GOULDIAN FINCH OFFSETS STRATEGY

Mt Todd Gold Project

Prepared for:

Vista Gold Australia Pty Ltd
PO Box 1467 DOUBLE BAY NSW
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PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
5 Foelsche Street
Darwin NT 0800 Australia
(GPO Box 654 Darwin NT 0801 Australia)
T: +61 8 8998 0100 F: +61 2 9427 8200
E: darwin@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Vista Gold Australia Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

Reference	Status	Date	Prepared	Authorised	Vista Gold Authorisation
680.10533-R01-v4.0	Approved by Vista Gold	18 October 2018	Sarah Smith	Paul Turyn	B Murdoch
680.10150-R01-v3.0	Incorporate revised Approval Conditions	12 May 2017	Mihkel Proos	Andrew Hutton	B Murdoch
680.10150-R01-v2.0	Client reviewed, DoEE reviewed	22 February 2017	Mihkel Proos	Paul Turyn	B Murdoch
680.10150-R01-v1.0	Draft		Mihkel Proos	Paul Turyn	B Murdoch

EXECUTIVE SUMMARY

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this *Offsets Strategy, Mt Todd Gold Project* v 4.0 is complete, current and correct.

2. I am duly authorised to sign this declaration on behalf of the approval holder.

3. I am aware that:

   a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.

   b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.

   c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed _____

Full name (please print) _____

Organisation (please print) _____

Date _____

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ABBREVIATIONS

DoEE	Department of the Environment and Energy
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EIS	Environmental Impact Statement
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*

CONTENTS

GFOS	Gouldian Finch Offset Strategy
Jawoyn	Jawoyn Aboriginal Association Corporation
MNES	Matters of National Environmental Significance
NRETAS	Natural Resources, Environment, the Arts and Sport
the Project	Mt Todd Gold Project
SOCS	Site of Conservation Significance
SOCS30	The Yinberrie Hills Site of Conservation Significance
SLR	SLR Consulting Australia Pty Ltd
TAC	Technical Advisory Committee
Vista Gold	Vista Gold Australia Pty Ltd
WM Act	Weeds Management Act

1 Introduction

SLR Consulting Australia Pty Ltd (SLR), on behalf of Vista Gold Australia Pty Ltd (Vista Gold), has developed this Gouldian Finch Offset Strategy (GFOS) for the development of the proposed Mt Todd Gold Project (the Project) in accordance with the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Environmental Offsets Policy 2012* (DSEWPaC, 2012a), and the conditions attached to the EPBC Act Approval issued 19 January 2018. The GFOS discusses the offset requirements for the Project including:

- The relevant Approval Conditions,
- Key threats and potential impacts to the Gouldian Finch (*Erythrura gouldiae*),
- Potential impacts of the Project on the Gouldian Finch,
- Residual significant impacts to the Gouldian Finch population,
- An overview of key offset strategies,
- Financial commitment associate with offsets and
- The process for development and approval of Offset Proposals.

1.1 Purpose

The Commonwealth environmental approval for the Project under the EPBC Act, issued 19 January 2018, is conditional on the submission of a GFOS for approval by the minister. The purpose of this GFOS is to provide a framework for how the potential residual significant impacts to the Gouldian Finch (described in **Section 5.2**) will be offset, and to describe the associated financial commitments.

1.2 Relevant approval conditions

The key Approval condition directly related to the structure and content of this GFOS is Condition 5 (**Table 1 Key approval condition**). The reference table provided as **Appendix A** identifies where the Conditions are addressed in this report. Related conditions include Condition 2 which outlines the objectives for Gouldian Finch Management, Condition 6 which described the required contents of Offset Proposals and Condition 7 which specifies the cost of the Offset Proposals (**Appendix B**).

Table 1 Key approval condition

Condition 5
The Approval holder must prepare and submit a Gouldian Finch Offset Strategy (GFOS) for approval by the **Minister** to provide a framework for how the residual significant impacts to the **Gouldian Finch** will be offset and associated financial commitments. The Approval holder must not **commence** the action unless the **Minister** has approved the GFOS. The approved GFOS must be implemented. The GFOS must: a. identify and assess threats to Gouldian Finch populations from the action and other sources, and outline options and priorities for addressing those threats as a basis for developing Offset Proposals (condition 6). To this end the GFOS must: i. review relevant literature including approved conservation advices, recovery plans and threat abatement plans relevant to the Gouldian Finch and ii. identify, specify and evaluate the best available science and iii. specify and evaluate feedback obtained from relevant stakeholder consultations b. considering 5(a), outline the: i. need(s) of, and/or threat(s) to, Gouldian Finch populations to be addressed by Offset Proposals (condition 6) ii. relative priority of different threat abatement, recovery and research strategies and actions to address the need(s) or threat(s) outlined at (i) iii. conservation gains that can be captured by addressing the need(s) or threat(s) outlined at (i) via the strategies and actions outlined at (ii) iv. purpose(s) of, and the environmental outcomes and specific objectives to be achieved by, the GFOS. c. outline a process for developing, and a schedule for submitting, Offset Proposals to the Department [the Department of the Environment and Energy, DoEE] for the written approval of the Minister (the schedule must provide for the full expenditure of offset contributions specified in Condition 7(a-c) by not later than 12 years after commencement) d. NOTE condition 5d is under review e. detail responsibilities and accountabilities including data handling, technical review, self-auditing and reporting requirements

1.3 Relationship with other reports

The GFOS is intended to be read in conjunction with the *Gouldian Finch Management Plan* (SLR, 2018). The terms of reference for the Gouldian Finch Technical Advisory Committee (TAC), outline the requirements for the TAC who provide technical oversite and approval of this GFOS.

1.4 Stakeholder consultation

Previous drafts of this GFOS were developed with the input of the Gouldian Finch TAC as convened at that time, this draft has been reviewed by the current TAC (see **Appendix C**). Vista Gold has engaged with other stakeholders during the preparation of this GFOS in the form of website updates, media releases and public project update sessions. A list of relevant stakeholders consulted is included in **Appendix D**.

2 Objectives and context of the Project

2.1 Location and nature of project activities

The project is located east of the Stuart Highway and north of the Edith Falls road, approximately 50 km north of Katherine, NT. The project area lies in the south-western end of the Yinberrie Hills, the Yinberrie Hills is recognised as an important bird site at Territory, National and International levels based on the Gouldian Finch population (Ward and Harrison, 2009; Dutson, Garnett, and Gole, 2009; Birdlife International, 2018). The site provides habitat for the largest known breeding population of the nationally threatened Gouldian Finch (O'Malley, 2006). The location of the lease is provided in **Figure 1 Mt Todd Gold Mine location and habitat disturbance areas**.

The Yinberrie Hills support grassy eucalypt woodlands with a mixed over storey of snappy or salmon gums (including *Eucalyptus tintinnans*), *E. tectifica*, *Corymbia confertiflora* and an understorey dominated by tall annual spear grasses. They provide habitat values for the Gouldian Finch that are scarce in the broader landscape including an understorey of perennial native grasses, retention of water in small rocky pools throughout the dry season and smooth-barked eucalypts with hollows.

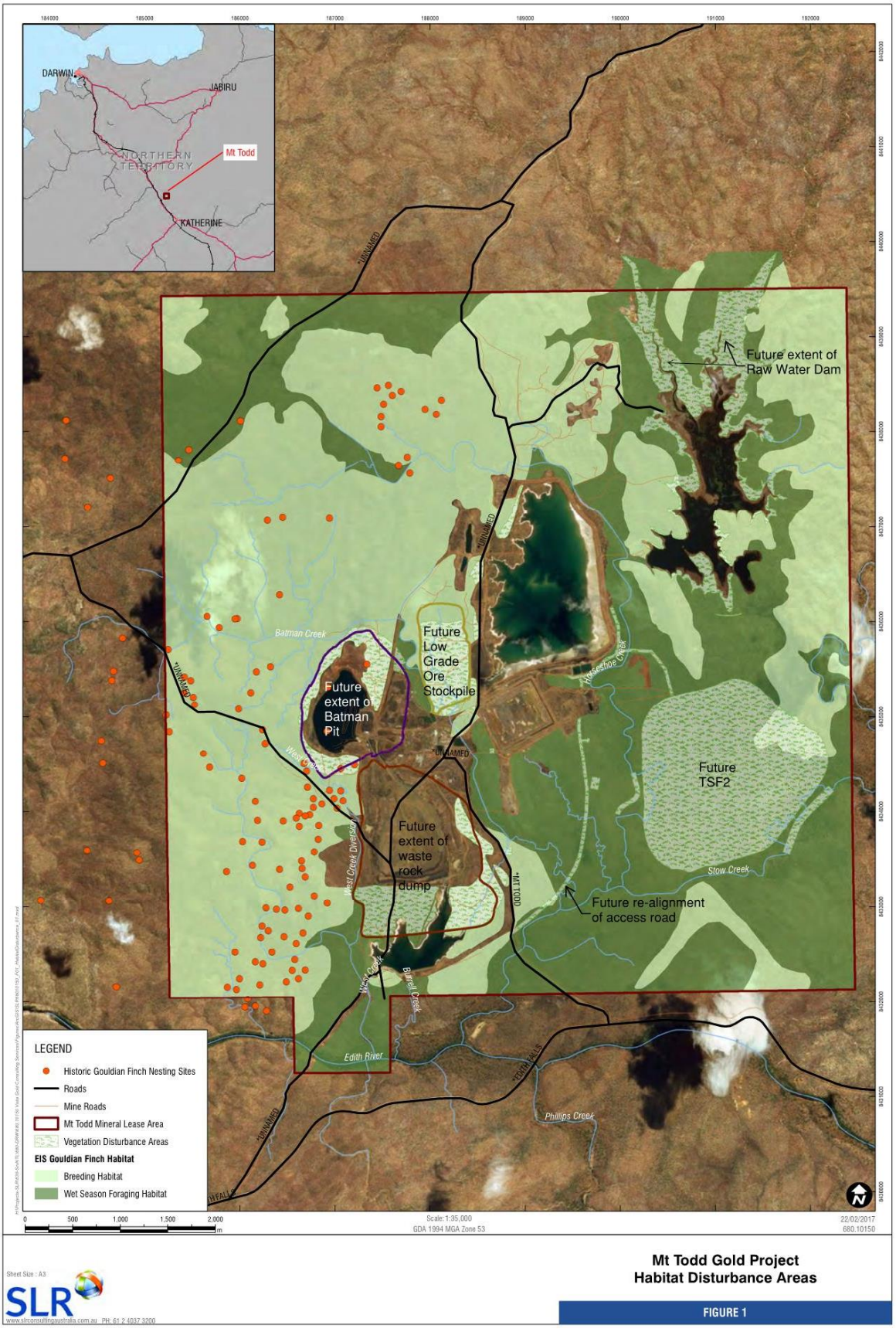
The site is partly a brownfield site previously mined for gold, with a total mining lease area of 5,365 hectares. Remnant mine infrastructure includes the (currently flooded) Batman Pit, a heap leach pad, a 16 million tonne waste rock dump, a tailings dam, low grade ore stockpiles, a raw water dam and the remains of processing facilities. Mining and associated operations would occur primarily on Mineral Leases MLN 1070, MLN 1071, ML31525 and MLN1127.

It is proposed the 17.8 million tonnes of ore will be process by the carbon in leach process per annum. Tailings are to be detoxified and sorted in an impoundment from which process water will be recycled to the process plant. Unrefined gold bars will be transported via secure shipment to a refinery.

2.2 Project schedule

The project will have a life of around 19 years inclusive of construction (two years), operations (thirteen years) and closure (four years). Construction will commence subject to a favourable Vista Gold final investment decision. The risks of the project outlined in **Section 5** are shared across the construction and operation periods.

Figure 1 Mt Todd Gold Mine location and habitat disturbance areas



3 Gouldian Finch profile

3.1 Description

The Gouldian Finch (*Erythrura gouldiae*) is a brightly coloured granivorous bird endemic to the savanna woodlands of northern Australia. It measures approximately 12 to 15 cm in length and weighs approximately 14 to 15 g (Higgins *et al.*, 2006a; Tidemann and Woinarski 1994). The adults exhibit three different facial colour-morphs: black-headed (most common), red-headed and yellow-headed (rare, **Figure 2 Red faced male Gouldian Finch, Edith Falls Road NT**). Juveniles are easily distinguished from the adults by their drab and nondescript olive-brown-grey plumage (Higgins *et al*., 2006a).

The Gouldian Finch is listed as Endangered under the EPBC Act and Vulnerable under the NT Territory Parks and Wildlife Act.

3.2 Gouldian Finch habitat characteristics and habitat utilisation patterns

Gouldian Finches occupy different regions of the landscape on an annual cycle driven by the availability of native grass seed, water and suitable breeding tree hollows (Dostine *et al*., 2001).

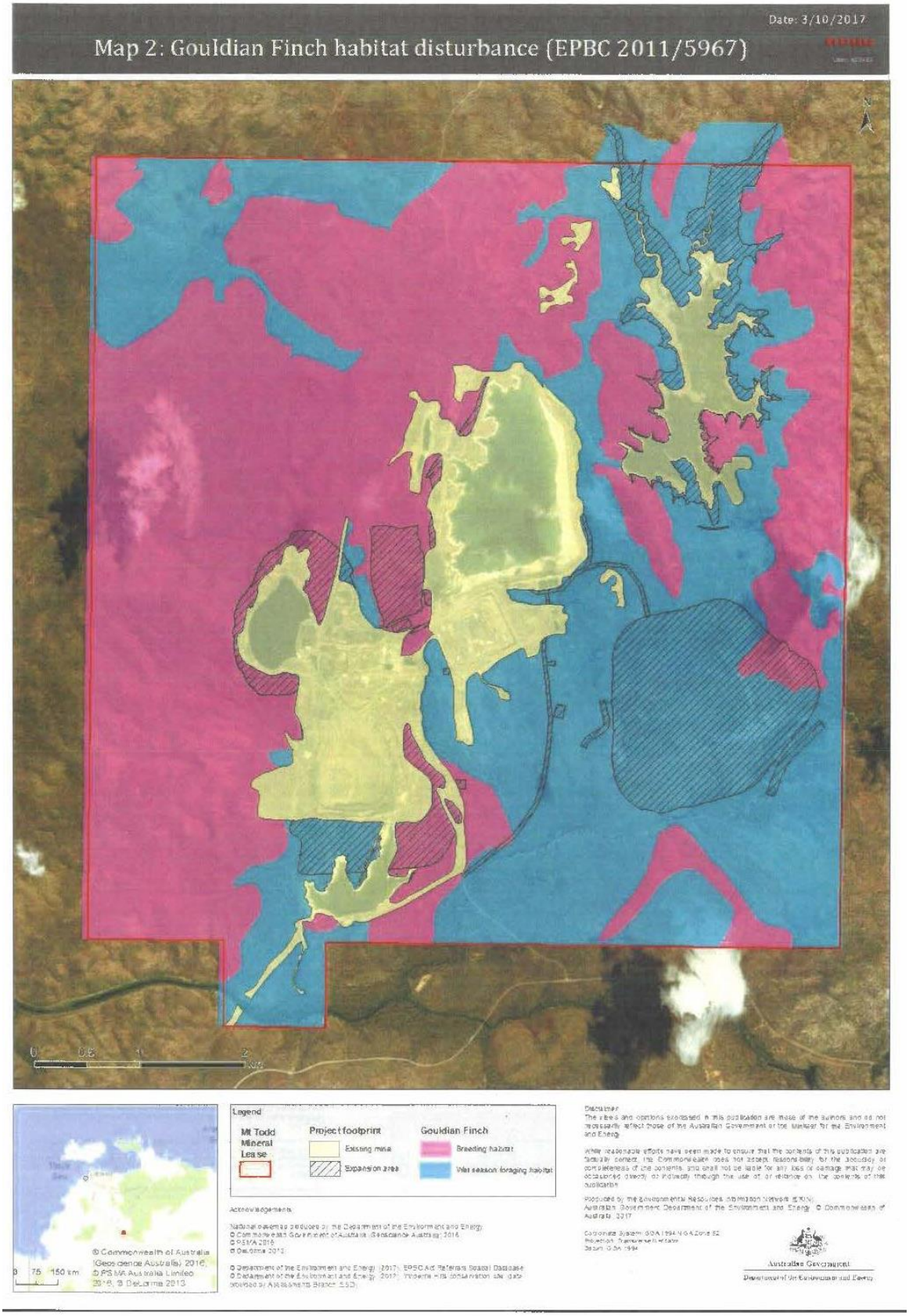
In the late part of the wet season and the dry season, between February and October, Gouldian Finches live in rocky wooded hills that contain snappy or salmon gums (*Eucalyptus tintinnans*). Hollows in these trees provide nesting sites. Seeds from native annual spear grass and sorghum species (*Sorghum intrans* and *S. stipoideum*), which have dropped to the ground surface, provide the staple diet for Gouldian Finches through the dry season while they are nesting and raising young (Lewis, 2007).

In the early wet season, Gouldian Finches move from the hills into lowland drainages to feed upon a more diverse assemblage of scattered perennial grasses (Dostine and Franklin, 2002). These, in approximately the order of seeding, are cockatoo grass (*Alloteropsis semialata*), golden beard grass (*Chrysopogon falax*), curly spinifex (*Triodia bitextura*) and giant speargrass (*Heteropogon triticeus*). There can be periods of low seed availability prior to the first heavy rains of the wet season (November to January). The low water and seed availability occurs just after the Gouldian Finch moults and develops a new complement of feathers and the same time which Gouldian Finches are moving to the lowlands (Natural Resources, Environment, the Arts and Sport (NRETAS) Gouldian Recovery Project, 2009; O'Malley, 2006).

The project is expected to require the clearing of both breeding and foraging habitat (133 ha and 476 ha respectively) (**Figure 3 Gouldian Finch habitat disturbance**).

Figure 2 Red faced male Gouldian Finch, Edith Falls Road NT

Figure 3 Gouldian Finch habitat disturbance



4 Potential impacts of the Project

Potential impacts of the Project on the Gouldian Finch population identified in the EIS (GHD, 2013a) and revised in the EIS supplement (GHD, 2013b) taking into account NT Environment Protection Authority and other feedback (e.g., NT EPA, 2014) include:

- Habitat loss through progressive clearance of 158 ha of potential breeding habitat and 451 ha of foraging habitat
- Acute or incremental poisoning when drinking at contaminated water sources or spillages
- Mortality or reduced fitness due to inhalation or ingestion of dust
- Mortality from traffic strike
- Reduced habitat quality and food availability due to changed fire regimes
- Reduced breeding success due to light, noise or vibration impacts
- Increased competition from more resilient granivorous bird species.

These potential impacts have been included in a species risk assessment (**Section 5.1**) with subsequent higher risk areas compared against the *Significant Impact Guidelines* (DoE, 2013) (**Section 5.2**).

4.1 Risk assessment

The definitions utilised in the updated risk assessment for likelihood and for consequence are shown in **Table 2 Quantitative measure of likelihood** and **Table 3 Quantitative measure of consequence** respectively. The risk assessment matrix is shown in **Table 4 Risk assessment matrix** and the risk assessment is shown in **Table 5 Mt Todd Gold Project Gouldian Finch risk assessment**.

Table 2 Quantitative measure of likelihood

Likelihood	Definition
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Table 3 Quantitative measure of consequence

Consequence	Definition
Minor	Minor risk of failure to achieve the GFOS objectives. Results in short term delays to achieving GFOS objectives, implementing low cost, well characterised corrective actions.
Moderate	Moderate risk of failure to achieve the GFOS objectives. Results in short term delays to achieving GFOS objectives, implementing well characterised, high cost/effort corrective actions.
High	High risk of failure to achieve the GFOS objectives. Results in medium-long term delays to achieving GFOS objectives, implementing uncertain, high cost/effort corrective actions.

Consequence	Definition
Major	The GFOS's objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies.
Critical	The GFOS's objectives are unable to be achieved, with no evidenced mitigation measures.

Table 4 Risk assessment matrix

		Consequence				
		Minor	**Moderate**	**High**	**Major**	**Critical**
Likelihood	**Highly likely**	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Table 5 Mt Todd Gold Project Gouldian Finch risk assessment

Impact	Description	Possible Consequences	Inherent threat rating			Proposed treatments to reduce threat rating	Target threat rating		
			Consequence	Likelihood	Rating		Consequence	Likelihood	Rating
Loss of breeding habitat	Total of 158 ha (comprising 0.03% of potential breeding habitat in the Yinberrie Hills SOCS (SOCS30)) will be cleared/inundated.	• Reduced area available to breed. • Reduced population viability. • Bird mortality (at the time of vegetation removal).	Minor	Highly likely	Medium	Clear breeding habitat during non-breeding periods.	Minor	Highly likely	Medium
Loss of potential foraging habitat	Total of 451 ha of wet season foraging habitat (comprising 0.08% of all possible wet season foraging habitat in the SOCS30) will be cleared/inundated. Note: Whilst wet season foraging habitat is likely to amount to a small proportion of overall foraging habitat in the SOCS30 or the actual Yinberrie Hills, the loss of even small areas of key wet season foods at critical times could have a substantial impact.	• Reduced area for foraging, particularly if during food bottlenecks. • Reduced population viability. • Bird mortality (at the time of vegetation removal).	Moderate	Highly likely	High	Construction and clearing outside of the wet season. Spatially display the extent of proposed foraging habitat loss with flagging tape on the ground - to clearly delineate the boundary prior to clearing.	Minor	Highly likely	Medium
Contaminated water	• The mine site provides sources of contaminated water, e.g. tailings dam. • Gouldian Finches are not likely to use tailings dams as a source of water on a regular basis. • The impact is not likely to occur as a cyanide destruction plant is planned before the water leaves the processing plant i.e. before it enters the tailings dam facility • Newly installed water treatment plant for the treatment of acid mine drainage and release of water downstream. • Use is most likely during the late dry, when alternative water sources are scarce).	• Susceptibility and limits of tolerance resulting in poisoning (specifically cyanide). • Gouldian Finches drink in large groups, thus, if contaminated water is lethal, it is likely to affect a large number of birds in a single incident.	Moderate	Unlikely	Low	The minimisation of weak-acid-dissociable cyanide via a standard destruction plant and reduction control methods (oxidation, biological, electrochemical treatment). The reduction of the attractiveness of the dam landscape for wildlife via design that includes, but is not limited to, the reduction of the dam surface area, removing dam bank vegetation, creating steep dam walls, naturally occurring alternative adjacent Gouldian Finch friendly water sources, and avoiding the creation of islands in the dam. The identification of clear trigger levels of weak-acid-dissociable cyanide where remediation action regarding water quality must immediately occur. A Discharge Plan has been developed by Vista Gold to address the requirements of NT EPA Waste Discharge Licence 178-2. Prepare and implement a Water Quality Monitoring and Management Plan (prepared as part of the Mine Management Plan) prior to the construction and mining phases. This information will assist in the management of the dams.	Minor	Possible	Low

Impact	Description	Possible Consequences	Inherent threat rating			Proposed treatments to reduce threat rating	Target threat rating		
			Consequence	Likelihood	Rating		Consequence	Likelihood	Rating
Dust	Increased dust generation during construction and operation. Maximum predicted incremental 24-hour PM_{10} concentration across the breeding area ranges from 14 µg/m^3 to 136 µg/m^3.	• Health impacts from inhalation and ingestion. • Reduction in availability of food during the dry season due to reduced plant productivity from dust deposition.	Moderate	Likely	Medium	Dust controls via watering, emission screens, road sealing, chemical applications, covering of exposed loads. Minimise mining, hauling and vehicle travel in the dry season when prevailing winds and strength of winds reach a trigger level that would results in extensive and heavy dust deposition in the breeding area. Trigger levels for dust and vegetation health monitoring that result in changes, limitations or even cessation of mining activity. Install real-time dust monitors onsite.	Minor	Possible	Low
Traffic	• Vehicle strike: the likelihood of the impact of road traffic is possible (i.e. once every 2-5 years). So very occasional instances that lead to multiple deaths. • Noise effects on breeding and foraging behaviour (the Gouldian Finches will forage on the road verges early in the dry season, when the sorghum seed at the road verge is more accessible than elsewhere). • Dispersal of chemical pollutants in road dust. Note: the majority of generated traffic is expected to be concentrated on Stuart Highway south of Edith Falls Road and on Edith Falls Road east of Stuart Highway (i.e. outside the core breeding area for the Gouldian Finch but within potential wet season foraging habitat).	• Mortality. • Noise effects on breeding behaviour. • Chemical pollutants in road dust.	Minor	Possible	Low	The extent of proposed new road network has been minimised, specifically in areas adjacent to feeding and nesting sites. Mine speed limit set. Prepare and implement a Traffic and Road Safety Management Plan, a Weed Hygiene Procedure and provision of on-site wash down facilities prior to the construction and mining activities. Permits for access during critical breeding season.	Minor	Unlikely	Low

Impact	Description	Possible Consequences	Inherent threat rating			Proposed treatments to reduce threat rating	Target threat rating		
			Consequence	Likelihood	Rating		Consequence	Likelihood	Rating
High intensity uncontrolled fire	• Escaped fire from planned burns undertaken by the Jawoyn (however, as Vista Gold does not own the land it does not have the right to determine how the Landowner manages it). • The creation and maintenance of tracks from Road Crews, and the increased traffic has the potential to lead to unintended ignitions.	• Reduced breeding habitat availability or quality. • Reduced availability of food resources.	Moderate	Likely	Medium	A Fire Management Plan including measures to: a. prevent and/or minimise mine-related bush fire ignitions b. manage fuel to reduce the rate of spread and intensity of bush fires and protect assets c. be bushfire prepared d. effectively contain fires. Ensure a fire unit/spotter is present with any road crew. Education of the workforce through inductions and toolbox talks. Vista Gold will investigate options to assist the Jawoyn with best-practice fire management in the Yinberrie Hills for the Gouldian Finch (with the assistance of the Technical Advisory Committee).	Moderate	Unlikely	Low
Frequent low intensity fires	Annual Asset Protection Zone burns: the Asset Protection Zone is a small well defined area that primarily protects poly-pipes moving water around the site.	• Reduced habitat quality. • Change plant species composition. • Change in food distribution.	Minor	Highly likely	Medium	Fire management for the purposes of asset protection will be undertaken in accordance with a mine Fire Management Plan. A Fire Management Plan including measures to: a. prevent and/or minimise mine-related bush fire ignitions b. manage fuel to reduce the rate of spread and intensity of bush fires and protect assets c. be bushfire prepared d. effectively contain fires. Education of the workforce through inductions and toolbox talks. Investigate options to offset mine-related impacts by contributing to improved fire management in the Yinberrie Hills for the Gouldian Finch (with the assistance of the Technical Advisory Committee)..	Minor	Highly likely	Medium

Impact	Description	Possible Consequences	Inherent threat rating			Proposed treatments to reduce threat rating	Target threat rating		
			Consequence	Likelihood	Rating		Consequence	Likelihood	Rating
Light	• Introduction of new light sources during construction. • Ongoing generation of light due to safety requirements during operation.	• Increased nuisance factor. • Potential impact of reduced breeding success. • Reduced appeal / use of habitat.	Moderate	Possible	Medium	Conduct a lighting survey. Ensure optimal placement of all lighting plants. Installation of lighting guards/shutters to direct light to road/working surfaces and away from adjacent vegetation. Relevant additional light impact assessments, including quantification, qualification, modelling and assessment of acceptability of impacts.	Minor	Possible	Low
Noise	Percentage of "core breeding area" (as defined in the project EIS) affected by noise (from construction and operation: *Dry season (L_{Aeq})* • 40-50 dBA: 32% • 50-65 dBA: 8% • >65 dBA: <1% (Total = ~40%) *Wet season (L_{Aeq})* • 40-50 dBA: 10% • 50-65 dBA: 3% • >65 dBA: <1% (Total = ~14%) Note: Ambient noise levels have been calculated at 38-45 dBA.	• 40-50 dBA: potential for acoustic masking of communication but most birds are expected to adapt given the ambient noise levels (38-45 dBA). • 50-65 dBA: occasional alert responses, avoidance behaviours (bird may move away from source to a point where the noise no longer masks their call). • >65 dBA: frequent alarm or flight responses, masking, and may affect nesting and roosting.	Moderate	Likely	Medium	If warranted during both the detailed design phase of the project and noise monitoring program (i.e. if the 65 dBA noise threshold occurs in a greater area than expected), a bund wall on the western edge of the waste rock dump should be constructed to ensure the core breeding area is not exposed to noise levels in excess of 65 dBA LAeq.	Minor	Possible	Low

Impact	Description	Possible Consequences	Inherent threat rating			Proposed treatments to reduce threat rating	Target threat rating		
			Consequence	Likelihood	Rating		Consequence	Likelihood	Rating
Vibration	• Minimal impacts during construction. • Increased impacts during operation (often daily blasts). • Peak impacts during blasting.	• Reduced breeding success. Blasting impacts could spook nesting birds resulting in abandonment. • Reduced appeal / use of habitat.	Moderate	Possible	Medium	Investigate vibration trigger levels and incorporate into the site Gouldian Finch Management Plan and Mine Management Plan. Develop blasting program to limit potential impact on adjacent fauna. Taking into consideration blast design, timing, volume and duration. Where possible, conduct large scale blasting activities during the wet season months. Weather monitoring prior to blasting to limit blasting during weather conditions which have the potential to increase airblast levels over the core habitat (avoiding hot dry conditions, and considering wind direction and atmospheric pressure). Relevant additional vibration impact assessments, including quantification, qualification, modelling and assessment of acceptability of impacts.	Minor	Possible	Low

4.2 Residual significant impacts

Using the risk assessment undertaken by SLR (2016b) and updated here, the potential mine-related impacts with a residual risk rating of medium and above are the loss of 158 ha of breeding habitat and 451 ha of wet season foraging habitat and frequent low intensity fires (**Table 5 Mt Todd Gold Project Gouldian Finch risk assessment**). These have been assessed against the *Significant Impact Guidelines* (DoE, 2013) for critically endangered or endangered species to determine the significance of the potential impacts in relation to the EPBC Act. This assessment is summarised in **Table 6 Test of significance of potential impacts**.

Table 6 Test of significance of potential impacts

Significant impact	Likelihood
Lead to a long-term decrease in the size of a population	Unlikely, given that: • There are existing disturbed areas in the vicinity of the mine and it is these that comprise the majority of habitat loss • The population known breeding area will not be fragmented • The mitigation measures committed to are assessed as reducing the significance of any potential effects.
Reduce the area of occupancy of the species	Likely due to: • Reduction in area where the species is known to occur, albeit estimated to be 0.03% of the known local area.
Fragment an existing population into two or more populations	Unlikely, given that: • There are existing disturbed area in the vicinity of the mine • The population known breeding area will not be fragmented.
Adversely affect habitat critical to the survival of a species (as defined in the significant impact guidelines)	Possible due to: • Reduction in available breeding and foraging habitat.
Disrupt the breeding cycle of a population	Unlikely (provided that the mitigation measures are adhered to).
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Possible but unlikely.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Possible but unlikely.

Significant impact	Likelihood
Introduce disease that may cause the species to decline, or	Possible but unlikely.
Interfere with the recovery of the species.	Possible but unlikely.

4.3 Management objectives for Gouldian Finch

The management objectives for the Gouldian Finch are outlined in Approval Condition 2 (**Appendix B**) and include prevention of:

- significant reduction in the quality or extent of breeding habitat outside of the project footprint
- significant reduction in the quality or extent of foraging habitat outside of the project footprint
- significant decrease in the short, medium or long-term abundance or distribution of the Gouldian Finch with the Yinberrie Hills Site of Conservation Significance
- significant decrease in the short, medium or long-term health of the Gouldian Finch with the Yinberrie Hills Site of Conservation Significance.

5 Threatening processes

Threats to the Gouldian Finch have been reviewed based on a range of published studies and other documents including:

- The National Recovery Plan for the Gouldian Finch (O'Malley, 2006)
- The Project's EIS, comments received regarding the EIS, and the EIS supplement (GHD, 2013a; Northern Territory Environment Protection Authority, 2014; and GHD, 2014 respectively), and a management plan developed under the Redbank Copper Limited Environmental approval (Redbank Copper Limited, 2010)
- Scientific papers and reference works (Dostine and Franklin, 2002; Dostine *et al.*, 2001; Garnett, Szabo and Dutson, 2011; Higgins, Peter and Cowling, 2006; Legge *et al.*, 2015; Lewis, 2007; Tideman and Woinski, 1994; Tideman *et al.*, 1999; Wonaski *et al.*, 2007).

The generally agreed position is described in the Recovery Plan:

> *Vegetation change through inappropriate fire regimes and grazing impacts of stock and feral herbivores is the factor most likely to be contributing to ongoing declines, or absence of recovery, in Gouldian Finch populations* (O'Malley, 2006. pp 5).

Vegetation change through fire is indirectly influenced uncontrolled access to habitat and the spread of grassy weeds; in addition stock and feral animal use can change vegetation but in high numbers, these animals can also directly impact the quality of waterholes, the impact of which is particularly important at the end of the dry season.

6 Primary offset strategies

The key strategies to be implemented under this plan address the threats to the Gouldian Finch population in the Yinberrie Hills identified in the Species Recovery Plan (O'Malley, 2006) and other literature (see **Section 5**). The key threats to be addressed by the proposed offsets are, in order of priority:

1. Inappropriate fire regimes
2. Feral animal grazing
3. Uncontrolled access
4. Weeds

In addition to threat mitigation, research projects to increase knowledge of the Gouldian Finch, and habitat improvement projects will be funded. Vista Gold propose to use a financial contribution (prescribed in Condition 7), to support an independent conservation agency to deliver ongoing management of the Gouldian Finch and its habitat in the Yinberrie Hills. The current intention is for Vista Gold to continue their relationship with the Jawoyn Aboriginal Association Corporation (Jawoyn), the Jawoyn have the required capacity and experience to undertake the full suite of management, monitoring and reporting requirements.

6.1 Location of Gouldian Finch populations and habitat to be protected

The Yinberrie Hills is recognised as an important bird site at Territory, National and International levels based on the Gouldian Finch population (Ward and Harrison, 2009; Dutson, Garnett, and Gole, 2009; Birdlife International, 2018). The site supports a large breeding population – although the actual population size is contentious and is likely to fluctuate both in size and in the proportion of juveniles in the population (Woinarski, 2013).

7 Offsets calculations

7.1 Habitat quality

Habitat quality is used in the offset process to feed into the calculation of the required offset area. A desktop assessment of habitat quality in areas to be impacted, and in the Yinberrie Hills in general, was conducted based on previous studies including Lewis, 2007; GHD, 2013a; GHD, 2013b; GHD, 2014. Each area was described according to the *Offset Assessment Guide* (DSEWPaC, 2012b), including scoring attributes that define critical Gouldian Finch breeding and foraging habitat. The benchmarks used indicate the best possible habitat likely to occur in a particular habitat for the species (i.e. 10 out of 10 for quality rating). The quality of undisturbed breeding and foraging habitat to be disturbed was rated as 7, with disturbed breeding habitat rated as 4, breeding and foraging habitat in the Yinberrie Hills more broadly was scored as 8 (**Appendix C**).

In 2017/18 a field survey was conducted which confirmed the assumptions made in the desktop study.

7.2 Offset area

Offset area requirements have been determined in accordance with the *EPBC Act Offsets Policy* (DSEWPaC, 2012a). The offsets calculator excel spreadsheet was used to determine appropriate offset requirements to compensate for the loss of Gouldian Finch habitat (**Table 7 Area and quality of impact and offset sites**). The calculator spreadsheets and the assumptions used to populate the calculator are provided in **Appendix D.**

Table 7 Area and quality of impact and offset sites

Habitat type	Area impacted	Quality of impacted habitat	Required area of offset (ha)	Current quality of proposed offset site
Potential breeding habitat	133	7	420	8
Potential breeding habitat (disturbed)	25	4	45	
Wet season foraging habitat	451	7	1,420	
TOTAL	609	-	1,885	-

7.3 Offset value

Approval condition 7 (**Appendix B**) specifies the value of offsets, calculated proportional the amount of habitat cleared. The maximum offset value is just over 2 million dollars (to be adjusted annually in accordance with the Darwin Consumer Price index) (**Table 8 Maximum offset value**). A minimum of 90% of the offset value is to be used for direct offsets with 10% available for research and education projects.

Table 8 Maximum offset value

Habitat	Unit cost* (ex GST)	Maximum area	Total cost* (ex GST)
Breeding habitat	$4,000 per ha	158 ha	$632,000
Foraging habitat	$3,000 per ha	458 ha	$1,374,000
	Total	**616 ha**	**$2,006,000**

* To be adjusted annually in accordance with the Darwin Consumer Price Index

8 Potential offset themes

8.1 Maintenance of suitable fire regime

A key potential threat to the Gouldian Finch in the Yinberrie Hills is reduced habitat quality and continuous availability of food resources due to changed fire regimes (O'Malley, 2006). Increased intensity of fire regimes can reduce body condition and health of the birds during periods of low seed availability, by reducing seed yield and abundance directly through removal or indirectly via long term changes to grass composition (Garnett *et al.*, 2011). Fire can also affect the availability of nesting hollows (Tidemann *et al.*, 1999). Both overall fire frequency and the occurrence of intensity late-season fires will be managed to best practice across the Yinberrie Hills and in neighbouring properties which have the potential to spread into the site.

Conservation gains targeted by appropriately managing fire throughout the Yinberrie Hills and surrounds include increased availability of suitable nesting habitat, and protection of a diversity of native grasses providing foraging opportunities.

8.2 Reduction of feral animal impacts

Introduced animals including horses, donkeys, wild cattle and pigs cause indirect effects by modification of vegetation and weed spread, and if not managed can directly impact water availability by damaging suitable water sources at the end of the dry season. Management of feral animals is dependent on monitoring, and implementation of control activities as required.

Conservation gains targeted by control of feral animals include protection of waterholes and maintenance of a diversity of native grasses.

8.3 Access control

Unrestricted access into the Yinberrie Hills has, and will continue to, result in increased frequency and/or intensity of wildfires, reduced diversity of native vegetation, increased soil disturbance, and weed spread. The majority of the perimeter of the Yinberrie Hills is not enclosed; however several gates have been installed at major entrances. These gates are regularly breached by members of the public. Options for access control include fencing and enforcement of access into the site as a whole, or identification and fencing of an area with high value Gouldian Finch habitat. In either case, ongoing maintenance will be critical.

Conservation gains targeted by installation of access control include improved fire management, reduced weed spread, and reduction of erosion.

8.4 Weed management

The control of weed species is currently a key management action within the Yinberrie Hills and will remain critical to achieving continued conservation improvements to the habitats within. Weeds classified under the NT *Weeds Management Act* (the WM Act) are to be managed in accordance with it. All owners, managers and occupiers of land as well as any other land user within the NT must comply with the WM Act.

Conservation gains targeted by weed control relate to reduction of fire frequency and intensity and nd protection of a diversity of native grasses providing foraging opportunities.

8.5 Research topics

Vista Gold is committed to additional research regarding Gouldian Finches in the Yinberrie Hills. A series of short term research programs are proposed to be undertaken. It is considered that research is a critical component of improving knowledge of the species in the Yinberrie Hills. CDU and DLRM will provide valuable assistance in prioritising and undertaking the research programs.

Research projects that may be conducted in the first five years of the Program include:

- Erection of artificial nest boxes
- Camera monitoring at waterholes
- Utilisation of artificial water points to attract finches to capture points
- Captive breeding program and associated bird physiological monitoring (in the aviary)
- Burning regimes and patches.

Each of these projects will include a comprehensive assessment of risks, in consultation with relevant experts including relevant government agencies, to ensure that additional threats or increased impacts are not introduced as a consequence. The management of these projects will be planned with due consideration of associated risks.

9 Offset proposals

9.1 Development of proposals

Offset proposals will be developed to meet the requirements of Approval Condition 6 (**Appendix B**), and will include (but not be limited to):

- The purpose of a project, or the question to be addressed by research
- A description of the project/research including details of the objective, location, stakeholder input, and budget
- A monitoring plan
- Details of land to be acquired (if any)
- Objectives, timeframe, ethics approvals, and researcher experience for research projects.

Consultation during preparation of each proposal will include, at a minimum, the Jawoyn, NT Department of Environment and Natural Resources, DoEE, and any other experts identified or recommended by those bodies. Each proposal will be ratified by relevant members of the Gouldian Finch TAC, submitted to DoEE for approval.

9.2 Schedule for submission of offset proposals and expenditure

Approval Condition 5 specifies that proposals for the total value of offsets must be submitted within seven years of commencement of the Project, and that full expenditure of offset contributions must be made within 12 years of Project commencement (**Table 1 Key approval condition**). A draft schedule for submission of offset proposals and expenditure on projects in provided in **Table 9 Schedule for submission of proposals and expenditure**, this proposal is subject to change depending on the outcomes of baseline studies, advice from the TAC and input from other stakeholders.

Table 9 Schedule for submission of proposals and expenditure

Offset theme	Proposal submission	Expenditure
Direct offsets		
Fire management	At commencement	$50,000 annually for 12 years
Feral animal management	At commencement	$25,000 annually for 12 years
Weed management	At commencement	$25,000 annually for 12 years
Access control	Following identification of suitable location, year 3	$160,000 installation $20,000 annual maintenance, 9 years
Installation of nest boxes or other habitat enhancement in the Yinberrie Hills	Following outcome of research, year 6	$150,000 installation $15,000 annual maintenance, 6 years

Offset theme	Proposal submission	Expenditure
	Approximate total	**$1,805,400**
Research projects		
Camera monitoring at waterholes	At commencement	$40,120 annually (across all projects) during the first 5 years from commencement
Erection of artificial nest boxes		
Utilisation of artificial water points to attract finches to capture points		
Captive breeding and physiological monitoring		
Burning regimes and patches		
	Approximate total	**$200,600**

10 Responsibilities and accountabilities

Each of the approved Offset Proposals will include monitoring and reporting commitments which will integrate with the monitoring required under the Gouldian Finch Management Plan (SLR 2018). Offset monitoring will be reported in the annual reports as required under the environmental approval and under the NT *Mining Management Act*. Data will be managed under Vista Gold's existing Data Management Policy, to ensure that records are kept robustly and consistently.

The responsibility for implementation, monitoring and review of the GFOS lies with the Mt Todd Mine Manager. As such, the Mine Manager has the ultimate responsibility for the implementation of this strategy and the associated offset proposals and shall make the appropriate resources available.

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APPENDIX A

Conditions of approval reference table

Approval conditions	Strategy section and page number	Key commitments
Condition 5: The Approval holder must prepare and submit a Gouldian Finch Offset Strategy (GFOS) for approval by the **Minister** to provide a framework for how the residual significant impacts to the **Gouldian Finch** will be offset and associated financial commitments. The Approval holder must not **commence** the action unless the **Minister** has approved the GFOS. The approved GFOS must be implemented. The GFOS must:		
a. identify and assess threats to Gouldian Finch populations from the action and other sources, and outline options and priorities for addressing those threats as a basis for developing Offset Proposals (condition 6). To this end the GFOS must: i. review relevant literature including approved conservation advices, recovery plans and threat abatement plans relevant to the Gouldian Finch and ii. identify, specify and evaluate the best available science and iii. specify and evaluate feedback obtained from relevant stakeholder consultations	Threats to the Gouldian Finch from the project and other sources are identified in **Section 4** and **Section 5**	NA
b. considering 5(a), outline the: i. need(s) of, and/or threat(s) to, Gouldian Finch populations to be addressed by Offset Proposals (condition 6) ii. relative priority of different threat abatement, recovery and research strategies and actions to address the need(s) or threat(s) outlined at (i) iii. conservation gains that can be captured by addressing the need(s) or threat(s) outlined at (i) via the strategies and actions outlined at (ii)	The threats to the Gouldian Finch to be addressed by offset proposals are described and prioritised in **Section 5**. Conservation gains of offset themes are identified in **Section 8**, and the purpose and outcomes of the GFOS are described in **Section 2**.	NA

Approval conditions	Strategy section and page number	Key commitments
iv. purpose(s) of, and the environmental outcomes and specific objectives to be achieved by, the GFOS.		
c. outline a process for developing, and a schedule for submitting Offset Proposals to the Department for the written approval of the Minister (the schedule must provide for the full expenditure of offset contributions specified in Condition 7(a-c) by not later than 12 years after commencement)	The process for developing offset proposals, and the schedule for proposals and expenditure is provided in **Section 9**	• Offset proposals to be developed as specified • Stakeholders to be consulted • Proposals to be approved by TAC and DoEE • Proposals and expenditure as specified
d. detail an adaptive management program to be implemented to promote the achievement of the specific objectives identified in the GFOS (particularly condition 5(b)), including by providing for early warning and early control: i. describe data to be collected and variables to be monitored, and the frequency of data collection and any monitoring to be carried out ii. monitoring methodology iii. precision and confidence of monitoring actions iv. management triggers v. interpretation and analysis of data collected and monitoring data to inform the contingency responses	Please note: this Condition is to be removed from the approval and has not been addressed	NA

Approval conditions	Strategy section and page number	Key commitments
vi. schedule periodic assessments of the risk of failure to achieve the purpose and objectives of the GFOS – each periodic assessment must account for the results of the monitoring program required at condition 3, and the results of monitoring completed under Offset Proposals approved and implemented under condition 6		
e. detail responsibilities and accountabilities including data handling, technical review, self-auditing and reporting requirements	Responsibilities and accountabilities for the GFOS are described in **Section 10**.	As described.

APPENDIX B

Related approval conditions

Approval condition 2

The approval holder must undertake the action in accordance with the following objectives for the Gouldian Finch for the life of the action. The action must not result in:

a. significant reduction in the quality or extent of breeding habitat outside of the project footprint, or

b. significant reduction in the quality or extent of foraging habitat outside of the project footprint, or

c. significant decrease in the short, medium or long-term abundance or distribution of the Gouldian Finch with the Yinberrie Hills Site of Conservation Significance, or

d. significant decrease in the short, medium or long-term health of the Gouldian Finch with the Yinberrie Hills Site of Conservation Significance.

Approval condition 6

To offset significant impacts to the **Gouldian Finch**, the Approval holder must submit Offset Proposals to the **Department** for approval.

Each Offset Proposal must:

a. be prepared by a **Suitably qualified expert(s)**

b. be consistent with the objectives of the approved Gouldian Finch Offset Strategy (GFOS, particularly condition 5b)

c. Describe the purpose, and either the research question to be addressed (for research projects, herein 'research') or the environmental outcomes and specific objectives to be achieved (for threat abatement and recovery action projects, here in 'projects')

d. describe the research or the project:

i. where the research project will occur (location)

ii. the management proposed, including the activities to be completed, sufficient to confirm the scale, magnitude, sequencing and timeframes for each research of project activity, and the reporting (publication) of the results.

iii. the tenure of the location, including by noting permissions obtained (or to be obtained) to conduct the research or project at the location

iv. the ecological values and ecological; conditions to be improved (projects_ ort investigated (research) at the location

v. specify the views on the research or project of all land (or lease) holders controlling the location, traditional owners with responsibilities for the location, the **Northern Territory Department of Environment and Natural Resources** and any other relevant stakeholders consulted

vi. specify how the Approval holder had responded to the views expressed by these people and organisations (under condition 6(d)(v))

vii. provide a budget with costings itemised for research or project commitments

a. For projects, demonstrate that the project will:

i. be addition to the general duty of landholders to manage land effectively at the project location, and additional to natural resource management programs already being carried out at the project location

ii. be consistent with other principals of the **EPBC Act Environmental Offsets Policy** – if relevant, details of how the Offset Proposal meets the criteria for research and education programs identified in Appendix A of the **EPBC Act Environmental Offsets Policy** must be included

f. for projects, detail a monitoring program in accordance with the **Department's Environmental Management Plan Guidelines** the includes, but is not limited to:

i. monitoring objectives, including for early warning and control

ii. variables to be measured

iii interim performance targets and completion criteria

iv. monitoring methodology

v. precision and confidence of monitoring actions

vi. interpretation and analysis of monitoring data to inform the contingency response and corrective actions

viii. for project of over three years' duration, details of an adaptive implementation program to review management measures and trigger management action considering monitoring data collects, to ensure environmental objects will be attained and/or maintained

ix. detail responsibilities and accountabilities including data handling, technical review, self auditing and reporting requirements

g. If an Offset Proposal involved land acquisition, identify the land, describe its ecological values to the **Gouldian Finch** and outline a schedule of commitments required to:

i. acquire the land (or the lease)

ii. establish the land of(or the lease) as an area that can be managed exclusively and effectively for conservation – such as through installing fencing or other means of controlling access

iii. provide evidence the land (or lease) can be formally (legally) protected for the [purpose of conservation – suitable evidence includes (but is not limited to) letters from agencies and administering conservation covenanting programs and pastoral leases confirming the land (or lease) to be acquired can be destocked (if applicable), formally (legally) protected or managed exclusively and effectively for conservation

iv. manage the land effectively for conservation and for the benefit of **Gouldian Finch**

h. for research the Offset Proposal must:

i. describe the research and why it will be beneficial to the conservation of the **Gouldian Finch**

ii. detail who will be undertaking the research and their relevant experience

iii. detail timeframes for completion of the research

iv. seek any relevant ethics clearances (if necessary)

v. conduct the research to a standard that would allow the results to be published in a peer reviewed scientific journal

vi. submit the research for publication in an appropriate peer reviewed scientific journal

The Approval holder must not commence an Offset Proposal until the Offset Proposal has been approved in writing by the **Department**. Unless otherwise agreed by the **Department**, approved Offset Proposals must be implemented.

For approved proposals, offset attributes and shapefile of the location of the projects must be provided to the **Department** within 6 months of the approval of the project.

Condition 7

To offset residual significant impacts to the **Gouldian Finch**, the Approval holder must undertake the Offset Proposals (condition 6) in accordance with the following requirements:

a. The value of the Offset Proposals associated with direct impacts will be calculated as follows::

   i. AUD $4,000 (excluding GST) per hectare of the (up to 158 hectares of) **clearing** of **breeding habitat** for the **Gouldian Finch** within the **Mt Todd Mineral Lease Area**

   ii. AUD $3,000 (excluding GST) per hectare for the (up to 458 hectares of) **Clearing** of **foraging habitat** for the **Gouldian Finch** within and outside of the **Mt Todd Mineral Lease Area.**

b. The value of expenditure on Offset Proposals must be adjusted annually in accordance with the Darwin Consumer Price Index (CPI) from 1 July 2018. The first adjustment is to be applied on 1 July 2018.

c. The Approval holder must have Offset Proposals submitted to the **Department** for approval to the total value of Offset Proposals by no later than seven years from **commencement**.

APPENDIX C

Technical advisory committee

TAC Composition

Name	Position in TAC	Professional Position	Company
TCA 2015/2016			
Brent Murdoch	Champion	Director and General Manager Australia	Vista Gold Australia Pty Ltd, NT
Sarah Legge	Technical Advisor		
Sonia Tidemann	Technical Advisor	Adjunct Research Fellow and Adjunct Professor (Ornithology and ethno-ornithology)	Batchelor Institute, NT
Mike Lawes / Leigh-Ann Woolley	Technical Advisor		
Don Franklin	Technical Advisor	Adjunct Research Fellow	Charles Darwin University, NT
James Brazill-Boast	Technical Advisor		Conservation strategy unit | Landscapes & ecosystems conservation branch Office of Environment and Heritage
Sarah Pryke	Technical Advisor	Principal Investigator	Division of Evolution, Ecology and Genetics | Research School of Biology The Australian National University
Peter Dostine		Senior Scientist	Water Resources Division, Department of Land Resource Management, NT
Brydie Hill		Senior Scientist	Flora and Fauna Division, Department of Land Resource Management, NT
Stephen Garnett	Technical Advisor	Professor	Charles Darwin University, NT
Owen Price	Technical Advisor	Senior Research Fellow	University of Wollongong, NSW
Alistair Stewart	Technical Advisor (statistical analysis)	Environmental and Technology Consultant	Sole trader
Mihkel Proos	Chair	Associate Environmental Scientist	SLR Consulting, NT
Loren Yallop	Secretary	Environmental Scientist	SLR Consulting, NT
TCA 2018/2019			
Brent Murdoch	Champion	Director and General Manager Australia	Vista Gold Australia Pty Ltd, NT
Martin Doyle	Technical Advisor (air quality specialist)	Director	Northstar Air Quality
Cameron Yates	Technical Advisor (fire specialist)	Team Leader - Darwin Centre for Bushfires Research	Research Institute for the Environment and Livelihoods - Charles Darwin University (CDU)

Name	Position in TAC	Professional Position	Company
Eddy Cannella	Technical Advisor (ecological relevance and statistical validity specialist)	Principal Zoologist	BIOSTAT Pty Ltd
Ian Radford	Technical Advisor (Gouldian Finch specialist)	Senior Research Scientist	The Government of Western Australia Department of Parks and Wildlife – Science and Conservation Division
Sarah Smith	Chair	Associate Environmental Scientist	SLR Consulting, NT
Loren Yallop	Secretary	Senior Environmental Scientist	SLR Consulting, NT

APPENDIX D

Project stakeholders

- NT Environment Protection Agency
- Department of Environment
- Department of Primary Industry and Resources
- Katherine Town Council
- Roper Gulf Council
- Jawoyn Association Aboriginal Corporation
- Amateur Fishing Association of Northern Territory
- NT Environment Centre
- NT Minerals Council
- Charles Darwin University
- Residents of Katherine, Pine Creek and surrounding areas
- Werrenbun Community
- Adjacent Landholders

APPENDIX E

Offset calculations

Habitat quality definitions

Component of habitat quality	General definition	Benchmark for breeding habitat	Benchmark for wet season foraging habitat
Site condition	This is the condition of a site in relation to the ecological requirements of a threatened species or ecological community. This includes considerations such as vegetation condition and structure, the diversity of habitat species present, and the number of relevant habitat features.	• Ample Salmon Gums (*Eucalyptus tintinnans*) with hollows for nesting • High abundance (c. >75%) of native sorghum to feed on • Appropriate fire regime (thought to be patchy, low-intensity fire regime concentrated around the early dry season) • No or very low disturbance from feral herbivores • No or very low disturbance from weeds.	• Sufficient abundance of perennial grasses including Cockatoo Grass (*Alloteropsis semialata*), Golden Beard Grass (*Chrysopogon fallax*), Curly Spinifex (*Triodia bitextura*) and Giant Speargrass (*Heteropogon triticeus*) • Appropriate fire regime (thought to be patchy, low-intensity fire regime concentrated around the early dry season) • No or very low disturbance from weeds • No or very low disturbance from feral herbivores.
Site context	This is the relative importance of a site in terms of its position in the landscape, taking into account the connectivity needs of a threatened species or ecological community. This includes considerations such as movement patterns of the species, the proximity of the site in relation to other areas of suitable habitat, and the role of the site in relation to the overall population or extent of a species or community.	• Rocky wooded hills • Close proximity to foraging habitat • Close proximity to small rocky waterholes • Away from substantial disturbance (e.g. active farming practices, residential areas, mining operations etc)	• Lowland drainages adjacent to breeding habitat

Component of habitat quality	General definition	Benchmark for breeding habitat	Benchmark for wet season foraging habitat
Species stocking rate	This is the usage and/or density of a species at a particular site. The principle acknowledges that a particular site may have a high value for a particular threatened species, despite appearing to have poor condition and/or context. It includes considerations such as survey data for a site in regards to a particular species population or, in the case of a threatened ecological community this may be a number of different populations. It also includes consideration of the role of the site population in regards to the overall species population viability or community extent.	• Number of historic nesting records • Number of recent nesting records • Abundance of nesting records relative to other known breeding sites.	• Number of ongoing anecdotal records • Regularity of sightings in area.

Quantity and quality of habitat

Habitat type	Impact area (ha)	Habitat Quality Attributes[1]			Average Score (out of ten)	Justification
		Condition	Context	Species Stocking Rate		
Condition of Gouldian Finch habitat in the Yinberrie Hills generally						
Breeding and foraging	N/A	7	9	8	7	The Yinberrie Hills are known for their importance to the Gouldian Finch. It is one of only a few substantial breeding sites known across the species' range, so much so that benchmarks for the species' breeding habitat requirements are set against those habitat characteristics found in the Yinberrie Hills. Whilst there has been a paucity of recent nesting records for Gouldian Finches in the Yinberrie Hills – probably due to the lack of survey effort rather than a reduced rate of breeding – there remain several ongoing management issues that are important for the Gouldian Finch. These include fire and grazing, and possibly the proposed Mt Todd Gold Project. This slightly reduces the habitat condition ranking.

[1] (DSEWPaC, 2012b) – score out of 10

Habitat type	Impact area (ha)	Habitat Quality Attributes[1]			Average Score (out of ten)	Justification
		Condition	Context	Species Stocking Rate		
Habitat to be impacted						
Potential breeding habitat	133	7	6	7	7	Whilst the Yinberrie Hills are, without doubt, a site of substantial significance to the Gouldian Finch, the areas of breeding habitat to be cleared are probably less utilised for breeding by the species (at least relative to the other 'prime' breeding areas higher up in the Yinberrie Hills) due to the history of disturbance in, and directly adjacent to, these sites and their proximity to infrastructure and ongoing activity by the public and mine personnel. In particular, the areas of breeding habitat proposed to be cleared that are bordering the western edge of the existing Batman Pit are generally regarded as being of high condition and historically (likely including pre-mining) have had high species stocking rates. However it's close proximity to the existing mining operations reduces its contextual rating. The areas of breeding habitat proposed to be cleared that are surrounding the existing raw water dam and to the east of the processing areas, are likely to be of lesser condition due to their lower elevations and observed lower density of E. tintinnans (noted during several general site visits undertaken from 2015 to 2017 as part of the studies for the Mt Todd Gouldian Finch Monitoring and Mitigation Program (SLR, 2017) and Mt Todd Gold Mine, Gouldian Finch Impact, Monitoring and Management Assessment (SLR, 2016). Historically, they also apparently contain less breeding records (relative to other areas of the Yinberrie Hills).
Potential breeding habitat (disturbed)	25	4	3	4	4	The already disturbed areas of breeding habitat that are proposed to be cleared (to the immediate north-east, south-east and south of the mine processing area) have been recently noted as being of sub-optimal breeding habitat due to the lower abundance of *E. tintinnans* and associated suitable hollows (GHD, 2014).

Habitat type	Impact area (ha)	Habitat Quality Attributes[1]			Average Score (out of ten)	Justification
		Condition	Context	Species Stocking Rate		
Wet season foraging habitat	451	8	5	8	7	Food availability is critical to better understanding the risk of the impact to the population from the removal or disturbance of foraging resources. In order to provide an indication of the significance of this impact, a measure of distances from the core breeding area was mapped and quantified (SLR, 2016). The distance from the outer boundary of, what was known as, the 'core' breeding area was classified as 'important' (0-3 km), 'distant' (3-7 km) and 'unreachable' (7-10 km). These distances were based on the distances finches can fly and did not take into account other variables such as availability or condition of water or food sources.

Offset calculator assumptions

- *Quantum of impact*:
    - Habitat quality = 4-7/10
    - *Area* = 609 ha, categorised into habitat type and quality
- *Offset location* = Yinberrie Hills (as managed by the Jawoyn)
- *Time over which loss is averted* = 20 years. Vista Gold's contribution to improved management of the land will be for the expected life of the mine.
- *Time until ecological benefit* = 5 years. Native vegetation is expected to improve in extent, species diversity and density within 5 years through improved fire regimes and reduced grazing.
- *Start area and quality* = minimum 1,885 ha and 8/10
- *Risk of loss without offset* = 5%. Without the proposed offset arrangements, there is little chance that the Yinberrie Hills will be lost. Most likely the property would continue to be managed under the current regime, however there remains potential that threats to the Gouldian Finch habitats will increased (due to reduced funding for management or increased visitation rates by the public).
- *Future quality without offset* = 6/10. Assumes threats to the species in the Yinberrie Hills will increase due to increased public visitation rates (and hence increasing the risk of wildfire and other forms of degradation) and reduce funding for management of the area.
- *Risk of loss with offset* = 5%. The land will not be placed under any additional legislated covenant. Vista Gold is simply proposing to contribute, financially, to improved management of the area. Hence, the risk of loss will not change.
- *Future quality with offset* = 9/10. The offset area is to be managed for conservation purposes, with implementation of key management plans incorporating direct threat management, aiming to maintain and enhance Gouldian Finch habitat features across the area.
- *Confidence in result* = 75%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing habitats and landscape context.

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*

2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Gouldian Finch
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Offset assessment- Disturbed Gouldian Finch breeding habitat to be lost

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Breeding Habitat (Disturbed)	**Area**	25	Hectares	
			Quality	**4**	Scale 0-10	
			Total quantum of impact	10.00	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Offset calculator

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	10.00	Adjusted hectares	Contribution to the Management of the YH	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	45	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	5%	0.00	75%	0.00	0.00	9.06	90.62%	Yes	
									Future area without offset (adjusted hectares)	42.8	**Future area with offset (adjusted hectares)**	42.8								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**9**	3.00	75%	2.25	2.12				

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value	Future value without offset	Future value with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Number of features e.g. Nest hollows, habitat trees	No															
Condition of habitat Change in habitat condition, but no change in extent	No															
Threatened species																
Birth rate e.g. Change in nest success	No															
Mortality rate e.g Change in number of road kills per year	No															
Number of individuals e.g. Individual plants/animals	No															

Summary

Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
						Direct offset ($)	Other compensatory measures ($)	Total ($)
	Birth rate	0				$0.00		$0.00
	Mortality rate	0				$0.00		$0.00
	Number of individuals	0				$0.00		$0.00
	Number of features	0				$0.00		$0.00
	Condition of habitat	0				$0.00		$0.00
	Area of habitat	10	9.06	90.62%	**Yes**	$0.00	#DIV/0!	#DIV/0!
	Area of community	0				$0.00		$0.00
						$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

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Matter of National Environmental Significance	
Name	Gouldian Finch
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Offset assessment- Gouldian Finch breeding habitat to be lost

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Breeding Habitat	**Area**	133	Hectares	
			Quality	**7**	Scale 0-10	
			Total quantum of impact	93.10	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Offset calculator

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	93.10	Adjusted hectares	Contribution to the Management of the YH	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	420	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	5%	0.00	75%	0.00	0.00	84.58	90.85%	Yes	
									Future area without offset (adjusted hectares)	399.0	**Future area with offset (adjusted hectares)**	399.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**9**	3.00	75%	2.25	2.12				

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value	Future value without offset	Future value with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Number of features e.g. Nest hollows, habitat trees	No															
Condition of habitat Change in habitat condition, but no change in extent	No															
Threatened species																
Birth rate e.g. Change in nest success	No															
Mortality rate e.g Change in number of road kills per year	No															
Number of individuals e.g. Individual plants/animals	No															

Summary

Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
						Direct offset ($)	Other compensatory measures ($)	Total ($)
	Birth rate	0				$0.00		$0.00
	Mortality rate	0				$0.00		$0.00
	Number of individuals	0				$0.00		$0.00
	Number of features	0				$0.00		$0.00
	Condition of habitat	0				$0.00		$0.00
	Area of habitat	93.1	84.58	90.85%	**Yes**	$0.00	#DIV/0!	#DIV/0!
	Area of community	0				$0.00		$0.00
						$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Gouldian Finch
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Offset assessment- Gouldian Finch foraging habitat to be lost

Impact calculator

	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	No		**Area**			
				Quality			
				Total quantum of impact	0.00		
	Threatened species habitat						
	Area of habitat	Yes	Foraging Habitat	**Area**	451	Hectares	
				Quality	**7**	Scale 0-10	
				Total quantum of impact	315.70	Adjusted hectares	
	Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
	Threatened species						
	Birth rate e.g. Change in nest success	No					
	Mortality rate e.g Change in number of road kills per year	No					
	Number of individuals e.g. Individual plants/animals	No					

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Offset calculator

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	315.70	Adjusted hectares	Contribution to the Management of the YH	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	1420	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	5%								
									Future area without offset (adjusted hectares)	1349.0	**Future area with offset (adjusted hectares)**	1349.0	0.00	75%	0.00	0.00	285.95	90.58%	Yes	
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**9**	3.00	75%	2.25	2.12				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
						Direct offset ($)	Other compensatory measures ($)	Total ($)
	Birth rate	0				$0.00		$0.00
	Mortality rate	0				$0.00		$0.00
	Number of individuals	0				$0.00		$0.00
	Number of features	0				$0.00		$0.00
	Condition of habitat	0				$0.00		$0.00
	Area of habitat	315.7	285.95	90.58%	**Yes**	$0.00	#DIV/0!	#DIV/0!
	Area of community	0				$0.00		$0.00
						$0.00	**#DIV/0!**	**#DIV/0!**

ASIA PACIFIC OFFICES

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
5 Foelsche Street
Darwin NT 0800
Australia
T: +61 8 8998 0100
F: +61 2 9427 8200

GOLD COAST
Ground Floor, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Suite 2, 2 Domville Avenue
Hawthorn VIC 3122
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

ROCKHAMPTON
rockhampton@slrconsulting.com
M: +61 407 810 417

SYDNEY
2 Lincoln Street
Lane Cove NSW 2066
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TAMWORTH
PO Box 11034
Tamworth NSW 2340
Australia
M: +61 408 474 248
F: +61 2 9427 8200

TOWNSVILLE
Level 1, 514 Sturt Street
Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

AUCKLAND
68 Beach Road
Auckland 1010
New Zealand
T: +64 27 441 7849

NELSON
5 Duncan Street
Port Nelson 7010
New Zealand
T: +64 274 898 628

NEW PLYMOUTH
Level 2, 10 Devon Street East
New Plymouth 4310
New Zealand
T: +64 0800 757 695