better’ an offset resource from a lower quality asset which is the subject of the impact may be substituted for a higher quality asset in order to obtain an improved environmental outcome.
 - Where relevant to emissions, ‘like for like or better’ may consist of a greater amount of pollutant being sequestered than what is required under ‘like for like’ and ‘offset ratio’ requirements (see Principle D). ‘Like for like or better’ may also refer to achieving ecosystem improvements *at the same time* as achieving emission offsets. For example, re-establishment of a desirable ecosystem would meet offset requirements for both emissions *and* ecosystems. However, establishing a plantation or nutrient-stripping pond would meet only emission offset requirements.
- Where ‘like for like or better’ principles cannot be achieved due to limited availability of comparable ecosystems in the local vicinity, it must be ascertained if the ecosystem to be impacted is special to the bioregion. This may require relevant government environmental agencies to reassess whether this particular

ecosystem type is a ‘critical asset’. Under this scenario, other more suitable offset sites may be recommended to the proponent by the relevant environmental agencies.

D. Positive environmental offset ratios should apply where risk of failure is apparent.

- Positive offset ratios should be used where there is a reasonable risk that the offset will not fully succeed over the long term. That is, the size of the offset to impact ratio should be larger than 1:1 and be *proportional* to both the importance of the environmental asset being impacted, and the likelihood that the offset is unlikely to achieve a ‘net environmental benefit’ outcome. Offset ratios should be based on past findings, success rates, current research or other similar projects being undertaken. Risk of failure could be reduced through, for example, putting offsets in more than one location.
 - When relevant to ecosystems, offset ratios should apply to environmental values, vegetation, habitat, species, ecosystem, landscape, and hydrology, in addition to physical area. The principle prevents complex ecosystems or unique species (that are difficult to restore, rehabilitate or reestablish) from being systematically degraded over time, particularly through cumulative impacts.
 - When relevant to emissions, offset ratios should apply to the quantity of the pollutant being discharged. The ratio should consider if pollutant emissions or offset outcomes (i.e. sequestration or net uptake) are expected to fluctuate significantly over time. Ratios should be weighted to accommodate periods of higher-than-expected emissions, or where an offset activity’s sequestration rate is likely to deteriorate over time.

In this regard, the issues associated with predicting and measuring environmental impacts – especially on biodiversity loss – should not be underestimated. Addressing these issues through offsets can lead to collateral benefits to improve the environmental impact process.

E. Environmental offsets must entail a robust and consistent assessment process.

- A robust, consistent and transparent assessment process will help to ensure that environmental offsets provide an equitable environmental outcome.
- Proponents proposing to cause or allow significant adverse environmental impacts must demonstrate adequate knowledge of the environmental values of the impact site and the proposed offset site(s). After acquiring this adequate knowledge, proponents must demonstrate how their proposed offset package will result in a ‘net environmental benefit’ outcome. If adequate information is lacking in any of these areas, the project proposal will be considered in the context of the ‘precautionary principle’.
- Assessments of both the impact and offset sites should include factors that are commonly identified through the Environmental Impact Assessment process.

- The EPA expects that those involved in the impact assessment or development of environmental offset proposals should have appropriate qualifications and experience to ensure reasonable standards are maintained.

F. Environmental offsets must meet all statutory requirements.

- Environmental offsets must meet all planning, statutory and regulatory requirements prior to further consideration.
- Negotiation of offset conditions should not be used to approve projects where they have been previously restricted by the abovementioned requirements.


G. Environmental offsets must be clearly defined, transparent and enforceable.

- Offsets must clearly define the environmental impact(s) it is intended for. Should the project be modified and cause further additional impacts beyond the original impact, this will require the project to be reassessed for additional environmental offsets.
- Actual offset activities being undertaken should be fully documented by the proponent. Environmental offsets must be based on open and accountable administration. The general public should be able to see that offset principles have been put into practice and that offset goals are being achieved.
- If the offset depends upon another party or parties (other than the proponent) for implementation then agreement should be reached before proposing the offset.

Implementation of offset activities should be legally secure and enforceable and, subject to compliance auditing as well as enforcement activities when breaches are apparent.

H. Environmental offset must ensure a long lasting benefit.

- Environmental offsets must be undertaken on the understanding that the activities and outcomes must be long-term. The probability of success (or otherwise) is an important consideration in the choice of offsets. Offset projects should demonstrate security of purpose, security of tenure and security of management. The costs of enduring management and maintenance form part of the offset and should be factored in. Where it is proposed to transfer enduring management responsibility from the proponent to another party or parties, agreed completion criteria may be relevant.
 - When relevant to ecosystems, the offset site should be legally protected with covenants or conservation agreements or transferred into the conservation estate to ensure that the positive environmental benefit is long lasting. Legal agreements may be required in some instances to identify responsibilities and to ensure the on-going management and maintenance of the offset site over an ecologically meaningful timeframe (perhaps decades).

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- When relevant to emissions, the offset activity should last for *at least* the duration of the emissions or environmental impact (whichever occurs for the longer duration). Legal agreements may be required to secure on-going management and maintenance over this timeframe.
 - Where environmental improvements are purchased from a ‘bank’, credit trading scheme, or contributions made to an appropriate trust fund, it must be clearly demonstrated that the organization responsible for undertaking the environmental improvement activity is also demonstrating security of tenure and management.

4. SCOPE

The scope of this Position Statement applies to all environmental issues, matters and advice for which the EPA has jurisdiction (recognising that some government agencies have responsibilities which involve offsets for activities on which the EPA does not provide advice)

Ecosystems and Emissions

This Position Statement is relevant to all new proposals for significant adverse impacts to ecosystems and for emissions to the environment.

The EPA on the advice of relevant government agencies will determine whether adverse residual impacts are significant or not. (Residue impacts are those which cannot be avoided, minimised, rectified or reduced such that they be no longer significant.)

The EPA encourages industry, developers, consultants, specialist scientists and community groups to consider options for environmental offsets in the early phases of a proposed project and, where reasonable and practicable, in consultation with the wider community.

Critical Assets

‘Critical assets’ represent the most important environmental assets in the State that must be fully protected and conserved for:

- the State to fulfill its statutory and policy requirements;
- the State to remain sustainable in the longer term; and,
- the EPA to comply with its general principles for advice and decision making (see Section 3 on Principles).

Therefore, when the issue is before the EPA, there is a presumption against recommending approval for proposals that are likely to have significant adverse impacts to ‘critical assets’. The EPA does not consider it appropriate to validate or endorse the use of environmental offsets where projects are predicted to have significant adverse impacts to the following:

i) Public Conservation Reserve System

- Nature reserves, national parks, conservation parks, regional parks, marine parks, marine nature reserves and marine management areas.
[Established in accordance with Conservation and Land Management Act 1984 and Land Administration Act 1997 and having regard for policies such as ‘New Horizons’.]

ii) Native Vegetation

- Where adverse impacts to native vegetation are seriously at variance to the principles to protect native vegetation listed under Schedule 5 of the *Environmental Protection Act 1986* or associated Regulations where:
 - “a) It comprises a high level of biological diversity;
 - b) It comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia;

- c) It includes, or is necessary for the continued existence of, rare flora;
- d) It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community;
- e) It is significant as a remnant of native vegetation in an area that has been extensively cleared;
- f) It is growing in, or in association with, an environment associated with a watercourse or wetland;
- g) The clearing of the vegetation is likely to cause appreciable land degradation;
- h) The clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area;
- i) The clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water;
- j) The clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”

(note: native vegetation includes marine habitats. Also, permitting processes for vegetation clearing on a merits basis are managed by the Department of Environment under Part V Division 2 of the Environmental Protection Act 1986. ss.51H(1) and 51I(2)(b) provides for specific powers to address offsets.)

- Where adverse impacts to a native terrestrial vegetation complex would result in a 30% or less representation of the pre-clearing extent of that vegetation complex in a bioregion (noting however that this threshold has been exceeded in some areas).
[*National Objectives and Targets for Biodiversity Conservation 2001-2005, EPA Position Statement 2*]
- Where adverse impacts to a native vegetation complex in constrained areas (i.e. areas of urban development in cities and major towns) on the Swan Coastal Plain would result in a 10% or less representation of the pre-clearing extent of that native vegetation complex.
[*for example Bush Forever 2000; Greater Bunbury Region Scheme, Peel Region Scheme*]
- Bush Forever reserves (not including those areas subject to negotiated planning solutions or complementary mechanisms and for which agreement has been reached that such areas fall outside the conservation requirements) having regard for the Western Australian Planning Commission’s Statement of Planning Policy No. 2.8 ‘Bushland Policy for the Perth Metropolitan Region (Draft)’.
[*Bush Forever 2000*]

iii) **Biodiversity**

- Declared Rare Flora (DRF) - that significantly impacts local populations.
[*listed pursuant to Wildlife Conservation Act 1950*]
- Declared Threatened Fauna - that significantly impacts local populations.
[*listed pursuant to Wildlife Conservation Act 1950*]
- Having regard for Threatened Ecological Communities (TEC) - which fits in any of the following categories: presumed totally destroyed, critically endangered, endangered, vulnerable or data deficient (where it would not be unreasonable to assume the TEC would fit into one of the other listed categories).

[as defined by English and Blyth, 1999, and identified by Department of Conservation and Land Management or approved pursuant to the Commonwealth Environment Protection and Biodiversity Conservation Act 1999]

- Having regard for the Priority Species List prepared by the Department of Conservation and Land Management.
[as identified by Department of Conservation and Land Management]

[in accordance with Environmental Protection Act 1986, Conservation and Land Management Act 1984, and with EPA Position Statements 2 and 3]

iv) Wetlands

- Ramsar Wetlands core conservation areas (as defined in the statement of values for nomination)
- A wetland listed in the 'A Directory of Important Wetlands in Australia', 3rd edition and more recent additions as contained in the Australian Wetlands Database at <http://www.deh.gov.au/water/wetlands/database/index.html>.
[Environment Australia, 2001a]
- Environmental Protection Policy (EPP) wetlands.
- Conservation Category Wetlands (CCW)
Conservation category wetlands not included in an Environmental Protection Policy may be viewed in the context of whether they have a reasonable chance of medium to long term survival of their environmental values although the underlying presumption is that they would normally be considered a critical asset
[as identified by Department of Environment and Department of Conservation and Land Management]

[in accordance with Environmental Protection Act 1986, Conservation and Land Management Act 1984 and with EPA Position Statement 4]

v) Rivers

- Wild and Scenic Rivers.
[as identified under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) and the Department of Environment]

vi) Landscape

- Where an important landscape, natural feature or environmental icon will be irreversibly impacted or destroyed. Such landscape features may be identified through planning instruments, systematic reviews of conservation reserves or the like.
[as accepted by the Environmental Protection Authority]

vii) Environments sensitive to Emissions / Discharges

- In areas where new or an addition to existing emissions present a significant risk to human health or the environment.
- In areas where new or an addition to existing emissions exceed a prescribed environmental or health standard.
- Where emissions contribute to a global environmental problem such as ozone depletion.

[in accordance with Environmental Protection Act 1986, Health Act 1911]

viii) Ecosystems vulnerable to threats

- Where the introduction of a key threatening organism, process or activity threatens, or has potential to threaten, the survival, abundance or evolutionary development of an indigenous species or ecological community as identified for ‘biodiversity critical assets’.

ix) Heritage

- Identified places of State, National or World Heritage significance (where potential impacts could compromise identified values) within the scope of the Environmental Protection Act 1986.
[as identified by the Environment Protection and Biodiversity Conservation Act 1999 (Cwth), Heritage of Western Australia Act, 1990]
- Places of Indigenous Heritage of high importance.
[as provided for by the Aboriginal Heritage Act 1972]

Government decision framework

In some instances, significant adverse impacts to ‘critical assets’ may be approved by State Government Ministers to provide an essential community service (such as electricity, water, gas and transport infrastructure), public benefit, or to allow strategic social or economic development to occur.

Under these circumstances, the EPA’s advice is that approval of any such project of this nature should be made conditional on the:

- Consideration or demonstration (to the maximum extent possible) of on-site impact mitigation; and
- Development and implementation of an acceptable, comprehensive offsets package for significant, residual adverse impacts.

5. IMPLEMENTATION

The purpose, scope and principles outlined in this Position Statement provide overarching guidance and direction on the issue from the EPA's perspective. Government agencies, local authorities, and relevant business and industry groups are encouraged to develop environmental offset policies and implementation guidelines that are consistent with this Position Statement.

WHEN AND HOW SHOULD ENVIRONMENTAL OFFSETS BE APPROVED?

The following are key questions about the application of environmental offsets. They are dealt with in more detail in the companion paper to this Position Statement viz. the EPA's Guidance Statement on Environmental Offsets. (in preparation).

Test 1 – are these proposed new activities, extensions or enhancements to existing activity, or existing activities requiring renewal of State government environmental approvals likely to have significant environmental impacts?

Test 2 – before offsets are considered, are potential environmental impacts demonstrably addressed following the hierarchy:

- avoid
- minimise (limit magnitude)
- rectify (restore, repair)
- reduce (over time) ?

Test 3 – are residual environmental impacts expected to have a significant adverse impact on critical or high value assets?

Test 4 – do residual environmental impacts remain significant but not so significant that the activity is likely to be found environmentally unacceptable (including in a cumulative impacts context)?

Test 5 – can significant residual environmental impacts be offset directly (including 'like for like or better')?

Test 6 – if such impacts cannot be fully or partially offset directly what contributing offsets could be reasonably proposed and implemented?

Test 7 – does the offsets package (direct and contributing) achieve the aspirational goal of 'net environmental benefit'? Are positive offsets ratios relevant?

Test 8 – is the offsets package robust and likely to provide a long-lasting benefit?

Test 9 – have the costs of enduring management and maintenance been included?

Test 10 – is the commitment to an offsets package clearly defined, transparent, implementable, enforceable and auditable?

DECISION-MAKING PROCESS

Figure 2 provides a summary of the decision-making process for using environmental offsets. Key features of the flowchart are outlined as follows.

First triangle: Environmental Assets

The following environmental asset types affect how project proposals and related offset activities are assessed.

- Critical Assets: represent the State's most important environmental assets that must be fully protected and conserved (as defined in Section 4). Significant adverse impacts to these assets should be avoided at all costs. Therefore, the EPA in providing its advice will adopt a presumption against approval of project proposals where significant adverse impacts affect 'critical assets'. However, where projects have been approved by the State Government (see Section 4) approval should be conditional on the:
 - consideration or demonstration (to the maximum extent possible) of on-site impact mitigation; and
 - development and implementation of an acceptable offsets package for significant, residual adverse impacts.

In these special circumstances, the project proponent should develop an environmental offset package using advice from relevant environmental government agencies and applying the principles identified in this Position Statement.

- High Value Assets: represents those environmental assets that are in good to excellent condition, are considered valuable by the community and / or government, but are not identified as 'critical assets'. Project proposals and offset activities for these assets may be referred to and assessed by the EPA on a case-by-case basis, but are otherwise considered by relevant environmental government agencies. EPA's Guidance Statement 33 'Environmental Guidance for Planning and Development' (Draft) (June 2005) is a useful resource when considering the suite of pertinent environmental assets.
- Low to Medium Value Assets: represents those assets that are less than good to excellent condition as recognised by government agencies and / or community. Offset activities do not need to be addressed through EPA's processes but will be dealt with by relevant government agencies. As a guide for plant communities, see Keighery (1994).

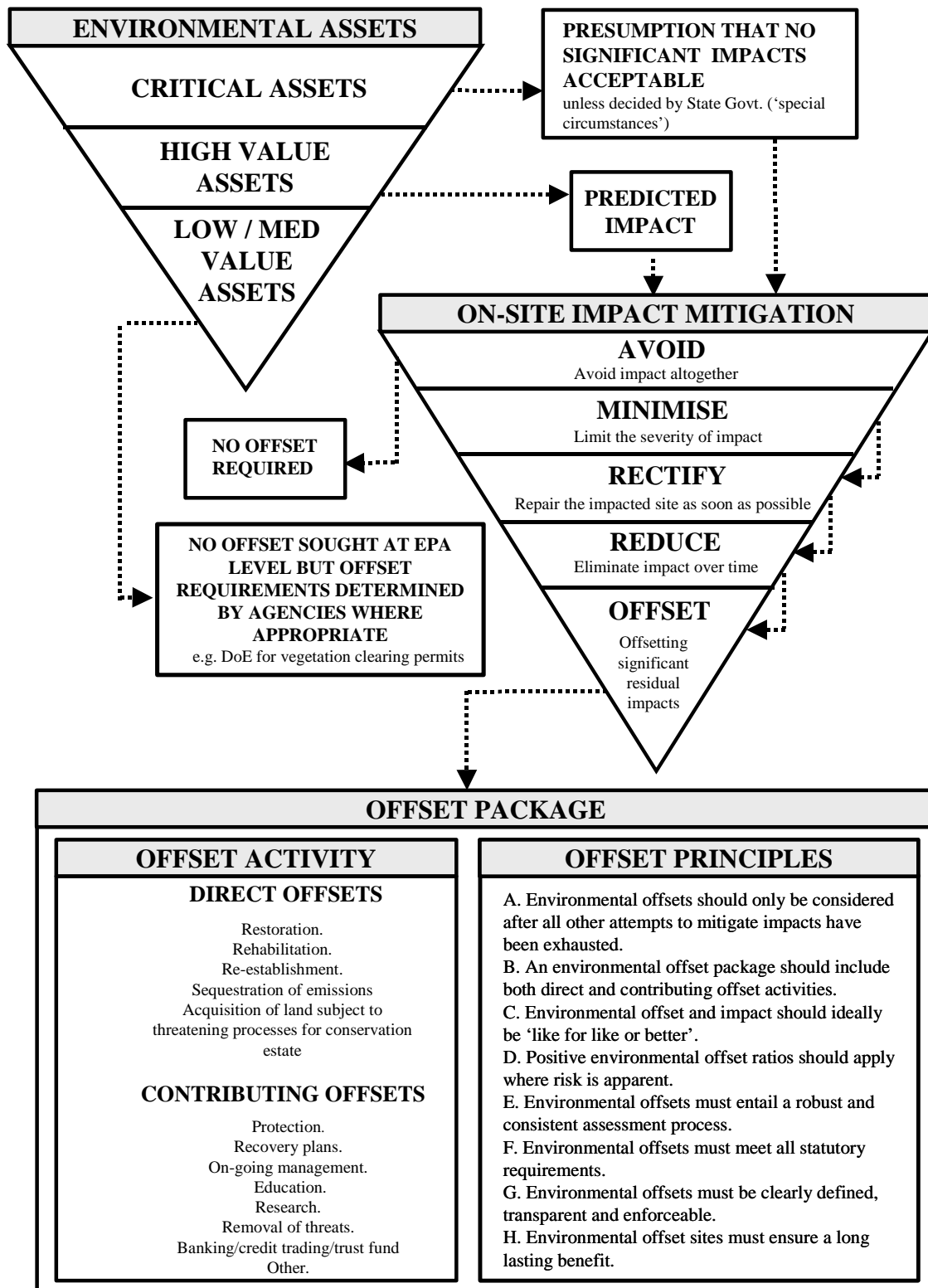


Figure 2: Decision framework for the use of environmental offsets

Second triangle: On-site Impact Mitigation

These five steps represent the sequence of considerations designed to help manage on-site environmental adverse impacts (in order of preference).

- Avoidance: significant adverse impacts to the environment are avoided through selection of a practicable alternative. If *all* environmental impacts are avoided then no offset activities are required.
- Minimisation: if adverse impacts are not avoidable, all appropriate and practicable steps should be taken to minimise adverse impacts.
- Rectification: where adverse impacts can't be minimised, all appropriate and practicable steps should be taken to repair, rehabilitate or restore the impacted site as soon as possible.
- Reduction: where adverse impacts can not be rectified as soon as possible, all appropriate and practicable steps should be taken to reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action and through the philosophy of continuous improvement
- Offsets: where significant residual adverse environmental impacts are still apparent after following the above mitigation sequence, then an environmental offset package may be used to achieve an aspirational 'net environmental benefit' outcome.

Box: Offset Package

An environmental offset package may be considered where adverse residual environmental impacts are significant, but not significant enough to make the project unacceptable.

To achieve a 'net environmental benefit' goal, the environmental offset package should address both direct offsets and contributing offsets.

Various types of offset activities are as follows.

- Direct Offsets: these ameliorative actions would generally occur away from the impact site and are designed to counterbalance the adverse environmental impact, with the aim of achieving no environmental difference (ie. no net loss). As a minimum, one direct offset activity should be considered from the following list of activities:
 - Restoration: has the goal of improving an existing ecosystem to near pre-impact condition. This includes restoring natural or historic functions, appearance and other characteristics. Restoration of existing ecosystems, while recognised as difficult, is a highly desirable offset because it results in a more fully functioning ecosystem. It is also more likely to succeed given existing hydrology and soils are conducive to maintenance of ecosystem functions. Restoration is time dependent.

- Rehabilitation: has the goal of improving and re-instating some of the functions of an existing high value asset (where appropriate, a critical asset), but impacted, ecosystem. Examples may include increasing native vegetation, enhancing habitat value, weed or feral fauna eradication, and/or establishing buffers. Rehabilitation of an existing ecosystem to produce an environmental benefit must outweigh the loss of the impacted ecosystem. When used as a sole direct offset activity, it may require the enhancement of several ecosystems or a much larger area than that lost from the impact. Rehabilitation is time dependent. Rehabilitation (and re-establishment) extends to recovery plans for directly affected species.
- Re-establishment: has the goal of re-establishing a functioning ecosystem with strategic environmental benefit. While restoration and enhancement of existing ecosystems is preferred, re-establishment may be beneficial in some instances. For example, forming a biodiversity corridor between two important ecosystems, or re-establishing ecosystems in areas of low representation. Re-establishment too is time dependent.
- Sequestration: specific to offsetting pollutant emissions, it has the goal of permanently removing or ‘locking up’ pollutants in the environment. This may be linked to activities associated with restoration, rehabilitation or re-establishment, or the use of banking or credit trading mechanisms, deep well injection and capping, soil amendment, or using other sequestration methods
- Acquiring Land for conservation: consists of purchasing the offset and transferring the land title into the conservation estate. Alternatively, establishing covenants with an approved organisation or establishing legal tenure agreements are other related activities. Land acquisition for conservation is considered a direct offset for the purposes of this Position statement if the land is subject to threatening processes because it has proven to be an important and valuable contributing offset measure by offering security of tenure, purpose and management in perpetuity

In some situations where adverse impacts to low, medium or high value environmental assets occurs, the environmental benefits of acquiring a ‘critical asset’ for conservation may greatly outweigh the overall environmental loss - in which case conservation through a combination of land acquisition, protection and on-going management may be considered a viable offsets package. It must be noted that this exception does *not* extend to adverse impacts to ‘critical assets’ (i.e. adverse impacts to one ‘critical asset’ should not be offset by conservation of another ‘critical asset’).

- Contributing Offsets: Contributing offset activities should be selected as necessary to meet the principles of this Position Statement. These activities may include:

- Protection: protecting the environment from threats or harm is achieved by using barriers or buffers, thereby reducing the risk of damage to, or pollution of, the offset site. For example fencing of valuable ecosystems.
- Removal of threats: undertaking initiatives that remove a threat(s) from the direct offset site thereby preventing it from being potentially damaged in the future. Examples might include eradication of feral animals, or exotic flora, removing pollutants, removing livestock, controlling the spread of diseases such as ‘dieback’, etc.
- Management: management of ecosystems is achieved by undertaking day-to-day activities that benefit the direct offset site. For example contributing to an environmental management plan for critical assets.
- Banking, Credit Trading or Trust Fund: where a proponent is unable to undertake restoration, rehabilitation, re-establishment or sequestration activities, they may consider the use of approved ‘banks’ or ‘credit-trading schemes’ to purchase environmental credits (improvements) to offset their adverse environmental impacts. Alternatively, an appropriate financial amount should be contributed to a statutory trust fund with the sole purpose of being used for a strategic environmental improvement activity. Unless banks, credit trading schemes, and trust funds are already in operation, contributions to these types of schemes will require methodologies to be developed that fully (financially) cost the adverse impacts to environmental assets, values and ecosystem services. These methodologies may take time to develop and will require endorsement by the EPA.
- Education: sustained education of community, business and industry about environmental issues related to the direct offset site or activity, or educating other industries or businesses of best practices to remedy poor environmental practices or behaviours.
- Research: investigating new technologies or innovative ideas to better address environmental issues or improve best practice associated with the direct offset activity. This also includes the necessary investigative work required for environmental assessments of impact and offset sites where current data or information is lacking.
- Other: the EPA encourages the development of innovative approaches aimed at improving environmental outcomes.

HYPOTHETICAL OFFSET CASE EXAMPLES

Example A: Wetland offset package

Despite best attempts to conserve a high value (but not critical asset) wetland, approval is given by Government for it to be lost due to strategic development. The proponent has documented all attempts at on-site impact mitigation, but is unable to mitigate all significant adverse impacts. The developer proposes an offset package which consists of finding a wetland in the local vicinity that has similar wetland attributes, functions and values as the wetland that will be impacted. After an extensive assessment process, working in collaboration with environmental government agencies, a suitable offsite wetland is found. The selected offsite wetland is in good condition; although it is showing some signs of degradation from the invasion of aquatic and terrestrial weeds, the presence of foxes, and the loss of under-storey species from the vegetation. The proposed offset activities include a combination of wetland rehabilitation works (direct offset), and a large cleared area on the wetland boundary will be replanted with local endemic species to provide an additional buffer area (direct offset). The proponent will ensure the removal of weeds and feral fox threats, and allocate funds for on-going long term management including monitoring and evaluation (contributing offsets). The whole wetland area will then be fenced from adjoining recreational space (contributing offset). The land will be purchased and placed into the conservation estate for long-term security (contributing offset). The developers will erect signage at the offset site and post quarterly updates and photos of their offset wetland's progress on their Internet site to show the community the progress of their offset wetland (contributing offset). The combination of the proponent's direct and contributing offset activities will contribute to a 'net environmental benefit' outcome.

Example B: Nutrient offset package

A large horticultural business wishes to expand operations and potentially increase nutrient waste discharge emissions to the nearby creek. Despite the company consistently demonstrating the use of best practice/technology, they are unable to mitigate any further discharges without a huge additional cost. The company proposes a nutrient offset package. After a robust assessment, with guidance from relevant authorities, an appropriate number of nitrogen (N), phosphorus (P) and carbon (C) units are calculated. The company agrees to offset these units by the purchasing and covenanting of a mature, re-established bushland area in the catchment (contributing offset) from an environmental credit-trading company (doing this meets the C, N and P offset requirements and has a bonus ecosystem offset). In addition, the company also commits to undertaking a collaborative research project with a local university looking at innovative ways for the business to further reduce their nutrient waste emissions (contributing offset), as well as options for removing nutrient emissions to the water body from other sources (e.g. intensive animal husbandry) (direct offset if implemented). The results of the research would be made publicly available on completion of the project. The combination of the proponent's offset activities will contribute to a 'net environmental benefit' outcome.

Although these hypothetical case examples do not provide quantitative details that will be necessary to develop an actual offset activity, the examples still provide an indication of how environmental offsets can be developed to meet the requirements of this Position Statement.

POLICY APPROACHES FOR IMPLEMENTATION

The EPA recognises that, for this environmental offsets approach to be implemented successfully, it must work in partnership with, and have the support of, government agencies. The EPA will use Part II, Section 17(3)(d) of the EP Act (1986) to implement the environmental offsets approach as outlined in this Position Statement. This part of the Act empowers the EPA to develop policy positions on particular aspects of the environment as follows:

s.17(3) ...the Authority, if it considers it appropriate or is requested to do so by the Minister, may -

(d) consider and make proposals as to the policy to be followed in the State with regard to environmental matters.

This tool would allow a state-wide environmental policy to be developed for environmental offsets. The EPA would develop the first stages of this policy as advice to the Minister for the Environment. State Government could then consider adopting the policy as whole-of-government policy. Such policies can provide definitive, whole-of-Government direction to government agencies, industry and community within existing statutory and regulatory frameworks. This is advantageous for dealing with major environmental issues that cross regional, sectoral and jurisdictional boundaries, as commonly occurs with issues associated with environmental offsets. It would be useful for State Government to adopt such a policy approach to ensure a consistent and unified system towards addressing environmental offsets.

It may be necessary to establish a repository of offset commitments to avoid double counting and to provide the basis of auditing success and compliance

The EPA sees that the responsibility for putting forward an offsets package and committing to and funding its implementation rests with the proponent of activities which could have a significant effect on the environment. The offsets package, in the context of a proponent seeking an approval from State government, is a tool to assist in the prevention, control and abatement of pollution and environmental harm and for the conservation, preservation, protection, enhancement and management of the environment. The EPA will take account of any offsets package put forward by proponents in advising Government on the environmental acceptability or otherwise of such activities.

6. GLOSSARY

Banking: banking, in an environmental context, refers to a system whereby credits are generated for undertaking environmental improvements (such as sequestration, restoration, rehabilitation and re-establishment activities). The credits can be later withdrawn (purchased) from the 'bank' to offset authorized adverse environmental impacts. The bank provides a centralized, cumulative record of credits (environmental improvements) and debits (adverse environmental impacts) within a standardized accounting framework and a goal of ensuring a neutral or positive balance as well as an audit function

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

Bioregion: represents an area with common ecological characteristics, including climate, geomorphology, landforms, lithology and characteristic flora and fauna.

Conservation: the positive, embracing, preservation, maintenance, sustainable utilisation, restoration and enhancement of the natural environment.

Covenant: is a voluntary, flexible agreement between a landholder and a recognised body to protect natural assets. It is attached to the landholder's land title and, if permanent, can prevent future owners from clearing or damaging natural assets on that land.

Credit trading: a market-based process of buying and selling credits (environmental improvements) and debits (environmental impacts).

Critical assets: represents the most important environmental assets in the State that must be fully protected and conserved for the State to meet its statutory requirements and to remain sustainable in the longer term.

Ecosystem: a defined community of organisms, their interactions, and their physical surroundings.

Environmental impact: represents an effect on the environment that leads to changes in its condition. Depending on the nature of the activity causing the impact, it may have either beneficial or adverse environmental outcomes.

Environmental harm: means direct or indirect harm resulting from the removal or damage to native flora or fauna, habitat, or environmental values. (see *Environmental Protection Act 1986*)

Environmental offset: (Synonyms: 'trade-offs', 'set-off', 'counterbalance')

Environmental offsets are commonly referred to environmentally beneficial activities undertaken to counterbalance an adverse environmental impact, aspiring to achieve 'no net environmental loss' or a 'net environmental benefit' outcome. This Position Statement discusses offsets in terms of:

Direct Offsets

A direct environmental offset is any environmentally beneficial activity undertaken to counterbalance an adverse environmental impact or harm, with the goal of achieving 'no net loss' and preferably a 'net environmental benefit'. Examples may include ameliorative actions including ecosystem restoration, rehabilitation or re-establishment activities or pollutant sequestration.

Contributing Offsets

A contributing environmental offset is any environmentally beneficial activity undertaken to complement and enhance the direct offset activity. Contributing offset activities do *not* assist in a 'no net loss' outcome, but instead add materially to environmental knowledge, research, management, protection, etc. It may also extend to forms of banking, credit trading and use of trust funds (where established) where adverse impacts can be offset through the purchase of environmental improvements elsewhere.

The terms 'direct' and 'contributing' reflect a sequence of approach, rather than a ranking of importance.

Environmental value: are particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health and which requires protection from the effects of pollution and harm. (ANZECC and ARMCANZ, 2000; see *Environmental Protection Act 1986*).

Incentives: something that induces or encourages people to act on a particular matter.

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).

Mitigation: Mitigation, in an environmental context, refers to a sequence of considerations designed to help manage adverse environmental impacts, which includes (in order of preference):

1. Avoidance – avoiding the adverse environmental impact all together;
2. Minimisation – limiting the degree or magnitude of the adverse impact;
3. Rectification – repairing, rehabilitating or restoring the impacted site as soon as possible;
4. Reduction – gradually eliminating the adverse impact over time by preservation and maintenance operations during the life of the action.; and,
5. Offsets – undertaking such activities that counterbalance an adverse, residual environmental impact.

Adapted from EPA (2001a). A similar approach is used by US EPA (1990).

'No net loss' concept : (Synonyms: 'zero net impact', 'no net difference')

The 'no net loss' concept aims to ensure that environmental loss is balanced by an environmental gain, so that there is no overall significant environmental difference. It

refers to no overall loss of the total extent, quality, ecological integrity and security of environmental assets and their values.

‘Net benefit’ concept: (Synonyms: ‘net gain’, ‘net improvement’)

The ‘net benefit’ concept aims to ensure more environmental gains occur compared to environmental losses. It refers to an overall improvement in the total extent, quality, ecological integrity and security of environmental assets and their values. The concept is subject to cumulative gains and losses within a specific area, region or project.

Offsets: see environmental offsets

Precautionary principle: where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

- i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
- ii) an assessment of the risk-weighted consequences of various options.

(s.4A, Environmental Protection Act 1986)

Sustainability: is meeting the needs of current and future generations through an integration of environmental protection, social advancement and economic prosperity. (Government of Western Australia, 2003)

Wetland banking: see ‘banking’.

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