

Ord River Irrigation Area - Weaber Plain Development Project

Buffer Management Plan

**Approved by DSEWPaC on
10 April 2012**

Prepared for
LandCorp
by Strategen

March 2012



STRATEGEN
environmental consultants

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March 2012

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1. Introduction

1.1 Project background

The Western Australian Minister for State Development is developing an area of land for irrigated agriculture across the Weaber Plain in the Kimberley region of Western Australia, approximately 30 km north-northeast of Kununurra and adjoining the existing Ord River Irrigation Area.

The Project requires land clearing for farms, sourcing of road building materials, construction of the main M2 channel and smaller distribution channels to service agricultural lots, roads, power supply infrastructure, and stormwater management, groundwater management, drainage and flood protection infrastructure. The Project also involves release of irrigation water from Lake Argyle, which will be conveyed via the Ord River and Lake Kununurra and gravity-fed to the proposed Development Area via the M2 channel.

The key characteristics of the Project Area relevant to the Buffer Area management include:

- irrigation with 80 to 120 GL/yr of water sourced from Lake Argyle
- clearing of approximately 9260 ha vegetation for farms and infrastructure including approximately 8205 ha for farmland
- clearing up to approximately 115 ha in the Buffer Area for sourcing of raw materials and construction laydown areas
- setting aside and management of approximately 11 470 ha of native vegetation as an environmental Buffer Area to protect watercourses and surrounding conservation reserves
- installation of infrastructure including channels, power supply, drainage and flood protection infrastructure and groundwater management infrastructure.

The WA Minister for the Environment approved implementation of the Weaber Plain Development Project (as part of the M2 Proposal) in February 2002 subject to a number of conditions outlined in Statement 585. Some changes to Statement 585 were subsequently made, resulting in the issue of Statement 830 on 7 May 2010.

The Weaber Plain Development Project was referred under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) on 14 May 2010. The then Australian Government Minister for Environment, Water, Heritage and the Arts determined on 11 June 2010 that approval under the EPBC Act was required as the Proposed Action was considered to potentially have a significant impact on:

- listed threatened species and communities (Sections 18 & 18A)
- listed migratory species (Sections 20 & 20A)
- wetlands of international significance (Sections 16 & 17B).

The Project was approved to be implemented, subject to a number of conditions, on 13 September 2011.

1.2 Purpose and scope of management plan

Condition 8 of Statement 830 and EPBC Act Condition 7 require that the person taking the action (the proponent) prepare a Buffer Management Plan prior to commencement of ground disturbing activities and farm lot clearance respectively, to protect the environmental values of the buffer, including watercourses, wetlands, native fauna and vegetation.

Statement 830 Condition 8 states that the Plan shall address:

1. Tenure of the Buffer Area (Section 1.4.1).
2. The role and purpose of the Buffer Area (Section 1.4.2).
3. Management and objectives and priorities for the Buffer Area (Section 2.3).
4. Management practices to apply to the Buffer Area (Section 2.3; Table 2, Table 3, Table 4).

5. Management of chemicals within or potentially affecting the buffer (Table 2).
6. The environmental values of the Buffer Area (Section 1.4.3).
7. Methods to control human and vehicular access to environmentally sensitive portions of the Buffer Area (Table 3).
8. Methods to minimise the impacts of construction activities (Table 2).
9. Rehabilitation of disturbed portions of the Buffer Area (Table 2).
10. Responsibilities for the maintenance of the Buffer Area (Section 1.4.1; Table 2, Table 5).

This document was initially prepared to address the requirement for a Buffer Management Plan as per Condition 8 of Statement 830. The plan also addresses Proponent Environmental Management Commitment 45 of Statement 830, which states:

“All undeveloped land in the Project Area will be managed for conservation.”

Table 1 outlines the requirements of the EPBC approval conditions and where the requirements have been addressed in this Buffer Management Plan.

Table 1 Correlation between Buffer Management Plan and EPBC conditions

Item	Conditions	Relevant sections
7A	Vegetation and fauna surveying and mapping of the Buffer Area (shown in Figure 2 of the supplementary Environmental Impact Statement). Faunal surveys must be targeted for EPBC Act threatened species that are likely to occur in the Buffer Area. The program must be developed in consultation with WA DEC, with methodologies approved by the Department. The person taking the action must provide results of the survey program to the Department, including maps showing the location of breeding, nesting or denning habitat identified in the Buffer Area. The survey must include the endangered Northern Quoll (<i>Dasyurus hallucatus</i>), the vulnerable Red Goshawk (<i>Erythroiorchus radiates</i>) and the vulnerable Northern Shrike-tit (<i>Falcunculus frontatus whitei</i>). Surveys must be completed by 31 December 2012.	Section 2.4 Table 3 item 18, 19
7B	Details of tenure and management arrangements of the Buffer Area that provides assurance that the area will be conserved and managed in perpetuity.	Section 1.4.1
7C	Ongoing management practices that will be applied to the Buffer Area to maximise benefits to listed threatened species.	Section 2.4 Table 3 item 6, 7, 17 and 21
7D	Methods to control human disturbance of the Buffer Area, including restriction of vehicular access.	Section 2.4 Table 3 item 1 - 3, 6-8
7E	Regular and ongoing inspection of the Buffer Area for weeds, plant pathogens and pest animals and methods to prevent the introduction and spread and provide for the quick control of weeds, plant pathogens and pest animals in the Buffer Area.	Section 1.3 Table 2 (detailed in the Weed, plant pathogen and pest animal management Sub-plan [Strategen 2011a] which is required to be implemented under Condition 8 of the EPBC approval)
7F	Fire management of the Buffer Area to maximise benefits to listed threatened species.	Section 2.4 Table 3 item 21 and detailed in the Fire Management Sub-plan
7G	Methods to minimise the impacts of construction activities on the Buffer Area.	Section 2.4, Table 3 item 1 - 5 and 8
7H	Rehabilitation of disturbed portions of the Buffer Area to benefit listed threatened species.	Section 2.4, Table 3 item 12
7I	Responsibilities and provision of resources for the ongoing management of the Buffer Area.	Section 1.4.1
7J	Protocols and timing of review and reporting to the Department.	Section 2.6 and 2.7

This revised Buffer Management Plan is thus intended to meet both sets of conditions, utilising the 'single plan' clause noted above. Condition 7F is specifically addressed in the Fire Management Plan for the Weaber Plain Development Project.

1.3 Relationship to other management plans

Many management actions for the Buffer Area are covered under other management sub-plans required under Condition 7 of Statement 830 and the EPBC Act approval conditions. Where this is the case, the actions are summarised (Table 2), with a reference to the appropriate sub-plan. Management actions include direct management within the Buffer Area and management outside the buffer that prevent or minimise impacts to the Buffer Area. In the event sub-plans are revised, that sub-plan must be implemented in the place of the sub-plan outlined in Table 2 and Table 4.

The specific actions identified to assist in achieving the management objectives for the Buffer Area are fully detailed and numbered in Table 3.

Table 2 Buffer management covered under other sub-plans

Sub-plan	Key aspects addressed
Native Title, Aboriginal Cultural Heritage and Social Impact Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • maintenance of access to the Buffer Area for Native Title holders • induction program for construction personnel covering relevant Aboriginal heritage issues and procedures, including procedures for if suspected heritage site is detected • establishment and maintenance of a cultural heritage GIS database of Aboriginal heritage sites within the buffer.
Biodiversity and Habitat Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • flagging, fencing or pegging the boundaries of construction areas to ensure activities do not intrude into the buffer • personnel induction and education • procedures for native animal encounters • destocking the Buffer Area • restricting movement of construction machinery and equipment to designated tracks and roads.
Fire Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • protection of buffer environmental values including habitat and breeding areas identified for species listed as MNES • protection of infrastructure from fire.
Chemicals Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • aerial spraying procedures to reduce potential for spray drift into the Buffer Area, such as weather conditions, droplet size, and qualifications of aerial sprayers • storage, handling and application/use of chemicals including herbicides, pesticides, fertilisers and hydrocarbons.
Community Issues Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • signage advising that access to the Weaber Plain Buffer Area is restricted.
Dust and Particulates Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • the installation of dust deposit gauges within the Buffer Area.
Environmental Education and Training Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • provision of education and information packages for prospective farm owners/managers, including information on the Buffer Area.
Groundwater Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • groundwater management measures to protect the Buffer Area from groundwater accretion impacts, including monitoring groundwater levels and quality, modelling, hydrocarbon spill responses, and determining trigger levels for salinity.
Rehabilitation Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • methods for rehabilitating disturbed portions of the Buffer Area after works have finished, consistent with surrounding vegetation type/community, including for areas where the following types of disturbance have taken place • temporary disturbance through installation of infrastructure (including clearing and earthworks) and material extraction.

Sub-plan	Key aspects addressed
Soil Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • measures to minimise erosion and sedimentation • protocols for vegetation clearing and ground disturbance to minimise detrimental effects on the Buffer Area • restriction of machinery, equipment and vehicle movements to designated tracks and roads • determining borrow pit locations to minimise erosion • topsoil management procedures.
Weed, Plant Pathogen and Pest Animal Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> • weed survey programs (establishing permanent weed survey transects through the Buffer Area for baseline information, such as species, density and distribution of weeds) • weed management in the Buffer Area following construction • hygiene procedures in relation to the Buffer Area, including clean down sites at access points to the Buffer Area to stop the spread of weeds and pathogens by removing vegetative matter, seeds and soil – applies to all vehicles. Access into buffer to be by designated tracks only • pest animal management strategies within the Buffer Area • Removal of stock from the Buffer Area • information provision to construction personnel and education of farm owners/managers, including in relation to weed identification, weed control, reporting requirements, soil management and pest animals • ensuring no water from farming allotments is directed into the Weaber Plain Buffer Area, including measures to address the potential for surface water to carry weeds from stockpiles (during construction) into the Weaber Plain Buffer Area • inspection of borrow pits and borrow pit access tracks prior to disturbance to ensure no weed species are present, if present must be cleared and controlled prior to borrow extraction • controlling the spread of weeds on the edge of the Weaber Plain Buffer Area and along access tracks, and monitoring to assess edge effects • signage at entry of buffer access tracks to discourage people taking pets into the area • establishing permanent monitoring sites for weeds and vegetation health in the Buffer Area along selected corridors.

The Gouldian Finch Conservation Plan (Strategen 2011b), though separate to the sub-plans outlined above, also influences management in the Buffer Area.

1.4 Description of the Weaber Plain Buffer Area

The Weaber Plain Development Area and Buffer Area cover approximately 8205 ha and 11 470 ha respectively. There are corridors linking different parts of the Buffer Area (Figure 1), which allow access to all parts of the buffer for the Miriwung and Gajerrong people (the Traditional Owners of the area) to exercise cultural practices as is their right under the Ord Final Agreement (OFA). The corridors also maintain ecological linkages between different habitats in the Buffer Area, allowing for wildlife movement.

There will not be any significant permanent infrastructure located within the Buffer Area, although some may be installed in certain locations, depending on final project requirements. For example, there is potential for a phone communication tower to be installed on Folly Rock, which is located in the centre of the Weaber Plain Buffer Area. This will necessitate a permanent track for ongoing access to this area for maintenance and repairs, and may also require fencing and signage. Other access tracks will be maintained throughout the buffer for fire management and access to monitoring points, groundwater bores, and other infrastructure including Buffer Area perimeter fencing.

1.4.1 Tenure and responsibility for the Buffer Area

Under the terms of the OFA, the buffer will be transferred as freehold land to the MG Corporation, and then compulsorily leased back to the Proponent¹, which will be responsible for the care, control, maintenance and management of the buffer. Surrounding native vegetation will be set aside and managed as an environmental Buffer Area to protect watercourses and surrounding conservation reserves. The primary role of the Buffer Area is to absorb any edge effects from the development to protect surrounding land outside the Buffer Area from environmental impacts, with a long-term goal to improve the environmental values of the area.

Under the Shire of Wyndham-East Kimberley Town Planning Scheme No. 7 (2010) the Buffer Area is zoned as a Conservation/Environmental Protection Reserve. The objective for this type of reserve is to identify and protect areas of conservation significance.

The costs of implementing Statement 830 and EPBC Act conditions relating to the Buffer Area will be met by the Proponent¹. Strata survey land tenure, under the *Strata Act 1985*, provides the statutory mechanism for ensuring payments for environmental management are made by landholders to the Proponent¹.

1.4.2 Role and purpose of the Buffer Area

The primary role of the Buffer Area is to absorb any edge effects from the development to protect surrounding land from environmental harm, including in reducing the impacts of elevated groundwater levels and minimising diffuse groundwater discharge (including salts) to watercourses. In particular, the buffer will protect the values of the Point Springs Nature Reserve, Weaber Range Conservation Area and Pincombe Range Conservation Area. The Buffer Area also retains fauna habitat and vegetation communities representative of the Weaber Plain.

Point Spring Nature Reserve is located between the Buffer Area and the Weaber Range Conservation Area (Figure 2). The reserve contains a Priority Ecological Community, a closed canopy rainforest on freshwater swamps on alluvial floodplain soils (DEC 2009b). Some of the main threats to this reserve are weeds and degradation by cattle. Historically, Point Spring was a watering point for cattle, and trampling and grazing over many years has resulted in detrimental ecological impacts. Efforts have been made over the last several years to de-stock the reserve and maintain an effective boundary fence, as well as to reduce stock density in surrounding pastoral leases to decrease pressure on fences; however, cattle are an ongoing cause of degradation in the reserve. Thus, the Buffer Area will fulfil an important role in insulating Point Spring Nature Reserve from environmental impacts arising from agricultural development across the Weaber Plain.

The Buffer Area is adjacent to two conservation reserves, which were established by the WA Government to offset the clearing of vegetation and fauna habitat resulting from the project: Weaber Range Conservation Area and Pincombe Range Conservation Area.

The Weaber Range Conservation Area is located to the north of the buffer and contains the Weaber Range (Figure 2). The majority of the Weaber Range consists of deeply dissected sandstone hills, rising to small remnant plateaux. The dominant rock, Point Spring Sandstone, gives rise to shallow stony soils, characterised by sparse woodland of scattered eucalypts over spinifex hummock grasses. Surrounding escarpments feature rugged cliff lines and scree slopes. In the southeast sector of the Weaber Range, just west of the NT border, small rainforest patches occur on sheltered sites. The Yard Creek drainage system features two important low-level seasonal swamplands.

The Pincombe Range Conservation Area is located to the south of the buffer and contains the Pincombe and Caves Spring ranges (Figure 2). The Pincombe and Cave Springs Ranges trend northeast/southwest, forming a series of parallel ridges. Both ranges typically feature skeletal stony soils, supporting sparse

¹ The Proponent will have responsibility for management, however at some point in the future an “appropriate body or corporate (yet to be determined)” may be established to facilitate management.

eucalypt woodland over spinifex hummock grasses. A significant seasonal swamp occurs in the extreme northeast of the conservation area, and a major freshwater seepage occurs at Cave Spring.

The Weaber Plain Buffer Area contains some areas that were originally included as part of the irrigation/farming areas, but were subsequently removed due to their environmental significance or cultural value. Many of the alterations to the initial project design were made as part of the OFA, particularly to ensure protection of Aboriginal heritage sites. Modifications to the project area were made during the original environmental assessment process to increase on-site retention of vegetation communities. For example a reasonably large area of black soil on the southern Weaber Plain was added to the Buffer Area to improve the conservation of wild rice stands.

1.4.3 The environmental values of the Buffer Area

The Buffer Area incorporates a number of restricted fauna habitats, such as wetlands and rocky outcrops, as well as more extensive habitats, such as grasslands and open woodlands. The Buffer Area also contains a number of areas of cultural heritage significance.

There are no defined drainage lines within the Buffer Area, and discharge from ephemeral watercourses in surrounding hills inundates the Weaber Plain during the wet season. The Weaber Plain is drained by Border Creek, an ephemeral watercourse forming in the eastern portion of the plain that drains in an easterly direction into the western catchment of the Keep River system.

The majority of the Weaber Plain is covered by a ground layer of tall (up to 2 m) perennial grasses with sparse emergent trees of *Eucalyptus microtheca*, *Bauhinia cunninghamii* and *Excoecaria parvifolia*. Grassland and very open low woodlands are the two primary habitats occurring on the Weaber Plain.

Of the 20 vegetation communities occurring in the project area three are considered to have conservation significance (Ecologia 1997). These are:

- *Oryza australiensis* (wild rice) grasslands, usually with an overstorey of *Excoecaria parvifolia*, which were recorded on the northern section of the Weaber Plain (both Em7 and Em8 support *Oryza australiensis*). These grasslands are rare and confined to black-soil plains in northern Western Australia and the Northern Territory.
- *Acacia ditricha* and *Bauhinia cunninghamii* low open woodland over *Chrysopogon fallax* tussock grassland and *Sorghum timorense* annual grassland (probably equivalent to a complex of the vegetation communities ET4², ET5 and ET6). This vegetation is widespread throughout the eastern section of the Weaber Plain.
- Vegetation supporting *Echinochloa kimberleyensis*, which was recorded during wet season surveys in small, scattered pockets near seasonal wetlands on the Weaber Plain, in association with wild rice and *Chrysopogon fallax*.

Details of the vegetation communities recorded in the project area and their retention within the Buffer Area is included with the relevant Final Project Design Plan (Phase 1 – Strategen 2010; Phase 2 Strategen 2011a) as required by Condition 11 of Statement 830.

² Low open woodland of *Eucalyptus microtheca*, *Bauhinia cunninghamii*, over a Shrubland of *Terminalia oblongata* subsp. *volucris* over dense grassland dominated by *Themeda triandra*, *Aristida latifolia*, *Sehima nervosum*, *Chrysopogon fallax* and *Ophiuros exaltatus*.

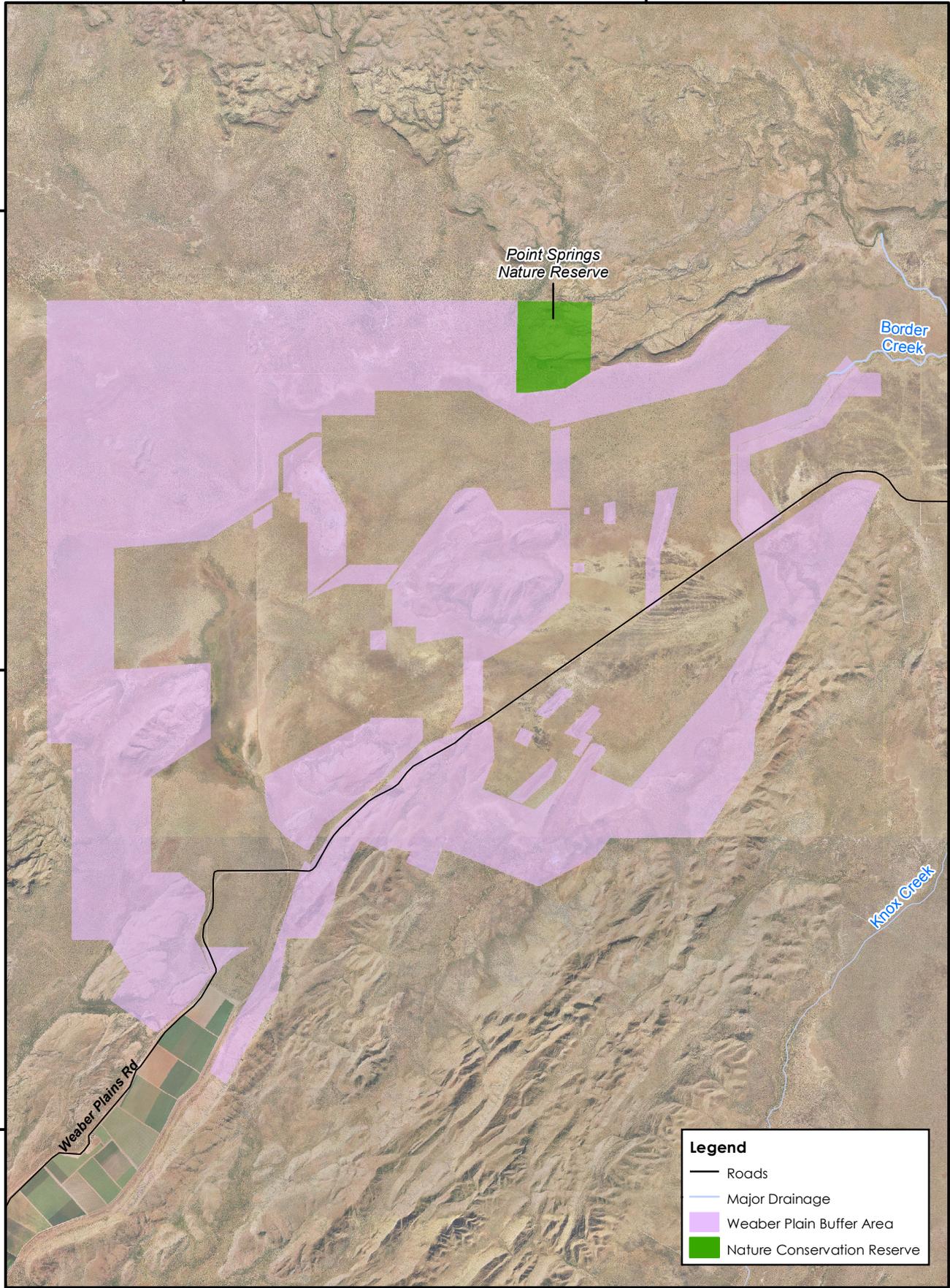
480000

490000

8300000

8290000

8280000



Point Springs Nature Reserve

Border Creek

Knox Creek

Weaber Plains Rd

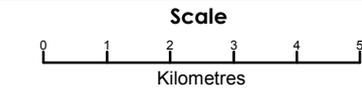
Legend

-  Roads
-  Major Drainage
-  Weaber Plain Buffer Area
-  Nature Conservation Reserve

Figure 1 Weaber Plain Buffer Area



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1:120,000
at A4

Coordinate System: GDA 1994 MGA Zone 52
Date: 1/12/2011
User: jcrute

Source: Geoscience Australia 2006, McMullenNolan 03/11/2011
Note that positional errors may occur in some areas

Regional Map



Source: ESRI 2008

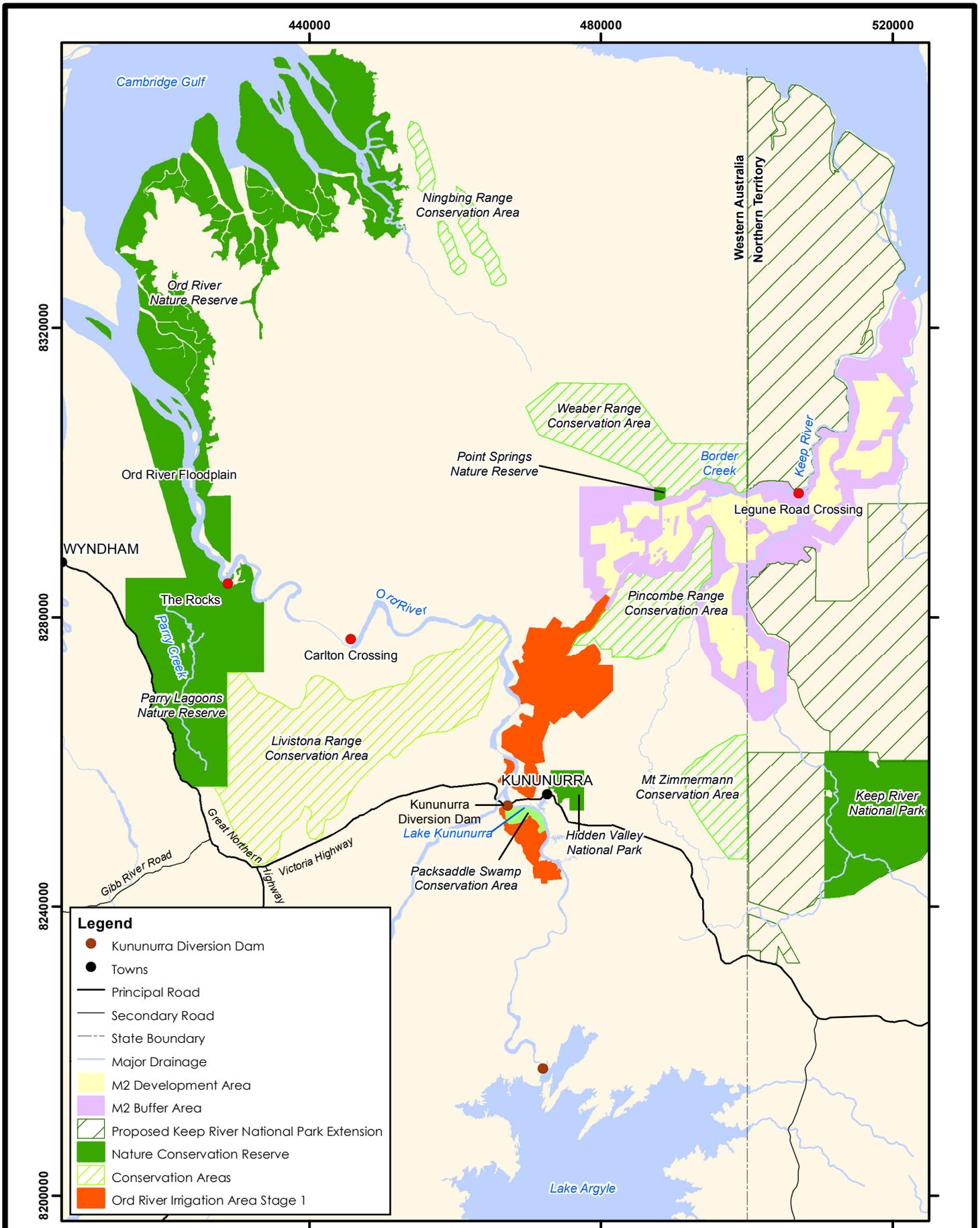


Figure 2 Conservation areas



Scale: 0 10 20 30 Kilometres

Scale: 1:700,000 at A4

Coordinate System: GDA 1994 MGA Zone 52
Date: 1/12/2011
User: jcrute

Source: Geoscience Australia 2006, McMullenNolan 03/11/2011
Note that positional errors may occur in some areas



2. Management

2.1.1 Overview of buffer management strategy

The main strategies for the management of the Buffer Area are to remove degrading influences: to minimise inappropriate fire; to minimise disturbance from construction and project operations; and to aid in the natural regeneration of degraded areas to enable the buffer to fulfil its intended role and purpose (Section 1.4.2). This strategy is also relevant to species listed as Matters of National Environmental Significance (MNES) under the EPBC Act, including the endangered Gouldian Finch (*Erythrura gouldiae*), endangered Northern Quoll (*Dasyurus hallucatus*), the vulnerable Red Goshawk (*Erythrorchus radiates*) and the vulnerable Northern Shrike-tit (*Falcunculus frontatus whitei*).

The buffer will experience edge effects from the proposal, but potential impacts from construction and operations, such as chemical application, will be managed and minimised, enabling the Buffer Area to function as a conservation area as well as a means of protecting adjacent conservation reserves.

The dominant degrading influences to be removed from the buffer are weeds and cattle, and dealing with these issues will have flow on effects for the health of the buffer. For example, removal of stock and ongoing implementation of eradication programs as required will reduce erosion problems and allow natural regeneration of vegetation, with long-term potential for an increase in biodiversity. The gradual revegetation of the Buffer Area will also reduce the impacts of elevated groundwater levels from the irrigated areas and minimise diffuse groundwater discharge (including salts) to downstream watercourses. Consideration will be given to the utilisation of species selected specifically for their ability to lower the groundwater table, given the local soil, water and solute settings.

Dealing with weeds and cattle in the first few years of buffer management will allow subsequent management to be lower intensity, requiring a reduced ongoing investment of resources. Degraded areas will be treated for weeds and revegetated to provide a colonising community, which will initiate the succession of more complex vegetation communities over time through natural processes.

It may take several years of gradual regeneration and improvements for areas to reach a satisfactory level of ecosystem function, and monitoring is an important component of ongoing buffer management. The overarching goal for the buffer is not to restore the area to pristine pre-European condition, but to attain a functional and robust buffer which can protect surrounding areas, and which is not deteriorating due to degrading influences.

A potential threat to the Buffer Area is the arrival of *Bufo marinus* (cane toad). Cane toads pose a large threat to the environmental values of the area, especially biodiversity values. Cane toad management requirements are outlined in Section 2.4 of this plan.

2.2 Environmental aspects to be managed

The following aspects of the development could potentially affect the values of the Buffer Area:

- **clearing**, both temporary and permanent, may increase erosion, lead to sedimentation of surface water and rising of the groundwater table, and provide favourable conditions for establishment of weeds, plant pathogens and pest animals
- **ground disturbance** may generate dust, increase risk of erosion, sedimentation of surface water, alter soil characteristics/profile, and create favourable conditions for weeds
- **application of chemicals** within farming areas may contaminate the Buffer Area (through transportation by wind or water) and groundwater beneath Weaber Plain
- **storage and use of fuels and oils** within the farming areas and use of fuels within the Buffer Area increases the risk of fire, and leakages may result in contamination of soil, surface water and groundwater
- **increase in number of people** in the area increases the potential for unauthorised access to the Buffer Area

- **vehicle movements** may result in erosion, introduce or spread weeds or plant pathogens, facilitate the movement of introduced fauna, and impact on native fauna through vehicle collisions
- **vegetation burning** as part of initial vegetation clearing in farm areas and/or burning of crops as part of the harvesting activities may increase the risk of fire outbreaks in the Buffer Area, and may affect vegetation and fauna habitat through deposition of ash
- **irrigation of agricultural lots** will increase accessions to groundwater and may lead to a rise in groundwater levels beneath the Buffer Area, potentially resulting in waterlogging and salinisation of portions of the buffer.

2.3 Environmental objectives

The environmental objectives for the Buffer Area are:

- to protect the environmental values of the buffer, including the protection of heritage sites, vegetation communities, watercourses, wetlands, native fauna (including MNES-listed species) and flora
- to improve the condition of the Buffer Area in the long term, to reduce weeds and feral animals, and to increase vegetation cover and density, especially in areas predicted to be subjected to high groundwater tables so that the discharge of groundwater to buffer watercourses can be minimised
- to minimise impacts to the buffer resulting from construction activities.

2.4 Management actions

Table 3 outlines the management actions that will be implemented within the Buffer Area to achieve the management objectives.

Table 3 Buffer management actions

Item	Action	Purpose	Timing	Responsibility
Construction*				
1.	Ensure development maps clearly delineate the Buffer Area and Development Area.	To prevent unauthorised clearing by ensuring clearing boundaries are appropriately documented and to ensure compliance with Commitment 39 of Statement 830.	Prior to ground disturbing activities***	Project Director
2.	Delineate the boundaries of the vegetation to be cleared for construction in the field with flagging tape, signage or fencing.	To prevent unauthorised clearing by ensuring clearing boundaries are marked in the field and to ensure compliance with Commitment 39 of Statement 830.	Prior to clearing activities***	Project Director
3.	Restrict movement of construction machinery and equipment to designated tracks and roads.	To minimise disturbance by consolidating vehicle access to designated areas.	Construction	Project Director
4.	Destock the Buffer Area and fence the Buffer Area.	To allow the Buffer Area to naturally recover from the adverse effects caused by cattle, such as erosion and spreading of weeds.	Construction	Project Director
5.	Install metallic reflectors on any barbed wire fence used onsite and consider the alternative use of plain wire in areas of high bat risk.	To prevent bats from flying into, and becoming entangled in barbed wire.	Construction	Project Director

Item	Action	Purpose	Timing	Responsibility
Access				
6.	Control vehicle access to the buffer through designated tracks, and provision of signage to inform of restrictions to areas, including speed restrictions, hygiene protocols, and to advise that no off-track driving is permitted.	To minimise impacts to the buffer by consolidating and restricting access and to ensure compliance with Commitment 44 of Statement 830 and Condition 7D of EPBC 2010/5491.	Ongoing	Project Director/ Proponent**
7.	Control human access to the buffer through provision of and signage at entry points to Buffer Area advising of restrictions, such as no pets in Buffer Area, and no unauthorised access.	To minimise impacts to the buffer by restricting access and to ensure compliance with Commitment 44 of Statement 830 and Condition 7D of EPBC 2010/5491.	Ongoing	Project Director/ Proponent**
Infrastructure				
8.	Induct all personnel constructing or utilising infrastructure within the Buffer Area, including roads, channels, groundwater bores and the phone tower, to advise on protocols for hygiene, wildlife encounters, prohibited activities etc.	To minimise potential for adverse environmental impacts by ensuring personnel are informed of environmental management procedures and to ensure compliance with Commitment 54 of Statement 830 and Condition 7G of EPBC 2010/5491.	At all times***	Project Director/ Proponent**
Vegetation improvement				
9.	Assess and map vegetation condition within the buffer according to the Keighery (1994) Vegetation Condition rating scale.	To provide data to inform management.	Prior to completion of construction	Project Director
10.	Stabilise and revegetate areas identified in Item 9 as containing vegetation below a rating of 'Very Good' in accordance with species lists and planting procedures determined in consultation with DEC.	To better enable the Buffer Area to fulfil its intended role and purpose by restoring ecological integrity and function to degraded areas.	Within 12 months of completion of construction	Project Director/ Proponent**
11.	In consultation with the DEC and DoW, revegetate areas within the buffer with species selected specifically for their ability to lower the groundwater table, given the local soil, water and solute settings. Species used in such revegetation will be agreed with the DEC and DoW.	To improve the ability of the buffer to reduce the potential impacts of elevated groundwater levels and minimise diffuse groundwater discharge (including salts) to downstream watercourses.	Within 12 months of completion of construction and as determined to be required in consultation with DEC and DoW	Project Director/ Proponent**
12.	Rehabilitate disturbed portions of the buffer to benefit MNES-listed species (as per Rehabilitation Management Sub-plan).	To maximise habitat extent and quality and minimise threats to MNES	Prior to completion of construction activities	Project Director
13.	Undertake weed control in areas identified in Item 9 as containing vegetation below a rating of 'Very Good', focusing on the most degraded areas first and in accordance with procedures detailed in the Weed, Plant Pathogen and Pest Animal Management Sub-plan (Strategen 2011a or as amended over time).	To better enable the Buffer Area to fulfil its intended role and purpose by restoring ecological integrity and function to degraded areas.	Within 12 months of completion of construction and ongoing	Project Director
Cane toads				
14.	Liaise with DEC regarding the need for utilising volunteer programs to work at removing toads from the Buffer Area.	To reduce the potential effect of cane toads on the Buffer Area.	As required	Project Director/ Proponent**

Item	Action	Purpose	Timing	Responsibility
15.	Provide information to land owners and Traditional Owners, on the Draft Cane Toad Strategy for Western Australia (DEC 2009a).	To reduce the potential effect of cane toads on the Buffer Area	Following completion of construction	Project Director/ Proponent**
Ongoing buffer maintenance and monitoring				
16.	Investigate the possibility of extending the DEC Traditional Owner Ranger Program (Kununurra based) into the Buffer Area, or incorporating other Indigenous management initiatives – consult with MG Corporation regarding shared responsibilities for maintenance of the Buffer Area.	To maximise opportunities for involvement of Traditional Owners in ongoing management of the Buffer Area	During construction	Proponent**
17.	Fence the Buffer Area, where required, to minimise stock invasion, remove introduced livestock, and continue to remove any subsequent invading livestock, as required, to protect native vegetation condition	To ensure species and habitats within the Buffer Area are not adversely affected by stock grazing	Fence installed prior to completion of construction and other actions ongoing	Proponent**
Fauna and habitat baseline surveys				
18.	Conduct baseline fauna surveys of MNES-listed threatened species including the endangered Gouldian Finch (<i>Erythrura gouldiae</i>), endangered Northern Quoll (<i>Dasyurus hallucatus</i>), the vulnerable Red Goshawk (<i>Erythrorchus radiates</i>) and the vulnerable Northern Shrike-tit (<i>Falcunculus frontatus whitei</i>) within the Buffer Area.	To establish baseline population information and inform ongoing management requirements	Prior to 31 December 2012	RDL
19.	Conduct baseline vegetation type and fauna habitat surveys for the MNES-listed threatened species within the Buffer Area.	To establish baseline habitat information and inform ongoing management activities	Prior to 31 December 2012	RDL
20.	Results of surveys undertaken in items 18 and 19 to be provided to DSEWPaC.	To provide relevant survey information.	Prior to 31 March 2013	RDL
Fire Management				
21.	Implement the Weaber Plain Development Project Fire Management Plan.	To reduce the potential for impacts of fire on the buffer, infrastructure, MNES populations and habitats	Ongoing throughout the entire action	Proponent**
Education and training				
22.	Educate contractors and landowners about incident and complaints reporting procedures for activities such as unauthorised access to the buffer and potential deleterious use of the buffer, such as pets, lighting fires.	To reduce the potential for impacts to the Buffer Area by ensuring contractors and landowners are aware of appropriate procedures and management measures and to ensure compliance with Commitment 54 of Statement 830	Prior to ground disturbing activities*** (contractors) At sale of land (landowners)	Project Director

*Items required under the Biodiversity and Habitat Management Sub Plan of the EMP (Strategen 2011a).

**The Proponent will have responsibility for management, however at some point in the future an “appropriate body or corporate (yet to be determined)” may be established to facilitate management.

***This also means “prior to the commencement of the action”.

2.5 Monitoring regime, targets and corrective actions

Many monitoring actions directly or indirectly related to impacts within the Buffer Area are covered under other environmental sub-plans, as summarised in Table 4. Full details of these monitoring actions, such as frequency, target, corrective action and responsibility, can be found in the appropriate sub-plans.

Table 4 Buffer monitoring covered under other sub-plans

Sub-plan	Focus of monitoring
Native Title, Aboriginal Cultural Heritage and Social Impact Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Extent of ground disturbance near marked boundaries of construction areas, and indirect impacts to Buffer Areas.
Biodiversity and Habitat Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Clearing boundaries and extent of clearing and ground disturbance along pre-defined boundaries.
Gouldian Finch Conservation Plan (Strategen 2011b)	<ul style="list-style-type: none"> Gouldian Finch populations and habitat.
Fire Management Plan (Strategen 2011c)	<ul style="list-style-type: none"> Fire-related change to habitat of MNES-listed species.
Chemicals Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Spray fall-out within the Weaber Plain Buffer Area Hydrocarbon storage and refuelling.
Community Issues Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Effectiveness and integrity of signage throughout the project area.
Dust and Particulates Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Dust deposition and airborne particulate levels.
Groundwater Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Groundwater levels and groundwater quality.
Infrastructure Maintenance Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Capacity and structural integrity of infrastructure such as drains, irrigation channels, etc.
Rehabilitation Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Rehabilitation success, weeds and erosion within rehabilitation sites in the Buffer Area.
Soil Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Soil erosion within areas of the buffer near construction activities and infrastructure Soil chemical status within the Buffer Area.
Surface Water Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Integrity of drainage infrastructure.
Weed, Plant Pathogen and Pest Animal Management Sub-plan (Strategen 2011a)	<ul style="list-style-type: none"> Weed species and weed density/cover/distribution along permanent weed survey transects in the Buffer Area and common use infrastructure areas Vegetation health along permanent weed survey transects in the Buffer Area and common use infrastructure areas Presence of vegetation within firebreaks of farms abutting the Weaber Plain Buffer Area Presence of Declared Weeds in agricultural areas Feral animals (including stock) in the Buffer Area.

The proposed monitoring regime (Table 5) includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action. Only monitoring actions that are not covered in other sub-plans have been included and detailed in the buffer monitoring regime.

Monitoring will be reported on an annual basis by the Proponent. Environmental targets have been developed based on buffer management objectives for the Weaber Plain Buffer Area. Monitoring is an important tool in the long-term management of the Buffer Area to ensure that there is no deleterious use that could lead to degradation, and to build records of weeds and vegetation health and record changes over time.

Table 5 Buffer monitoring regime

Item	Activity and location	Frequency	Target	Corrective action	Responsibility
1.	Assess vegetation condition using the Keighery (1994) rating scale and update vegetation condition map.	Annually commencing within 12 months of the commencement of the action	All areas within buffer to be in 'Very Good' or better condition.	<ol style="list-style-type: none"> 1. Investigate cause, e.g. cattle intrusion, loss of seed through heavy rains. 2. Take appropriate remedial actions, e.g. feral animal eradication programs, stabilise and revegetate area (in accordance with Item 10 in Table 3), undertake weed control (in accordance with Item 13 in Table 3). 3. Monitor success of remedy (annually at time of regular monitoring). 	Proponent*
2.	Monitor Gouldian Finch habitat and populations in the Buffer Area, utilising methodologies endorsed by DEC.	Annually as per the Gouldian Finch Conservation Plan.	All areas within buffer.	<ol style="list-style-type: none"> 1. As per Gouldian Finch Conservation Plan (Strategen 2011b) and monitoring regimes to be established by DEC and the Ord Project. 	Proponent*
3	Fire monitoring.	Annually within 12 months of the commencement of the action as per the Fire Management Plan.	All areas within buffer.	<ol style="list-style-type: none"> 1. As per Fire Management Plan. 	Proponent*

*The Proponent will have responsibility for management, however at some point in the future an "appropriate body or corporate (yet to be determined)" may be established to facilitate management.

2.6 Performance reporting

Performance reporting of this Buffer Management Plan will be implemented consistent with the reporting requirements set out in the Ord River Irrigation Area – Weaber Plain Development Project Environmental Management Plan (Ord EMP), which is to produce systematic, comprehensive and informative reports on environmental management and monitoring for the Weaber Plain Development (Strategen 2011a). Under this regime performance will be reported in:

- an Annual Environmental Report (AER)
- a triennial Performance Review Report.

Both the AER and triennial Performance Review Report will be prepared by the Proponent. The reports will be provided to the relevant regulatory authorities and made publicly available.

The AER will address conditions of Statement 830 and consistent with Condition 3 of the EPBC approval, the reporting will also address compliance with the conditions and management plans specified in the approval as well as the following:

- describe the status of work activities and environmental management
- outline the status of implementation of Procedure 14 of Statement 830 (relates to the creation of conservation reserves)
- identify any significant environmental incidents that occurred over the previous 12 months
- present and provide interpretation of monitoring results from the previous 12 months

- outline developments scheduled to occur in the next 12 months
- outline the effectiveness of the environmental management measures currently implemented and detail actual environmental performance against the targets specified in environmental management documents.

Also as described in the Ord EMP the triennial Performance Review Report will:

- describe the status of work activities and environmental management
- outline the status of implementation of Procedure 14 of Statement 830
- identify any significant environmental activities that occurred over the previous three years
- summarise and provide interpretation of monitoring results from the previous three years
- outline the effectiveness of the environmental management measures currently implemented and detail actual environmental performance against:
 - targets specified in environmental management documents
 - environmental objectives reported on by the WA Environmental Protection Authority (EPA) (2000, 2001) DLPE (2000) and DIPE (2002)
 - commitments documented in Schedule 2 of Statement 830.

Consistent with Condition 19 of the EPBC approval, an independent audit of compliance with conditions is required annually beginning twelve months after the commencement of the action, and the resultant report will be submitted to the Australian Government Minister administering the EPBC Act or the delegate to the Minister. It is noted that compliance reporting is also required by Statement 830.

2.7 Review and revision

Consistent with the Ord EMP and the conditional EPBC Act approval, the Buffer Management Plan will be reviewed by the Proponent as part of the annual environmental reporting process and revised as required.

The Department of Environment and Conservation (DEC), Department of Water (DoW) and the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) will be advised of any changes to the Buffer Management Plan and provided with the revised. Plan. The revised Buffer Management Plan will not be implemented unless written approval is received from these regulatory authorities.

Construction personnel will be notified of revisions to the program at a site briefing or using other suitable methods as required. In addition, the proponent will ensure that continued improvement of the plan occurs in response to environmental incident resolutions, audit findings, monitoring results, and changes in regulatory requirements.

3. References

- Department of Environment and Conservation (DEC) 2009a, *Draft Cane Toad Strategy for Western Australia 2009-2019*, Government of Western Australia.
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- Department of Lands, Planning and Environment (DLPE) 2000, *Ord River Irrigation Scheme Stage 2 Biodiversity Assessment*, Biodiversity Assessment Report and Recommendations by the Environment and Heritage Division, Department of Lands, Planning and Environment, August 2000.
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- Environmental Protection Authority (EPA) 2001, *Ord River Irrigation Area Stage 2 (M2 Supply Channel), Kununurra Part 2 – Management*, Report and Recommendations of the Environmental Protection Authority, Bulletin 1016, May 2001.
- Keighery BJ 1994, *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*, Wildflower Society of WA (Inc.), Nedlands, Western Australia.
- Strategen Environmental Consultants (Strategen) 2010, *Ord River Irrigation Area – Weaber Plain Development Project: Phase 1 Final Project Design Plan*, prepared for LandCorp, May 2010.
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- Strategen 2011b, *Ord River Irrigation Area – Weaber Plain Development Project, Gouldian Finch Conservation Plan*, unpublished report prepared for LandCorp, May 2011.
- Strategen 2011c, *Ord River Irrigation Area – Weaber Plain Development Project, Fire Management Plan*, unpublished report prepared for LandCorp, November 2011.