

**PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT AND
ENVIRONMENTAL MANAGEMENT PLAN
DUCK CREEK FLOOD DAMAGE REINSTATEMENT AND
REHABILITATION WORKS
2006**



Printed copies are uncontrolled unless marked otherwise

CONTENTS

1. INTRODUCTION	3
2. BACKGROUND.....	3
3. DESCRIPTION OF THE PROJECT.....	4
METHODOLOGY	6
3.1.1 Preliminary Desktop Study.....	7
3.1.2 Site Investigation	8
4. EXISTING ENVIRONMENT	8
5. CLEARING OF NATIVE VEGETATION	9
6. DECISION TO REFER.....	11
7. ENVIRONMENTAL MANAGEMENT PLAN	12
8. REFERENCES	17
APPENDIX A LOW IMPACT ENVIRONMENTAL SCREENING CHECKLIST	18
APPENDIX B SITE PHOTOGRAPHS.....	20
APPENDIX C DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT'S THREATENED FLORA AND FAUNA DATABASE SEARCHES	28
APPENDIX D AUSTRALIAN HERITAGE PLACES INVENTORY, HERITAGE COUNCIL OF WESTERN AUSTRALIA AND THE MUNICIPAL HERITAGE INVENTORY DATABASE SEARCHES	33
APPENDIX E DEPARTMENT OF INDIGENOUS AFFAIRS DATABASE SEARCH.....	35
APPENDIX F DOE'S SENSITIVE WATER RESOURCES DATABASE SEARCH	38
APPENDIX G WAPC'S ACID SULFATE SOILS MAPPING.....	41
APPENDIX H DEPARTMENT OF AGRICULTURE ADVICE ON DECLARED WEEDS	44
APPENDIX I DEPARTMENT OF ENVIRONMENT AND HERITAGE DATABASE SEARCH.....	46

DUCK CREEK

COMBINED ENVIRONMENTAL REPORT

1. INTRODUCTION

Earlier this year, within a period of four months (Jan to April 2006) the Duck Creek Bridge abutment and approach road was washed-out to a length of 40m by cyclones Emma, Clare and Glenda.

This structure is located in the southern-west part of Pilbara Region (managed by the Gascoyne region) on the Nanutarra – Munjina Road (SLK 62.29) within the Shire of Ashburton.

As a temporary solution, the washed-out section of the road (western abutment) was repaired with loosely compacted and poorly graded fill material and rock rubble batter which was easily accessible material available at the time.

Main Roads Gascoyne undertook the necessary clearing for fill material under the exemption stated in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004, Section 5 Item 21* which states “Clearing that is the result of the construction of a temporary vehicular track that is necessary to bypass a stretch of road that is impassable due to unforeseen damage to part of that stretch of road.”

The emergency repair works was crucial for reopening access to the highway which services the mining industry in the area.

2. BACKGROUND

This bridge has been subjected to many floods before; and the type of damage is a repetition of previous similar incidents.

Studies have been carried out and many cost effective options have been considered to find a road user safe solution.

Improvements to the surrounding floodways and bridge opening will lower the water-depths and water-velocities on the bridge; eventually creating a safe environment for the bridge abutments and reduce silt transportations.

The material generated from excavating-and-lowering the floodway could be utilised on the side-track construction; possibly a considerable saving.

Since there is a shortage of quality material for the works, fill material and rock will be brought in from three new gravel pits.

As per Main Roads’ Environmental Assessment and Approval process, the Low Impact Environmental Screening Checklist has been completed for the proposal, refer Appendix A. As the proposed works involves the clearing of native vegetation and the creation of new rock and gravel pits, the preparation of a project specific Preliminary Environmental Impact Assessment (PEIA) and Environmental Management Plan (EMP) is required. This report fulfils this requirement.

3. DESCRIPTION OF THE PROJECT

The proposed reinstatement and rehabilitation works to the Duck Creek Bridge involves the following:

- Reinstatement of the western abutment.
- Rehabilitation of the bridge which includes:
 - Lowering the eastern floodway based on recommendation from waterways studies
 - Additional protections on the western abutment by implement a guide-bank on right-bank. Eventually this will protect the bridge substructure and at the same time protect creek erosion.
 - Replacing the visibly settled eastern approach slab as part of rehabilitation works to provide an even road surface.

The approximate length of the damage is estimated to be 25 meters from the bridge. This was extended up-to 40m at the time of temporary re-instatement works to bring in fill material. The depth is almost the full height from the ground-level to the road surface level, ie approximately 8m.

The total volume of earth required for the Duck Creek Bridge repair works will be approximately 17,000m³.

The location and boundaries of the study area are shown in Figures 1 and 2 and include the following features:

- Three material pits near the Duck Creek bridge washout. These sites can best be described as iron capped hills with rocky loose shale.
- Side-track access to the east of the bridge. This track is the old highway which was decommissioned in 1985. The same alignment will be used for this project.

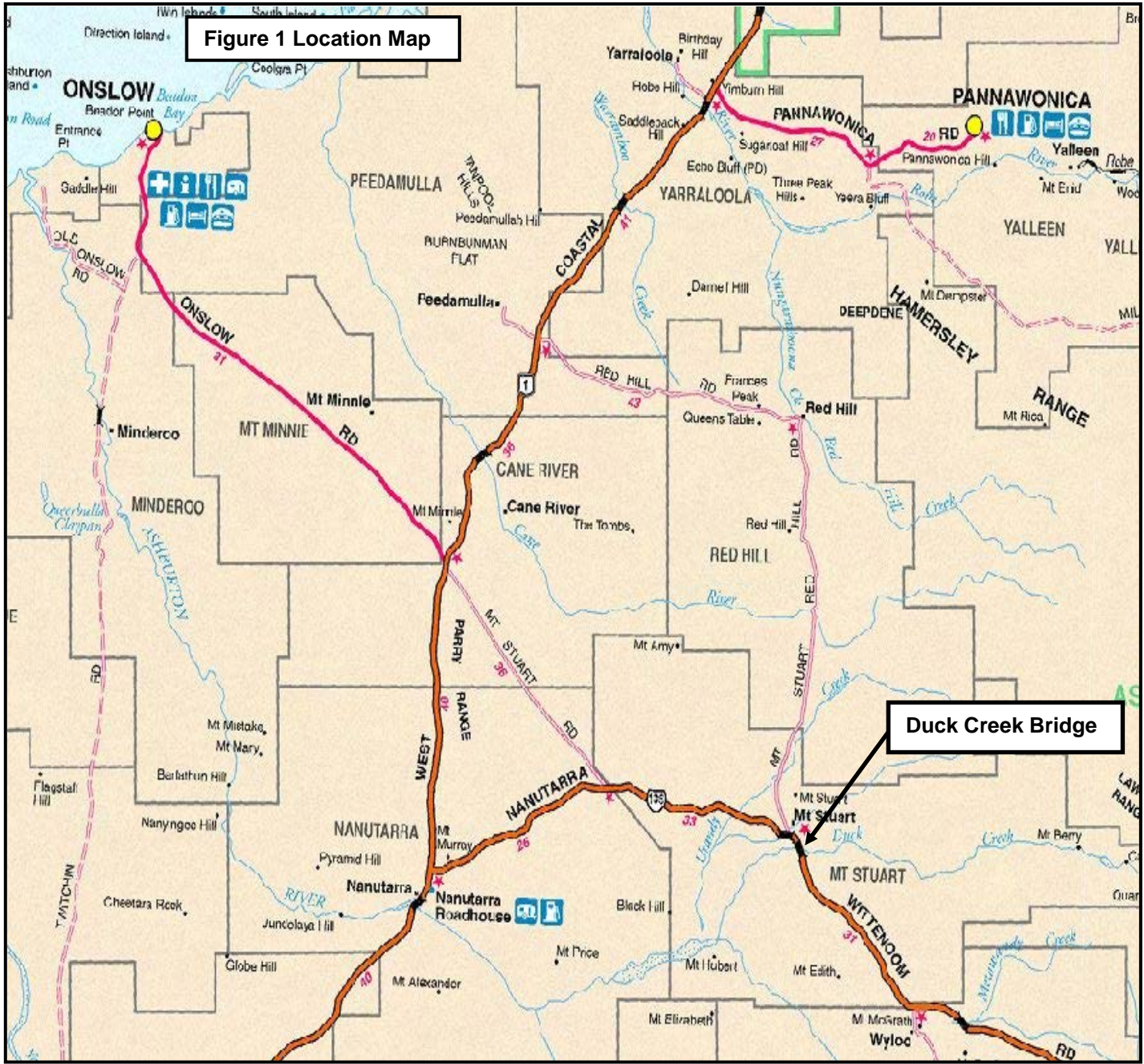
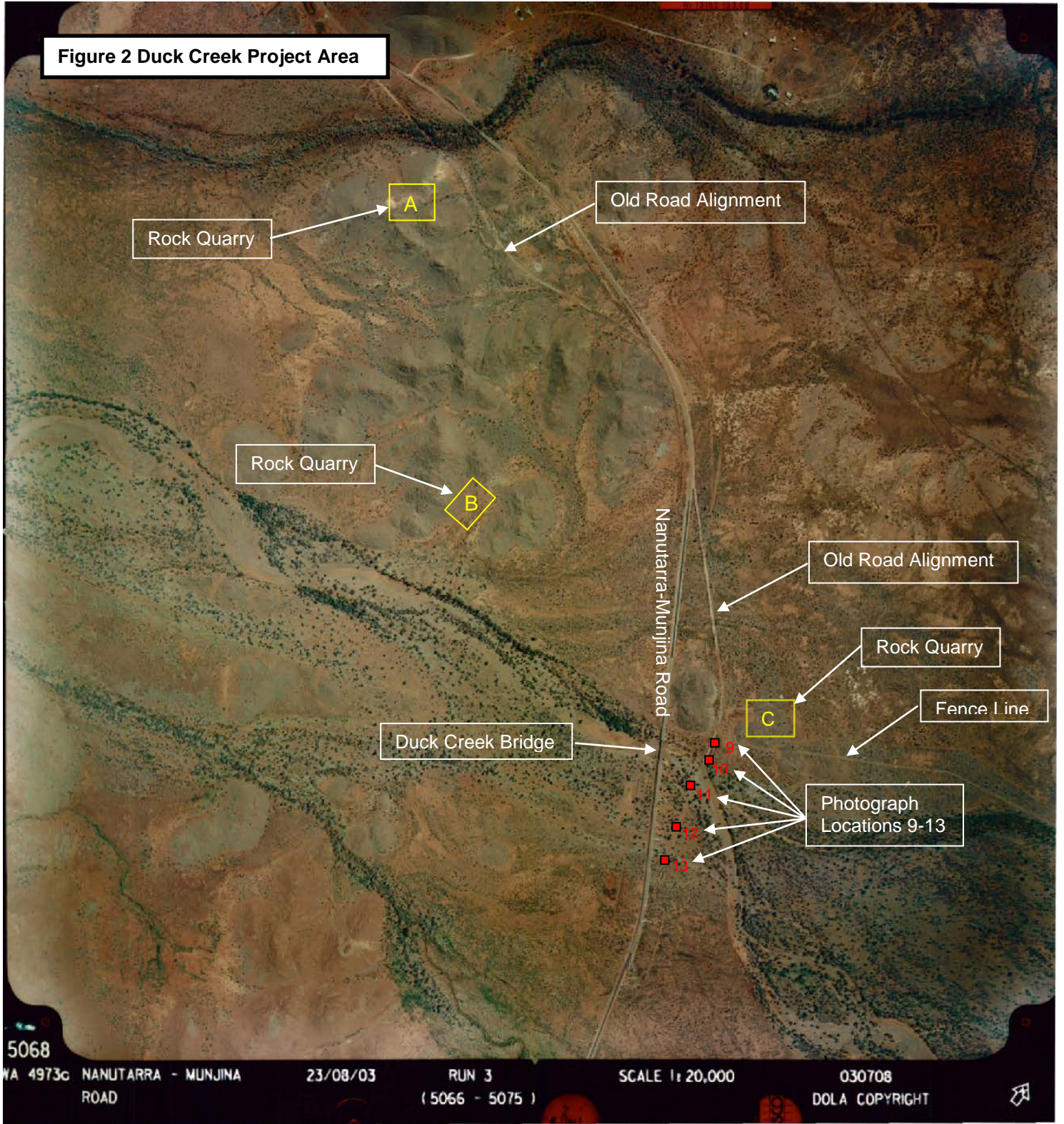


Figure 2 Duck Creek Project Area



Methodology

3.1.1 Preliminary Desktop Study

A preliminary assessment of the project area and its potential constraints was undertaken by reviewing a number of government agency managed databases.

Wetlands

The locations of wetlands within the project area was determined using the Commonwealth Department of Environmental and Heritage (DEH) mapping tool, Department of Environment (DoE) Environmentally Sensitive Area (ESA) mapping tool (http://portal.environment.wa.gov.au/portal/page?_pageid=53,2569721&_dad=portal&_schema=PORTAL).

Threatened Flora, Fauna and Communities, Conservation Reserves and ESAs

Department of Conservation and Land Management's (CALM's) database (contact CALM direct) was searched for known populations of threatened flora, fauna and Threatened Ecological Communities (TECs) and conservation reserves, refer Appendix C. A quick TEC check can be done using the ESAs mapping tool http://portal.environment.wa.gov.au/portal/page?_pageid=53,2569721&_dad=portal&_schema=PORTAL.

Air Quality

The need for a local air quality assessment was determined using the criteria outlined in the MRWA environmental guideline, Air Quality.

Heritage

Non-indigenous heritage was examined utilising the Australian Heritage Places Inventory (<http://www.heritage.gov.au>), Heritage Council of Western Australia (<http://register.heritage.wa.gov.au/>) and the Shire of Ashburton's Municipal Heritage Inventory refer Appendix D.

Aboriginal Heritage

A Search of the Department of Indigenous Affairs' (DIA's) (<http://www.dia.wa.gov.au/Heritage/SitesSurveysSearch.aspx>) database was undertaken to determine whether the project area contains any sites of Aboriginal heritage, refer Appendix E.

Sensitive Water Resources

The Water Information Officer of the Department of Water's regional office was consulted on sensitive water resources (including Public Drinking Water Source Areas) to determine whether the project area supported, or was adjacent to, any significant lakes, rivers or wetlands or proclaimed areas, refer Appendix F. To contact a water Information Officer http://portal.environment.wa.gov.au/pls/portal/PORTAL.www_app_module.show?p_sessionid=4837&p_header=true

Contaminated Sites

The project area is within a reserve that has remained in control of Main Roads and there is no evidence of contamination therefore it is not considered a contaminated site.

Acid Sulfate Soils

The Western Australian Planning Commission's acid sulfate soils maps were reviewed and the self assessment done (<http://www.wapc.wa.gov.au/Publications/213.aspx>) to determine what level of risk the project area is exposed to, refer Appendix H.

Weeds

Consultation was undertaken with the Department of Agriculture to determine whether there are any known populations of declared plants or significant weeds in or adjacent to the project area, refer Appendix H.

Dieback

Project receives <400 mm of rain so determined not to be an issue.

Commonwealth Referral

The decision to refer the project to the Commonwealths DEH was based upon whether the project was going to impact upon matter of national significance, eg World Heritage properties, protected wetlands and migratory species, Commonwealth marine areas, threatened species or communities or nuclear actions (refer to the Commonwealth webpage www.deh.gov.au/epbc/assessmentsapprovals/index.html for further information and the search tool page at <http://www.deh.gov.au/erin/ert/epbc/imap/map.html>), refer Appendix I.

3.1.2 Site Investigation

A site visit was carried out by Srinath Fernando on 20/04/06 to examine the general features of the area. The broad vegetation types in the vicinity of the project area were identified. Other issues that were considered included topography, the impacts on creek lines, property access and the potential for noise and vibration impacts (dilatation).

4. EXISTING ENVIRONMENT

Beard (1975) described the physiographic unit surrounding the Duck Creek area as “All of this unit consists of very poor stony country-the northern portion being especially so-and is mapped as sparse shrub steppe.”

The general cover that was found over the three rock quarry sites (as seen in Appendix B, photographs 3 to 8) consisted of *Triodia basedowii* and *Triodia wiseana* with sparsely spaced shrubs such as *Acacia bivenosa*, *Cassia pruiinosa* and *Cassia oligophylla*. Sparse populations of *Acacia xiphophylla* were also observed.

Vegetation along the old highway track to the east of the bridge is lined with *Eucalyptus camaldulensis* within the river bed and *Acacia citrinoviridis*.

The vegetation in all project areas is well represented and not classified as threatened or endangered.

5. CLEARING OF NATIVE VEGETATION

Under the amended *Environmental Protection Act 1986 (EP Act)* clearing of native vegetation must be under the authority of a clearing permit.

In assessing whether the project is likely to have a significant impact on the environment, the project has been assessed against the DoE's 10 principles of clearing, see table below.

Clearing Principles - <i>Environmental Protection Act</i> Section 5	Yes/No
Does the area to be cleared comprise a high level of biological diversity?	No
Does the area to be cleared comprise the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia?	No
Does the area to be cleared include, or is necessary for the continued existence of, rare flora?	No
Does the area to be cleared comprise the whole or a part of, or is necessary for the maintenance of, a threatened ecological community?	No
Is the area to be cleared significant as a remnant of native vegetation in an area that has been extensively cleared?	No
Does the area to be cleared within, or in association with, an environment associated with a watercourse or wetland?	No
Is the clearing of the vegetation likely to cause appreciable land degradation?	No
Is the clearing of the vegetation likely to have an impact on the environmental values of any adjacent or nearby conservation area?	No
Is the clearing of the vegetation likely to cause deterioration in the quality of surface or underground water?	No
Is the clearing of the vegetation likely to cause, or exacerbate, the incidence or intensity of flooding?	No

Rock and gravel material will be sourced from 3 different locations (Figure 2).

Rock Quarry A is located on the right hand side of Nanutarra-Munjina Road at 60.65 SLK. The site was pegged and marked with the dimensions being 80 meters wide and 120 meters long, making total clearing area 9.6 hectares.

Rock Quarry B is located on the right hand side of Nanutarra-Munjina Road at 61.03 SLK. The site was pegged and marked with the dimensions being 30 meters wide and 129 meters long, making the total clearing area 3.87 hectares.

Rock Quarry C is located on the left hand side of Nanutarra-Munjina Road at 62.20 SLK. The site was pegged and marked with the dimensions being 87.5 meters wide and 165 meters long, making the total clearing area 14.43 hectares.

Total clearing area for materials is 27.9 hectares. Please note that this total represents an area that has been pegged out in the field at the time of the emergency works and that the actual clearing requirements would be expected to be significantly smaller.

No clearing of remnant native vegetation will take place for the side access track since the old highway alignment will be utilised. (See Appendix B)

There is some regrowth of *Acacia pyrifolia* DC at the southern end of the old highway (See Appendix B Photograph 13). This regrowth is approximately 20 years old.

Assessment of Aspects and Impacts
Table 1: Aspects and Impacts – Duck Creek

Aspect	Evaluation of Potential Impacts
Air quality	Not relevant to the proposed works. Local air quality assessment is not required for the project since: <ul style="list-style-type: none"> the predicted traffic flow is less than 15,000 vehicles per day in rural areas; residential and other sensitive receptors are not within 200 meters of the road centre;
Dust	Likely to be a minor issue during earthworks. No major sensitive receivers adjacent to the proposed works, but excessive dust could impact vegetation.
Fauna	No significant fauna issues associated with any of the proposed works. The Orange Leaf-nosed Bat was identified in a CALM database search, but it roosts in caves, none of which are present in the works area. The Western Pebble-mound Mouse was another species identified in the CALM search, but occurrences have only been sited in the Barlee Range Nature Reserve which is approximately 60 kilometres to the south of the works area. The potential impact is therefore very low.
Vegetation – clearing	The native vegetation to be cleared will be done so using the purpose permit as the project does not occur within an ESA.
Vegetation – TECs/DRF	Consultation with CALM confirms that the proposal is not going to have a significant impact upon any DRF or TECs. All search results show flora species not occurring within the project area. <i>Goodenia nuda</i> is the species closest to the works but actually occurs along Mount Stuart Road and not Nanutarra-Munjina Road(See Appendix C)
Vegetation – weeds	Consultation with the Department of Agriculture confirms that there are no declared plants in the project area. Consideration in reducing the spread of weeds in the project area will occur.
Vegetation – dieback	Not an issue given the project area receives less than 400 mm of average annual rainfall.
Reserves / Conservation areas	Not an issue. Project does not occur with any reserves.
Heritage (non-indigenous)	A search of the Australian Heritage Places Inventory, Heritage Council of Western Australia and the Shire of Ashburton's Municipal Heritage Inventory on-line databases has indicated that there is one site present in the proposed works areas. The Duck Creek gorge is an area that will not be impacted by the project due to the minor nature of the repair works.
Aboriginal heritage	A search of DIA database identified no known sites of Aboriginal heritage significance within the vicinity of the project area. Consultation was undertaken with the Puutu Kunti Kurram and Pinikura Claimant group and an onsite visit was conducted for all materials sites. The claimant group indicated that there were no concerns over the sites that were selected for materials.
Surface water/drainage	Consultation with Department of Water's Karratha office has confirmed that the proposed works will not disturb or interrupt any natural drainage and surface run-off patterns. Advice regarding a permit to disturb bed and bank shows that it is not required.
Wetlands	There are no wetlands within the vicinity of the project area.
Groundwater	No dewatering nor drainage modifications are required, hence no change to groundwater level or quality.
Noise and vibration	No major sensitive local receivers.
Visual amenity	The proposed works will result in minor and short-term visual impacts during construction.
Public safety and risk	Provided traffic management and signage to Main Roads standards is employed, none of the proposed works present any significant hazards to public safety. The proposed works will serve to enhance public safety by improving local road conditions.
Hazardous substances	Not relevant to the proposed works.
Contamination	Given the relatively superficial nature of the required earthworks, there appears to be a low risk of any significant contamination issues.
Salinity	Given the nature and scale of the project the impact is not relevant.

Table 1: Aspects and Impacts – Duck Creek

Aspect	Evaluation of Potential Impacts
Acid Sulfate Soils	The WAPC's self-assessment (Planning Bulletin 64) indicates that no further soil investigation is required for the project.
Statutory Land Use Planning	Not relevant to the proposed works

6. DECISION TO REFER

Given the scale of the project, the low significance of its impacts to the surrounding environment and the environmental management measures proposed, the project does not require referral to the WA Environmental Protection Authority or the Commonwealth Department of the Environment and Heritage.

7. ENVIRONMENTAL MANAGEMENT PLAN

This section of the report (the EMP) has been developed for the project area following the completion of the above sections. The main aims of this EMP is to provide a management plan to assist in minimising the environmental impacts of the activities associated with the proposed works and identify who is responsible for the implementation of the management strategies.

This EMP will only address the actions already listed as well as any site-specific issues that were identified during the PEIA. The project specific management measures identified within this EMP are in addition to the standard specifications used for Category 2 projects. The environmental management measures/conditions in Main Road's Specifications 203, 204, 301, 302 and 304 are still to be followed where applicable.

The areas that require special management will be addressed in terms of:

- area of management (eg vegetation);
- the timing of the various management requirements;
- the management objectives for each area;
- the management strategies that are necessary to minimise the impact;
- the person/s responsible for implementing the management action; and
- on whose advise or Main Roads requirement

ENVIRONMENTAL MANAGEMENT PLAN					
Area of management	Timing	Management objective	Management Strategy	Responsibility	Whose advice
Communication	All phases of Construction	The Project Manger is required to identify both internal and external stakeholders, obtain their requirements on the Project and communicate as required or at regular intervals with key stakeholders.	Develop and implement a communication plan including response to complaints, liaising/reporting to government agencies, engagement with the community and other when work is performed outside the normal hours with specific reference to nuisance issues such as noise, dust and lightning spill.	Project Manager	Main Roads
Vegetation Clearing - Record-keeping	All phases of Construction	All projects should maintain the required records relating to clearing native vegetation under the purpose permit	Clearing: <ul style="list-style-type: none"> a copy of the PEIA & EMP (Minor projects) for small projects; a map showing the location where the clearing occurred, recorded in an ESRI Shapefile; the size of the area cleared (in hectares); the dates on which the clearing was done. 	Project Manager	DoE
			Revegetation and rehabilitation of areas: <ul style="list-style-type: none"> a copy of each Revegetation Plan; a map showing the location of any area revegetated and rehabilitated recorded in an ESRI Shapefile; a description of the revegetation and rehabilitation activities undertaken; and the size of the area revegetated and rehabilitated (in hectares). 	Project Manager	DoE
			Each offset implemented: <ul style="list-style-type: none"> a copy of each offset proposal; a map showing the location of any offset implemented recorded in an ESRI Shapefile; a description of the offset implemented; and the size of the area of the offset (in hectares). 	Project Manager	DoE
Vegetation Clearing - Record-keeping	All phases of Construction	All projects should maintain the required records relating to clearing native vegetation	Each management strategy implemented: <ul style="list-style-type: none"> a map showing the location of any area to which a management strategy has been 	Project Manager	DoE

ENVIRONMENTAL MANAGEMENT PLAN					
Area of management	Timing	Management objective	Management Strategy	Responsibility	Whose advice
(cont.)		under the purpose permit	<p>applied recorded in an ESRI Shapefile;</p> <ul style="list-style-type: none"> a description of the management strategy implemented; and the size of the area to which the management strategy was applied (in hectares). 		
			<p>Control of weeds, dieback and other pathogens:</p> <ul style="list-style-type: none"> a copy of any management plan prepared; and for any pathogen other than dieback, the appropriate steps taken 	Project Manager	DoE
Vegetation - Clearing	Pre-Construction	<p>Ensure that the overall objectives of the alignment and construction works are compatible with maintaining and, where possible, enhancing the biological integrity of the surrounding environment and minimising vegetation loss and degradation; and</p> <p>Ensure the retention of as many habitat trees, shrubs and vegetated corridors for fauna as possible, particularly where associated with riparian zones.</p>	Selection of designs/locations that minimise adverse impacts on the biological environment	Project Manager	Main Roads
			Construction works to be undertaken in summer to reduce the potential for soil erosion and drainage line siltation due to vegetation removal and heavy rains.	Project Manager	Main Roads
			Any stockpiled vegetation from clearing works shall not be burnt. This vegetation shall be used during any rehabilitation works and either chipped or replaced according to the EMP.	Project Manager	Main Roads
			Stormwater drainage shall be treated and disposed of in accordance with DoE requirements	Project Manager	DoE
Surface Drainage	Pre-Construction	Maintain the hydrological regime that exists prior to the construction of the proposal	Ensure that the road blends in with the surrounding environment	Project Manager	Main Roads
Visual Amenity	Pre-Construction	Ensure that the road blends in with the surrounding environment	Access to private property and appropriate traffic management measures should be planned and implemented prior to the construction of works	Project Manager	Main Roads
Noise, Vibration and Dust	Construction	Ensure that the construction of the proposal does not become a nuisance to the public	Works associated with the construction of the development should not prevent public access along the adjacent reserve. Public access should be maintained along the reserve at all times	Project Manager	Main Roads

ENVIRONMENTAL MANAGEMENT PLAN					
Area of management	Timing	Management objective	Management Strategy	Responsibility	Whose advice
			Any complaints regarding dust will be attended to as soon as possible	Project Manager	Main Roads
			Where it is found that trucks leaving the site are carrying excessive material onto sealed surfaces, these areas will be swept to reduce dust generation and maintain traffic safety.	Project Manager	Main Roads
			Watering, the use of hydromulch or other forms of mulching to protect loose surfaces shall be used as mitigation measures	Project Manager	Main Roads
			The designated servicing area will be bunded to contain any spills or leaks and shall not be located in an area adjacent to any drainage areas or watercourses or will drain into a temporary sump.	Project Manager	Main Roads
Pollution and Litter	Construction	Ensure that the construction of the proposal is managed to a standard that minimises any adverse impacts on the environment.	Emergency cleanup procedures shall be implemented in the case of any spillage. These will include control of spilled material and removal of contaminated soil to an approved site. The contractor shall ensure appropriate equipment is available at all times to control any spills and shall notify the Superintendent's Representative as soon as possible following a spill.	Project Manager	Main Roads
			All waste oil will be collected for recycling and any empty fuel/oil containers, used filters and waste hydraulic parts to be collected and stored in an allocated area then removed to an approved site.	Project Manager	Main Roads
			Dumping or temporary storage of bitumen, asphalt, concrete or aggregate should only occur at designated depots or controlled hardstands.	Project Manager	Main Roads
			The project areas, including hardstand areas, will be kept in a tidy manner at all times.	Project Manager	Main Roads
			All litter on the project will be placed into lidded bins and disposed of at an approved site.	Project Manager	Main Roads
			No fires shall be lit within the project area	Project Manager	Main Roads
Fire	Construction	Ensure that the fire risk	Machinery will be fitted with approved spark	Project Manager	Main Roads

ENVIRONMENTAL MANAGEMENT PLAN					
Area of management	Timing	Management objective	Management Strategy	Responsibility	Whose advice
		associated with the construction of the proposal is minimised.	arresting mufflers.		
			A water tanker will be on site at all times.	Contractor	Main Roads
			If any materials of significance to Aboriginal people are discovered, works will immediately cease within 100m of the material and the site will be examined by a qualified archaeologist.	Project Manager	DIA
Aboriginal Heritage	Construction	Ensure that there is no unauthorised disturbance to Aboriginal heritage sites during construction	The DIA will be notified in the event of any significant Aboriginal Heritage discovery.	Project Manager	
Aboriginal Heritage (cont.)	Construction	Ensure that there is no unauthorised disturbance to Aboriginal heritage sites during construction	If skeletal material is uncovered during works the WA Police Service will also be advised immediately.	Project Manager	
			A formal induction program will be conducted for all personnel prior to commencing work on the site. The program will aim to make them fully aware of all management strategies.	Project Manager	Main Roads
Site Management	Construction	Ensure that the site is managed to ensure that construction of the proposal will have minimal impact upon the surrounding environment	Site office and materials storage areas will be located on previously disturbed/ designated area	Project Manager	Main Roads
			Replace the cleared trees with locally occurring natives	Project Manager	Main Roads
Rehabilitation	Post-Construction	Leave the project area free from debris; and Rehabilitate the project area so that the revegetated area provides a net increase in area of native vegetation at the site.	All waste materials from the development are to be completely removed from the site upon completion of the development. Final clean-up shall be to the satisfaction of the Project Manager and the Site Superintendent.	Project Manager	Main Roads

8. REFERENCES

Beard, J.S. (1976) *Vegetation survey of Western Australia: the vegetation of the Pilbara area Western:map and explanatory notes to sheet 5, 1:10,000,000 series Australia, map and explanatory memoir, 1:250,000 series*

Appendix A

Low Impact Environmental Screening Checklist

Checklist - Low Impact Environmental Screening

The Low Impact Environmental Screening Checklist is part of the environmental assessment and approval process, explained in Figure 2 and in the procedures. It should be noted that the checklist does not address Aboriginal heritage issues. Please refer to Main Roads guideline *Aboriginal Heritage* for the heritage assessment process.

All projects are to be screened to identify those that are Low Impact, ie that will have a low impact on the environment and that can be adequately managed through standard contract clauses.

Projects that have "No" to **all** items are classed as Low Impact and should be implemented using standard contract clauses in the Tender Document Process.

Projects that have "Yes" to **any** item will require further environmental assessment and will be implemented using an Environmental Management Plan.

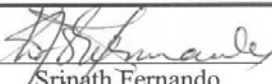
Tick "Yes" or "No" for every item. Circle the relevant part of the item.

Project Name Duck Creek – Nanutarra-Munjina Road - 62.29 SLK

ITEM NO.	ITEM	Y	N
1	New road or road reserve to be created or expansion of existing road reserve.		x
2	Works require ground disturbance or clearing of native vegetation.	x	
3	New, or expansion of existing, pits or quarries. (non-commercial sources)	x	
4	Adjoining sensitive land use. eg residential or hospital or education centre		x
5	Passes over, adjoins or drains directly into a wetland or sensitive watercourse.		x
6	Local natural drainage regime / hydrology will be changed.		x
7	Within/immediately adjacent to surface/underground Public Drinking Water Source Area.		x
8	Dewatering, or a new water bore.		x
9	Known potential source of hazardous materials within or adjoining the road reserve. e.g. Acid Sulphate Soils, existing petrol station, industrial site or waste disposal site (landfill)		x
10	Buildings will require demolition.		x

Completed By:

Signature



Date 25/05/06

Name

Srinath Fernando

Title PM

To be reviewed by
a Main Roads
Environment Officer

Signature



Date 25/05/06

Name

Matt Oswald

Title EO

Comments:

Appendix B

Site Photographs



Photograph 1. Duck Creek Flood Damage - Nanutarra Munjina Rd - 62.29 SLK- South East View



Photograph 2. Duck Creek Flood Damage - Nanutarra Munjina Rd - 62.29 SLK- North West View



Photograph 3. Rock Quarry Site A - East View -Nanutarra Munjina Rd - 60.65 SLK



Photograph 4. Rock Quarry Site A - South View- Nanutarra Munjina Rd - 60.65 SLK



Photograph 5. Rock Quarry Site B - West View- Nanutarra Munjina Rd - 61.03 SLK



Photograph 6. Rock Quarry Site B - West View- Nanutarra Munjina Rd - 61.03 SLK



Photograph 7. Rock Quarry Site C - South View- Nanutarra Munjina Rd - 62.20 SLK



Photograph 8. Rock Quarry Site C – North View- Nanutarra Munjina Rd - 62.20 SLK



Photograph 9. Old Access Road – South View.



Photograph 10. Old Access Road – South View.



Photograph 11. Old Access Road – South View.



Photograph 12. Old Access Road – South View.



Photograph 13. Old Access Road – South View.

Appendix C

Department of Conservation and Land Management's Threatened Flora and Fauna Database Searches

OSWALD Matt (GEnv)

From: Lullfitz, Ben [BenL@calm.wa.gov.au]
Sent: Thursday, 29 June 2006 3:54 PM
To: OSWALD Matt (GEnv)
Subject: RE: Duck Creek Threatened Flora Search
Attachments: Duckcreek_drf&plist_290606.doc; Duckcreek_letter_290606.doc;
Duckcreek_waherb_290606.doc

Hi Matt

Please find attached the Herbarium search data and DRF & Priority list for the search you requested around the Duck Creek Bridge. A search was conducted on the Departments Threatened (Declared Rare) Flora database, however there were no results retrieved.

The search coordinates used were:

NW corner - 22°11' S, 115°45' E

SE corner - 22°45' S, 116°21' E

Please refer to the attached letter for conditions in relation to the supplied information. Feel free to contact me if there are any queries.

Regards

Ben Lullfitz

Threatened Flora Database Officer
Species and Communities Branch
Department of Conservation and Land Management
Locked Bag 104, Bentley Delivery Centre WA 6983
Ph (08) 9334 0123 Fax (08) 9334 0278
benl@calm.wa.gov.au

-----Original Message-----

From: OSWALD Matt (GEnv) [mailto:matthew.oswald@mainroads.wa.gov.au]
Sent: Monday, 26 June 2006 2:16 PM
To: Lullfitz, Ben
Subject: Duck Creek Threatened Flora Search

Ben,

Main Roads Gascoyne Region proposes to undertake repair works on Duck Creek Bridge after a section of the bridge was washed out in March 2006.

Part of the Main Roads environmental approval process requires the region to consult with CALM in regards to threatened flora.

The location details of the works area is below.

Region: Gascoyne
Road location: Nanutarra Munjina Road
Station Name: Mount Stuart
Co-ordinates (4 points given): Latitude 22°27'59 S
Longitude 116°02'21 E

29/06/2006

**DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
DECLARED RARE AND PRIORITY FLORA LIST
22 February 2005**

SPECIES / TAXON	CONS CODE	CALM REGION	DISTRIBUTION	FLOWER PERIOD
Abutilon uncinatum ms	1	P	Onslow, Yaraloola Stn	Sep
Goodenia nuda	3	P	Weeli Wolli, Roy Hill, <u>Mt Stuart</u>	Aug
Goodenia pascua	3	P	Hamersley Stn, Sandy Creek, Port Hedland, Onslow, Gardie, Roebourne, Little Sandy Desert	May-Aug
Sida sp. Wittenoom (WR Barker 1962)	3	P	Wittenoom, Nickol Bay, Roy Hill, Fortescue Roadhouse, Nanutarra	Aug-Sep

WAHERB SPECIMEN DATABASE
GENERAL ENQUIRY

Goodenia nuda
E.Pritz. (Goodeniaceae)
CONSERVATION STATUS:P3 TYPE STATUS: INE *
Coll.: R. Carolin 7788 Date: 10 08 1970 (PERTH 02611104)
LOCALITY 96 miles from Onslow on Mount Stuart road WA
LAT 22 Deg 31 Min Sec S LONG 116 Deg 5 Min Sec E
Ascending herb. Corolla yellow, purple marking in throat. Spinifex
grassland.

Sida sp. Wittenoom (W.R. Barker 1962)
PN (Malvaceae)
CONSERVATION STATUS:P3
Coll.: P.G. Wilson 13036 Date: 28 06 1988 (PERTH 06484360)
LOCALITY 6 km E of Nanutarra, on road to Wittenoom WA
LAT 22 Deg 32 Min 11.000 Sec S LONG 115 Deg 49 Min 46.000 Sec E
0.3 m high, calyx in young fruit.
Previous det.: Sida sp.

23.324 °S 115.551 °E / 23 °S 116.54 °E Duck Creek Bridge (plus ~50km buffer)

* *Date* *Certainty* *Seen* *Location Name* *Method***Schedule 1 - Fauna that is rare or is likely to become extinct***Rhinonicteris aurantius* **Orange Leaf-nosed Bat** 1 records

This species of bat occurs in a few scattered locations in the Pilbara, as well as the Kimberley. It roosts in caves and is sensitive to human disturbance.

1995	1	3	Barlee Range NR	Night sighting
------	---	---	-----------------	----------------

Priority Four: Taxa in need of monitoring*Pseudomys chapmani* **Western Pebble-mound Mouse (Ngadji)** 4 records

This species is well-known for the characteristic pebble-mounds which it constructs over underground burrow systems. These mounds are most common on spurs and lower slopes of rocky hills.

1994	2	0	Barlee Range NR
1994	1		Barlee Range NR
1994	1	1	Barlee Range Nature Reserve
1995	1	1	Barlee Range Nature Reserve

* Information relating to any records provided for listed species:-

Date: date of recorded observation

Certainty (of correct species identification): 1=Very certain; 2=Moderately certain; and 3=Not sure.

Seen: Number of individuals observed.

Location Name: Name of reserve or nearest locality where observation was made

Method: Method or type of observation



Appendix D

Australian Heritage Places Inventory, Heritage Council of Western Australia and the Municipal Heritage Inventory Database Searches

HERITAGE COUNCIL OF WESTERN AUSTRALIA

[HERITAGE COUNCIL](#) | [PLACES DATABASE](#) | [HERITAGETRAILS](#)

[ABOUT](#) | [DEVELOPMENT](#) | [INSURANCE](#) | [ASSISTANCE](#) | [PUBLICATIONS](#) | [CASE STUDIES](#) | [EDUCATION](#) | [CONTACT](#)

Search this site

Displaying results: [1-1] of 1

[QUICK SEARCH](#)
[ADVANCED SEARCH](#)
[RESULTS LIST](#)
[LOCATION REPORT](#)
[SAVE DATA](#)

[WHAT IS THE STATE REGISTER](#)
[OTHER HERITAGE LISTS](#)

hide selected | **hide unselected**

Duck Creek Gorge (4405)

hide selected | **hide unselected**

[▲ top of page](#) | [\[disclaimer \]](#) | © copyright 2006 heritage council of western australia

Appendix E

Department of Indigenous Affairs Database Search



Search Criteria

0 sites in a search box. The box is formed by these diagonally opposed corner points:

MGA Zone 50	
Northing	Easting
7513176	403093
7514304	404320

Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

Copyright

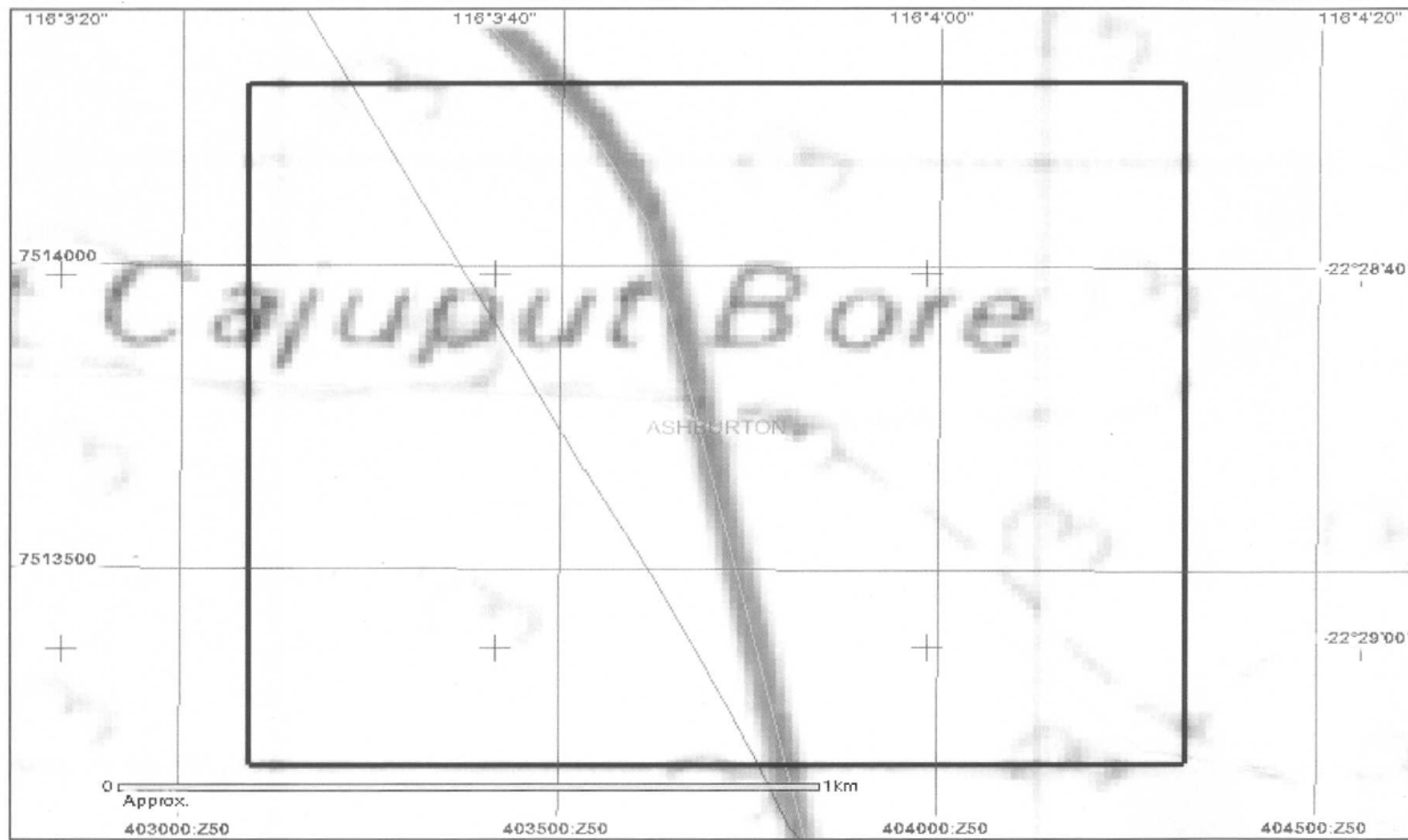
Copyright in the information contained herein is and shall remain the property of the State of Western Australia. All rights reserved. This includes, but is not limited to, information from the Register of Aboriginal Sites established and maintained under the Aboriginal Heritage Act 1972 (AHA).

Legend

Restriction	Access	Status	Coordinate Accuracy
N No restriction	C Closed	I Interim register	Accuracy is shown as a code in brackets following the site coordinates.
M Male access only	O Open	P Permanent register	[Reliable] The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
F Female access	V Vulnerable	S Stored data	[Unreliable] The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code "closed" or "vulnerable". Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.



Legend

- Highlighted Area
- Town
- Map Area
- Search Area

Copyright for base map information shall at all times remain the property of the Commonwealth of Australia, Geoscience Australia - National Mapping Division. All rights reserved.

Copyright for Native Title Land Claim, Local Government Authority, Mining Tenement boundaries shall at all times remain the property of the State of Western Australia, All rights reserved.

For further important information on using this information please see the Department of Indigenous Affairs' Terms of Use statement at <http://www.dia.wa.gov.au/terms.aspx>

Appendix F

DoE's Sensitive Water Resources Database Search

OSWALD Matt (GEnv)

From: RECHICHI Jason [jason.rechichi@water.wa.gov.au]
Sent: Tuesday, 4 July 2006 9:27 AM
To: OSWALD Matt (GEnv)
Subject: RE: Duck Creek-Sensitive Water Resources
Attachments: InterScan_Disclaimer.txt

Matt

The department hasn't assessed all water resources in the Pilbara and I can't justify driving down to Duck Creek to make an assessment. From a desktop analysis I would suggest Duck Creek doesn't meet any of the criteria mentioned below. However, if you or another officer have visited the area and therefore are aware of any issues you should make note of this.

Please supply photos of the existing crossing to be used for the maintenance works.

Regards
Jason

-----Original Message-----

From: OSWALD Matt (GEnv) [mailto:matthew.oswald@mainroads.wa.gov.au]
Sent: Monday, 3 July 2006 4:19 PM
To: RECHICHI Jason
Subject: RE: Duck Creek-Sensitive Water Resources

Jason,

Thanks for the information but I need conformation from yourself or your department that none of those items listed under 'Sensitive Water Resources' will be impacted by the project. Under our environmental processes I cannot make that assumption since I am not the authority that governs this area.

The old highway (our proposed side access track) has been previously cleared and the same alignment will be used, therefore no clearing of vegetation will need to take place.

The only works which will occur is placing fill material over those sections which have depressions or divots to give a safe and smooth surface for vehicles. This fill material will not go outside the existing boundary.

Regards,

Matthew Oswald
Environment Officer
Main Roads Western Australia
Gascoyne Region
Phone (08) 9941 0713
Fax (08) 9941 0701

From: RECHICHI Jason [mailto:jason.rechichi@water.wa.gov.au]
Sent: Monday, 3 July 2006 3:56 PM
To: OSWALD Matt (GEnv)
Subject: RE: Duck Creek-Sensitive Water Resources

Matt

The following provides a definition of a sensitive water resource:

Sensitive water resources

Clean water resources used for drinking, sustaining aquatic and terrestrial ecology, industry and aesthetic values, along with breathable air, rank as the most fundamental and important needs for viable communities. These water resources should remain within specific quality limits, and

10/07/2006

therefore require stringent and conservative protection measures. Guidance on water quality parameters necessary to maintain water values are published in the Australian Government's *National Water Quality Management Strategy Guidelines* (see web page www.deh.gov.au/water/quality/nwqms/index.html).

This Department strives to improve community awareness of catchment protection measures for both surface water and groundwater aquifers as part of a multi-barrier protection approach to maintain the quality of water resources and their values.

To be considered sensitive, water resources must support one or more of the environmental values described below. Any activity or land use may pose a risk to water quality if contaminants could be washed or leached into sensitive water resources in discernible quantities. These water resources include shallow groundwater accessed by water supply wells, waterways, estuaries, or wetlands. Community support for these values, setting of management objectives for water resources and implementation of a practical attainment strategy are seen as key elements in protecting and restoring the values of these resources.

Sensitive water resources include:

- a. those proclaimed or assigned as Public Drinking Water Source Areas (ie Water Reserves, Catchment Areas or Underground Water Pollution Control Areas) under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909*, the *Country Areas Water Supply Act 1947* or the *Health Act 1911*;
- b. those used as private drinking water supply sources (ie for human or stock consumption);
- c. waters with specific qualities necessary to support commercial or industrial activities eg aquaculture, food processing or crop irrigation;
- d. waterways (other than engineered drains or ornamental features) including:
 - waterways managed under the *Waterways Conservation Act 1976*, ie the Avon, Peel-Harvey, Leschenault, Wilson Inlet and Albany Waterways Management Areas; and
 - the Swan-Canning Estuary and lands managed under the *Swan River Trust Act 1988*;
- e. wetlands that are pristine or possess conservation values, but not those highly disturbed, unless subject to active management to restore specified environmental values, including:
 - policy areas covering water resources defined via Part III of the *Environmental Protection Act 1986* eg *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*; and
 - wetlands of regional, national and international importance, including but not limited to Conservation Category wetlands and Resource Enhancement category wetlands and wetlands listed within *A Directory of Important Wetlands in Australia*. See the Australian Department of the Environment and Heritage web site (includes information on Ramsar convention sites) www.deh.gov.au/water/wetlands/database/directory.
- f. groundwater aquifers that sustain important ecological functions eg cave ecology;
- g. locations where contact with surface water or groundwater from the water table is likely to affect people's health or well-being, eg garden, recreation or irrigation sources; and
- h. waterways or wetlands meeting recognised cultural or social needs, eg water resources used for community swimming, fishing or valued for their visual appeal.

I'll need more information regarding the bed and banks permit application eg what works are you doing? Are you going to be clearing any veg? etc.

10/07/2006

Appendix G

WAPC's Acid Sulfate Soils Mapping



ACID SULFATE SOILS

APPLICANT SELF - ASSESSMENT FORM

PLEASE COMPLETE THIS SELF-ASSESSMENT FORM AND ANSWER THE FOLLOWING:

STEP 1: IS THERE EVIDENCE OF A SIGNIFICANT RISK OF DISTURBING ACID SULFATE SOILS AT THIS LOCATION?

Question 1:

Is the land depicted in Figures 1 - 11 of the Western Australian Planning Commission's Planning Bulletin No. 64: Acid Sulfate Soils as having a 'high risk of Actual Acid Sulfate Soil (AASS) & Potential Acid Sulfate Soil (PASS) < 3m from surface'?

Note: Planning Bulletin No. 64: Acid Sulfate Soils can be downloaded from:
<http://www.wapc.wa.gov.au/publications/policies/bulletins/PB64/64Nov03.html>

TICK BOX AS APPROPRIATE:

YES

NO

Question 2:

Is the land located in an area, whether depicted in Figures 1 - 10 or not, where site characteristics and local knowledge lead you to form the view that there is a significant risk of disturbing acid sulfate soils at this location?

TICK BOX AS APPROPRIATE:

YES

NO

If YES to either of these two questions go to Step 2.

If NO to both of these questions no further investigation is required.
Sign this form and submit it with your application.

STEP 4:

CARRY OUT DETAILED SITE ASSESSMENT IN ACCORDANCE WITH DEPARTMENT OF ENVIRONMENT GUIDELINES.

Question 7:

Did the Detailed Site Assessment reveal the presence of acid sulfate soils?



TICK BOX AS APPROPRIATE:

YES


NO

If **YES** to this question you should consider modifying the design of the proposal to ensure that there is no disturbance to acid sulfate soils at this location. Regardless of whether you modify the design or not, sign this form and submit it with your application together with the written results of the Preliminary and Detailed Site Assessments.

If **NO** to this question then no further investigation or work is required. Sign this form and submit it with your application together with the written results of the Preliminary and Detailed Site Assessments.

APPLICANT SIGNATURE:

▶ Matthew Oswald
Full Name

▶ 
Signature

▶ 30/6/06
Date

TICK BOX FOR ATTACHMENTS AS APPROPRIATE:

- Preliminary site Assessment Results
- Detailed site Assessment Results
- The proposal has been designed to avoid disturbance of Acid Sulfate Soils at this location

Appendix H

Department of Agriculture Advice on Declared Weeds

OSWALD Matt (GEnv)

From: Longbottom, Andrew [alongbottom@agric.wa.gov.au]
Sent: Wednesday, 28 June 2006 5:09 PM
To: OSWALD Matt (GEnv)
Subject: RE: Declared Plants & Weeds-Duck Creek

Matt,

There are no known declared weeds on or in the vicinity of Duck Creek or House creek. Weeds that are known to occur in the creek system are Mexican Poppy but these are no longer declared and haven't been for a number of years. Acacia farnesiana is also found along the Duck Creek system, but isn't declared. It would be appreciated if all efforts to reduce the spread of these two weeds could occur.

Andrew Longbottom
Bio-security officer
Department of Agriculture and Food
Karratha.

-----Original Message-----

From: OSWALD Matt (GEnv) [mailto:matthew.oswald@mainroads.wa.gov.au]
Sent: Wednesday, 28 June 2006 4:41 PM
To: Longbottom, Andrew
Subject: Declared Plants & Weeds-Duck Creek

Andrew,

Main Roads Gascoyne Region undertook emergency repair works on Duck Creek in February 2006. A 20 meter section of the bridge washed out due to cyclone Emma.

In order to comply with our clearing permit I am required to complete an Environmental Impact Assessment Report. Part of this report requires me to consult with the Department of Agriculture in order to determine if there is any know populations of declared plants or significant weeds in or adjacent to the project area.

The location details of the works area is below.

Region: Gascoyne
Road location: Nanutarra Munjina Road
Station Name: Mount Stuart
Bridge Location: Duck Creek
Co-ordinates: 22°28'47 S
116°03'48 E

Thanks for the assistance. Please contact me if anything requires clarification.

Regards

Matthew Oswald
Environment Officer
Main Roads Western Australia
Gascoyne Region
Phone (08) 9941 0713
Fax (08) 9941 0701

This e-mail and any files transmitted with it are privileged and confidential information intended for use of the addressee. The confidentiality and/or privilege is not waived, lost or destroyed if it has been transmitted to you in error. If you received this

29/06/2006

Appendix I

Department of Environment and Heritage Database Search



Australian Government
Department of the Environment and Heritage

Protected Matters Search Tool

You are here: [DEH Home](#) > [EPBC Act](#) > [Search](#)

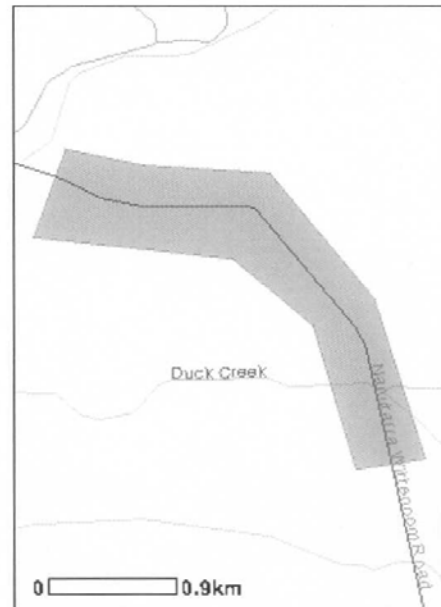
26 June 2006 15:20

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the [reveal](#) at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at <http://www.environment.gov.au/atlas> may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.deh.gov.au/epbc/assessmentsapprovals/index.html>



Search Type: Area
Buffer: 0 km
Coordinates: -22.46332,116.04210, -22.46445,116.04753, -22.46501,116.05633, -22.47380,116.06363, -22.48503,116.06718, -22.48578,116.06232, -22.47568,116.05932, -22.47100,116.05371, -22.4695,116.03986



http://www.deh.gov.au/cgi-bin/erin/ert/epbc/epbc_report.pl

26/06/2006

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.deh.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance: (Ramsar Sites)	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	3
Migratory Species:	3

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.deh.gov.au/heritage/index.html>.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species,

whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.deh.gov.au/epbc/permits/index.html>.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Places on the RNE:	None
Listed Marine Species:	7
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Other Commonwealth Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Threatened Species [Dataset Information]	Status	Type of Presence
Mammals		
<i>Dasyurus hallucatus</i> *	Endangered	Species or species habitat may occur within area
Northern Quoll		
<i>Rhinonicteris aurantius (Pilbara form)</i> *	Vulnerable	Species or species habitat likely to occur within area
Pilbara Leaf-nosed Bat		
Reptiles		
<i>Morelia olivacea barroni</i> *	Vulnerable	Species or species habitat may occur within area
Olive Python (Pilbara subspecies)		
Migratory Species [Dataset Information]		
Migratory Terrestrial Species		
Birds		
<i>Haliaeetus leucogaster</i>	Migratory	Species or species habitat likely to occur within area
White-bellied Sea-Eagle		
Migratory Wetland Species		
Birds		
<i>Charadrius veredus</i>	Migratory	Species or species habitat may occur within area
Oriental Plover, Oriental Dotterel		
<i>Glareola maldivarum</i>	Migratory	Species or species habitat may occur within area
Oriental Pratincole		

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
<i>Apus pacificus</i> Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
<i>Ardea alba</i> Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
<i>Ardea ibis</i> Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
<i>Charadrius veredus</i> Oriental Plover, Oriental Dotterel	Listed - overfly marine area	Species or species habitat may occur within area
<i>Glareola maldivarum</i> Oriental Pratincole	Listed - overfly marine area	Species or species habitat may occur within area
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
<i>Merops ornatus</i> Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and

point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- • some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgments

This database has been compiled from a range of data sources. Environment Australia acknowledges the following custodians who have contributed valuable data and advice:

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- **Natural history museums of Australia**
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium

- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCLIM Version 1.8 Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Last updated:

Department of the Environment and Heritage
GPO Box 787 Canberra ACT 2601 Australia
Telephone: +61 (0)2 6274 1111

© Commonwealth of Australia 2004