Mining Management Exploration Activities

Northern Territory of Australia – *Mining Management Act 2001*

It is recommended that the Mining Management Plan (MMP) is completed in conjunction with the user guide available on the Northern Territory Government website.

Section 1 – Project Details

Project Name Provide new or existing project name	Frewena East

Authorisation Number Insert existing authorisation number, where applicable	A1095-01

Operator Name Use ASIC-ABR registered name (if a company), or name of the applicant	Inca Minerals Limited
Operator ABN and ACN numbers	128 512 907

Location and Access Details Include brief description of the location, access details, and distance to nearest town or community	The site (EL32795 and EL32580) is located between 15km and 50km south-east of the intersection of the Barkly Highway and the Tablelands Highway. Access to the site is via Barkly Hwy, Tablelands Hwy and existing Dalmore Downs station roads and tracks. The Barkly Homestead is the closest facility to the Project.

Target Commodity Details Include target mineral commodities (i.e. gold, copper etc.)	Iron ore copper-gold (IOCG), sedimentary exhalative (SEDEX), and/or orogenic mineralisation with potential for associated commodities including silver, zinc, lead, bismuth, cobalt, tungsten, molybdenum, and rare earth elements, amongst others. Phosphate enrichment is also possible.

Mining Activities Summarise the mining activities (exploration) to be the subject of the proposed Authorisation or Variation. Drilling programs over a maximum of four years are supported and encouraged and can be staged. Please refer to the guidelines for further information.	Drilling - 40 x drill holes of 1,200m depth. RC with diamond tails.

Proposed Schedule Include start and finish dates of ground disturbing work	Dry Season

Mining Interest and Land Ownership

List the mining interests (titles), the title holder name/s, the title expiry date and the Property name/Land holder (e.g. pastoralist or Aboriginal land trust) for each title.

Title Number	Title Holder	Expiry Date	Underlying Property Name or Land Holder
EL32795	Inca Minerals Limited 90% Jonathan West 5% MRG Resources Pty Ltd 5%	14/09/2027	NT Portion 773, PPL988 – Dalmore Downs Station
EL32580	Inca Minerals Limited 90% Jonathan West 5% MRG Resources Pty Ltd 5%	23/06/2027	NT Portion 00002 – West Ranken Station NT Portion 773, PPL988 – Dalmore Downs Station

Organisational Structure

Position Title	Name
Managing Director	Ross Brown
General Manager	Jonathan West
Exploration Manager	Robert Heaslop

Section 2 – Operator Self-Assessment of the Environmental Risk

Environmental considerations

ASSESSMENT ASPECT	YES or NO	ACTIONS REQUIRED (if answered YES)	APPENDED INFORMATION (e.g. evidence of consultation with DEPWS and/or management plan where required).
Step 1: Are there any threatened flora and fauna species or habitats of significance that may occur in the proposed work area?	Yes	The Operator must assess the likelihood of threatened species or their habitats occurring at or near the site. If the likelihood is high, then a "Significant Impact Assessment" must be undertaken and appended to this document.	Consulted NR Maps site on 1/11/2021. Map of EL32580 downloaded from the NR Maps site indicates no threatened flora and fauna species have been reported or recorded as being present within the site or the immediate area. The site does record instances of the Grey Falcon, approximately 12.5km from the Project. Map of EL32795 downloaded from the NR Maps site indicates no threatened flora and fauna species have been reported or recorded as being present within the site or the immediate area. The site does record sightings of the Grey Falcon, approximately 4.3km from the Project. Information received from the Department of Environment, Parks, and Water Security (DEPWS) Flora and Fauna Division considers that the following Threatened Species may potentially occur within or immediately adjacent to EL32580 and EL32795: • Australian painted snipe. • Brush-tailed mulgara. • Grey falcon. • Plains death adder. A 300m no-work exclusion zone shall be applied to any tree identified a a Grey Falcon nesting site. EPBC Report downloaded on 1/11/2021 lists 8 threatened fauna species, no flora species recorded within the search grid area however, no species are recorded within EL32795 or EL32580. Reports, Maps and data sheets for site and adjacent areas listed threatened species are attached at Appendix 1 as evidence of proponent awareness. If observed, the proponent shall record the occurrence and report it to the DITT and DEPWS.

ASSESSMENT ASPECT	YES or NO	ACTIONS REQUIRED (if answered YES)	APPENDED INFORMATION (e.g. evidence of consultation with DEPWS and/or management plan where required).
Step 2: Are there any known declared weeds within the proposed work area?	No	Seek advice from DEPWS – Weed Management Branch to determine if weeds are present on site and ensure management measures are appropriate for the level of activity proposed and attach a Weed Management Plan (if required).	The NR Maps site shows reported occurrences of the following declared weeds within EL32795 and EL32580: • Mesquite Class A and C; • Parkinsonia Class B and C. The above listed weeds are declared as Weeds of National Significance (WONS). • Noogoora Burr Class B and C. Refer to NR Map attached at Appendix 1. No recorded weeds within area proposed for activity - Refer to map showing area of proposed activity at Appendix 2. EPBC reported weed species that are or may potentially be present within the search area grid are listed in Appendix 1. In addition to those in the NR Maps, the following weeds are listed in the EPBC report: • Prickly Acacia Class A and C; and • Buffell Grass – not a declared weed in the NT. Vehicle hygiene measures are detailed in the Project Weed Management information sheet. Given the NR Maps recorded infestations and concentrations (dense/very dense) of weeds within the site, and the potential for the presence of weeds within work areas, the proponent shall pay particular attention to personnel and contractor observance of vehicle hygiene measures. The 2018 NT Weeds Branch Weed Management Handbook at Appendix 1 shall be the reference tool that the proponent will use to assist in identifying and managing site declared weeds. If observed, the proponent shall record the occurrence for pastoralist, DITT and DEPWS reference.

ASSESSMENT ASPECT	YES or NO	ACTIONS REQUIRED (if answered YES)	APPENDED INFORMATION (e.g. evidence of consultation with DEPWS and/or management plan where required).
Step 3: Will you be using water from bores or other sources for the operation?	No	Water related matters on mineral titles are no longer exempt from the *Water Act 1992.* Please consult with DEPWS Water Resources and/or familiarise yourself with the *Water Act* to ensure compliance under this Act when undertaking exploration activities.	The proponent will consult with the pastoralist for use of limited amounts of water for drilling purposed if and when required.

Environmental assessment and cultural considerations

ASSESSMENT ASPECT	YES or NO	MANAGEMENT REQUIREMENTS
Step 4: Is your project likely to have a significant impact on the environment?	No	Refer to the NTEPA Environmental Factors and Objectives Guideline.
Step 5: Are there Aboriginal sacred sites in the Project area?	No	Sacred Sites are protected under the NT *Aboriginal Sacred Sites Act 1989* and administered by the Aboriginal Areas Protection Authority (AAPA). It is recommended that advice be sought from AAPA in relation to sacred site protection. The proponent has consulted with the AAPA and received advice that no sacred sites are recorded or registered within the Project. The AAPA does not allow sacred site reports or information provided to be shared with third parties

ASSESSMENT ASPECT	YES or NO	MANAGEMENT REQUIREMENTS
Step 6: Are there archaeological and heritage sites in the Project area?	No	Heritage and archaeology sites are protected in the NT. NT Department of Territory Families, Housing and Communities (DTFHC) administers the *Heritage Act 2011.* Seek advice in relation to protection of heritage and archaeological sites. The proponent has consulted with the NT Heritage Branch who confirmed no heritage or archaeological sites are present within the areas of proposed activity. A copy of the report is attached at Appendix 1.

Section 3 – Amendments

As per Section 41(3) of the *Mining Management Act*, an MMP reviewed and amended under Section 41(1)(a) is to have amendments made since the previous MMP submission clearly identified.

Section	Amendment
4. Activities Proposed	Change in pad area size to 25m x 35m (was 20m x 25m)
8. Required Attachments	Revised security calculation for amended drill pad disturbances

Section 4 – Activities Proposed for this MMP only

Provide relevant EL numbers

Mining Interests (i.e. titles)	**EL32795**	**EL32580**
Number and type of proposed exploration drill holes	20 RC with diamond tail	20 RC with diamond tail
Maximum depth of proposed holes (m)	1,200m	1,200m
Number and size of drill pads to be cleared (Length: m x Width: m)	20 pads (25m by 35m)	20 pads (25m x 35m)
Total area of drill pads to be cleared (ha)	1.75ha	1.75ha
Number of proposed water bores	0	0
Is drilling likely to encounter groundwater in multiple or confined aquifers? (Y, N, unsure) If answering yes, please provide the number of exploration holes where this is likely to occur	unsure	unsure
Number of costeans	0	0
Volume to backfill costeans (Length: m x Width: m x Depth: m)	n/a	n/a
Number of bulk sample pits	0	0
Volume to backfill bulk sample pits (Length: m x Width: m x Depth: m)	n/a	n/a
Bulk sample pits approved under *Mineral Titles Act*? (Y or N). If Yes provide approval	n/a	n/a
Line/track clearing: (length m x width m)	5,000m by 4m	10,000m by 4m

Mining Interests (i.e. titles)	**EL32795**	**EL32580**
Area of proposed line/track clearing (ha)	2ha	4ha
Camp area to be cleared (ha)	n/a	1ha
Camp Infrastructure (i.e. demountable, tents) Please provide a complete list with measurements as required in the security calculation	Camp either based at Barky Homestead or within cleared area in EL32580	Camp either based at Barkly Homestead or using short term tents/caravan style arrangement
Other	nil	nil
Total proposed area of disturbance (ha)	3.75ha	6.75ha

Section 5 – Previous Disturbance (for existing Authorisations only)

The 'Disturbance Tracking' spreadsheet must be completed and attached to the MMP submission to complete this section. The spreadsheet is available on the departmental web page where this template is located.

No disturbance to date of amended MMP.

Section 6 – Environmental Management

By checking these shaded boxes, you are agreeing to implement the following minimum environmental management standards on the project area. Where boxes have been left unchecked, justification is required.

6.1		Blade-up approach for clearing will be used (i.e. no windrows, leave root stock and topsoil)
6.2	X	Significant vegetation will be avoided during clearing (i.e. large trees, specimens providing habitat or food sources, riparian vegetation, and threatened species)
6.3	X	Vegetation clearing during, and immediately after rainfall events, will be avoided
6.4	X	Vegetation clearing will be kept to the minimum required to safely traverse vehicles and drill rigs along tracks and drill pads
6.5	X	Where blade-up techniques cannot be employed, topsoil and vegetation will be stockpiled appropriately for rehabilitation purposes
6.6	X	All employees and contractors will be trained and inducted in relation to the management of environmental risks in the work area, including weeds, waterways, threatened species, soil erosion, sacred sites and heritage areas
6.7	X	Sumps will be lined or tanks of appropriate size to contain water, sediment and drilling fluids encountered during drilling, will be used
6.8	X	Sumps, drill holes, and fuel stores will be located away from environmentally significant areas and water courses
6.9	X	Excavations (sumps, costeans and pits) will be appropriately ramped to allow fauna egress
6.10	X	Drill holes will be securely capped immediately after drilling
6.11	X	Vehicle hygiene measures will be employed to prevent the introduction and spread of invasive species and pathogens when mobilising vehicles and equipment from one location to another
6.12	X	Hydrocarbon spills will be minimised using liners and drip trays under machinery, and appropriately sized spill-kits available in the event of a spill
6.13	X	Hazardous substances (including hydrocarbons) will be stored and handled in accordance with relevant Australian Standards
6.14	X	Hydrocarbons will be stored in lined and bunded areas
6.15	X	Waste will be stored securely while on-site to minimise windblown rubbish and access by feral animals
6.16	X	Waste will be removed off-site and disposed of at an appropriate waste management facility
6.17	X	All environmental incidents will be reported to the Department in accordance with Section 29 of the *Mining Management Act.*

6.18	**X**	Acid and Metalliferous Drainage (AMD) and Potentially Acid Forming (PAF) material derived from drilling cuts will be managed to avoid AMD and PAF related issues on site.
6.19	**X**	Radioactive/NORM drill cuttings will be managed to avoid radiation related issues on site.
6.20	**X**	Dust management will be implemented on site.

Justification and alternative management measures:

6.1 not checked to ensure main access track is properly constructed for duration of the Project but required rehabilitation as per 6.5 will be carried out. Where blade up approach is suitable (i.e. minor tracks) this will be undertaken

Section 7 – Rehabilitation and Closure

By checking these shaded boxes, you are agreeing to implement the following minimum rehabilitation standards on the project area. Where boxes have been left unchecked, justification is required.

A refund of security related to completed rehabilitation on site requires the submission of a rehabilitation report including photographs, an updated security calculation and updated disturbance tracking spreadsheet to the Department.

7.1	X	Drill holes will be plugged below ground level at a minimum depth of 0.4 metres and soil mounded to prevent subsidence, within 6 months of completion of drilling.
7.2	X	Drill holes encountering multiple or confined aquifers will be grouted with concrete.
7.3	X	Drill samples/spoil will be returned down drill holes, buried in sumps, or removed from site.
7.4	X	All drill hole and access markers including flagging tape, wooden markers and star pickets will be removed from site.
7.5	X	Cut and fill drill pads will be re-contoured to be consistent with the surrounding terrain.
7.6	X	Drill pads and compacted areas along the contour (on sloping ground) will be ripped/scarified of and tracks will be cross-ripped (zig-zag).
7.7	X	Tracks will be rehabilitated, including pushing in all windrows, unless otherwise agreed in writing by the land holder or appropriate third party.
7.8	X	Appropriate erosion and sediment controls will be installed where erosion is evident or likely to occur.
7.10	X	Access through watercourses will be removed and banks restored.
7.11	X	All previously disturbed areas will be stable, with no evidence of active soil erosion.
7.12	X	All excavations will be backfilled within 6 months of their completion.
7.13	X	All water bores will be decommissioned unless otherwise agreed in writing by the land holder or appropriate third party.
7.14	X	All rubbish and infrastructure will be removed from site.
7.15	X	Topsoil will be replaced and vegetation re-established.
7.16	X	Contaminated soils (e.g. hydrocarbon or hazardous chemicals) will be rehabilitated or removed from site.
7.17	X	Monitoring will be undertaken following the wet season or a significant rainfall event.

Justification and alternative management measures:

Section 8 – Required Attachments

8.1	**X**	Initial Application for Authorisation or variation of Authorisation (only if details on the form have subsequently changed)
8.2	**X**	Nomination of Operator Form, where required
8.3	**X**	Security Calculation Spreadsheet – Appendix 2 contains the revised Operator Security Calculation to account for increased drill pad disturbances.
8.4	**X**	Evidence of Land Access Agreement if operating on an Exploration Licence (EL) on Pastoral Lease (e.g. two-ways exchange of email). Copy of the landowner letter granting Inca Minerals Ltd access to both Dalmore and Alroy Downs Pastoral Leases is attached at Appendix 2. Activity will be conducted entirely within Dalmore Downs Pastoral Lease.
8.5	**N/A**	Disturbance tracking spreadsheet (for existing Authorisations)
8.6	**X**	Spreadsheet with coordinates of proposed drill holes or polygons of target areas – Appendix 2
8.7	**X**	KML/shape files/track logs of proposed tracks, camp sites and proposed drill holes or polygons of target areas – Appendix 2
8.8	**X**	Map(s) of the work area(s) showing: 1. title boundaries and title numbers 2. current and proposed drill holes, or polygons of target areas 3. current and proposed tracks 4. rehabilitated areas 5. camp sites 6. heritage sites or significant environmental areas 7. environmental constraints
8.10	**N/A**	Radiation Management Plan (if applicable)
8.12	**X**	Document(s) being appended in relation to Section 2 (if any): - Appendix 1 - Environmental and Cultural Considerations - Appendix 2 – Additional Information

EL32795 and EL32580 – Frewena East Project Weeds and Weed Management

The following declared weeds were identified in 2021 DEPWS map and 2021 EPBC Report at Appendix 1 as occurring within or having the potential to be present within the Project.

Weed Species	Declared Weed Classification	Treatment
Parkinsonia	Class B and C – Weed of National Significance (WONS)	Chemical and non-chemical treatments are detailed in the 2018 Weeds Branch Weed Management Handbook at Appendix 1.
Prickly acacia	Class A and C – Weed of National Significance (WONS)	Chemical and non-chemical treatments are detailed in the 2018 Weeds Branch Weed Management Handbook at Appendix 1
Mesquite	Class A and C – Weed of National Significance (WONS)	Chemical and non-chemical treatments are detailed in the 2018 Weeds Branch Weed Management Handbook at Appendix 1
Noogoora Burr	Class B and C	Chemical and non-chemical treatments are detailed in the 2018 Weeds Branch Weed Management Handbook at Appendix 1

The proponent will consult with the respective pastoralist in the event that treatment of weeds by spraying is under consideration.

The proponent has a copy of the 2018 NT Weeds Branch Management Handbook is the reference tool that the proponent shall use to assist in managing site weeds in consultation with the owner and occupier of the site.

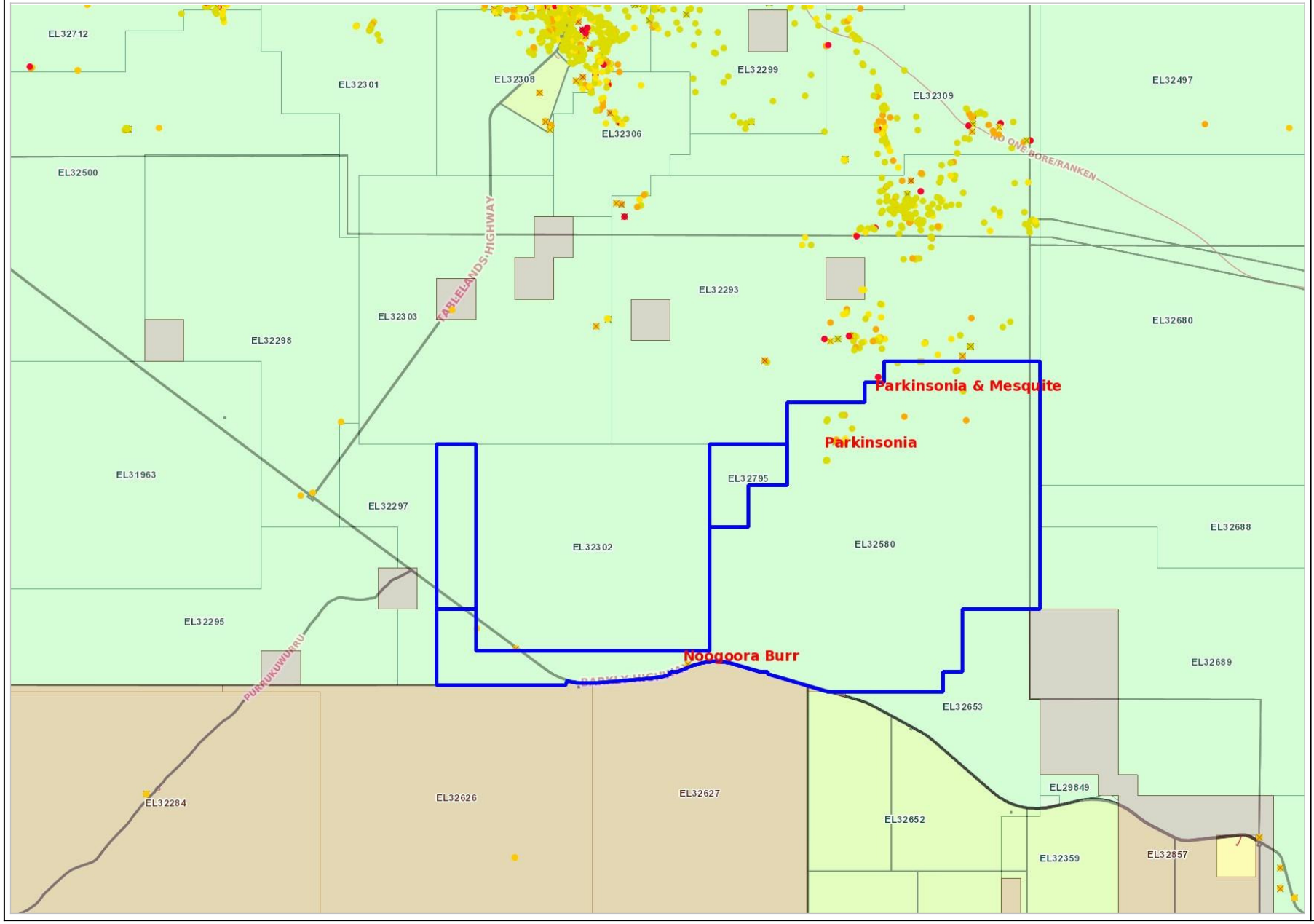
Vehicle Hygiene Measures

- Proponent vehicles and equipment shall be inspected for the presence of weeds prior to gaining entry to the site. If present, weeds shall be removed and stored in a heavy-duty plastic storage bag of drum for disposal at Tennant Creek tip or buried in a pit of a minimum depth of 1 metre.
- Proponent vehicles and plant shall be inspected before leaving the site. If present, weeds shall be removed and stored in a heavy-duty plastic storage bag of drum for disposal at Tennant Creek tip or buried in a pit of a minimum depth of 1 metre.

- The proponent shall inspect all contractor vehicles, plant and equipment for the presence of weeds prior to entering and leaving the site.
- Records and dates of vehicle, plant and equipment inspections and the results shall be recorded by the proponent or contractor. Records shall be retained by the proponent in the event that review by the DITT is requested.

NR MAPS

EL32795 & EL32580 - NR Maps Recorded Weeds



Legend

Weed Records (DENSITY CLASS)

- Scattered
- Scattered (Treated)
- Moderate
- Moderate (Treated)
- Dense
- Dense (Treated)
- Very Dense
- Very Dense (Treated)
- Unknown Density
- Unknown Density (Treated)

Exploration Licences - Application

Exploration Licences - Granted

GENERAL_TEXT

TENURE_TYPES

- Freehold
- Vacant
- Perpetual Pastoral Lease
- Reserve
- Government
- Crown Lease Term
- Crown Lease Perpetual
- Right to Freehold Title

N

Metres 5,000 10,000 15,000 20,000

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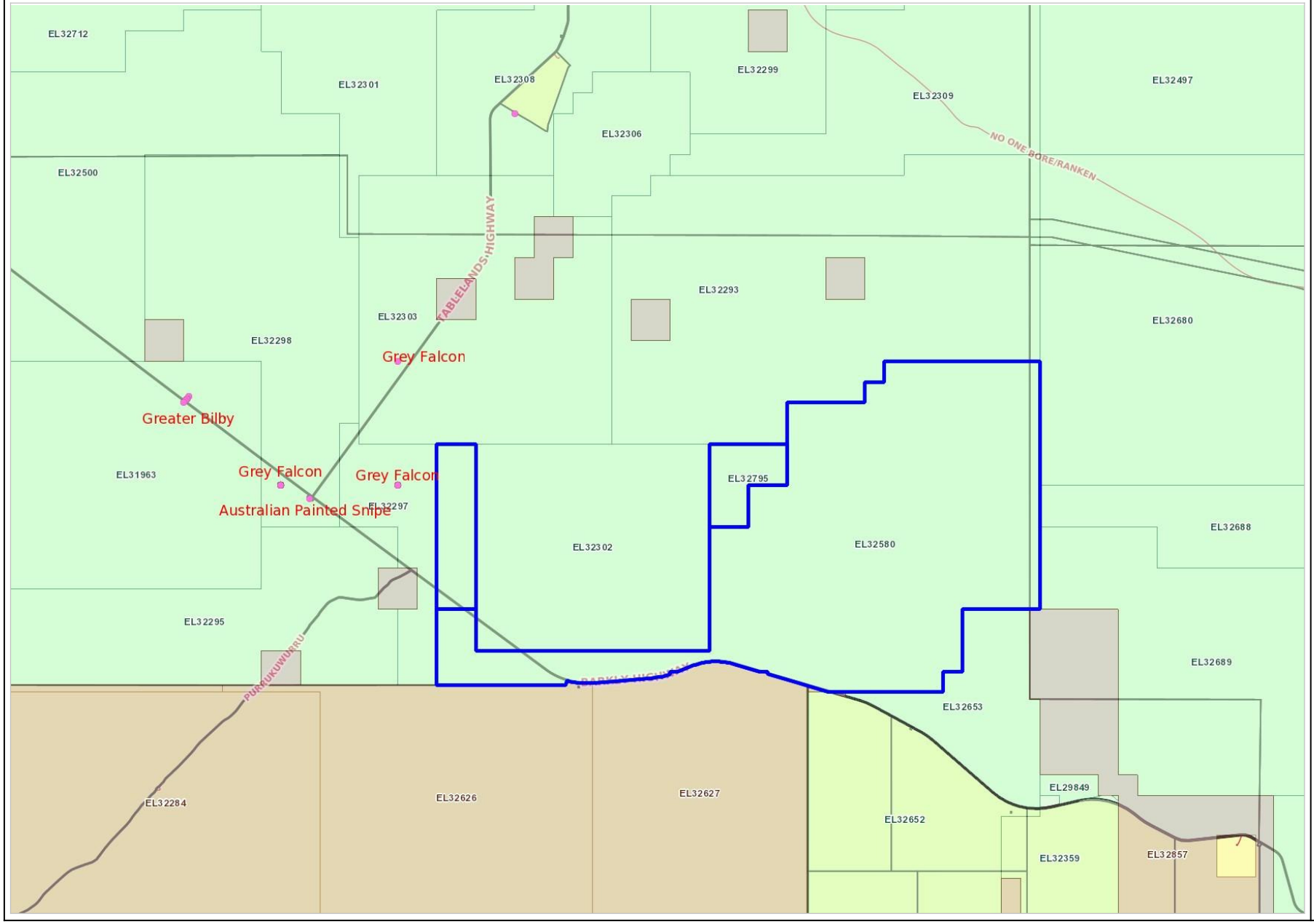
Geospatial Services Branch

Created by anonymous, 01 Nov 2021

NR MAPS

EL32795 & EL32580 - Threatened Flora & Fauna Species



Legend

Threatened Flora

Threatened Fauna

Exploration Licences - Application

Exploration Licences - Granted

GENERAL_TEXT

TENURE_TYPES

- Freehold
- Vacant
- Perpetual Pastoral Lease
- Reserve
- Government
- Crown Lease Term
- Crown Lease Perpetual
- Right to Freehold Title
- Special Purpose Lease
- Pastoral Lease
- Registered Mining Lease
- Other Lease

N

Metres 5,000 10,000 15,000 20,000

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Geospatial Services Branch

Department of Environment, Parks and Water Security

Created by anonymous, 01 Nov 2021

Australian Government

Department of Agriculture, Water and the Environment

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 caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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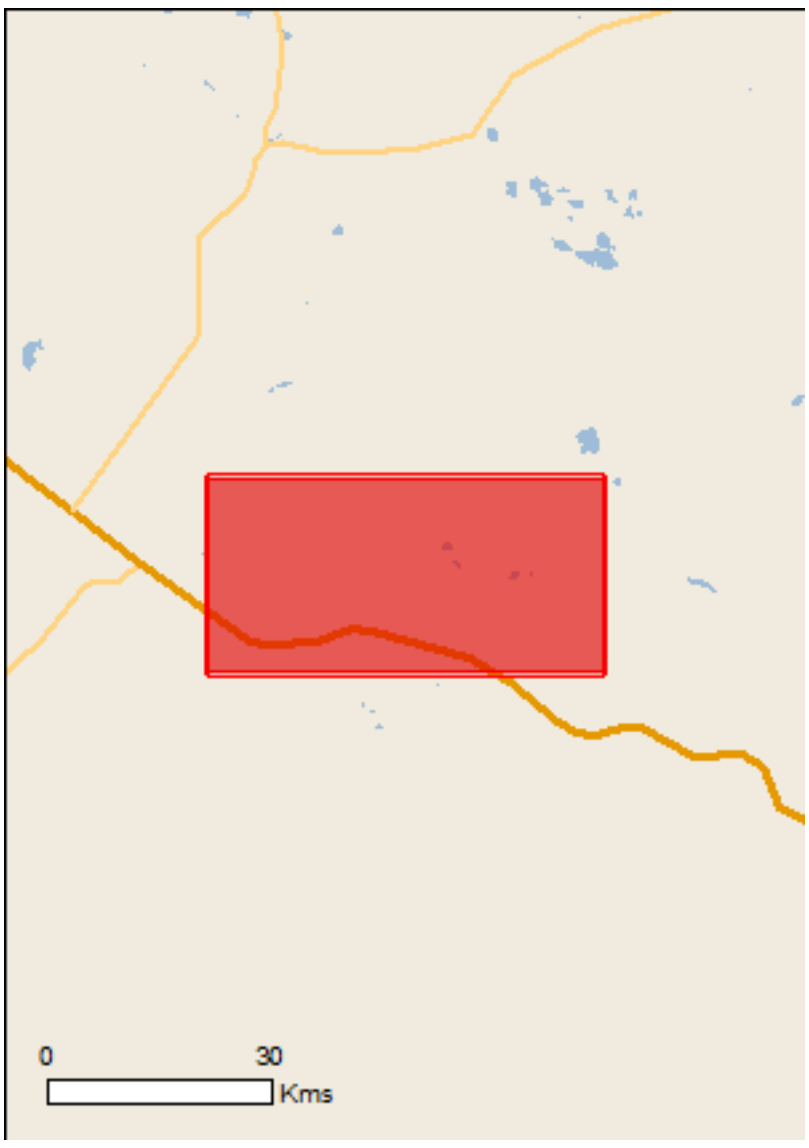
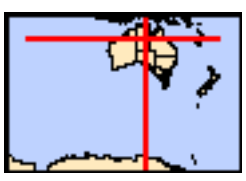


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates

Buffer: 0.5Km



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.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	8
Listed Migratory Species:	10

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. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

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.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	14
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	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
Regional Forest Agreements:	None
Invasive Species:	11
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Acanthophis hawkei Plains Death Adder [83821]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum		
Oriental Pratincole [840]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species	[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.	

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to 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 and National Heritage properties, Wetlands of International and National 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.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

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.

Coordinates

-19.67162 135.99115,-19.67162 136.4615,-19.89001 136.4615,-19.89001 135.99115,-19.67162 135.99115

Acknowledgements

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-Office of Environment and Heritage, New South Wales
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-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-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, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Threatened Species of the Northern Territory

AUSTRALIAN PAINTED SNIPE
Rostratula benghalensis australis

Conservation status
Australia: Endangered
Northern Territory: Vulnerable

Photo: Tom Tarrant

Description

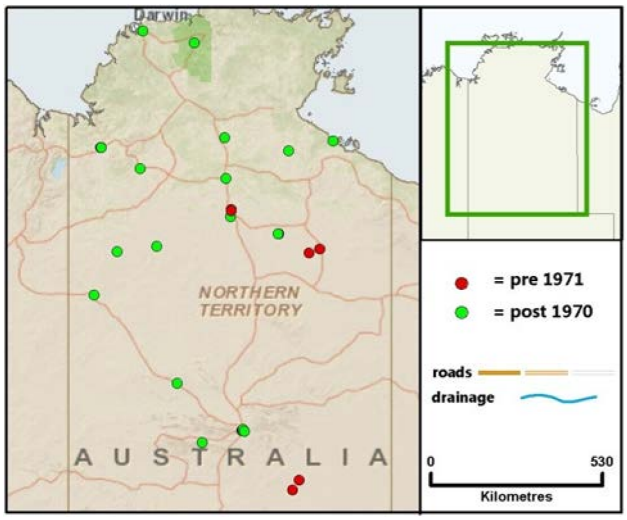
The Australian painted snipe is a wader of around 220-250 mm in length. The head, neck and upper breast is chestnut-bronze. The back and wings are dark olive-green, finely barred black and are ornamented with bright chestnut spots and black bars. The back has a conspicuous buff-coloured V. A broad white band separates the neck and wings. There is a broad white horizontal band through the eye.

The male is a smaller, less colourful bird, lacking the rufous on the hindneck. This species is generally inconspicuous, and occurs solitarily or in only small parties.

Distribution

Until recently (Lane and Rogers 2000), the Australian painted snipe was generally considered part of a more widespread species that extended throughout Indonesia, Asia and Africa and on many Pacific Islands. As re-defined, the species is now considered restricted to Australia. Australian painted snipe are most frequently recorded in south eastern Australia, particularly in the Murray-Darling Basin.

Records from tropical northern Australia are mostly from Queensland. In northern Western Australia it has been recorded from the Pilbara and Derby but not since 1950 (Blakers et al. 1984). In the Northern Territory (NT) it was recorded breeding at Tarrabool Lake on Eva Downs on the Barkly Tablelands in 1993



Known locations of Australian painted snipe

(Jaensch 1994), with non-breeding records from Lake Woods in 1993 and an un-named swamp on Sturt Plateau in 2001 (Jaensch 2003). It is likely that the species could occur on any shallow ephemeral wetlands in central or southern Northern Territory. It is also possible that the species could occur in northern areas of the NT.

Conservation reserves where reported:

Kakadu National Park.

Ecology

Australian painted snipe occur in shallow, vegetated, freshwater swamps, claypans or inundated grassland (including temporary wetlands). They feed at the water's edge and on mudflats, taking seeds and probing for invertebrates. Three to six eggs are laid in a shallow scrape nest. No sites are known where the species is resident and the species may well be nomadic. Its occurrence appears to be unpredictable (Rogers 2001). It is unobtrusive during the day, feeding primarily at night.

Habitat of the painted snipe at Tarrabool Lake on the Barkly Tablelands. (Photo: Jaensch 1994)

Conservation assessment

Australian painted snipe appear to have disappeared from south-western Australia (Johnstone and Storr 1998). The reporting rate for the species has declined steadily since the 1950s (Lane and Rogers 2000) with fewer than 100 records since 1990 (Garnett and Crowley 2000). Garnett et al. (2011) classified the status of the species as endangered at a national level because of this small population size and continued population decline.

Assigning a status for the species in the Northern Territory is more problematic because of lack of knowledge of population size and trends. As it appears to be nomadic, the species is unlikely to have a population that is separate to that inhabiting other areas of Australia. Accordingly, it would mean the species is likely to have declined in the Territory. This is supported by evidence of a decline in northern Western Australia (Johnstone and Storr 1998). Watkins (1993) estimated that the Australian population was 1,500 individuals, but provided no explanation as to how this was derived. The species qualifies as Vulnerable (under criteria A2b; C1) in the NT due to:

- population reduction of >30% over the last 10 years or 3 generations; and
- population size less than 10,000 and continuing decline of at least 10% within 10 years or three generations.

Threatening processes

The main process affecting the species in southern areas is wetland drainage. Johnstone and Storr (1980) attribute the decline of painted snipe in the Kimberley to degradation of habitat by cattle. Cattle degrade habitat by trampling and grazing of tussocks. As most NT swamplands suitable for this species occur on pastoral lands, this process may also be detrimentally affecting this species in the NT, although there are no substantial data to assess this impact (Jaensch 2003).

Conservation objectives and management

There is no existing management program for the wild population of this species in the Northern Territory.

Research priorities are to:

I. increase surveys of wetlands with specific searches undertaken for painted snipe.

Management priorities are to:

I. ensure a range of shallow ephemeral wetlands throughout central and southern Northern Territory are managed to ensure that habitat degradation by cattle does not occur.

Compiled by

Robert Taylor
Ray Chatto
John Woinarski
[updated November 2013]

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Threatened Species of the Northern Territory

CURLEW SANDPIPER

Calidris ferruginea

Photo supplied by BirdLife Australia

Conservation status
Australia: Critically Endangered
Northern Territory: Vulnerable

Description

The Curlew Sandpiper is a small-medium sized shorebird with long legs and a long black tapering down-curved bill. In non-breeding plumage (typical of Australian visitors) the top and back of the head and the upperparts are grey-brown with little mottling or scalloping.

There is a white 'eye-brow'. The underparts are light with a grey wash across the breast. A white rump and broad wing bar are apparent in flight.

Distribution

Curlew Sandpipers breed in central and eastern Siberia (Russia). Annual southerly migration takes them to Africa, southern Asia and Australasia. Their distribution in Australia during the non-breeding season is quite widespread, with records in the north and south, and scattered through inland Australia (Garnett et al. 2011).

In the Northern Territory (NT), Curlew Sandpipers have been recorded from most coastal areas and these are important non-breeding and stop-over areas. Chatto (2003) considered the Fog Bay and Chambers Bay areas and the Port McArthur area as the main areas for the species in the NT. They have also been reported at Alice Springs and Newhaven Station (presumed to be migrants passing through).

Conservation reserves where reported: Barranyi National Park, Djukbinj National Park, Kakadu National Park, Keep River National Park and Limmen National Park.

Ecology

After breeding in the northern summer on the arctic tundras of Siberia, those that overwinter in Australia migrate southwards along the East Asian-Australasian flyway. These non-breeding birds forage around coastal brackish lagoons, intertidal mud and sand flats, estuaries, saltmarshes and occasionally on inland freshwater wetlands (Garnett et al 2011). They feed on marine worms, molluscs and crustaceans.

Conservation assessment

The status of this species in Australia and globally was reviewed in 2010 (by Garnett et al. (2011), and BirdLife International (2011), respectively). For the population(s) migrating to Australia, Garnett et al. (2011) considered that its recent decline was 50-79 per cent in three generations (c. 23 years). This was based on many years of counts at key sites across Australia: e.g. Rogers et al 2010. Garnett et al (2011) rated its Australian status as Vulnerable A2bc+3c+4bc. Globally, other populations have not shown such declines and BirdLife International (2011) rates its global status as Least Concern.

Birds visiting the NT probably comprise a minor proportion of the global population of this species: Chatto (2003) estimated that the minimum Top End population of Curlew Sandpipers was 17 800 individuals; BirdLife International (2011) estimated the current total global population at 1.8 -1.9 million individuals.

Birds occurring in the NT are a component of the migratory Australian population, and can reasonably be assumed to have suffered a reduction of similar proportion. So at first pass the species rates as Endangered (under criterion A2ac+4c):

- observed reduction of the migratory population visiting Australia of >50 per cent over the last three generations (c. 23 years), expected to continue in the future;
- causes of reduction have not ceased and may not be reversible; and
- decline in habitat quality of northern hemisphere breeding grounds.

  decline in habitat quality of northern hemisphere breeding gr

However, following the International Union for the Conservation of Nature Regional Guidelines, this status should be downgraded by one level because conditions within the NT are not deteriorating and the global population is large and relatively stable such that the breeding population could rescue the regional population if it declined. Consequently, this species is listed as Vulnerable (A2ac+4c) in the NT.

Threatening processes

The main acute cause of population decline for birds migrating to Australia is habitat loss at migratory stop-over grounds (mudflats in the Yellow Sea area: Barter 2002; Moores et al. 2008; Hassell 2010), but habitat degradation has also occurred more gradually across most of its range.

Conservation objectives and management

In the NT, the primary conservation objective is to maintain stable non-breeding populations by retaining healthy coastal mudflat, sandflat, estuarine and other wetland habitats.

Secondarily, the Australian Government should be supported in its international endeavours to promote conservation of shorebirds along the East Asian-Australasian flyway.

Complied by

Simon Ward

[updated December 2012]

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Threatened Species of the Northern Territory

GHOST BAT

Macroderma gigas

Conservation status
Australia: Vulnerable
Northern Territory: Near Threatened

Photo: B. Taubert

Description

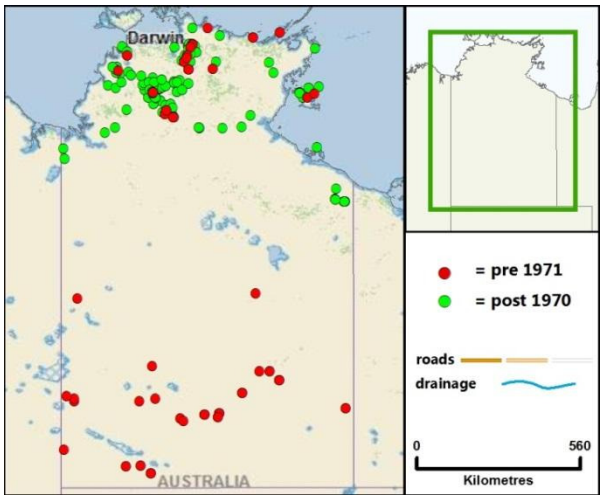
The Ghost Bat is the largest species of microchiroptern bat in Australia (those bats that use echo-location) and one of the largest in the world. It is pale grey or brown on the back and lighter on the belly. The wing membranes are pale cream to brown. The ears are very large, joined together above the head and have a large tragus. The nose-leaf is large but relatively simple and the eyes are large. There is a tail membrane but no tail.

Distribution

At the time of European settlement the species was sparsely distributed in Central Australia but more numerous in northern Australia. There are several records of the Ghost Bat in rocky areas in the southern NT up until the early 1960s but an extensive survey of caves and mine sites in the region in 1985 failed to find continuing populations (Churchill and Helman 1990). At this time, however, the Ghost Bat remained in the recent memory of several Aboriginal people from Papunya and Docker River.

The species' current range in northern Australia ranges from relatively arid conditions in the Pilbara region of Western Australia to humid rainforests of northern Queensland. One of the largest known colonies occurs in a series of gold mine workings at Pine Creek in the Northern Territory. Elsewhere in the Territory they have been recorded throughout the mainland Top End north of approximately 17^0 latitude as well as Elcho Island, Groote Eylandt and other nearby islands.

The distribution of Ghost Bats is influenced by the availability of suitable caves and mines for roost sites. There are likely to be very few maternity sites across Australia (only ten are known) which probably explains the strong genetic differentiation of populations across Australia.



Known locations of the Ghost Bat

Conservation reserves where reported:
Kakadu NP, Litchfield NP, Limmen NP, Keep River NP, Cutta Cutta Caves NP, Umbrawarra Gorge NP, Kintore Caves CR.
(There are past records of the species from Uluru-Kata Tjuta NP, Tjoritja / West MacDonnell Ranger NP.)

Ecology

The Ghost Bat is primarily insectivorous, but also feeds on other bats, small terrestrial mammals, birds, frogs and reptiles (Milne et al 2016). It perches in vegetation and preys on passing prey, or actively flies over surfaces, such as the ground, looking for prey.

Ghost bats use several roosts or perches each night but often return to the same daytime roost, often in a deep crack or cave. Daytime roosts may change seasonally. Mating typically occurs in May, with births a couple of months later. Females usually aggregate in maternity roosts when breeding, but few such sites are known. The largest known site is near Pine Creek.

Conservation assessment

The species was once much more widespread in the Territory, with populations in Central Australia. The species disappeared from these more arid areas of the Territory in the 1960s and 1970s. These declines are long-enough ago that they do not influence the current assessment of the conservation status of the species when using the criteria of the International Union for the Conservation of Nature.

The current total population in the Northern Territory is estimated to be 2500–3500 individuals, based on counts at known colonies (Worthington Wilmer 2012). The population in Pungalina, in the Gulf Coastal/Gulf Plains Bioregions, is estimated to be 100 from counts undertaken from 2005 to 2012 (N. White pers. comm., in DoE 2016). The population at Pine Creek is estimated to be 550 (Grant et. al, 2010). There is currently no accurate estimate of the number of Ghost Bats in Kakadu.

Milne & Pavey (2011) considered the species to be relatively common and secure in the wet dry tropics of the Northern Territory. It is possible that Ghost Bat numbers have declined at four caves in Kakadu but these observations remain unconfirmed.

Counts in the largest known roost in the Territory, in an adit near Pine Creek, showed increasing numbers in the 1980s, from 300 in 1980 to 1500 in 1990 (Grant et al. 2010). However, more recent counts in 2010 and 2013, but using different methods, recorded fewer than 600.

The Ghost Bat was added to the National threatened species list as Vulnerable in May 2016, on the basis of national population declines of more than 30% in the last 24 years (three generations) (Criterion 1 A2(b)(c)(d), A3(b)(c)(d), A4(b)(c)(d)) and a declining national population of less than 10,000 individuals (Criterion 3 C1). The species is currently listed in the Northern Territory as **Near Threatened**.

Threatening processes

Nationally, the most significant threatening processes to the Ghost Bat are habitat loss and degradation due to mining – particularly destruction or disturbance of roost sites in Queensland and Western Australia. Habitat alteration through livestock and feral herbivore grazing, inappropriate fire regimes or weed incursion can make foraging more difficult.

In the Northern Territory, the roosting site supporting the largest known colony is an adit (horizontal ventilation tunnel for a mine) near Pine Creek that is in danger of collapse. This

site also experiences disturbance from cavers, ecologists and members of the general public entering the adit; Ghost Bats are easily disturbed and such disturbance can cause loss of young and/or abandonment of the roost site. Ghost Bats are known to be susceptible to cane toad toxin and bats have been found dead with chewed toads in their throats in Kakadu National Park (Woinarski et al., 2014).

Conservation objectives and management

Management priorities are:

- Assess the structural integrity of the Pine Creek adit and investigate ways to secure the site for Ghost Bats.
- Educate people not to disturb roost sites, especially at the Pine Creek roost.

Research/Monitoring priorities are:

- Monitor local population sizes of all known subpopulations, but especially at Pine Creek and in Kakadu NP.
- Additional surveys, especially to locate breeding sites, are required in remote parts of the Northern Territory.

Complied by

Simon Ward
Damian Milne
[May 2016]

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Threatened Species of the Northern Territory

GREATER BILBY
BILBY

Macrotis lagotis

Conservation status
Australia: Vulnerable
Northern Territory: Vulnerable

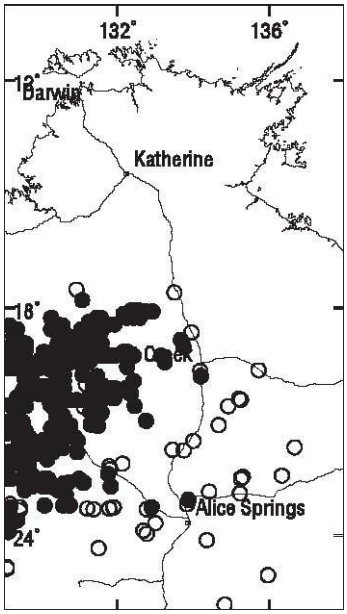
Description

The greater bilby is a large bandicoot (body mass males, 800-2500g; females, 600-1100g) with soft silky fur. The fur is ash grey over most of the body, whereas on the belly it is pure white to cream. The basal 20 percent of the tail is the same colour as the upper-body, the central 40 percent is black and the distal 40 percent, pure white. The forelimbs are robust and equipped with three stoutly clawed toes (and two unclawed toes) giving the animal a formidable burrowing capacity. The slender hind limbs are long and resemble those of macropods. The snout is long and delicate and the ears are large and rabbit-like.

Distribution

Within the Northern Territory, it occurs in the central and western parts of the Tanami bioregion, the southern Sturt Plateau bioregion and the northern Great Sandy Desert bioregion. The distribution is highly fragmented within this area. The most southerly recent records are in the vicinity of Kintore, the most northerly around Newcastle Waters and Wave Hill.

Historically, the greater bilby occupied a vast area of arid and semi-arid Australia. Its distribution declined dramatically in the years following European settlement and it now occupies about 20% of its former range. The species occurs in two separate geographic areas; one extending from the western deserts region of the Northern Territory and Western Australia north to the Pilbara and Kimberley regions, the second in the Channel Country of south-west Queensland (Watts 1969; Southgate 1990a).



Known locations of the greater bilby.
o = pre 1970; • = post 1970.

Conservation reserves where reported: None (although it formerly occurred in areas that are now included within Uluru Kata-Tjuta National Park, Watarrka National Park and West MacDonnell National Park).

Ecology

Habitat of the greater bilby in the Northern Territory is characterised by sandy soils dominated by hummock grasslands covered predominantly by three species of spinifex, *Triodia basedowii*, *T. pungens* and *T. schinzii*. An overstorey of low shrub cover dominated by *Acacia* and *Melaleuca* species grows over much of this country. This predominantly sandy landscape also includes rocky outcrops, laterite rises and low lying drainage systems (Southgate 1990b). Broad-scale surveys of bilbies in the Northern Territory in the 1990s indicated that laterite and drainage line land systems were occupied more frequently than sand plain and dune systems.

The greater bilby is omnivorous and major foods vary across seasons (Southgate 1990b). Important plant foods include seed from various grasses and sedges including Button Grass (*Dactyloctenium radulans*), Desert Flinders Grass (*Yakirra australiensis*) and Parakeelya (*Calandrinia* spp.) and bulbs from Bush Onion or Yalka (*Cyperus bulbosus*) and *Wurmbea deserticola*, many of which are most abundant soon after fires (Southgate and Carthew 2006). At a site in central Australia, fruiting bodies of underground fungi were the major dietary component. Major invertebrate prey includes termites, ants, beetles, insect larvae and spiders. Most of the food of the Greater Bilby is excavated from the soil and holes may attain 25 cm in depth.

Bilbies dig burrows up to two metres deep and an individual may have over a dozen regularly used burrows within its home-range. Bilbies forage at night. Movements of 5 km during one night have been recorded for male bilbies. Males, females and juveniles may occupy overlapping home ranges. Densities of 12–16 individuals/km^2 are reached in optimal habitat. However; a density of 1-2/km^2 is more typical (Southgate 1987).

Litters, comprising one to three young, can be produced at any time of year (Southgate *et al.* 2000). Young remain in the pouch for approximately 75 days, before being cached and suckled in maternal burrows for a further two weeks prior to independence. Under ideal conditions, there is the potential to produce four litters every year. Captive animals live up to 10 years (Southgate *et al.* 2000).

Conservation assessment

No estimates are available for the size of the Northern Territory population of the greater bilby. The range of the species in the Territory is declining and contracting northwards. For example, populations located in the vicinity of Alice Springs in the late 1960s (Watts 1969) are no longer present. However, bilbies in the Northern Territory appear to be nomadic and undergo large population fluctuations in response to food availability. These characteristics result in it being difficult to accurately assess population trends for two reasons. First, no sites are known in the Territory that are considered to permanently hold colonies of bilbies. Second, depending on rainfall and food availability, very few bilby records may be reported during one time period but this can change quickly. This natural variation must be taken into account when considering the conservation status of the species.

Notwithstanding the above caveats, the greater bilby is **Vulnerable** in the Northern Territory (under criteria C2a(i)) based on:

- population size estimated to be <10,000 mature individuals;

- continuing decline in numbers of mature individuals; and
- no subpopulation estimated to contain more than 1000 mature individuals.

Threatening processes

Predation by the introduced European fox appears to be the major threat faced by the greater bilby in the Northern Territory (Southgate 1987). Predation by other carnivores (i.e. feral cat, dingo) could also threaten bilby populations. However, there is considerable interaction between these three predators. Specifically, dingoes may protect a range of native species, including bilbies, by controlling cats and foxes either through direct predation or excluding them from carrion during droughts.

Competition with rabbits may also be an important threatening process faced by the greater bilby. However, the negative impact of rabbits has been greatly reduced following the release of rabbit calicivirus disease (RCD) in the 1990s. Grazing by cattle may be a threat on some pastoral leases. Unsuitable fire regimes may restrict breeding and impede dispersal into unoccupied areas, and reduce food options and availability (Southgate and Carthew 2006).

Conservation objectives and management

A national Recovery Plan for the greater bilby was established in 2006 (Pavey 2006).

The plan recommends the following management actions that include the Northern Territory:

i. reduce fox and cat numbers at key wild populations where bilbies are in decline;
ii. continue husbandry and coordinated management of captive populations;
iii. refine monitoring methodology;
iv. monitor trends in occurrence at wild populations; and
v. continue to manage the recovery process through a national recovery team.

The greater bilby is maintained in captivity at the Alice Springs Desert Park and is displayed in its nocturnal house. National Bilby Day takes place in September each year and the Desert Park is a focus for educational activities involving the species.

Complied by

Chris Pavey
[May 2006]

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Threatened Species of the Northern Territory

GREY FALCON

Falco hypoleucos

Conservation status
Australia: Not listed
Northern Territory: Vulnerable

Photo: P. McDonald

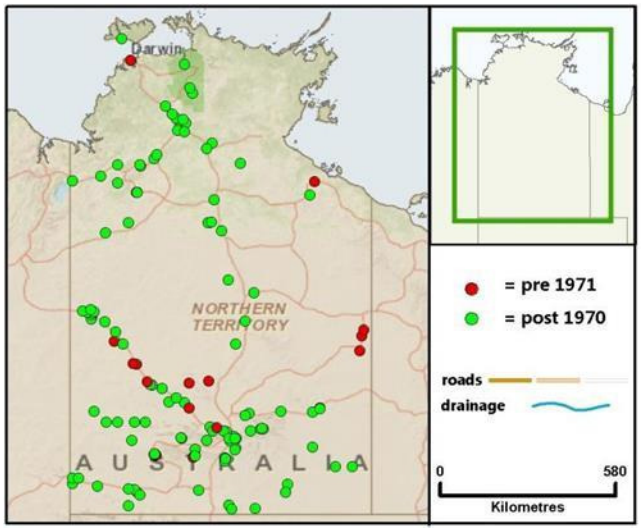
Description

The Grey Falcon is a medium-sized compact pale falcon. The head and upperparts are a light blue-grey, with darker grey flecking on the wings and barring on the tail. The wing-tips are black. The cheeks and chin are white, except for the faint grey tear under each eye, and the underparts are white with fine dark streaks. The bill is grey with a dark tip. The cere, eye-ring and legs are bright yellow.

Distribution

The Grey Falcon is found in low densities through much of the arid and semi-arid areas of Australia and has been recorded in all Australian mainland states and territories. The majority of records from the Northern Territory (NT) are from the southern half, but there are records all the way up to Darwin and also a record from Groote Eylandt.

Conservation reserves where reported: Finke National Park, Kakadu National Park, Nitmiluk National Park, Uluru National Park, Watarrka National Park and West MacDonnell Ranges National Park.



Known locations of the Grey Falcon

Ecology

Grey Falcons live in areas of lightly-timbered lowland plains, typically on inland drainage systems, where the average annual rainfall is less than 500 mm. Where they occur they are always at low densities and are mostly seen as singles or pairs. They use nests built by other species and prefer nests in the tallest trees along watercourses. Clutches are of one to four eggs. Nesting has been recorded from June to November, but in any one area may occur only in above-average rainfall years.

Grey Falcons hunt birds, often parrots and pigeons, typically from the air with a distinctive fast, level and low-to-the-ground hunting flight. They will also take insects on the wing. They many also pounce on mammals, reptiles and birds from a high perch.

Conservation assessment

The status of Grey Falcons in Australia was assessed in 2010 by Garnett et al. (2011). They considered the Australia-wide population to be in the order of 500 pairs and they considered the species to be Vulnerable.

The population of breeding birds in the NT must be fewer than the Australia-wide population, so the species qualifies as Vulnerable in the NT (under criterion D1), based on:

A very small total population size (<1 000).

Threatening processes

Threats to the Grey Falcon are not clearly defined. Habitat alteration and destruction through clearing for grazing and agriculture probably lead to declines in the species' southern and eastern ranges early last century, and confined them more to the arid parts of its range (Garnett et al. 2011). n the NT, such factors have probably been less influential.

Here landscape-scale changes in fire-regimes or grazing by feral or domestic herbivores may, in the long-term, reduce the availability of nesting trees and appropriate prey species.

Conservation objectives and management

Conservation objectives are to maintain stable populations of Grey Falcons across their range in the NT and to maintain successful breeding. The management required includes developing methods of assessing population trends and implementing long-term monitoring of populations.

Compiled by

Simon Ward

[updated December 2012]

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Threatened Species of the Northern Territory

NIGHT PARROT

Pezoporus occidentalis

Conservation status
Australia: Endangered
Northern Territory: Critically Endangered

Night parrot. (WT Cooper, National Library of Australia)

Description

The night parrot is a medium-sized (22-25 cm head-body length) bird with a dumpy build and a short tail. The head, neck, upperbody and chest are bright green, whereas the rest of the underparts are yellow-green to yellow. The body plumage features a range of black and yellow streaks, bars and spots. The uppertail is black-brown in the centre and pale yellow on the sides. When wings are folded, the primary flight feathers are black-brown. The bill, legs and feet are blue- grey. The eyes are dark. Sexes are similar in size and appearance.

Distribution

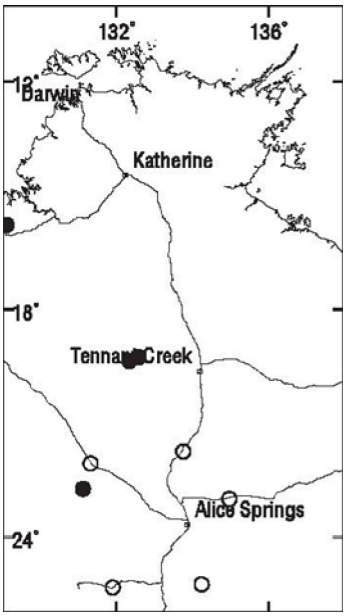
The distribution of the night parrot has not been well documented, but it is restricted to arid and semi-arid Australia. Twenty-two museum specimens existed prior to 1990, all but one taken in the 19th century. Of the specimens, three were collected in north-west and north-central Western Australia (including the only 20th century specimen in 1912) and the remainder in South Australia (Forshaw et al. 1976). F. W. Andrews collected 16 of the South Australian specimens in the vicinity of the Gawler Ranges and Lake Eyre in the 1870s. A specimen was apparently taken in south-west New South Wales in 1897 (Forshaw 1970) and a number of recent sightings, including a carcass by the roadside in 1990, come from north-western Queensland in the vicinity of Boulia and Cloncurry (Boles et al. 1991; Garnett et al. 1993). Prior to the discovery of the 1990 specimen, the night parrot was widely considered to be extinct.

No specimens of the night parrot have been taken in the Northern Territory; however, sightings were made up to 1923 at the Alice Springs Telegraph Station, Horseshoe Bend Station, Idracowra Station, Henbury Station and Hermannsburg (Whitlock 1924). The notes of the Horn Expedition indicate that the species was relatively common in central Australia in the 1890s, but by the 1920s it was already scarce (Whitlock 1924). Potential sightings in the Northern Territory between 1950 and 2005 are from Harts Range, Stirling Station, Muckaty Station, Keep River National Park, Kildurk Station and the Tanami Desert. A well-publicised potential sighting of the species in the Northern Territory was in January 1996 when two individuals were reported at dusk near a stock watering point on Newhaven Station, 350 km WNW of Alice Springs.

Conservation reserves where reported:

There are no conservation reserves in the NT where populations of night parrot are known

to be extant. The only recent (post 1930) records in reserves are of one possible sighting in Keep River National Park, and the 1996 record from Newhaven (managed by Australian Wildlife Conservancy and Birds Australia as a reserve).



Known locations of the night parrot.

□ = pre 1970; • = post 1970.

Ecology

Almost all our knowledge of the night parrot comes from the observations of naturalists from the late 19th century. The night parrot appears to be a nocturnal bird that forages on the ground. During the day it rests within clumps of spinifex. It also nests within spinifex hummocks, building a rough nest in which up to four white eggs are laid. The bird becomes active during dusk and, generally, flies to water to drink prior to foraging. The diet consists of seeds of grasses and herbs, particularly those of spinifex (Triodia).

The night parrot appears to be highly nomadic, moving in response to availability of food and water. After periods of heavy rain with abundant seeding of spinifex, the species was often locally common (Andrews cited in Wilson 1937). However, during droughts, the species would disappear from formerly suitable habitat.

The night parrot is known from spinifex grasslands in stony or sandy areas and samphire and chenopod associations on floodplains, salt lakes and clay pans. Suitable habitat is characterized by the presence of large and dense clumps of spinifex. It may prefer mature spinifex that is long unburnt (Ashby 1924).

A number of calls have been reported. The typical call when birds come into water to drink is described as a long drawn-out mournful whistle that carries for a considerable distance (Bourgoin cited in Wilson 1937).

Conservation assessment

The night parrot may be extinct in the Northern Territory. Although it was apparently not uncommon in the 19th century, numbers declined during the early part of the 20th century with no confirmed records since the mid 1920s. However, regular reports of potential sightings indicate that the species may continue to persist in low numbers.

No systematic field surveys for the species have been undertaken, although a number of people have spoken with and obtained information on records of the species from Aboriginal people. In the absence of suitable surveys and following continued potential sightings, it is not appropriate to classify the night parrot as extinct. Therefore, it is classified as **Critically Endangered** (under criterion C2b) due to:

- a population size estimated to be <250 mature individuals;
- continuing decline in numbers of mature individuals; and
- extreme fluctuations in numbers of mature individuals.

Threatening processes

If any individuals remain in the Northern Territory, key threatening processes are likely to be habitat degradation caused by altered fire regimes and grazing by stock, and predation by introduced carnivores.

Conservation objectives and management

There is no existing management program for this species in the Northern Territory. However, any potential sightings of the

species that seem feasible will be investigated.

More broadly, the conservation outlook for this species will benefit from broad- scale management of feral predators (cats and foxes), reduction in feral herbivores, and amelioration of fire regimes.

Compiled by

Chris Pavey [April 2006]

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Threatened Species of the Northern Territory

PLAINS DEATH ADDER

Acanthopsis hawkei

Conservation status
Australia: Vulnerable
Northern Territory: Vulnerable

Photo: G. Brown

Description

The systematics of the genus *Acanthophis* is poorly resolved. Recent molecular work by Wuster *et al.* (2005) shows that what was considered the northern species *A. praelongus* is at least three species.

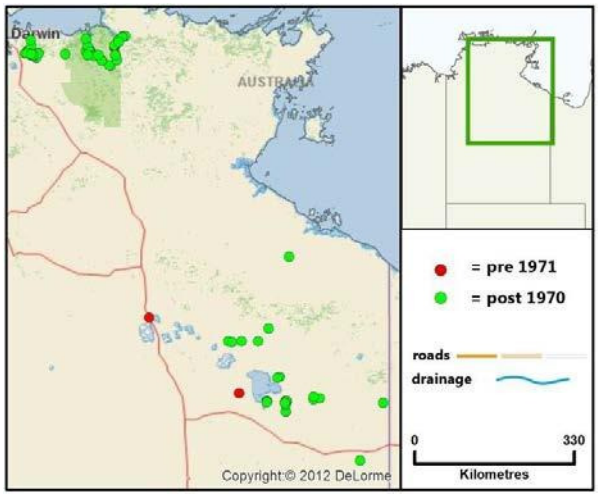
The plains death adder *A. hawkei* is the species associated with cracking black soil plains habitat. As for all death adders, the body is short, stout and banded, the head triangular and distinct from the neck, and the tail is slender and tipped with a spine (used to lure prey within striking distance). They grow up to 600 mm in total length.

Distribution

The plains death adder has a disjointed distribution. It is known to occur on the cracking soils on floodplains of the Adelaide, Mary and Alligator Rivers as well as the cracking black soils of the Barkly Tableland on the Northern Territory (NT)/Queensland (QLD) border and the Mitchell Grass Downs of western QLD. It likely occurs on floodplains and cracking soil plains across mainland northern Australia.

The other two species in this group are *A. praelongus*, now considered confined to northern QLD, and *A. rugosus*, which occurs throughout woodlands across other parts of northern Australia. The latter species is also found in New Guinea.

Conservation reserves where reported:
Kakadu National Park, Mary River National Park, Djukbinj National Park and Fogg Dam Conservation Reserve.



Known locations of *Acanthophis hawkei*

Ecology

The plains death adder occurs on the flat, treeless cracking-soil plains of northern Australia, where it is a major predator on frogs, reptiles and rats. They consume frogs

and lizards when young (95 per cent of their diet), but switch to mammals (typically rodents) when they reach a large size (often only attained by females, Webb et al. 2005).

Like all death adders, they are highly venomous ambush foragers (i.e. they wait in hiding until prey comes near). To attract prey to within striking distance, this species undulates its specially modified tail-tip to imitate a defenseless insect. Unfortunately, cane toads respond more strongly to this lure than do native prey species.

During the Wet season individuals move every three to ten days, in apparently random directions, distances ranging from a few metres to a kilometre (Phillips and Webb, unpub. data). Between moves, plains death adders assume an ambush position and wait for prey. When it floods they simply float in debris or rest on emergent vegetation. During the Dry season movement is less frequent and they often retreat into deep soil cracks. Radiotracking suggests that they are nomadic and do not have definable home ranges.

Male adders mature in 12 months, whereas females typically take longer (18-24 months). Adders in the wild (without toads) are unlikely to live for much more than ten years, so the generation time is likely to be between three and five years.

Conservation assessment

Plains death adders have declined sharply in numbers since the arrival of cane toads in the coastal floodplains of the NT. Monitoring at one long-term study site over five years following toad arrival suggests an 89 per cent reduction in adder numbers over this time period (Phillips *et al.* 2009). This magnitude of decline has likely happened whenever toads have invaded naïve adder populations across northern Australia. There are currently no data on the status of other populations (e.g., on the Barkly Tableland). It is possible that toads will not completely overlap the range of *A. hawkei* in the south of its range, as drier conditions potentially restrict the toads' spread in these areas.

Across the species' disjoint distribution in the NT, the densest populations are on the coastal floodplains of major rivers west of the Arnhem escarpment (Extent of Occurrence (EOO) c. 13 300 km^2). Lower densities (less than half that found in coastal floodplain areas) are found on the blacksoil plains of the Barkly Tablelands (EOO c. 52 000 km^2 within the NT). Based on area and relative population densities in these two areas, the coastal floodplain population (pre-cane toads) represented approximately 40 per cent of the NT population. If the whole coastal floodplain population has crashed, or will crash, to the extent documented by Phillips et al (2010; 2008 encounter rates eleven per cent of 2004 pre-toad rates), the population decline for the total NT population is in the order of 36 per cent (assuming no decline in the Barkly population). Note that cane toads have been recorded sporadically in the northern Barkly region but their extent and numbers (and therefore their likely impact on plains death adder populations) are unknown.

This species qualifies as **Vulnerable** in the NT (under criteria A4e), based on:

- An observed population reduction (over ten years or three generations) where the time period includes both the past and the future, and where the causes of reduction have not ceased, due to the effects of an introduced taxon (cane toad).

Threatening processes

The advance of cane toads NT presents the most acute threat facing this snake species. Death adders are naïve to toads and their toxins, but because of their specialised

ambush foraging tactics are spectacularly good at attracting and catching toads, which they mistake for palatable prey (Hagman *et al.* 2009). As a consequence of their poor ability to discriminate between toads and native frogs, and because toads are extremely toxic, death adders die in large numbers when toads arrive in an area (Phillips *et al.* 2010).

There is no evidence that death adder populations recover following the arrival of toads. Toads do exert strong selection on adders to evolve avoidance behaviours and change morphology (Phillips *et al.* 2010), but whether adder populations can evolve toad avoidance behaviours before going extinct is unknown.

Conservation objectives and management

The likelihood of stopping the spread of cane toads across the NT is very small. Given our inability to prevent localised population crashes once cane toads arrive, conservation and management effort is best aimed at:

i. monitoring depleted populations to examine for evidence of recovery; and
ii. preventing cane toads from spreading to offshore islands with populations of death adders. However, it is possible that plains death adders do not occur on any NT islands (the species there being A. *rugosus*).

Complied by

Simon Ward Ben Phillips
[updated December 2012]

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Threatened Species of the Northern Territory

Red goshawk. (Photo: I. Morris)

RED GOSHAWK

Erythrotriorchis radiates

Conservation status
Australia: Vulnerable
Northern Territory: Vulnerable

Description

The red goshawk is a large reddish- brown hawk, with conspicuous dark streaks from chin to belly, conspicuously barred on the underwing and tail. The head is whitish with dark streaks. The legs and feet are strong and yellowish, with prominent red feathering ("trousers"). Compared with the common Brown Goshawk, the wings are longer and more pointed and the tail is shorter.

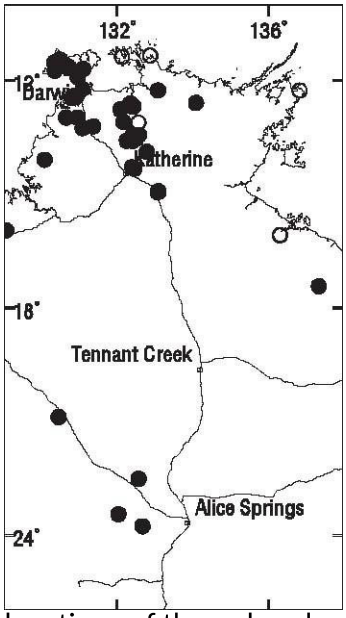
Distribution

The red goshawk occurs across much of northern Australia, from near Broome in the south-west Kimberley to south-eastern Queensland. Within this range it generally occurs in taller forests characteristic of higher rainfall areas, but there are some isolated recent records from central Australia.

It appears to be unusually common on the Tiwi Islands (Bathurst and Melville).

Conservation reserves where reported:

Garig Gunak Barlu National Park, Kakadu National Park, Litchfield National Park, Nitmiluk National Park.



Known locations of the red goshawk.

☐ = pre 1970; • = post 1970.

Ecology

The red goshawk hunts mainly for medium-sized birds (up to the size of kookaburras and black cockatoos). Territory size is typically very large (up to 200 km2) (Debus and Czechura 1988; Czechura and Hobson 2000).

The preferred habitat is tall open eucalypt forest and riparian areas (including paperbark forest and gallery forests). The conspicuous basket- shaped stick nest is typically placed in large trees near watercourses (Aumann and Baker-Gabb 1991).

Threatened Species Information Sheet

Conservation assessment Based on a series of surveys across northern Australia (Debus and Czechura 1988; Aumann and Baker- Gabb 1991; Czechura and Hobson

2000), there is now reasonably reliable information available on distribution and total population. Garnett and Crowley (2000) collated these surveys to estimate the population size as 1000 breeding birds, and considered it to be Vulnerable at the national level, on the IUCN 1994 criterion of D1 (<1000 mature individuals).

Based on the proportion of the known distribution, the Northern Territory population probably accounts for about one-third of the total population (that is, about 330 mature individuals). Of this tally, an estimated 120 live on Melville Island (Woinarski et al. 2000). Developing forestry operations may reduce this Melville Island population by about 10%. Given these figures, the red goshawk qualifies as Vulnerable in the Northern Territory (under criteria C2a(i)) due to:

- population size estimated to number <10000 mature individuals;
- a continuing decline (observed, projected or inferred); and
- population structure with no subpopulation containing more than 1000 mature individuals.

Threatening processes Nationally, the red goshawk has been threatened chiefly by clearance of preferred habitat for agriculture, with some localised problems related to

illegal egg-collection, shooting, and fire (Garnett and Crowley 2000). In the Northern Territory, the most immediate threat is clearing of prime habitat on Melville Island for short rotation plantations of exotic pulpwood.

Conservation objectives and management

The management priorities are:

(i) to minimise the impact of the developing Melville Island forestry industry, through retention of adequate habitat especially around known nest sites, and (ii) the establishment of an appropriate monitoring program. Such habitat retention (around nesting sites) and monitoring is now established (Hadden 2000; D. Baker-Gabb pers. comm.)

Elsewhere, across its NT range, a monitoring program should be established, and populations safeguarded from ongoing clearing of tall open forests.

Compiled by

John Woinarski [April 2006]

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