

2nd Fauna Experts Joint Report

Black-throated Finch (southern)

Land Court of Queensland

Land Court of Queensland Registry: Brisbane

Numbers: MRA428-14, EPA429-14, MRA430-14, EPA431-14, MRA432-14, & EPA433-14.

Applicant: Adani Mining Pty Ltd

First Respondent: Land Services of Coast and Country Inc.

Statutory Party: Department of Environment and Heritage Protection

Experts and Areas of Expertise:

- Lindsay Agnew (**LA**), biologist – area of expertise relevant to the current matter – Black-throated Finch southern subspecies (*Poephila cincta cincta*).
- Adrian Caneris (**AC**), biologist – area of expertise relevant to the current matter - Black-throated Finch southern subspecies (*Poephila cincta cincta*).
- Mike Olsen (**MO**), botanist - area of expertise relevant to the current matter – floristic and vegetation characteristics of habitat for Black-throated Finch southern subspecies (*Poephila cincta cincta*).
- Bruce Wilson (**BW**), botanist - area of expertise relevant to the current matter – floristic and vegetation characteristics of habitat in areas where Black-throated Finch southern subspecies (*Poephila cincta cincta*) occurs.

Meeting Dates: Various telephone and email communications from 20 February 2015 onwards.

Expert's Statement

We acknowledge that we have been instructed to assist the Land Court of Queensland by investigating and reporting on issues relevant to the Black-throated Finch southern subspecies (*Poephila cincta cincta*). We assert that we are qualified to give opinion evidence as an expert witness in relation to this issue in dispute in the current proceeding.

We verify that our instructions have included the Land Court Rules 2000 (current as at 13 December 2013) and the Uniform Civil Procedure Rules 1999, which we have read and understand, and that no instructions were given or accepted to adopt or reject any particular opinion in preparing this Joint Report. We confirm that each expert understands the expert's duty to the court and has complied with that duty in preparing this Joint Report.

Important Note

In this Joint Report, **matters of agreement are unattributed**. Comments made by individual experts and/or matters of disagreement are prefixed by the relevant expert(s) initials.

1.0 BACKGROUND

- 1.1 This 2nd Joint Report has been prepared by **AC** and **BW** on behalf of the Applicant, Adani Mining Pty Ltd and **LA** and **MO** on behalf of the First Respondent, Land Services of Coast and Country Inc (together, **the Experts**), in accordance with the **Order** made by the Land Court of Queensland on 30 January 2015.
- 1.2 This 2nd Joint Report provides focus on materials of relevance received following the completion of our 1st Joint Report dated 15 January 2015.
- 1.3 As part of our duty to the Court, we have sought additional information in order to adequately investigate the facts in relation to the issues in dispute in the proceeding.
- 1.4 To that end, we have, jointly or individually, sought the following information to assist in the preparation of this 2nd Joint Report:
- a. The results of the 3rd round of BTF monitoring and associated reporting.
 - b. Any further botanical or site specific (disturbance area and proposed offset area) assessment of extant habitat values.
 - c. Confirmation and details of, if any, proposed changes to the mine layout, and specifically if the north-eastern portion of the mine is being converted from open cut to underground.
 - d. In regards to the BTF surveys and monitoring events, confirmation of personnel and experience in relation to BTF and target surveys for BTF. For each survey event:
 - i. Details of the most senior ecologist actively participating in BTF surveys or monitoring events and a list of all field workers for each survey event, including their experience in surveys for BTF.
 - e. Any anecdotal evidence of BTF that have been observed at and around the mine site or camp.
 - f. Confirmation that there is a process in place to inform relevant Adani staff (environment officer) of such sightings and provision of any anecdotal records currently held. AC, notes that the site induction included specific mention of the species and requirement to report any sightings.
 - g. Various reports refer to BTF records derived from field work undertaken by Ecology and Heritage Partners Pty Ltd. This work has not been described in any detail. Provide details of the surveys and records associated with various references to the same, e.g. "Within the Mine Study Area and broader Moray Downs property during June/July 2012 surveys (by Ecology and Heritage Partners Pty Ltd (unpublished data, 2012) - approximately 155 black-throated finches (southern) were observed at 12 sites." (page 111 of GHD (2013). Report for Carmichael Coal Mine and Rail Project SEIS - Matters of National Environmental Significance).
 - h. Data and information to assist in assessing BTF population characteristics and habitat usage across the known BTF distribution.
- 1.5 This 2nd Joint Report provides a review of that additional information and includes our areas of agreement and disagreement in relation to the issues in respect of the Black-throated Finch southern subspecies (*Poephila cincta cincta*) (**BTF**). Wherever possible, in our discussions regarding the review of that additional material, we have attempted to provide cross-referencing with the specific issues contained within the First Respondent's amended notice of issues was delivered on 2 December 2014 (**Preliminary Issues**) as discussed in the 1st JR.

2.0 3RD ROUND OF BTF MONITORING

- 2.1 The report is entitled *Black-throated Finch Monitoring Report Pre-wet season survey 2014* (Niche Environmental and Heritage 2015). The report was provided by the Applicant by email on 13 February 2015.
- 2.2 **LA & AC:** The title of the report indicates that it was neither a dry season nor a wet season survey. The Niche Environmental and Heritage (Niche) report makes various references to a “substantial amount of rainfall” prior to the survey, rainfall during the survey period, and that ephemeral water sources were present which would have impacted on the results of the water source watches. The report concludes that “To make comparison between survey periods valid it is important that the assessment method is consistently applied and that survey effort is comparable”. Given that it is neither a wet nor a dry season survey, and the survey period is not directly comparable with any of the previous BTF monitoring events, the Niche commentary on data comparisons between inconsistently timed survey events is highly relevant.
- 2.3 **LA & AC:** Given the above, the Niche (2015) field work program could not validly be considered to represent a dry or a wet season monitoring event. If the intention was to implement a survey which would augment the understanding of BTF occurrence and habitat usage across the site (which is not made clear in the Niche report), then it is considered that the reported work does indeed achieve that.
- 2.4 **LA & AC:** All monitoring reports should provide details of weather and field conditions.
- 2.5 **LA & AC:** There is certainly value in having information obtained during the pre-wet season although this would need to be undertaken repeatedly and systematically to contribute meaningfully to monitoring results.
- 2.6 **LA & AC:** In addition to the above, there are a variety concerns which are apparent following the review of the Niche (2015) report. Some of these are highlighted below:
- 2.6.1 In regard to consistency in monitoring methodology, the pre-wet season monitoring establishes a number of notable departures from the monitoring program¹ as described in the 2014 BTF Management Plan (GHD 2014b). The Niche (2015) report does not provide any rationale for departures in monitoring methodology or suite of monitoring sites which formed the basis of the on-going monitoring program as established in the 2014 BTF Management Plan.
- 2.6.2 In regards to water source surveys, the Niche (2015) report states in Section 2.2.3.2, that the following was implemented at each of the survey sites: 1 x 3-hour early morning and 1 x 1-hour late afternoon surveys. The report’s Annexure 8 clearly shows that for the majority of survey sites, the stated methodology was not applied². In the 1st JR, our shared view in reviewing previous water body survey methodologies, was that counts needed to be conducted from dawn and for a period of at least 6 hours (Issue No. 19; 1st JR).

¹ GHD (2014b) noted the following: “The following monitoring program was developed in consultation with the black-throated finch Recovery Team (meeting on 3 April 2013, James Cook University, Townsville), and DotE (meeting on 7 June 2013, Canberra). It also incorporates information and advice provided by DEHP via their submission on the Project’s SEIS (November 2013).”

² Annexure 8 describes water source surveys at 10 sites. Average effort for each survey was 1.65 person-hours. Average effort for each survey site was 2.98 survey person-hours and the range was between 0.1 to 4.77 survey person-hours.

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- 2.6.3** In regards to water source surveys, the Niche (2015) report states in Section 2.2.3.2, that all water source surveys were "... conducted between sunrise and 3 hours after sunrise". With reference to the Geoscience Australia database³, three hours after sunrise would have been 0822 hours. Annexure 8 of the Niche (2015) report clearly shows none of water watch surveys complied with the methodology stated earlier in the report.
- 2.6.4** The Niche December 2014 survey program implemented the 2ha/20-minute survey methodology at a variety of locations on the site, with the majority being implemented in the northern part of the site. This survey approach has been reviewed in the 1st JR, with both experts agreed that the 2ha/20-minute approach does not represent a suitable method to investigate BTF site usage (Issue No. 19; 1st JR)⁴.
- 2.7 LA & AC:** It should be noted that the 3rd round BTF monitoring report does not include the results of camera traps. The results from camera traps could change results provided in **Table 1**.
- 2.8 LA & AC:** Notwithstanding the abovementioned concerns, the Niche (2015) report provides confirmation that the site continues to support a significant BTF population. As the report's Graph 2 demonstrates, the survey results generated by the December 2014 survey (329 BTF) was notably the highest total aggregate of BTF recorded for any of the seven site surveys to date.
- 2.9 AC:** Although there is variation on the standard monitoring protocols, this monitoring event has contributed valuable information in regard to BTF presence and usage on the site during pre-wet season conditions. This information is only available due to the undertaking of such monitoring as a result of the proposed mine and conditions.
- 2.10 LA & AC:** The Niche (2015) report review provided in Graph 2 only considers site records derived from the EIS and SEIS reporting stream and does not incorporate other site records, some of which are highly significant, e.g. site records of Stanley Tang (BTF aggregation of >400 BTF) as previously discussed in the 1st JR.
- 2.11 LA:** Other notable results arising from the December 2014 survey include:
- 2.11.1** Six BTF nests were detected, though it is not apparent that these were the result of "targeted nest surveys". The report notes that all six nests were located in the three discrete locations within the northwest corner of Moray Downs and within the same general area where nests and nesting activity were observed in May 2013.
- 2.11.2** A notably high proportion of "incidental" BTF records, which included a variety of new BTF record locations.
- 2.12 AC:** The results have highlighted and confirmed the prior agreement that the 2ha monitoring sites are of low value. The effort would be far better off focused on locations where BTF are sighted to gain information on habitat values in those locations.
- 2.13 AC:** The additional records of breeding add to the recognised value in conducting targeted nest surveys and these should be undertaken following early rainfall events at the start of the wet season.

³ Australian Government's Geoscience Australia calculates that for Moray Downs (21°57'00" 146°38'00"), sunrise would be at 0522hrs for 03/12/2014. <http://www.ga.gov.au/bin/geodesy/run/sunrisenset>

⁴ In the 1st JR, it is agreed that 20-minute bird survey is not a method recommended in the Commonwealth Government's BTF assessment guideline (DEWHA 2009) or the in the national survey guideline for BTF or other threatened bird species (DEWHA 2010).

- 2.14 LA:** In regards to discussion on the survey results, Niche (2015) report noted the following:
- 2.14.1** “The low mean and median group/flock size recorded during surveys in December 2014 may be attributed to the high proportion of smaller groups/flocks (i.e., 2-4 birds) recorded during surveys (Graph 4). It appears that large flocks comprising >20 birds)”. Whilst part of the results interpretation, in regard to large flocks, is obviously missing, it is my view that the high proportion of observations of flock/group size of 2-4 BTF may also be attributed to larger flocks breaking up into smaller family breeding flocks (cf. what would not be an expected finding from a dry season survey).
- 2.14.2** “The spatial distribution of BTF records during this survey is also similar to that reported previously, with the majority of records occurring in the north-western corner of Moray Downs (including the far north of the Project Area) ...”. Given that the vast majority of the December 2014 survey effort was focussed on largely the same parts of the site as surveyed in the previous six surveys, the report’s finding is not surprising.
- 2.15 AC & LA:** There is confusion within the Niche (2015) report in respect to site names and locations. This is apparent in the statements about the trough that had not previously been surveyed (5 Mile Bore). This location is the 4 Mile bore and has been previously surveyed. There is a clear need for the monitoring program to standardise data collection. This includes but is not limited to site name/s, datum units, and duration of monitoring events.
- 2.16 AC:** Further although the new site 5 mile bore is referred to as being a ‘site’ it was only visited once for 6 minutes. This seems an anomaly given the reference to it as a site and the number of birds recorded in this location at the time.
- 2.17 AC:** There clearly needs to be more rigor and uniformity in BTF monitoring events and subsequent reporting. Whilst there is room for improvement, the monitoring to date provides highly valuable data and the required changes are not onerous.
- 2.18 AC:** It is not unusual for monitoring programs to be adaptive and to be adapted following identification of improved techniques or logistical constraints etc. It is important that any changes provide improved results or analysis.
- 2.19 AC & LA:** The recommended changes provided within the 1st and 2nd JRs should be adopted for future monitoring events.

3.0 2012 ECOLOGY AND HERITAGE PARTNERS BTF REPORT

- 3.1 LA & AC:** The EIS and SEIS reporting stream⁵ has provided various references to surveys by Ecology and Heritage Partners (unpublished, 2012), and whilst acknowledging that the report does "... provide excellent baseline data on the presence and broad distribution of the species... " (GHD 2012b) on the site, no details have been provided in any of the Applicant's BTF reports. We requested details of the surveys and records associated with various references to the same, as raised in the 1st JR, and a summary report was provided by the Applicant by email on 13 February 2015.
- 3.2 LA & AC:** The EHP (2012) report notes that the primary focus of the work was to survey for, record and monitor BTF within EPCs 1690 and 1080. Field work was undertaken by three ecologists during the period 4 June to 4 July 2012. It is clear from the report that only a minority of the survey work, due to field conditions, was undertaken within the southern part of the site.
- 3.3 LA & AC:** The EHP (2012) report provides details of 12 separate BTF records, including two notable sightings of flocks of >50 BTF. Mapping of the record data indicates that these 2 large flocks are from the same location and are located in the northern portion of the site in proximity to the 10 Mile Bore where other large flocks have also been located previously.
- 3.4 AC & LA:** Where such information is collected it is important that these results are provided for, and obtained by, the monitoring program to allow inclusion in known records and locations.

4.0 ADDITIONAL INCIDENTAL BTF RECORDS FOR THE SITE

- 4.1 LA & AC:** We both were aware of the potential for BTF observations which might derive from activities other than the reported BTF surveys. In the 1st JR, we requested that any evidence of BTF that have been observed at and around the mine site or camp be provided, as well as confirmation that there is a process for recording such information. A copy of the "BTF register" was provided by the Applicant by email on 13 February 2015.
- 4.2 LA:** In regard to BTF sightings on the site, we are advised, by way of a letter from the Applicant's lawyers (dated 13 February 2015), that "Sightings of the BTF are to be reported to the Environmental Adviser for entry in the register".
- 4.3 AC:** This requirement is specifically and clearly conveyed during the site induction.
- 4.4 LA & AC:** The copy of the "BTF register" provides 10 BTF records during the period 15 July 2012 to 18 April 2014. Of these 10 records, 7 are listed as "confirmed sightings".
- 4.5 LA & AC:** Of the 7 "confirmed sightings", two are regarded as highly significant, being observations of two large flocks, one observation of >150 BTF (17 September 2013) and another flock of 75 BTF (6 April 2013). Both records are attributed to Shaun Lovelock (Adani employee).

⁵ i.e. GHD 2012a, 2012b, 2013, 2014a, and 2014b.

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- 4.6 LA:** It is probable that the record of the flock of >150 BTF, may be part of the records referred to in GHD (2014a), though this is unclear as reported flock size is notably different (about 100 BTF versus >150 BTF). The relevant reference in GHD (2014a), though also referred to in subsequent reporting, is as follows:
- 4.6.1** "... though anecdotally a few weeks prior to our survey, a student (Stanley Tang) from James Cook University, trapped and banded 50 birds, and located a flock of about 100 birds, at 10 Mile Bore. Prior to his successful trapping, he spent a number of days searching for birds and was unable to locate any (S. Lovelock, Adani, pers. comm.)."
- 4.7 AC:** I agree that it is likely these are likely to be the same sighting records, being recorded in separate datasets.
- 4.8 LA:** It is understood that Shaun Lovelock was the Adani chaperon for Stanley Tang during his site survey over the three-day period 17 to 19 April 2013 (*pers comm.* S. Tang, 2015).
- 4.9 LA & AC:** The addition of the abovementioned records has been incorporated into a table which provides a summary of those BTF records which have not formed part of any data analysis within the Applicant's EIS or SEIS reporting on BTF (**Attachment 2**). A summary comparison of the key data parameters of the Applicant's BTF records and those additional to that reporting for the mine site is presented in the following table (**Table 1**).
- 4.10 LA:** That data comparison has highlighted notable differences between the two data sources.

Table 1: Comparison of the key data parameters of existing and additional BTF records

| Key BTF Record Parameters | Applicant's BTF Records (within reporting) | Additional BTF Records (not within reporting) |
|------------------------------------|---|--|
| Number of BTF record observations | 125 | 40 |
| Cumulative Total of BTF recorded | 1025 | 1019 |
| Number of flocks >30 BTF recorded | 9 | 7 |
| Number of flocks >50 BTF recorded | 0 | 5 |
| Number of flocks >100 BTF recorded | 0 | At least 3 |

- 4.11 AC:** A site register is a valuable tool in collection of incidental records for the site and surrounds. Ideally there is a nominated person, as is the case currently with Mr. Shaun Lovelock being the nominated person. It is important to ensure accurate capture of these records and they are provided to, and included within, each monitoring event reporting and ultimately with the BTF Recovery team. Further, it is important that the analysis of records is thorough and includes identification of potential double ups and follows up with relevant recorders/observers to check sightings details.
- 4.12 AC:** Based on my own site visit and incidental observations within reports to date, it is apparent that incidental sightings provide a valuable source of data.

5.0 BTF SURVEY TEAM PERSONNEL AND BTF SURVEY EXPERIENCE

5.1 LA & AC: In the Commonwealth Government's *Survey guidelines for Australia's threatened birds*, DSEWPaC (2010)⁶, the following is noted:

- a. "It is an expectation of EPBC Act assessors that surveys should be conducted by appropriately experienced observers who have excellent identification skills, including familiarity with species' calls and a good knowledge of bird behaviour, at least in relation to the taxa/taxon being targeted."

5.2 LA & AC: In the Commonwealth Government's *Significant impact guidelines for the endangered black-throated finch*, DEWHA (2009a)⁷, the following is noted:

- a. "It is an expectation of the department that surveys be conducted by appropriately experienced observers who have excellent identification skills, including familiarity with species calls and a good knowledge of avian ecology, at least in relation to the species being targeted."

5.3 LA & AC: As it was not clear to the experts in their reviews, we requested in the 1st JR that information be provided in regard to the following:

- a. "In regards to the BTF surveys and monitoring events, confirmation of personnel and experience in relation to BTF and target surveys for BTF. For each survey event: details of the most senior ecologist actively participating in BTF surveys or monitoring events and a list of all field workers for each survey event, including their experience in surveys for BTF."

5.4 LA & AC: In response to our request in the 1st JR, the Applicant's lawyers (by cover letter dated 13 February 2015), advised that they have provided the following "Details of the staff involved in EIS and SEIS surveys are provided in responses to point 3 above. The Niche report includes a summary of survey personnel."

5.5 LA & AC: We have reviewed a spreadsheet which provides a listing of staff involved in EIS and SEIS surveys. It is our view that the persons overseeing the field work (team leaders) and reporting were of suitable experience.

⁶ This document provides a guide to planning and undertaking surveys on threatened birds listed under the *EPBC Act*, relevant to a referral to the Commonwealth Environment Minister.

⁷ This document provides a guide to planning and undertaking surveys in regard to the Black-throated Finch (southern) as part of a significant impact, relevant to a referral under the *EPBC Act* to the Commonwealth Environment Minister.

6.0 ADDITIONAL VEGETATION ASSESSMENT INFORMATION

- 6.1 LA & AC:** In responding to Issue 20 of the 1st JR (though also others), there was considerable discussion between the experts in regard to the extent to which the methodology applied to assess BTF values of both the mine site and proposed offsets might have suitably incorporated grasses (*Poaceae*), which form a critical component of the feeding habitat for BTF. That discussion was not informed by any detailed data which could have been reviewed to assess claims made in the relevant reports (ELA 2014a & 2014b).
- 6.2 LA & AC:** As a result, the experts requested “Any further botanical or site specific (disturbance area and proposed offset area) assessment of extant habitat values”. In response, two spreadsheets were provided by the Applicant by email on 13 February 2015.
- 6.3 LA:** One spread sheet, entitled BTF_EE data Carmichael Mine (1).xlsx, provides data on the presence/absence of “key grass species”⁸ for 50 Ecological Equivalence Sites (EE Sites) located within the mine site. There is no other data for other grasses (*Poaceae*). Key features of that summary are as follows:
- 6.3.1** Of the 50 EE sites, “key grass species” were recorded at 26 EE sites.
 - 6.3.2** 7 of the 8 “key grass species” were recorded from the EE Sites; i.e. *Enteropogon acicularis*, *Alloteropsis semialata*, *Eragrostis sororia*, *Panicum decompositum*, *Themeda triandra*, *Dichanthium sericeum*, and *Panicum effusum*.
 - 6.3.3** The maximum number of “key grass species” recorded at any EE site was 4 species (1 EE site) and the average number of “key grass species” recorded across the suite of sites was 1 species.
- 6.4 LA:** The second spread sheet, BTF_EE data Moray Downs West.xlsx, provides data in regard to the presence/absence of “key grass species” at 9 sites within the proposed offset areas. It is my understanding that these 9 sites are the only locations within the proposed offset areas where assessments included surveys for the “key grass species”. Surveys at these locations were undertaken to augment the suite of other sites where the Ecological Equivalence Methodology was implemented, though did not include “key grass species” as part of the assessment. Key features of the spreadsheet are as follows:
- 6.4.1** “key grass species” were recorded at all 9 “BTF sites”.
 - 6.4.2** 4 of the 8 “key grass species” were recorded from the “BTF sites”., i.e. *Alloteropsis semialata*, *Eragrostis sororia*, *Panicum decompositum*, and *Themeda triandra*.
 - 6.4.3** The maximum number of “key grass species” recorded at any EE site was 3 species (5 EE sites), with the average number being 2 species.
- 6.5 LA:** In reviewing the abovementioned data, it is noted that there appears to be a notable disparity in sampling effort between the mine site and the proposed offset areas in regards to the inclusion of the 8 “key grass species”. As acknowledged by **BW** in the 1st JR (point 6.10.12), there is no explanation given for the inequalities of sampling effort in the ELA documents.

⁸ The term “key grass species” used in both ELA reports refers to eight grass species listed in DEWHA (2009).

- 6.6 LA:** As noted in the 1st JR, there is significantly wider suite of grass species which are known, or strongly suspected, to form part of the diet of the BTF (see discussion for Issue 31, 1st JR). That suite of grass species should have been considered as part of designing a suitable approach to assessing BTF habitat values for both the mine site and proposed offset areas. Information drawn from readily available public sources, including the BTF Recovery Team, would have been available to the Applicant's consultants. Had such a process been implemented, that review is likely to have concluded the following, as I have done from implementing such a review:
- 6.6.1** That there is evidence of BTF feeding on 23 different grass species.
 - 6.6.2** That there is evidence of a further 12 grass species may form part of the BTF diet, though as noted by the report authors, observational data was not sufficient to completely confirm inclusion in the BTF diet.
 - 6.6.3** That of the 25 grass species recorded as confirmed or suspected of forming part of the diet of the BTF, approximately 16 species (over 60%) have been recorded on the mine site at survey sites where BTF have been recorded (see **Attachment 2**).
 - 6.6.4** Data on grass species occurrence was drawn from GHD (2013)⁹ as a complete list of grass species for the ELA (2014a and 2014b) ecological equivalence surveys was not available for review.
 - 6.6.5** That the list of the 8 "key grass species" used to inform the Ecological Equivalence assessments for the mine site and proposed offset areas represents, at best, only 50% of the suite of grass species which should have been included in a potential list of "key grass species".
- 6.7 LA:** It can only be concluded that a biologist with experience in BTF ecology was not consulted in the planning of the assessments which ELA undertook, and upon which decisions would ultimately be made in regard to assessing BTF habitat values on the mine site and the basis for the offset areas as proposed. Furthermore, I disagree with the reasoning of **BW** in the 1st JR that there is not enough information on the diet of BTF to have warranted a different approach to the assessment of BTF habitat values for the mine site and the proposed offset areas. It is my view that reliance on an "entry-level" enquiry to sourcing information on the BTF diet does not demonstrate rigor in the approach taken. In regard the concerns outlined above, and other concerns highlighted in the 1st JR, it remains my view that the application of the EEM assessment as implemented by ELA (2014a and 2014b) is certainly not commensurate with the type of habitat assessment which is warranted given the significance of BTF population and the potential requirements to determine suitable offset habitat.
- 6.8 AC:** Whilst I agree there is additional information available on grass species of value to BTF, the utilisation of the 8 key species as undertaken does not prevent EE methodology from providing a suitable means by which to identify that proposed offset sites have similar values and potential to provide the required offset.
- 6.9 AC:** The more refined assessments, which are condition of approval, require assessment to measure the offset suitability and overall measures are commensurate with the impact.

⁹ Appendix C GHD (2013). – *Complete plant species list for 2-ha bird count areas, indicating mean cover within black-throated finch (southern) present and absent sites.*

- 6.10 BW:** The approach used in the ELA assessments on the Carmichael Mine and Moray Downs West offset site was to use broad groupings of regional ecosystems to quantify BTF habitat. The target grass species information was not collected to provide detailed habitat information but to provide qualitative verification of habitat types. This approach identified 94% of the remnant vegetation on the Carmichael Mine lease as BTF habitat (derived from ELA, 2014a, Table 2, Assessment Units 1-6), which has subsequently been used to determine the minimum offset requirements for the project (see JR section 4).
- 6.11 BW:** I agree with the **LA** assessment that many of the 25 grass species would be present on the mine site. However, these grass species are not evenly distributed across the mine site and therefore an assessment of BTF habitat based on their distribution and abundance is likely to identify less BTF habitat than the approach using the broad vegetation groups in the ELA 2014a assessment. More detailed assessments, as per the draft EA conditions, are required to fully assess the BTF habitat, but I consider that the ELA approach using broad vegetation groups is appropriate as this stage of the assessment process.
- 6.12 BW:** I have agreed in the JR (6.7.6) that more intensive surveys would provide more detailed information on the occurrence and abundance of grass species. From my extensive experience in carrying out fauna habitat surveys I consider more detailed information on the relative abundance of the different grass species and the interaction with other habitat requirements such as water and vegetation structure could also be important determinants of BTF habitat. Therefore, I expressed the opinion in the JR (6.7.6) that more intensive survey of Poaceae may not provide a lot more additional guidance about BTF habitat at this time. I consider that it is appropriate to carry-out such surveys in coordination with the detailed BTF research into nesting and feeding requirements and updates to BTF habitat classification that is required under the EA condition I6 for the project.
- 6.13 MO:** I agree with **BW** with respect to his comment at 6.12 with respect to the output of more intensive surveys, but the critical point remains that a limited subset of the known food plants of Poaceae were used (only 8 species of widespread taxa) and the recently supplied do not provide any additional contextual or spatial data relevant to the food resources of the BTF. This is not a situation such as the intimate link between plants such as *Pararistolochia praevenosa* and *Pararistolochia laheyana* as obligate food plants of the endangered *Ornithoptera richmondia*. BTF feed on common and widespread species of Poaceae (see **Attachment 2**), but within the study area, there are globally significant populations of BTF feeding on these Poaceae and we still have no spatial or autecological data to explain why this should be so. The recently supplied data does not aid in our knowledge of these relationships or provide any adequate spatial or contextual data on the habitat of BTF – the target species in this instance. Without such an understanding, it would be cavalier to remove the known habitat from these sites and threaten the viability and integrity of the known concentrations of BTF within the proposed Carmichael Mine footprint.
- 6.14 MO:** The following comments relate to the data supplied recently for both the proposed Carmichael Mine and the potential offset areas as addressed by **LA** above (comments 6.3 and 6.4 in particular). Given that each additional data gathering event on BTF appears to reinforce the global significance of the BTF population on the proposed Carmichael Mine (1st JR and subsequent data discussed above by **LA**), the import of data on the distribution of data on Poaceae is, in my view, of critical significance to any assessment of the proposed Carmichael Mine on this BTF population. I am unsure of the context of the comments by **AC** below (see comment 7.5) that appear to suggest that the significance of this population is in doubt on the basis of currently unknown sites and/or data and a lack of survey effort in other areas. It is true that the on-going studies for this project continue to reinforce the global

significance of the BTF population in the study area analogous to the situation with *Livistona lanuginosa*.

- 6.15 MO:** I note that **BW** states that the “sampling intensity used in the EE assessments in the ELA 2014a and 2014b meet or exceed the specifications in the DERM (2011) method” (1st JR). It is noted that **BW** is listed as one of the authors of DERM (2011). To rely on an assay of only 8 species out of the many dozens of known food species (23 species of Poaceae recorded from the study area are known or strongly suspected of being a food source for BTF (see **LA** comment 6.6) does not provide adequate data, in my view, to assess the actual use of either the proposed Carmichael Mine site or any potential use of the proposed offset area by the acknowledged globally significant population of BTF increasingly confirmed to be utilising the site. To rely on a sample size of only 25 ha of the proposed Carmichael Mine site for this globally significant population of BTF does not appear to provide any meaningful data on why this area sustains the greatest known concentrations of BTF on the planet. Still unanswered, from my perspective, is the landscape pattern of the relevant Poaceae that accounts for the known globally significant population of BTF at this site.
- 6.16 BW:** I am one of the authors of the BioCondition assessment method and participated in the development of the EE Method (DERM 2011) which relies to a large extent on the BioCondition method. Under the policies operating at the time, the Queensland Government required that the EE method be used to compare impact areas with offset sites. The EE method is similar to methods used in other parts of Australia for the comparison of impacts and offsets sites. The EE method includes specifications that each assessment unit be sampled by up to 5 sites (JR, 6.10.12). The sampling intensity on Carmichael Mine (ELA 2014a) was higher than for Moray Downs West (ELA 2014b) and higher than the recommendations in the EE method. Sampling sites were placed in representative areas to ensure the range of variation in habitat observed in the field was sampled in both studies. This is standard practice for these types of assessments and the sampling intensity in both studies was appropriate for the type and relatively uniform nature of the vegetation in this part of Queensland.
- 6.17 MO:** As an example of my concerns regarding the sampling intensity issue, the low sampling intensity is highlighted by utilising Broad Vegetation Groups (BVGs) as surrogates for biodiversity parameters with BVGs 17a and 17b (EE13-EE21) having a sample area of 4.5 ha for an impact area of 8,811 ha (ELA, 2014a). **MO** still considers BVGs or Regional Ecosystems (Res) to be poor surrogates, particularly for parameters such as the spatial distribution of Poaceae in JR1 as affirmed by the recently supplied data. This recent provision of the data on Poaceae from the EE sites further exemplifies the concerns of **MO** from JR1. Reliance on presence/absence data from such a small sample area with no correlation studies between BTF usage of even the restricted range of Poaceae reported in ELA 2014a and 2014b provides little comfort that the statutory agencies had adequate or appropriate data to assess the impact of the proposed Carmichael Mine or the efficacy of the potential offset areas to provide viable food resources for this globally significant population of BTF.
- 6.18 MO:** Whilst the recently provided data provide evidence of the presence (of perhaps only a single tussock of any of the target species) of the target 8 species, this does not provide any more validation of either the EE methodology or the utility of the offset areas to provide a food resource to the known globally significant population of BTF in these areas should for some unknown and unexplained reason they should move there when their known habitat is destroyed beneath the footprint of the proposed Carmichael Mine. **MO** does not expect any greater assurance could be afforded these matters if the data underlying other numerical indices such as Bio-Condition (GHD, 2013b) were available to assess in a similar fashion to that undertaken currently on the recently supplied data. Thus, the supplied data confirms that there remains an inadequate database available to assess the

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spatial patterning of the critical Poaceae across either the proposed Carmichael Mine or the potential offset areas.

- 6.19 MO:** I do not consider it to be useful to rely on a lack of knowledge (**BW** (1st JR) – “I consider a more intensive survey of Poaceae species may not provide a lot more additional guidance about BTF habitat at this time”) and this is the reason for the very real need to invoke the *Precautionary Principle* in this instance as espoused by **MO** in the 1st JR – “Given the current lack of a detailed understanding of the patterning of these Poaceae and the relationship to BTF across the study area, the *Precautionary Principle* must be invoked given the global significance of the BTF population across the study area.”
- 6.20 AC:** It is my view the conditions include a precautionary approach. That is the ongoing detailed assessments must demonstrate appropriate commensurate offsetting for the project to progress. The conditions require demonstration, and includes independent reviews, of appropriate mitigation being achieved.

7.0 2015 BTF RECOVERY TEAM REPORT

- 7.1 **LA & AC:** In the 1st JR, the experts were in agreement that none of the Applicant's reporting provided a detailed assessment of the site's BTF population or BTF habitat values in a regional context (see discussion addressing Issue No. 20). In the 1st JR, there was also criticism centered around the apparent failure of the Applicant's reporting to review a variety of publicly (readily) available recourses or any apparent meaningful attempts to seek or assess data from researchers in order to assist in addressing key issues such as the contextualisation of site's BTF population significance and information to assist in assessing and interpreting habitat characteristics and values (see: first JR 6.7 discussion addressing Issue No. 20).
- 7.2 **LA:** In order to assist in addressing the expert's concerns, one of us (**LA**), has sought data and information from one of those publicly accessible recourses, the Black-throated Finch Recovery Team (BTFRT). A report has been prepared by the BTFRT (BTFRT 2015; **Attachment 1**). The BTFRT is comprised of scientists and those involved in research in a variety of aspects of BTF biology. The BTFRT maintains a database of BTF records. That database contains nearly 3,000 records and spans the period 1800 to present (BTFRT 2015).
- 7.3 **LA & AC:** The BTFRT (2015) report provides data to assist in contextualising the BTF population on the mine site. Furthermore, the BTFRT report provides data which highlights the comparative significance of the BTF population on the mine site and the Townsville population – previously considered to be the largest and most significant population of BTF.
- 7.4 **LA & AC:** A review of the data and interpretation from the BTFRT (2015) report highlights the following contrasts:
- a. The largest flock size recorded for the Townsville population was 150 BTF, in 1996.
 - i. **cf.** the largest flock size recorded for the mine site is >400 BTF, in 2013.
 - b. There are no records of flocks of >100 BTF recorded for the Townsville population in the past 5 years.
 - i. **cf.** there are at least 3 separate records of flocks of >100 BTF on the mine site since 2013.
 - c. There are only 4 records flocks of >100 BTF ever recorded for the Townsville population¹⁰.
 - i. **cf.** for the mine site, there are at least 3 separate records of flocks of >100 BTF since 2013.
 - d. There is only 1 record of a flock >30 BTF recorded for the Townsville population in the past 5 years.
 - i. **cf. for the mine site, there are 16 records of flocks of >30 BTF in the past 5 years¹¹.**
 - e. "The BTFRT no longer assumes the Townsville population to be the largest BTF population. The largest numbers are now thought to be in central Queensland, in the eastern Desert Uplands Bioregion."
 - f. "... that the population in the eastern Desert Uplands Bioregion in the vicinity of Moray Downs is likely to be the most significant and largest population of BTF remaining".

¹⁰ Being 150 in 1996, 134 in 2004, 110 in 2005, and 104 in 2005.

¹¹ **Applicant's reports: 9 records** of >30 BTF flock size, comprising 1 record (April/May 2011), 1 record (November 2011), record (May 2012), 3 records (May 2013), 1 record (October 2013), and 2 records (December 2014). **Additional confirmed reports: 7 records** of >30 BTF flock size, comprising 2 record (July 2012), 1 record (April 2013), 2 records (September 2013), and 2 records (December 2014).

- 7.5 AC:** Much of the above information is only as a result of the subject application and associated assessments. It is not unreasonable to assume that with more detailed work in the wider landscape, similar habitat values (either existing or as ultimately required by conditions), that similar numbers of BTF could also be recorded. It is unlikely that as a result of the proposed actions in regard to the BTF population persistence in and around the eastern Desert Uplands Bioregion, the species and population future is restricted to or obligate upon the disturbance area.
- 7.6 LA:** I agree with **AC** that BTF are not restricted to the subject site or immediate surrounds. I disagree with **AC's** suggestion that with more detailed work in the wider landscape would result in similar numbers of BTF being recorded. I am aware of an expanding body of information which indicates that there is no evidence of BTF occurrence elsewhere which compares with the significance of the BTF population on the mine site.
- 7.7 LA:** For some time, the wider landscape has been of considerable interest to researchers and birdwatchers alike, and has been subject to various EIS surveys by ecological consultants. Despite this extensive work to date, there have been no findings which indicate anything close to the abundance of BTF detected on the mine site. Some examples of survey effort and findings within the wider surrounding landscape, and relevant to the mine site, include:
- 7.7.1** Applicant's own target surveys on adjoining Doongmabulla station and Mellaluka Springs stations in May 2012¹² and during a 12 survey period in March/April 2013¹³ - No BTF recorded¹⁴.
- 7.7.2** Applicant's own target surveys to the east of the mine site for offsite infrastructure assessment (GHD 2013)¹⁵ - included 44 hours of waterbody watches, 2,016 hours of remote camera trap surveys, 15 hours of bird surveys and 32 km of driving transects. Only 1 BTF was recorded.
- 7.7.3** Applicant's own target surveys to the west of the mine site for a quarry (CDM Smith 2013)¹⁶ – included 10 hours of terrestrial surveys over several days, 6 hours of surveys of water bodies, and 8 days of remote camera trap surveys during March and July 2013. No BTF recorded.
- 7.7.4** BTF researcher Stanley Tang spent more than a week in September 2013 searching for BTF on stations to the near north and west of the mine site, though no BTF were recorded (*pers comm.* S. Tang, 2015). That work was undertaken immediately prior to his 3-day survey on the mine site, where he did record BTF and in significant abundance, e.g. a flock of >400 BTF (the largest BTF flock ever recorded).
- 7.7.5** BTF target surveys associated with significant infrastructure projects within Galilee Basin, e.g. the 2010 South Galilee Coal Project EIS, 2011 Alpha Coal and Rail EIS, 2012 Kevin's Corner Coal EIS, and the 2012 Galilee Coal and Rail Project. No BTF recorded.

¹² GHD (2012). Doongmabulla Springs Technical Report. Report for Carmichael Coal Mine and Rail Project: Mine Technical Report.

¹³ GHD (2013). Report for Doongmabulla and Mellaluka Springs. Carmichael Coal Mine and Rail Project SEIS

¹⁴ GHD (2013) "... this species was not observed during either Doongmabulla wetland field survey (2012 and 2013). Large flocks of black-throated finches have been recorded on the Project (Mine) Area nearby (GHD, 2012g)."

¹⁵ GHD (2013). Report for Offsite Infrastructure Ecological Assessment. Carmichael Coal Mine and Rail Project SEIS.

¹⁶ CDM Smith (2013). Environment Protection and Biodiversity Conservation Act 1999: Adani Quarries Environmental Impact Review. Adani Mining Pty Ltd.

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- 7.7.6** I have implemented at least 10 days of target BTF dry and wet season surveys in the northern part of the Galilee Basin (2011-2014). This work has occurred on land to the west, south-west, north-west, south, and east of the Moray Downs property and formed part of a total survey effort of 14 survey-person days. I have recorded BTF and a review of those records shows that average flock size was 2-5 BTF, with a flock of 16 BTF being the largest recorded and observed on land immediately adjacent and to the west of the mine site (October 2011).
- 7.7.7** I have implemented at least 28 days of both dry and wet season target surveys for BTF within the southern part of the Galilee Basin (2011-2012) as part of a total program comprising 62 survey-person days. No BTF recorded.
- 7.7.8** Birdlife Australia (April 2012)¹⁷ – 16 highly experienced bird watchers over a one-month period implemented target surveys throughout the Galilee Basin, including the following stations of geographic relevance to the mine site – Moonoomoo, Doongmabulla, Yarrowmere, Mellaluka, Laglan, Bulliwallah, and around Lake Buchanan. BTF were recorded at 5 sites on 3 properties – Doongmabulla, Yarrowmere and Moonoomoo. One flock of 10 BTF were recorded (adjacent to the mine site) with the remaining sightings of 1 to 2 BTF elsewhere.
- 7.7.9** BTF Recovery Team database results for a search area within 100km of the mine site. All records of >15 BTF derive from the mine site. There is one record of a flock of 13 BTF within the surrounding area, with the majority of records being less than 5 BTF (BTFRT 2015 report; **Attachment 3**).
- 7.7.10** BTF Recovery Team members (2011 onwards) - various surveys, with results of typically of small of up to four BTF, though no large flocks (*pers comm.* E. Vanderduys, BTFRT, 2015).
- 7.7.11** Protect the Bush Alliance (October 2014)¹⁸ – target survey implemented on Mellaluka station by four highly experienced bird watchers over a five-day period. No BTF recorded.
- 7.8 MO:** It is my understanding that analogous detailed studies that conform to the prescribed survey methodologies have been conducted elsewhere in the Galilee Basin (see LA's summary in 7.7) and across the Desert Uplands Bioregion and no analogous concentrations of BTF have been found in those studies. Further, it is my understanding that there is a correlation between the presence of BTF and the following 3 factors:
- Water supply year round (artificial/natural);
 - Woody Habitat for perching and nesting: and,
 - Selected Poaceae that are known food sources for BTF.
- In my view, it is the correlation between these factors that is at the crux of the disagreements in this and the 1st BTF JER.
- 7.9 MO:** It is known that the aforementioned 3 factors are present across the landscape in various permutations and combinations. It is also known that at some, but not all, sites with these 3 factors present, there are known concentrations of BTF that form the globally significant population at the heart of this matter. What is not known is why these concentrations of BTF have not been recorded at seemingly similar sites with analogous habitat factors.

¹⁷ Birdlife Southern Queensland (2012). Galilee Basin Survey 1-30/4/12 Report.

¹⁸ Gillman, S. and Pritchard, T. (2013). Mellaluka Survey Report 2014. Protect the Bush Alliance, Brisbane.

- 7.10 LA:** The data summary in 7.4 clearly supports the view that the habitats of the mine site support a nationally significant BTF population, and one of the largest known BTF populations. Apart from seeking relevant data from the BTF Recovery Team, I have also sought an assessment from Birdlife Australia. In their report dated 28 January 2015¹⁹, Birdlife Australia stated the following:
- a. “The Moray Downs property supports Australia’s largest known population of the Southern Black-throated Finch.”
 - b. “Based on the number of BTF recorded at the site, BirdLife Australia considers the Moray Downs Property one of the most important sites for this species in Australia.”
- 7.11 AC:** It is clearly recognised and previously agreed that the BTF on and around the subject are a significant population. The approval conditions have resulted from both state and commonwealth regulators consideration of the potential impacts.
- 7.12 LA:** From the BTFRT (2015) report, I also note their comments in regard the diet of the BTF, Buffel grass management, and comments of the suitability of the Ecological Equivalence Methodology in regards to assessing BTF habitat values.
- 7.13 MO:** In particular, the recently supplied data does not provide any evidence of the distribution of *Cenchrus ciliaris* which is seen to be of importance for BTF autecology given its acknowledged poor food value to BTF (1st JR). **MO** notes that data on neither the distribution nor the management of *Cenchrus ciliaris* across either the proposed Carmichael Mine or the potential offset areas has been provided amongst the recently supplied data set despite this being a species of significance to BTF and the offset issue in particular. **MO** notes the comment in the BTFRT report (2015) “The BTF is not aware of any successful control programs for *Cenchrus ciliaris*, except for small scale controls using chemical and physical controls (e.g. Desert Park, Alice Springs; WA islands), but no large scale successes are known.”
- 7.14 BW:** There are few examples of the successful control of already established *Cenchrus ciliaris*. However, there is scope for management of this species, particularly on the sandy infertile soils associated with the BTF habitat on Carmichael Mine and Moray Downs West. *Cenchrus ciliaris* does not grow as well on these soils compared to higher fertility clay soils. Increased grazing pressure (Eyre et al. 2003, Franks, 2002) and hot fires (Butler and Fairfax (2003) have been associated with increased *Cenchrus ciliaris* abundance. Therefore management of these factors could lead to a reduction in *Cenchrus ciliaris* abundance. I have seen areas of dense *Cenchrus ciliaris* associated with *Eucalyptus melanophloia* woodlands on sandy infertile soils decrease in abundance and native species richness and abundance increase following decreased/removal of grazing pressure from cattle. In addition, bare ground is known to promote the establishment of *Cenchrus ciliaris* (McIvor, 2003). Therefore reducing grazing pressure, which will reduce the amount of bare ground, is likely to reduce the spread of *Cenchrus ciliaris* compared to a “business as usual” scenario at the offset site. The Alice Springs and WA examples of *Cenchrus ciliaris* control mentioned by **MO** above include manual/herbicide control and reseeding. These methods might be applicable for particular high value offset sites although may not be cost effective across wider areas.
- 7.15 MO:** I do not share the optimism of **BW** that future research **may** provide an answer to the management of *Cenchrus ciliaris* either within the footprint of the proposed Carmichael Mine or across the potential offset areas. I agree with **BW** that the examples proffered in the BTFRT report

¹⁹ A copy of BirdLife Australia report has been provided to AC (20 February 2015).

(2015) would not provide a cost effective management tool in a landscape where the site cannot be isolated from the continual ingress of dispersed seeds of *Cenchrus ciliaris*, the most widespread and abundant introduced plant found across Australia.

- 7.16 AC:** In respect to the sites BTF population and its context there is little doubt that local landscape holds a significant population. It should be noted that this information is only known as a result of the studies undertaken to date.
- 7.17 AC:** The proposed establishment of a BTF Bioregional Management Plan will further describe the characteristics of the regional population and identify known/potentially suitable habitat and where information is required. It should be noted that there has been a considerably higher level of assessment within the subject area and that there is a lack of such information in other areas across the region to allow accurate comparative assessment on a regional basis.
- 7.18 AC:** In addition, as the project progresses there is a requirement to undertake more detailed and specific assessment of the habitat values and to have these assessments reviewed (See: Coordinator Generals report conditions I2 to I7) within the disturbance area and offsets to accurately measure habitat values lost and gained.
- 7.19 AC:** The approval conditions and proposed offsets to date will result in the protection and long term management of suitable habitats for BTF in the local landscape. The ongoing protecting and management, including restoration actions, would otherwise be unrequired, and thus there would be no certainty the current BTF habitat values on the subject lands (project area and offset sites) would remain, due to ongoing pastoral activities and other recognised threats continuing unabated.
- 7.20 LA:** I understand **AC's** position outlined in 7.18, which has been expressed by **AC** in a variety of ways in the 1st JR. I reiterate that as I appreciate, project approvals have been granted on the understanding that the accepted deficiencies in the BTF survey and habitat assessments²⁰, the assessment of impact significance, and the utility of proposed offsets can all be improved post-approval, as a result of implementing the relevant approval conditions, to the extent that both project impacts and impact mitigation strategies can be ultimately deemed suitable/acceptable. As there appears to be no impact thresholds nominated by the relevant approval conditions, it seems that the only likely primary response to new knowledge which describes an increase in impact significance is by way of providing additional offsets.
- 7.21 LA:** As a result of my reviews of data for this 2nd JR, and as outlined in the 1st JR, it is certainly not clear to me that a significant component of the currently proposed offset areas provide habitat suitable to BTF or represent an acceptable discharge of the potential offset obligation, commensurate with the potential significance of the impact to this nationally significant BTF population. Furthermore, there is no existing information to demonstrate that a potential increase in the offsets required, could be found within the area surrounding the mine site.
- 7.22 AC:** The information on BTF and their habitat partitioning gained to date and ultimately obtained from the further assessments required by approval conditions, will result in a significant increase in understanding of BTF and their habitat requirements.

²⁰ The Coordinator-General's report was highly critical of all aspects of that BTF survey program, concluding that as a result of the identified deficiencies, the abundance of BTF had been grossly understated and the description of BTF habitat was incorrect.

7.23 MO: The statements above by **AC** confirm that the “Precautionary Principle” should be invoked until such times as there is greater certainty and understanding of the unique properties of this area supporting this globally significant population of BTF. **MO** is unaware of any other records even remotely similar to those from the study area, but concedes that **AC** and **LA** have greater expertise in that area. **MO** does not share the optimism of **AC** that there is adequate understanding of why the BTF populations in the study area utilise the areas (particularly the Poaceae food sources) they are currently known from or would move into offset areas when these areas are lost beneath the proposed Carmichael Mine footprint. Specifically, the recently supplied data (and that supplied to date) do not provide an adequate database to interpret the spatial distribution of the critical Poaceae or the relationships between the known concentrations of BTF and those Poaceae resources across the study area.

8.0 POTENTIAL CHANGES TO THE MINE LAYOUT

- 8.1 AC:** In relation to the proposed change in mine design referred to in paragraphs 3.2 to 3.4 of the 1st JR, we requested further information on any proposed changes.
- 8.2 LA:** It should be noted that “proposed changes to the mine layout” were alluded to in the 1st JR by **AC**, though no detail was divulged.
- 8.3 AC:** It is understood that Adani is pursuing approval of the Carmichael Coal Mine as described during the Environmental Impact Statement (EIS) process.
- 8.4 AC:** As part of that ongoing refinement and development of detailed engineering design, some modifications to the initial development phase of the Mine layout are being considered.
- 8.5 AC:** we were provided with 3 figures which showed the original layout, the revised layout, and a separate figure which highlighted some changes in disturbance footprint.
- 8.6 AC:** We are uncertain as to whether or not the proposed changes have been notified formally.
- 8.7 LA:** As I am aware, there is no formal notification of proposed changes for the experts to properly consider. Furthermore, I am not aware of any requests to other discipline experts to jointly assess any formal or informal changes to the mine layout as proposed by the Applicant.
- 8.8 MO:** I share the view of **LA** espoused in 8.7.
- 8.9 AC;** The modified layout would include:
- I. a new location for Underground Mine 1 (Pit A) which may be moved approximately two kilometres southeast towards and underneath the open cut Pit B;
 - II. the relocation of the mine infrastructure area located east of Underground Mine 1 to be within the footprint of Pit B. Open cut Pit B would remain in the same location as set out in the Supplementary EIS (SEIS) mine layout; and
 - III. the reduction of top soil storage areas located in the north east and east of the SEIS Mine layout, such that they would be accommodated within a spoil storage area located between Pit B and C.
- 8.10 AC:** as noted in the first JR that should a northern portion of the lease may have a reduced footprint size and an increased area of underground mining where previously open cut mining was intended. This change would reduce the potential direct and indirect impacts on the BTF habitats.

8.11 AC: Given the northern portion is recognised as the area holding the higher value habitats this change, if undertaken, is viewed as a reduction in potential impacts on high value BTF habitats.

9.0 CLOSING COMMENTS AND RECOMMENDATIONS

9.1 MO: I recommend that a research project be funded to determine the correlation between water source, woody habitat and Poaceae food resources across both the proposed Carmichael Mine and the potential offset areas to determine the inter-relationships between these factors. It is considered that only when the outcomes of this research project are known could the existing data gaps be filled and consequently, it would provide some degree of confidence that there is an adequate understanding of the autecology of BTF across the study area. Further, it is considered that then, and only then, could the utility of the potential offset areas be appropriately assessed to provide the habitat required for the globally significant population of BTF that is co-incident with the footprint of the proposed Carmichael Mine. I defer to the expertise of **AC** and **LA** regarding the question of the movement (natural or artificial) from the mine footprint into the potential offset areas. My understanding is that no concentrations of BTF have been recorded from the potential offset areas to date that are analogous to the concentrations observed within the footprint of the proposed Carmichael Mine.

9.2 AC: Considerable portions of the disturbance footprint contain high value habitats for BTF, as does the surrounding landscape including the proposed offsets. The provision and protection of the considerable offset values currently mandatory on the approval provides a long term net benefit in retained and secure habitat values.

9.3 LA: Evidence within this 2nd JR provides further confirmation of the national significance of the BTF population on the mine site. Furthermore, that the abundance of BTF on the mine site strongly contrasts with evidence of BTF abundance elsewhere in the wider landscape. This 2nd JR also provides further evidence of the fundamental deficiencies in the Applicant's BTF survey and habitat assessment reports. On the evidence within this 2nd JR, and in conjunction with evidence provided in the 1st JR, I have formed the view that there can be no confidence that a potentially significant impact to a nationally significant BTF population can be averted or suitably mitigated were the proposed mine to proceed on the basis of the current approval and suite of conditions. In both this Joint Report and the 1st JR, my counterpart and I are in firm agreement in regards to many issues, not the least, that there is a nationally significant BTF population on the mine site, and that the Applicant's survey and monitoring program is flawed. Beyond those strong points of agreement, our positions diverge as I do not share the same enthusiasm or confidence that **AC** and **BW** maintain in regards to the suitability of the proposed impact mitigation strategy, which is largely underpinned by the proposed offsets. Here the fundamental concerns I have are: a) there are no impact thresholds nominated by the relevant approval conditions to assess the performance of the impact mitigation strategy, and b) that there is insufficient evidence to assert that the proposed offsets are suitable.



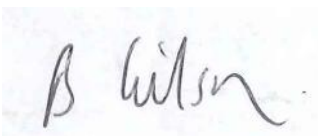

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Attachments

- Attachment 1:** Summary of Black-throated Finch Records not included within the Applicant's Reporting
- Attachment 2:** Grass Species Known or Suspected within the Diet of Black-throated Finch (southern) - A Data Comparison prepared by Lindsay Agnew
- Attachment 3:** Black-throated Finch Recovery Team Report

Date of Agreement: 27th February 2015

| | |
|---|--|
|  |  |
| Adrian Caneris | Lindsay Agnew |
|  |  |
| Bruce Wilson | Mike Olsen |

Attachment 1 - 2nd BTF Joint Report

Summary of Black-throated Finch Records not included within the Applicant's Reporting

Note: Records of SL (>150 BTF; 17/09/2013) and ST (100 BTF; 18/09/2013) are considered to represent part of other reported records and have not been included in the summary data analysis.

| Location | Date | Observer | Adults | 1 | 2-4 | 5-9 | 10-19 | 20-29 | 30+ | Records | Sites | Number of BTF Observations | 40 |
|--------------------------------------|------------|----------|--------|---|-----|-----|-------|-------|-----|---------|-------|--------------------------------|------|
| Intersection of 10 mile Rd & 40 line | 15/07/2012 | SL | 12 | | | | 1 | | | 1 | 1 | Number of BTF Record Sites | 33 |
| 10 mile Rd near 70 line | 25/09/2012 | SL | 10 | | | | 1 | | | 1 | 1 | Cumulative # of BTF recorded | 1019 |
| 10 mile bore | 6/04/2013 | SL | 75 | | | | | | 1 | 1 | 1 | BTF Flock Size - Minimum | 1 |
| 11 mile bore | 11/07/2013 | SL | 15 | | | | 1 | | | 1 | | BTF Flock Size - Maximum | 400 |
| 10 mile bore waterhole | 25/07/2013 | SL | 8 | | | 1 | | | | 1 | 1 | BTF Flock Size - Average | 40 |
| ten mile bore and water hole | 17/09/2013 | SL | 150 | | | | | | 1 | 1 | | BTF Flock Size - Median | 9 |
| middle Murphy bore | 18/04/2014 | SL | 1 | 1 | | | | | | 1 | 1 | Number of records of 1 BTF | 3 |
| 10 mile bore & surrounds | 18/09/2013 | ST | 400 | | | | | | 1 | 1 | 1 | Number of records of 2-4 BTF | 11 |
| 10 mile bore & surrounds | 18/09/2013 | ST | 100 | | | | | | 1 | 1 | | Number of records of 5-9 BTF | 7 |
| 10 mile bore & surrounds | 19/09/2013 | ST | 40 | | | | | | 1 | 1 | | Number of records of 10-19 BTF | 8 |
| Site 1 - 1st JR | 03/12/2014 | AC | 3 | | 1 | | | | | 1 | 1 | Number of records of 20-29 BTF | 3 |
| Site 2 - 1st JR | 03/12/2014 | AC | 3 | | 1 | | | | | 1 | 1 | Number of records of >30 BTF | 7 |
| Site 3 - 1st JR | 04/12/2014 | AC | 3 | | 1 | | | | | 1 | 1 | | |
| Site 4 - 1st JR | 04/12/2014 | AC | 13 | | | | 1 | | | 1 | 1 | | |
| Site 5 - 1st JR | 04/12/2014 | AC | 17 | | | | 1 | | | 1 | 1 | | |
| Site 3 - 1st JR | 05/12/2014 | AC | 36 | | | | | | 1 | 1 | | | |
| Site 2 - 1st JR | 05/12/2014 | AC | 22 | | | | | 1 | | 1 | | | |
| Site 6 - 1st JR | 06/12/2014 | AC | 120 | | | | | | 1 | 1 | 1 | | |
| Site 7 - 1st JR | 07/12/2014 | AC | 3 | | 1 | | | | | 1 | 1 | | |
| Site 7 - 1st JR | 08/12/2014 | AC | 8 | | | 1 | | | | 1 | | | |
| Site 8 - 1st JR | 17/04/2012 | LA | 9 | | | 1 | | | | 1 | 1 | | |
| Site 9 - 1st JR | 17/04/2012 | LA | 2 | | 1 | | | | | 1 | 1 | | |
| Site 10 - 1st JR | 24/11/2014 | LA | 2 | | 1 | | | | | 1 | 1 | | |
| Site 11 - 1st JR | 24/11/2014 | LA | 25 | | | | | 1 | | 1 | 1 | | |
| Site 12 - 1st JR | 24/11/2014 | LA | 6 | | | 1 | | | | 1 | 1 | | |
| Site 13 - 1st JR | 24/11/2014 | LA | 1 | 1 | | | | | | 1 | 1 | | |
| Site 15 - 1st JR | 25/11/2014 | LA | 9 | | | 1 | | | | 1 | 1 | | |
| Site 16 - 1st JR | 25/11/2014 | LA | 2 | | 1 | | | | | 1 | 1 | | |
| | 09/06/2012 | E&HP | 10 | | | | 1 | | | 1 | 1 | | |
| | 10/06/2012 | E&HP | 2 | | 1 | | | | | 1 | 1 | | |
| | 12/06/2012 | E&HP | 8 | | | 1 | | | | 1 | 1 | | |
| | 14/06/2012 | E&HP | 6 | | | 1 | | | | 1 | 1 | | |
| | 18/06/2012 | E&HP | 1 | 1 | | | | | | 1 | 1 | | |
| | 20/06/2012 | E&HP | 10 | | | | 1 | | | 1 | 1 | | |
| | 29/06/2012 | E&HP | 2 | | 1 | | | | | 1 | 1 | | |
| | 26/06/2012 | E&HP | 10 | | | | 1 | | | 1 | 1 | | |
| | 30/06/2012 | E&HP | 1 | | 1 | | | | | 1 | 1 | | |
| | 02/07/2012 | E&HP | 50 | | | | | | 1 | 1 | 1 | | |
| | 05/07/2112 | E&HP | 50 | | | | | | | 1 | 1 | | |
| | 05/07/2112 | E&HP | 4 | | 1 | | | | | 1 | 1 | | |
| survey site BTF 1 | 9/09/2014 | ELA | 20 | | | | | 1 | | | | | |

Attachment 2 - 2nd BTF Joint Report

Grass Species Known or Suspected within the Diet of Black-throated Finch (southern) A Data Comparison prepared by Lindsay Agnew

Table Notes:

Column 1 - **Grey Literature** (Reported Observations – Confirmed genera and species)

Column 2 - **Grey Literature** (Reported Observations – Confirmed species only)

Column 3 - **Grey Literature** (Reported Observations - Suspected by researcher/report author, though not confirmed)

Column 4 - **Carmichael Mine** (Grass species recorded at survey sites where BTF recorded; APP C, GHD 2013)

Column 5 - **Carmichael Mine** (“Key Grass Species” used to augment the Ecological Equivalence Methodology; species listed in DEWHA (2009))

* - Introduced grass species

Species highlighted in **bold** – Grass species common to Columns 2/3 and 4, i.e. grass species reported in literature which were also recorded on the mine at survey sites where BTF were recorded.

| Poaceae | Column 1 | Column 2 | Column 3 | Column 4 | Column 5 |
|---|----------|----------|----------|----------|----------|
| Alloteropsis semialata | 1 | 1 | | 1 | 1 |
| <i>Alloteropsis cimicina</i> | 1 | 1 | | | |
| <i>Aristida calycina</i> var. <i>calycina</i> | | | | 1 | |
| <i>Aristida contorta</i> | | | | 1 | |
| <i>Aristida holathera</i> | | | | 1 | |
| <i>Aristida hygrometrica</i> | | | | 1 | |
| <i>Aristida ingrata</i> | | | | 1 | |
| <i>Aristida jerichoensis</i> | | | | 1 | |
| <i>Aristida latifolia</i> | | | | 1 | |
| <i>Aristida queenslandica</i> | | | | 1 | |
| <i>Aristida</i> sp. | | | | | |
| <i>Astrebla pectinata</i> | | | | 1 | |
| Bothriochloa decipiens | 1 | 1 | | 1 | |
| <i>Bothriochloa ewartiana</i> | | | | 1 | |
| <i>Bothriochloa pertusa</i> * | | | | 1 | |
| <i>Cenchrus ciliaris</i> * | | | | 1 | |
| <i>Chloris inflata</i> * | 1 | 1 | | | |
| <i>Chloris</i> spp. | 1 | | | | |
| Chrysopogon fallax | | | 1 | 1 | |
| <i>Cleistochloa subjuncea</i> | | | | 1 | |
| <i>Cymbopogon obtectus</i> | | | | 1 | |
| Dactyloctenium radulans | 1 | 1 | | 1 | |
| <i>Dactyloctenium</i> sp. | 1 | | | | |
| Dicanthium sericeum | 1 | 1 | | 1 | 1 |
| <i>Digitaria ammophila</i> | | | | 1 | |
| Digitaria brownii | | | 1 | 1 | |
| <i>Digitaria ciliaris</i> * | 1 | 1 | | | |
| Digitaria divaricatissima | | | 1 | 1 | |
| <i>Digitaria</i> sp. | 1 | | | | |
| <i>Echinochloa colona</i> * | 1 | 1 | | | |
| <i>Echinochloa crus-galli</i> * | | | | 1 | |
| <i>Echinopogon</i> sp. | 1 | | | | |
| <i>Eleusine indica</i> * | 1 | 1 | | | |
| <i>Enneapogon polyphyllus</i> | | | | 1 | |
| <i>Enneapogon robustissimus</i> | | | | 1 | |
| <i>Enteropogon acicularis</i> | 1 | 1 | | | 1 |
| Enteropogon ramosus | | | 1 | 1 | |
| <i>Eragrostis basedowii</i> | 1 | 1 | | | |
| <i>Eragrostis cumingii</i> | | | | 1 | |

| Poaceae | Column 1 | Column 2 | Column 3 | Column 4 | Column 5 |
|-------------------------------------|-----------|-----------|-----------|-----------|----------|
| <i>Eragrostis lacunaria</i> | | | | 1 | |
| <i>Eragrostis leptostachya</i> | | | | 1 | |
| <i>Eragrostis sororia</i> | 1 | 1 | | 1 | 1 |
| <i>Eragrostis sp.</i> | 1 | | | | |
| <i>Eragrostis speciosa</i> | | | | 1 | |
| <i>Eragrostis tenuifolia*</i> | | | | 1 | |
| <i>Eremochloa bimaculata</i> | 1 | 1 | | | |
| <i>Eremochloa sp.</i> | 1 | | | | |
| <i>Eriachne mucronata</i> | | | | 1 | |
| <i>Eriachne obtusa</i> | | | | 1 | |
| <i>Eulalia aurea</i> | | | 1 | 1 | |
| <i>Heteropogon contortus</i> | | | 1 | 1 | |
| <i>Iseilema vaginiflorum</i> | | | | 1 | |
| <i>Melinis repens</i> | 1 | 1 | | 1 | |
| <i>Oxychloris scariosa</i> | | | 1 | 1 | |
| <i>Panicum decompositum</i> | 1 | 1 | | 1 | 1 |
| <i>Panicum effusum</i> | 1 | 1 | | | 1 |
| <i>Panicum sp.</i> | 1 | | | | |
| <i>Paspalidium rara</i> | | | 1 | | |
| <i>Paspalidium sp.</i> | 1 | | | | |
| <i>Paspalum sp.</i> | 1 | 1 | | | |
| <i>Sarga plumosum</i> | | | | 1 | |
| <i>Schizachyrium fragile</i> | | | 1 | 1 | |
| <i>Schizachyrium spp.</i> | 1 | | | | |
| <i>Sehima nervosum</i> | | | | 1 | |
| <i>Setaria apiculata</i> | 1 | 1 | | | |
| <i>Setaria sp.</i> | 1 | | | | |
| <i>Setaria surgens</i> | 1 | 1 | | | |
| <i>Sorghum spp.</i> | 1 | 1 | | | |
| <i>Sporobolus caroli</i> | 1 | 1 | | | |
| <i>Sporobolus diander</i> | | | 1 | | |
| <i>Sporobolus indicus</i> | | | 1 | | |
| <i>Themeda avenacea</i> | | | | | |
| <i>Themeda triandra</i> | 1 | 1 | | 1 | 1 |
| <i>Triodia pungens</i> | | | 1 | 1 | |
| <i>Urochloa mosambicensis*</i> | 1 | 1 | | | 1 |
| Totals | 33 | 23 | 12 | 45 | 8 |

Attachment 3 - 2nd BTF Joint Report



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27 January 2015

Lindsay Agnew
Austecology
5 Davina Street, Tarragindi, Q, 4121
By email (lindsay@austecology.com.au)

Re Request for information by Lindsay Agnew, 21 January 2015

Herein, we provide responses to your letter request, dated 21 January 2015.

The Black-throated Finch Recovery Team (BTFRT) maintains a database of Black-throated finch (BTF) records. The database contains 2907 lines of data ("records"), with abundances ranging from 0 (= an unspecified number of birds) to 400. The database spans the period 1800 – present, with 69 records having no timeframe given (i.e. the year of the record is not known). Accuracy of many of the earlier records is difficult to assess, with the earliest record that has an associated abundance being 1976.

1. Characteristics of the Townsville BTF population

1.1. What is the largest flock size (and record date) recorded for the Townsville population.

I clipped BTF records by the Townsville Coast Plains IBRA subregion for this query.

There are three flocks containing over 100 individuals, 134 (Oct 2004), 110 (Oct 2005), and 104 (Sept 2005) respectively.

1.2. How many records (and individual sites) are there for flocks of 100 or more BTF in the past 5 years for the Townsville population.

Area queried is the same as for 1.1.

None.

1.3. Apart from Mitchell's 1996 observation of 150 BTF, is the BTFRT aware of any other records of flocks greater than 100 BTF for the Townsville population.

See 1.1.

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1.4. How many records (and individual sites) are there for flocks of over 30 or more BTF in the past 5 years for the Townsville population.

Area queried is the same as for 1.1. Years queried were 2010, 2011, 2012, 2013, 2014, 2015.

There is one record over 30 individuals at one time and place. The record was of 43 birds in Oct 2013.

In addition to this, Juliana Rechetelo has collected data in the Townsville region for the last 3 years for her PhD thesis, and has recorded flocks of over 30 individuals on several occasions (in one location) – likely including many of the same individuals repeatedly observed. These records are not yet in the BTFRT database.

1.5. The 2010 Action Plan provided an estimate of no more than 600 "mature" individuals for the Townsville population. What is the BTFRT's current estimate for the Townsville population.

The 600 figure was a very rough guess and is unsubstantiated. The general feeling among BTFRT members is that the population is likely less than this figure.

2. 2010 action plan for Australian Birds

2.1. The 2010 Action Plan noted that the Townsville population is "assumed" to be the largest of three BTF subpopulations. Given that the assumption is approximately 5-years old, and further information has been collected throughout the distribution of the BTF, does the BTFRT maintain that the Townsville population remains the largest BTF subpopulation.

The BTFRT no longer assumes the Townsville population to be the largest BTF population. The largest numbers are now thought to be in central Queensland, in the eastern Desert Uplands Bioregion.

2.2. The 2010 Action Plan also characterised two other subpopulations, that of the Ingham region and the third subpopulation associated with "scattered sites in central-eastern Queensland.

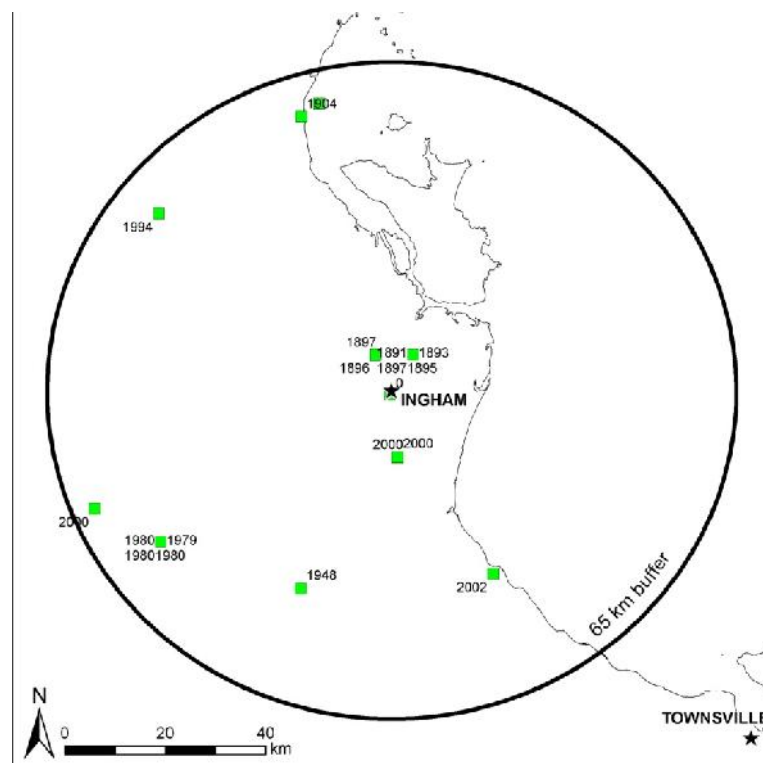
2.2.1. Can the BTFRT provide an estimate of the BTF subpopulation of the Ingham region.

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The BTFRT has insufficient data on BTF from the Ingham region to provide a subpopulation estimate for that region. In the BTFRT database there is a total of 23 records within a 65 km radius (chosen so as not to collect Townsville population records) of Ingham town centre, all of unspecified number, some suspected of being low spatial accuracy, and some probable duplicates.



2.2.2. Can the BTRF provide a view on the status of the BTF subpopulation of the Ingham region.

In view of the information given above, only broad inferences may be made about any BTF population in the Ingham region. It seems unlikely that it forms a significant and/or stable population, but without further records and investigation this assumption is only weakly supported by evidence.

2.3. The 2010 Action Plan, in referring to the third subpopulation, noted the following –
“Poorly known subpopulations in central-eastern Qld are assumed to have no more than 400 mature individuals.”

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2.3.1. Can the BTRF provide a view on the significance or otherwise of the BTF population recorded on the Moray Downs property.

It is the current (Jan 2015) view of the BTFRT that the population in the eastern Desert Uplands Bioregion in the vicinity of Moray Downs is likely to be the most significant and largest population of BTF remaining.

3. BTF records and information for the Area surrounding the Site

3.1. Can the BTFRT provide any records for the area surrounding the Moray Downs property. I suggest a search area buffer of 100km based on the nominal centre of the site, being UTM 55 K 433555.15 m E 7565429.39 m S. A simple plan depicting that area is **attached**.

The following table has BTF records listed chronologically. Zero in the abundance column indicates that the number of individuals was not recorded. This table is derived from a 100 km radius buffer around the boundary of Moray Downs property, as opposed to the centroid provided above, and so is a slightly more generous area.

| ABUND | YEAR | X | Y |
|-------|------|----------|----------|
| 0 | 1845 | 146.9167 | -21.2000 |
| 0 | 1970 | 145.8667 | -22.7500 |
| 0 | 1978 | 146.5000 | -22.5000 |
| 0 | 1978 | 146.9167 | -21.9167 |
| 0 | 1978 | 146.9167 | -21.5833 |
| 0 | 1978 | 147.4167 | -21.4167 |
| 0 | 1978 | 146.2500 | -21.1667 |
| 0 | 1979 | 146.4167 | -21.7500 |
| 0 | 1979 | 146.5833 | -21.5833 |
| 0 | 1979 | 146.2080 | -20.9580 |
| 0 | 1979 | 146.1678 | -20.9485 |
| 0 | 1980 | 146.2500 | -22.4167 |
| 0 | 1980 | 146.2500 | -22.0833 |
| 0 | 1980 | 146.1761 | -21.0901 |
| 0 | 1980 | 146.2511 | -21.0818 |
| 0 | 1980 | 146.2928 | -21.0401 |
| 0 | 1981 | 146.2910 | -21.0410 |
| 0 | 1981 | 146.7511 | -21.0818 |
| 0 | 1981 | 146.6428 | -21.0401 |
| 0 | 1982 | 146.1750 | -21.0910 |
| 0 | 1982 | 146.2910 | -21.0830 |

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| ABUND | YEAR | X | Y |
|-------|------|----------|----------|
| 0 | 1986 | 146.0000 | -21.0000 |
| 0 | 1986 | 146.8719 | -21.5151 |
| 0 | 1993 | 145.7796 | -21.5168 |
| 0 | 1994 | 145.9358 | -21.7558 |
| 0 | 1998 | 145.9656 | -21.8364 |
| 0 | 1998 | 145.9467 | -21.5328 |
| 0 | 1998 | 145.9460 | -21.5330 |
| 0 | 1998 | 145.9656 | -21.8364 |
| 0 | 1998 | 145.9467 | -21.5328 |
| 0 | 1999 | 145.9995 | -21.7919 |
| 0 | 1999 | 145.5375 | -22.6531 |
| 1 | 1999 | 145.5375 | -22.6529 |
| 1 | 1999 | 145.5375 | -22.6529 |
| 4 | 1999 | 145.9994 | -21.7919 |
| 0 | 1999 | 145.5370 | -22.6530 |
| 0 | 1999 | 145.9650 | -21.8360 |
| 0 | 1999 | 146.4787 | -21.8046 |
| 0 | 2001 | 146.0417 | -21.9639 |
| 0 | 2001 | 145.9906 | -21.4469 |
| 0 | 2003 | 146.1181 | -22.2910 |
| 0 | 2003 | 146.2156 | -22.1681 |
| 0 | 2003 | 146.2350 | -22.0923 |
| 0 | 2003 | 146.1181 | -22.2910 |
| 0 | 2003 | 146.2156 | -22.1681 |
| 0 | 2003 | 146.2350 | -22.0923 |
| 0 | 2005 | 146.2183 | -21.9383 |
| 0 | 2005 | 146.2318 | -21.9372 |
| 0 | 2005 | 146.2375 | -21.9104 |
| 13 | 2012 | 146.1950 | -21.1735 |
| 1 | 2012 | 146.1992 | -21.1888 |
| 3 | 2012 | 146.0687 | -21.9660 |
| 2 | 2012 | 146.0824 | -21.9692 |
| 5 | 2012 | 146.0896 | -21.9717 |
| 4 | 2012 | 146.1354 | -21.9905 |
| 8 | 2012 | 146.3753 | -21.9972 |
| 19 | 2012 | 145.9756 | -21.4581 |
| 10 | 2012 | 145.9974 | -21.7929 |
| 10 | 2012 | 145.9824 | -21.7771 |
| 4 | 2012 | 146.2858 | -22.0454 |
| 1 | 2012 | 145.9769 | -21.4598 |
| 1 | 2012 | 146.2684 | -21.9147 |
| 20 | 2012 | 146.2733 | -21.9150 |

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| ABUND | YEAR | X | Y |
|-------|------|----------|----------|
| 3 | 2012 | 146.3673 | -21.9612 |
| 3 | 2012 | 146.2292 | -21.9071 |
| 30 | 2012 | 146.2197 | -21.8515 |
| 10 | 2012 | 146.2145 | -21.8508 |
| 13 | 2012 | 146.2424 | -21.8542 |
| 10 | 2012 | 146.2685 | -21.8573 |
| 5 | 2012 | 146.2877 | -21.8596 |
| 4 | 2013 | 146.2604 | -21.9368 |
| 10 | 2013 | 146.2479 | -21.9210 |
| 30 | 2013 | 146.2137 | -21.9512 |
| 1 | 2013 | 146.2305 | -21.9335 |
| 11 | 2013 | 146.2167 | -21.8820 |
| 1 | 2013 | 146.1968 | -21.8489 |
| 8 | 2013 | 146.2699 | -21.9278 |
| 33 | 2013 | 146.3306 | -21.9759 |
| 1 | 2013 | 146.3264 | -21.8766 |
| 19 | 2013 | 146.2165 | -21.8677 |
| 14 | 2013 | 146.2221 | -21.8517 |
| 24 | 2013 | 146.2157 | -21.8827 |
| 2 | 2013 | 146.3458 | -21.9980 |
| 30 | 2013 | 146.2412 | -21.9340 |
| 8 | 2013 | 146.2569 | -21.9263 |
| 8 | 2013 | 146.4099 | -22.1687 |
| 3 | 2013 | 146.2913 | -21.9406 |
| 1 | 2013 | 146.2582 | -21.9197 |
| 41 | 2013 | 146.2573 | -21.9202 |
| 1 | 2013 | 146.3099 | -21.9012 |
| 3 | 2013 | 146.4092 | -22.1873 |
| 10 | 2013 | 146.4329 | -22.1775 |
| 11 | 2013 | 146.3833 | -22.1376 |
| 2 | 2013 | 146.4092 | -22.1873 |
| 400 | 2013 | 146.2574 | -21.9200 |

3.2. I am aware of 22 grass Genera which are known to provide feeding resources for BTF to varying degrees. These are from the following Genera: *Alloteropsis* spp., *Bothriochloa* spp., *Chloris* spp. (native and introduced sp.), *Dactyloctenium* spp., *Dichanthium* spp., *Digitaria* spp. (native and introduced sp.), *Echinochloa* spp., *Echinopogon* sp., *Eleusine* sp., *Enteropogon* sp., *Eragrostis* spp., *Eremochloa* sp., *Eriachne* sp., *Melinis* sp., *Panicum* spp., *Paspalidium* sp., *Paspalum* sp., *Schizachyrium* spp., *Setaria* spp., *Sporobolus* spp., *Themeda*

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sp., and *Urochloa* sp. Other genera for which I am not aware of any positive feeding records, though suspected of being used by BTF include *Eulalia* spp., *Aristida* spp., and *Triodia* spp.

There does not seem to be any glaring omissions from the above list. See also Nicole Isles (2007) thesis. Available from BTFRT.

3.2.1. As I appreciate, much of the above is derived from observations within other parts of the BTF's distribution. Can the BTFRT provide a view as to the general relevance of this suite of grass Genera to BTF within the area I am considering.

3.2.2. In regards to improving foraging habitat values relevant to BTF, is the BTFRT aware of any examples where the implementation of a weed control program targeting *Cenchrus ciliaris* has been successful on larger sites such as cattle grazing properties.

The BTF is not aware of any successful control programmes for *Cenchrus ciliaris*, except for small scale controls using chemical and physical controls (e.g. Desert Park, Alice Springs; WA islands), but no large scale successes are known.

4. Assessment of BTF habitat Values

4.1. In regards to the assessment of BTF habitat values, is the BTFRT aware of any habitat assessment guidelines which would provide particular focus on the habitat resources and conditions which are specifically relevant to BTF.

4.2. I am aware that two sets of widely available guidelines that have been used to assess, amongst other ecological values, those of habitat values for BTF. These have been used on the project site to determine the comparative values of habitats within project impact areas and proposed offset areas for BTF. These are the *Ecological Equivalence Methodology Guideline3* and the *BioCondition* methodology.

4.2.1. Does the BTFRT have a view on whether such assessment guidelines are specific enough to identify habitat values for BTF and form the basis for habitat modelling systems.

There is no single proven assessment guideline. There is geographic bias in the management guidelines (towards the Townsville region), but these are not BTF range wide. Habitat modelling based on bioclimatic and regional ecosystem data was used in Vanderduys et al "*Addressing potential cumulative impacts of development on*

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threatened species: the case of the endangered black-throated finch", and the layers generated can be provided if necessary.

There are also unpublished data arising from Juliana Rechetelo's work on the Townsville coast plains, but these analyses have not been finalised as yet.

Yours sincerely

A handwritten signature in black ink, appearing to read "A.C. Grice". The signature is written in a cursive style with a large initial "A" and "G".

Dr. A.C. Grice
Chair, Black-throated Finch Recovery Team