

**Independent report regarding the possible occurrence of Carpentarian Grasswren  
(*Amytornis dorotheae*) on Tanumbirini station in the Northern Territory**

*Prepared by Conservation Partners 17/12/2025*

**Authors**

Henry J. Stoetzel (primary author), Nick Leseberg (final review)

Conservation Partners | phone: 0488735803 | [henry.stoetzel@conservationpartners.org.au](mailto:henry.stoetzel@conservationpartners.org.au)

**Contents**

**1. Introduction**

1.1 Context

1.2 Conservation Significance of the Record

1.3 Purpose and Scope of This Independent Assessment

1.4 Data Sources

1.5 Key Findings

**2. Background Information**

2.1 Relevant Ecological Knowledge

2.2 Detection and Survey Considerations

2.3 Threats

**3. Assessment of the 2024 Tanumbirini Record**

3.1 Biogeographic Context of the Record

3.2 Vegetation at the Site

3.3 Fire History at the Site

**4. Conclusions and Recommendations**

4.1 Likelihood of Occurrence

4.2 Conservation Significance

4.3 Implications for Impact Assessment

4.4 Recommended Next Steps

**5. References**

**6. Expert Witness Declaration and Statement of Compliance**

## 1. Introduction

### 1.1 Context

In December 2024, fauna surveys undertaken on Tanumbirini Station recorded an individual identified in the survey results as “Grass wren” (*Amytornis* sp.) within the family Maluridae. The record was reported as not corresponding to a species listed under either the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the *Territory Parks and Wildlife Conservation Act 1976* (NT TPWC Act) (Appendix F: Beetaloo Basin Appraisal Pilot Environment Management Plan). The taxonomic identification was not resolved to species level, and no supporting diagnostic information was provided in the survey documentation.

The genus *Amytornis* comprises 14 species of grasswrens, each characterised by narrow habitat requirements and generally restricted distributions (Christidis 1999, Christidis et al. 2010, Christidis et al. 2013). The EP161 area on Tanumbirini Station is located approximately 100 km west of the historically recognised distribution of the Carpentarian Grasswren (*Amytornis dorotheae*), and more than 350 km from any known population. The only other *Amytornis* species known to occur within several hundred kilometres are the Dusky Grasswren (*A. purnelli*), recorded approximately 180–200 km to the south-west in the arid interior, and the White-throated Grasswren (*A. woodwardi*), which is confined to the sandstone landscapes of the Arnhemland Plateau more than 350 km to the north-west (Birdlife Australia unpublished, Atlas of Living Australia).

The Carpentarian Grasswren was originally described from a specimen collected approximately 160 km east of the record in question (Fleming and Strong 1990). On biogeographic grounds, it therefore represents the most plausible candidate species within the genus *Amytornis* should the Tanumbirini observation correspond to a grasswren. An alternative explanation is that the record represents a superficially similar species, recorded either through misidentification or misclassification within the species list.

Substantial uncertainty surrounds this record. The Carpentarian Grasswren is listed as Endangered, with population declines and local extirpations strongly linked to altered fire regimes (Garnett 2021). The species is widely considered to have been extirpated from the northern extremity of its former range, including areas west of Borrooloola. Consequently, while the record warrants careful consideration, it should be treated with caution in the absence of corroborating evidence such as photographic documentation, call recordings, or repeat detections.

### 1.2 Conservation Significance of the Record

The Carpentarian Grasswren is currently listed as Endangered at both federal and territory levels, in part due to the apparent loss of its northern population, which includes the region east of Tanumbirini Station. The species was last reliably recorded in this north-western area between 1990 and 2000 and has since been regarded as locally extinct (Perry et al. 2011, Harrington and Murphy 2015). A confirmed detection in 2024 would therefore represent the first record in more than 25 years and would constitute a finding of major conservation importance for the Northern Territory where the species is most threatened.

In the Northern Territory, the Carpentarian Grasswren is currently known from only two distinct locations on Calvert Hills Station and Wollogorang Station (Perry et al. 2011, Harrington and Murphy 2015). These locations are natural wildfire refugia, exhibiting steep sided escarpments with an abundance of crevices and vegetation patches that are naturally protected from fire, owing to the complex rocky nature of the landscape (Perry et al. 2011, Harrington and Murphy 2015, Stoetzel et al. 2020, H. Stoetzel unpublished). Despite the protective qualities of these refugia, wildfire impacts are ongoing and the species occurs in very low numbers at these locations (BirdLife Australia unpublished, H. Stoetzel unpublished). Only two neighbouring territories are known to persist on Calvert Hills and no more than five have been recently recorded on Wollogorang.

The species exhibits cryptic behaviour and low detectability without targeted survey methods, and there is potential for misidentification with other small passerines. Given the substantial conservation implications associated with a putative re-discovery well beyond the northern limit of its historical range and more than 350 km from known populations, independent verification of this record is essential (Leseberg et al. 2020).

### **1.3 Purpose and Scope of This Independent Assessment**

This report synthesises published literature, ecological knowledge, and spatial analysis to evaluate the likelihood of occurrence of Carpentarian Grasswren at the proposed sites on EP161. The assessment draws on biogeographic context, species-specific ecological requirements, and habitat characteristics of the survey site including vegetation, geology and fire history. The potential for a misidentification with other similar species is also discussed.

### **1.4 Data Sources and Methods**

This assessment draws on a combination of peer-reviewed literature, regulatory documentation, unpublished expert datasets, targeted field investigations, and spatial datasets. Together, these sources provide the best available evidence for evaluating the likelihood of Carpentarian Grasswren (*Amytornis dorotheae*) occurrence and habitat suitability at Tanumbirini Station. Likelihood terminology used in this report follows a precautionary framework in which ‘possible’ indicates that occurrence cannot be excluded based on ecological evidence, while recognising substantial uncertainty in the absence of diagnostic confirmation.

Project-specific information was sourced from Appendices J–K of the Beetaloo Basin Appraisal Pilot Environmental Management Plan (EMP). These documents provided site-specific vegetation descriptions, fauna survey results, and contextual information relevant to potential impacts, and were used as a baseline for comparison with known habitat characteristics of the species.

Unpublished expert datasets formed a key evidentiary component of this assessment, including long-term research from H. Stoetzel’s PhD project (unpublished), targeted Carpentarian Grasswren monitoring surveys conducted by BirdLife Northern Queensland (unpublished), and field investigations undertaken on Chidna Station, Queensland, under a Threatened Species Grant (Conservation Partners unpublished). These datasets comprise

verified occurrence records, quantitative and qualitative habitat measurements, and behavioural observations collected by experienced personnel using standardised field methods.

Analysis undertaken as part of these projects included desktop assessment of vegetation mapping, occurrence records and published literature to identify potentially suitable habitat. Broad-scale National Vegetation Information System (NVIS) mapping for the Northern Territory was used, recognising its limited accuracy, while higher-quality Queensland Regional Ecosystem mapping was used in Queensland.

Species distribution modelling initially published in Stoetzel et al. (2020) was tested and refined using extensive field survey data prior to recalibration of subsequent models. Although the Tanumbirini record lies marginally outside the modelled extent, habitat suitability was inferred based on site context and the presence of key environmental attributes associated with the species' persistence, including the continuity of suitable lithology and topographic complexity.

Habitat characteristics influencing Carpentarian Grasswren persistence—including vegetation composition, *Triodia* height and cover, lithology, topographic complexity, and fire history—were assessed using field-based methods and post-fire monitoring of known sites, including colour-banded populations. These analyses informed interpretation of habitat quality and resilience in relation to known ecological requirements of the species.

Spatial datasets were used to visualise and contextualise key habitat attributes, including fire history from the North Australian Fire Information (NAFI) database, geological and geomorphological datasets (Raymond et al. 2012, Amatulli et al. 2018, Amatulli et al. 2019), and species occurrence data from BirdData, eBird, the Atlas of Living Australia (ALA). Publicly available occurrence records were interpreted cautiously and primarily for contextual purposes, with greater evidentiary weight afforded to verified expert datasets.

## **1.5 Key findings**

The occurrence of the Carpentarian Grasswren at Tanumbirini Station cannot be excluded on ecological grounds, based on current information, as habitat characteristics at the site are consistent with those known to support the species elsewhere within its range. However, substantial uncertainty surrounds the December 2024 record. In the absence of corroborating evidence, there is a high risk of misidentification, particularly given that the presence of several superficially similar species likely to occur at the site are not accounted for in the EMP.

Accordingly, this report recommends the implementation of a targeted verification program to resolve the status of the record. This should include call-playback surveys conducted by experienced observers familiar with the species' vocalisations and habitat use, and undertaken under appropriate seasonal and weather conditions. Such surveys are necessary to confirm or refute the presence of the Carpentarian Grasswren at Tanumbirini Station and to ensure that land management and regulatory decisions are informed by robust, evidence-based information.

## 2. Background information

### 2.1 Relevant Ecological Knowledge

The Carpentarian Grasswren (*Amytornis dorotheae*) is a rare, cryptic passerine endemic to the Gulf of Carpentaria region of northern Australia. The species is a highly specialised *Triodia* obligate species, occurring in open eucalypt woodlands with a ground layer dominated by spiny, hummock-forming perennial grasses of the genus *Triodia*. These habitats are most commonly associated with rocky, silica-rich lithologies and occur in a discontinuous arc extending from the Mount Isa region of north-western Queensland to the Borroloola region of the Northern Territory (Stoetzel et al. 2020). Siliciclastic lithologies, namely sandstone and meta-sandstone, combined with medium to high topographic complexity are apparently the best predictors of suitable habitat in addition to fire history (Perry et al. 2011, Stoetzel et al. 2020).

Suitable habitat is characterised by a sparse to moderately open tree canopy, typically dominated by one or more of *Eucalyptus leucophloia* subsp. *europa*, *Corymbia dichromophloia* (syn. *C. capricornia*), *Eucalyptus herbertiana*, and *Eucalyptus miniata* (Harris and Stewart 2009, Perry et al. 2011, H. Stoetzel unpublished). Additional tree species may occur locally, particularly in areas influenced by riparian processes, fire refugia, run-on zones, or ecotonal transitions associated with changes in lithology (H. Stoetzel unpublished). A low to mid-storey shrub layer, frequently dominated by *Acacia* species, is also a common structural component of occupied sites (Harris and Stewart 2009, H. Stoetzel unpublished).

The Carpentarian Grasswren is strongly dependent on *Triodia* for foraging, nesting, and shelter from predators and environmental extremes (McKean and Martin 1989, Harris and Stewart 2009, Perry et al. 2011, Harrington and Murphy 2015, H. Stoetzel unpublished). Consequently, vegetation post-fire age is a key determinant of habitat suitability. Mature *Triodia* hummocks provide dense, structurally complex cover, and their consistent availability within territories appears necessary for sustained occupancy. Rates of *Triodia* growth and the development of protective structure may vary spatially in response to *Triodia* species composition, fire history, soil properties, hydrology, and climatic conditions (Rice and Westoby 1999, Armstrong and Garnett 2011, Armstrong 2012). As a result, precise age-class thresholds are difficult to define; however, habitat is generally considered to regain functional suitability approximately three years or more following fire, once sufficient hummock structure has redeveloped (Harrington and Murphy 2015). Older hummocks appear particularly important for concealing dependent juveniles during the period immediately following fledging, when vulnerability to predation is highest (H. Stoetzel unpublished).

Despite this dependence on mature *Triodia*, the species occurs in landscapes shaped by spatially heterogeneous fire regimes and is capable of utilising younger post-fire age classes for foraging and, in some cases, nesting, provided that patches of mature *Triodia* persist within territories (BirdLife Australia; H. Stoetzel unpublished). Accordingly, while *Triodia* age is an important factor, the spatial configuration and patchiness of fire history, and the resulting persistence of fine-scale refuges of long-unburnt vegetation, are likely to be more critical determinants of habitat quality than the most commonly observed post-fire age alone (Stoetzel et al. 2020).

Rocky substrates, including rock piles and outcrops containing deep crevices, provide an additional and critical refuge, particularly following extensive or high-intensity fire events (H. Stoetzel unpublished). Grasswren groups may persist within rocky refugia immediately post-fire; however, the retention and subsequent recovery of mature *Triodia* within surrounding habitat appears essential for longer-term population persistence (Conservation Partners unpublished). Thermoregulation is also likely to be an important component of the species' ecology in extreme heat conditions. Individuals utilise cooler microhabitats associated with trees, mature *Triodia* hummocks, and rocky features (e.g. shaded crevices and areas of late-afternoon shade), and have been observed drinking at waterholes, likely as a behavioural mechanism to mitigate heat stress (H. Stoetzel unpublished).

## 2.2 Detection and Survey Considerations

Detection probability is a critical consideration when interpreting both historical and contemporary records of the Carpentarian Grasswren. The Carpentarian Grasswren is inherently difficult to detect without the use of call playback. Individuals typically remain quiet and concealed within spinifex hummocks in the presence of observers. Detection without playback generally requires familiarity with the species' song and contact calls, as individuals often communicate vocally from within dense ground cover.

Home range mapping using colour-banding and radio-telemetry on Calton Hills Station, Queensland, recorded an average home range size of approximately 10.5 ha. Smaller ranges were observed during the wet-season breeding period (approximately 5–10 ha), followed by expansion to larger ranges (approximately 10–20 ha) once dependent young become mobile (H. Stoetzel unpublished).

Current monitoring programs employ a standardised survey protocol involving playback locations spaced at 200 m intervals along box-shaped transects with 600 m sides. Even under optimal conditions and in areas with high territory density, this method detects the species in approximately 72% of surveys, indicating that false absences are likely without repeat visits (BirdLife Australia unpublished).

The species is typically encountered in pairs or small family groups with up to six members. It is likely socially monogamous and may engage in cooperative breeding, consistent with patterns documented in other grasswren species (Karubian 2001; Gibson Vega 2022). The vocal repertoire is complex, comprising squeaks, whistles, and trills, as well as insect-like single-syllable contact calls. Vocal activity plays a central role in territory defence and is thought to peak during the breeding season, which follows sufficient rainfall and typically occurs during the November–March wet season.

Brief visual observations or short vocalisations may lead to misidentification, particularly by observers inexperienced with the species. Several sympatric species can superficially resemble the Carpentarian Grasswren, including the Kalkadoon Grasswren (*Amytornis ballarae*), Spinifexbird (*Poodytes carteri*), Purple-backed Fairywren (*Malurus assimilis*), and Red-backed Fairywren (*Malurus melanocephalus*). However, the Carpentarian Grasswren can be distinguished by its white throat, black sub-moustachial stripe, and strongly patterned upper-body plumage. Additional diagnostic features include coloured flank feathers and undertail coverts, which are yellow-buff in males and rich red-brown in females.

## 2.3 Threats

Inappropriate fire regimes represent the primary threatening process for the Carpentarian Grasswren, particularly large-scale, homogeneous wildfires that remove extensive areas of mature spinifex without leaving sufficient unburnt refuges. Predation impacts are likely to be most severe in the immediate post-fire period, when birds are displaced into smaller habitat patches and cover is reduced. Feral cats (*Felis catus*) are also present within grasswren habitat and are potential predators, especially of dependent young (Conservation Partners unpublished). Feral cats preferentially move along linear features such as tracks, creek lines, and fire scar boundaries, increasing predation risk in disturbed landscapes (Conservation Partners unpublished).

Land clearing and other human activities may directly remove critical habitat features and indirectly increase predation pressure and weed invasion at a local scale. The naturalisation of buffel grass (*Cenchrus ciliaris*), represents an additional emerging threat, due to its capacity to invade spaces between spinifex hummocks and promote more frequent, hotter, and more contiguous fires (Garnett 2021). Pollution and sedimentation of waterways potentially impact Carpentarian Grasswren if impacted watercourses are important for hydration-mediated thermoregulation (i.e. drinking behaviour associated with heat stress) as observed in Queensland (H. Stoetzel unpublished).

Natural wildfire refugia are often scarce and spatially limited within the landscape. These areas, buffered from fire impacts by topography or other environmental factors (e.g. rocky outcrops, drainage lines, and water sources), may have a disproportionate importance for population persistence (Perry et al. 2011, Stoetzel et al. 2020). Such locations may function as source populations following large-scale fire events and play a critical role in recolonisation of the broader landscape once conditions become suitable. Impacts to these refugial nodes are therefore likely to have consequences beyond their immediate footprint, and are therefore likely to warrant a higher level of protection under precautionary management frameworks.

Collectively, these ecological characteristics underscore the species' vulnerability to landscape-scale disturbance and the importance of fine-scale habitat structure and fire refugia in determining persistence.

## 3. Assessment of the 2024 Tanumbirini Record

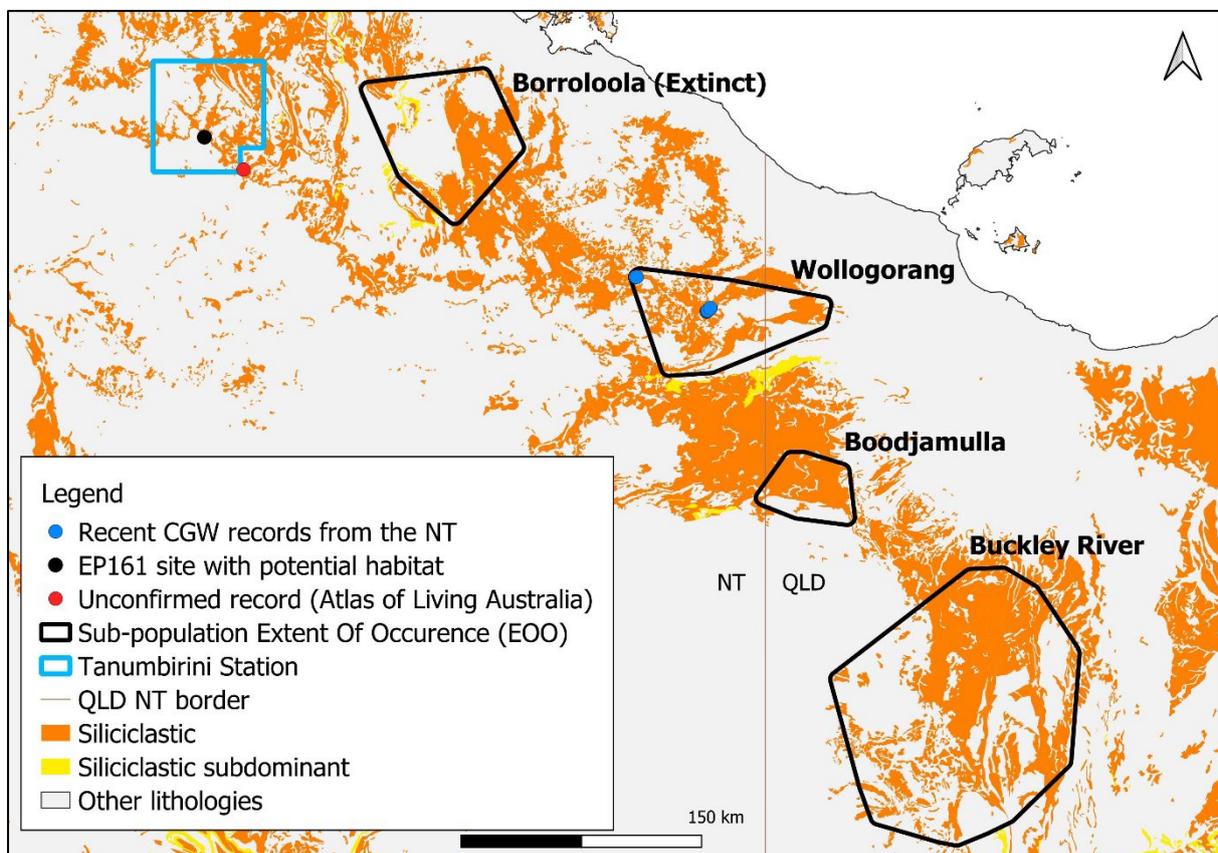
### 3.1 Biogeographic Context of the Record

Based on published literature and verified occurrence datasets, the 2024 record in question is located approximately 100 km west of the historical Extent of Occurrence (EOO) of the most northern sub-population (Figure 1), commonly referred to as the Borroloola population (Harrington and Murphy 2015). Prior to the species' decline and apparent extirpation across much of its northern range, it is plausible that suitable habitat on Tanumbirini Station supported the species. Typical dissected sandstone-*Triodia* habitats occur on the property and are akin to, and partially contiguous with, habitat associated with proximal verified historical records from the Borroloola population (Figure 1).

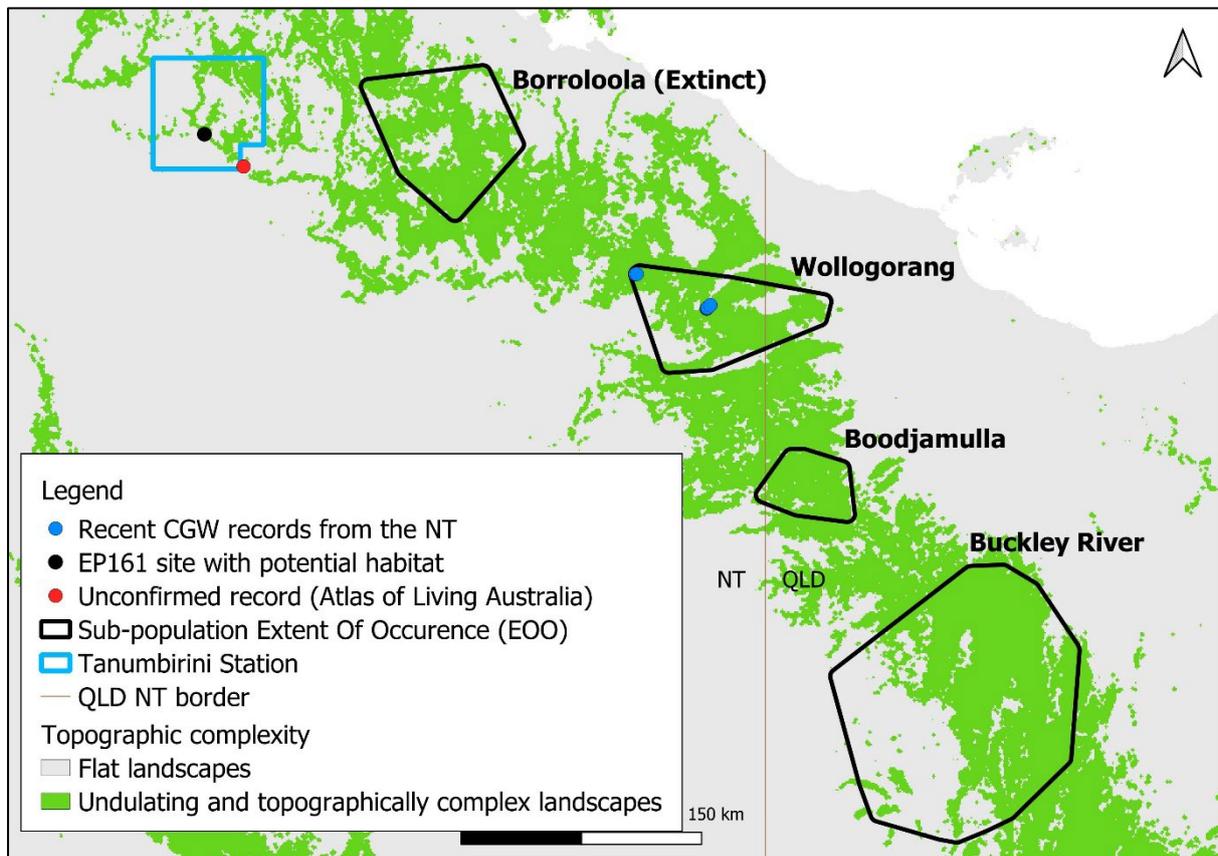
A historical record dated 21 May 1999 from October Creek is listed in the Atlas of Living Australia database and associated coordinates place this record approximately 30 km southeast along the Carpentaria Highway from the 2024 record in question (Figure 1 & 2). However, the veracity and spatial accuracy of the October Creek record are uncertain. It is plausible that the observation originated 15-20 km downstream along October Creek, which would place it within more typical Carpentarian Grasswren habitat associated with more appropriate geology. This uncertainty likely explains its exclusion from verified datasets.

The 2024 record in question is also spatially separated from the more substantial ranges northeast on Tanumbirini Station, which are geomorphologically similar to the dissected sandstone habitats the species is known from in the NT. Nevertheless, low sandstone derived protrusions occur at the location of the record. These features form part of a distinct rocky breakaway following the margin of an elevated plateau. These landscapes support some vegetation communities with *Triodia*-dominated understories and are connected to the more substantial sandstone features to the north west where grasswrens would be more expected (Figures 1 & 2).

Such gentler, more undulating landscapes are not characteristic of habitats currently or historically occupied elsewhere in the Northern Territory, likely reflecting the combined effects of altered fire regimes and limited availability of fire refugia. However, such geomorphic and lithological configurations are consistent with known Carpentarian Grasswren habitat near Mount Isa in Queensland, where fire impacts are less. Close to Mount Isa they have been recorded 8-10km from significant exposed sandstone protrusions on more undulating habitats with rocky drainage lines (Beruldsen 1992).



**Figure 1:** Map showing the distribution of silica rich lithologies (i.e., siliciclastic), a key determinant of suitable habitat for Carpentarian Grasswren. These habitats are present at the site and connected to formerly occupied habitats to the west. Lithology data were sourced from (Raymond et al. 2012).



**Figure 2:** Map showing undulating and topographically complex habitats associated with Carpentarian Grasswren habitat. These habitats were defined according to the presence of landforms other than flat as detailed in (Amatulli et al. 2018). These landforms include peaks, ridges, shoulders, spurs, slopes, hollows, foot slopes, valleys, and pits.

### 3.2 Vegetation at the Site

The Environmental Management Plan (EMP) identified two vegetation communities at the site that align closely with known Carpentarian Grasswren habitat. Community 1a: *Corymbia dichromophloia*, *Eucalyptus leucophloia*, *Erythrophleum chlorostachys* mid-high open woodland. Community 1b: *Corymbia dichromophloia*, *Eucalyptus leucophloia*, *Erythrophleum chlorostachys* mid-high open woodland over *Acacia calligera* low shrubland.

Field data reported in the EMP indicate that the understory within both communities is dominated by *Triodia bitextura*, a species recognised as a nesting and foraging substrate for the grasswren (Harris and Stewart 2009, H. Stoetzel, unpublished). The overstorey is dominated by tree species commonly associated with the species' habitat, including *Eucalyptus leucophloia* and *Corymbia dichromophloia*, while the presence of sparse acacias

(*A. cowleana* and *A. calligera*) in the shrub layer represents another characteristic structural feature of suitable habitat. *Petalostigma pubescens* and *Terminalia canescens* were also recorded in the mid-story and are a known component of the species habitat elsewhere in their range (H. Stoetzel unpublished).

Importantly, *Triodia*-dominated communities at the site are interspersed with lancewood stands and rocky, sandstone-derived protrusions. This mosaic closely resembles habitat configurations documented in Queensland, where the species occurs in relatively narrow swathes associated with geological features of comparable form and lithology, including but not limited to monitoring sites on Flora Downs Station, Split Rock Station and Thornton Station (Harris and Stewart 2009, H. Stoetzel unpublished, BirdLife Australia unpublished).

Collectively, these vegetation characteristics are consistent with those documented at verified Carpentarian Grasswren sites elsewhere in its range.

### 3.3 Fire History at the Site

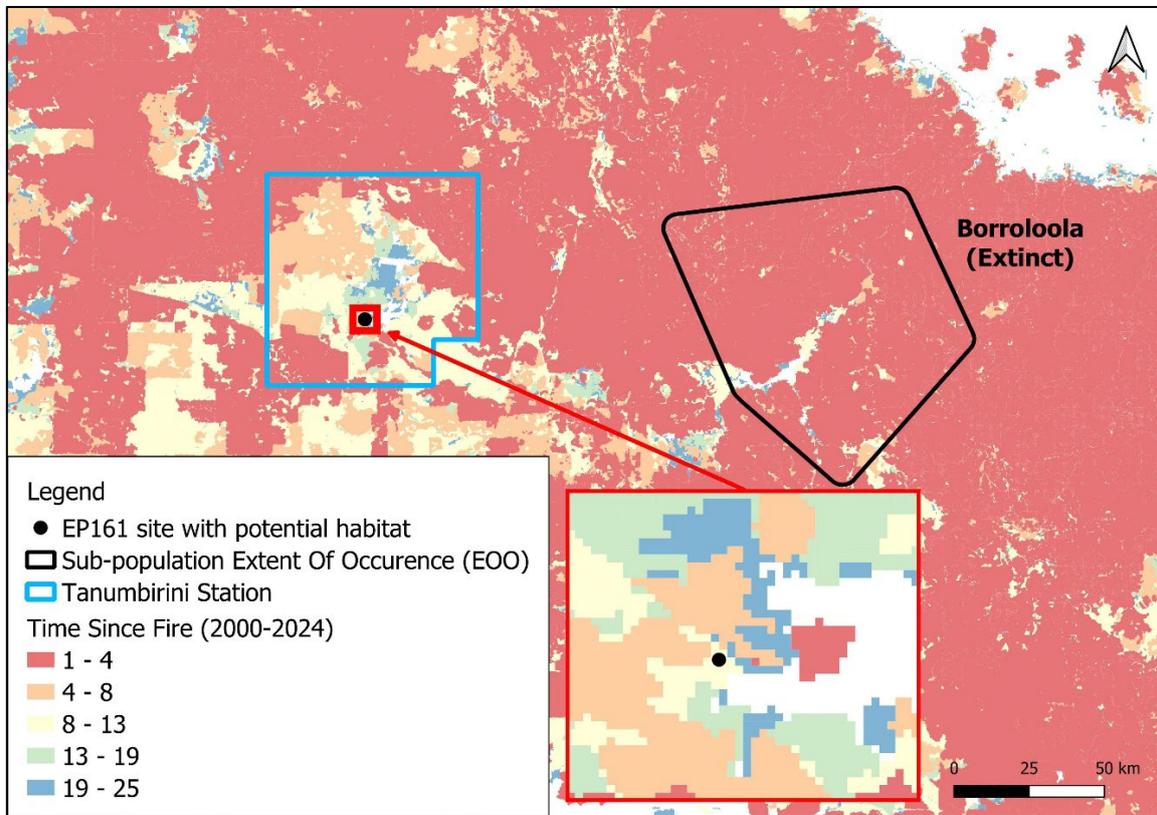
Fire history is a critical factor in assessing the likelihood that a remnant of the Borroloola population may have persisted at this location despite widespread declines elsewhere across the northern range. The only readily available fire history dataset for the area is derived from the North Australian Fire Information (NAFI) database. These data do not capture the fine-scale fire critical to Carpentarian Grasswrens persistence; however, they are suitable for assessing the broader landscape scale fire regimes. Conditions that would indicate suitability for Carpentarian Grasswren include infrequent fire and patchy fire as opposed to large-scale homogeneous fire. Another key indicator would be the presence of mature *Triodia* (i.e., >3-5 years since fire).

To assess fire regime suitability, NAFI data layers, including time since last fire, fire frequency, and late dry season fire frequency, were analysed in QGIS 3 and compared against habitat within the Borroloola population Extent of Occurrence (Figures 4, 5 & 6). In addition, vegetation structure measurements reported in the EMP were used as a proxy for post-fire age, given the strong relationship between *Triodia* height and time since fire.

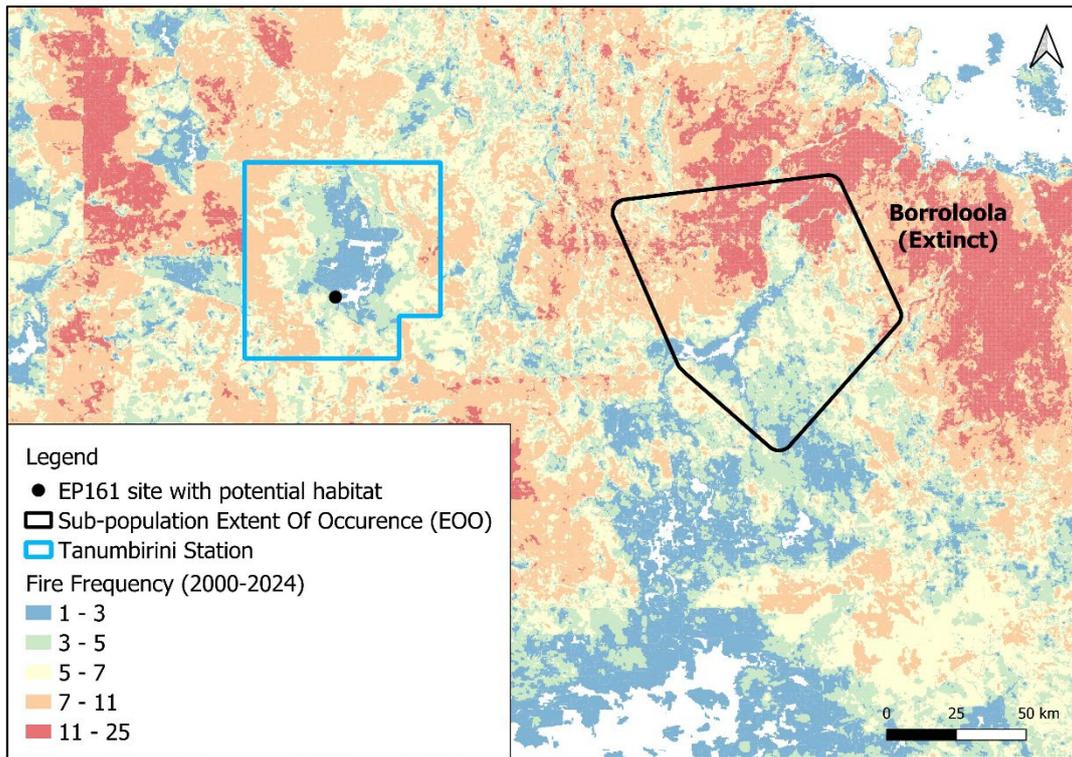
The average *Triodia* height reported in the EMP was 50 cm and is consistent with habitat age classes known to be suitable for the species elsewhere (BirdLife Australia, H. Stoetzel, unpublished). This result also aligns with the NAFI-derived estimate of 7-9 years since fire at the site. The time since fire mapped within the Borroloola population was generally lower and less patchy than fire on Tanumbirini and the EP161 site, which contained a diversity of age classes including areas unburnt for more than 24 years. If these mature age classes and refuges indeed correspond with suitable *Triodia* habitats it is possible that the fire regime at this location is more conducive to Carpentarian Grasswren persistence than the habitats closer to Borroloola for example.

The presence of rocky features capable of acting as fire refugia would further increase the likelihood of persistence; however, detailed information on the availability and configuration of such refuges was not provided in the EMP and therefore cannot be assessed with confidence. Furthermore, fire frequency at the site, and the frequency of late season fires,

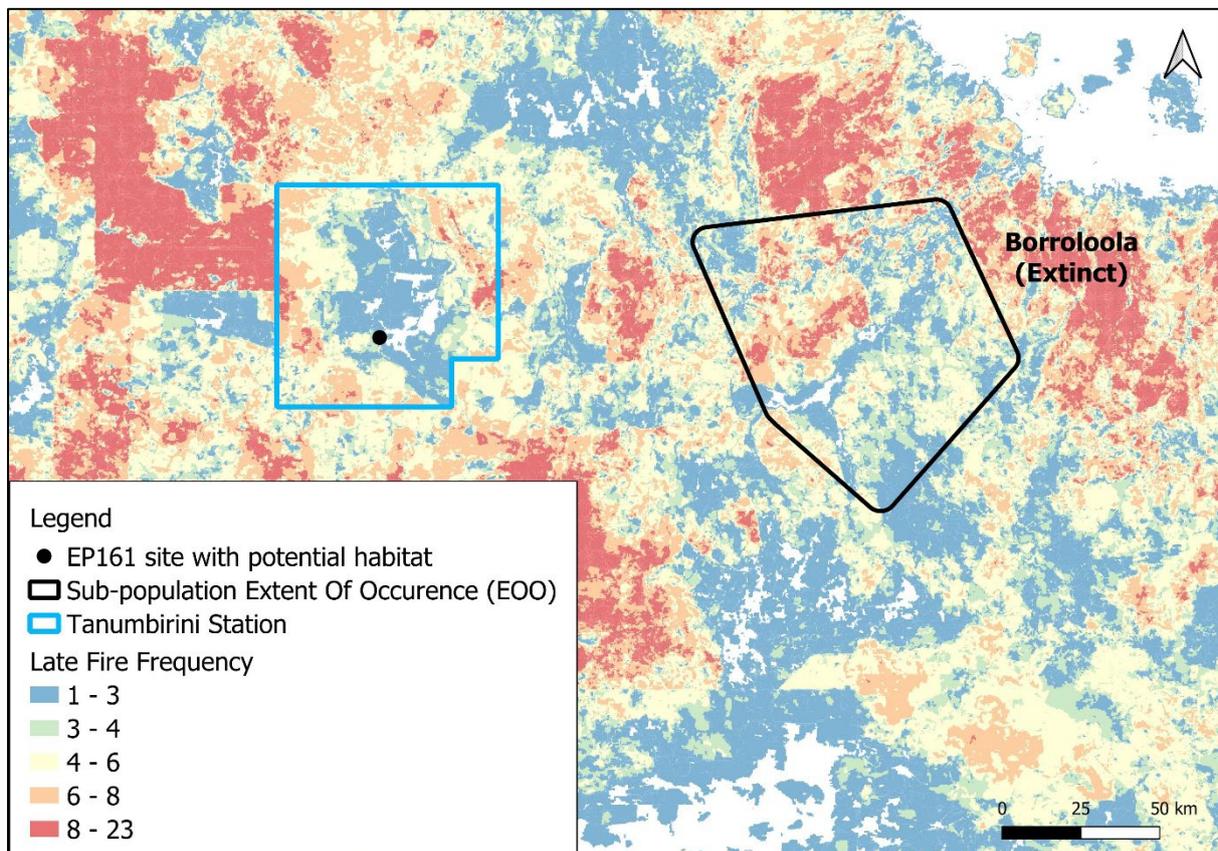
appears to be generally lower than at many historical locations across the Northern Territory especially sites close to Borroloola (Figures 4, 5 & 6).



**Figure 4:** Time since fire layer downloaded from NAFI shows that the Tanumbirini has sufficiently mature age classes, and a diversity of age classes in a patchy configuration. This contrasts with conditions within the Borroloola sub-population Extent of Occurrence which are mostly 1-4 years since burnt.



**Figure 5:** Fire frequency layer downloaded from NAFI shows a generally lower fire frequency at the Tanumbirini site as opposed to higher fire frequencies observed within the Borroloola population.



**Figure 6:** Late fire frequency layer downloaded from NAFI depicts the number of fires that occurred in the late half of the year between 2000 and 2024 and suggests the Tanumbirini site is also associated with relatively few late season fires.

In combination, biogeographic context, vegetation structure, and fire history indicate that suitable habitat is present at the site, while substantial uncertainty remains regarding current species occupancy.

## **4. Conclusions and Recommendations**

### **4.1 Likelihood of Occurrence**

Based on the available evidence, the occurrence of the Carpentarian Grasswren (*Amytornis dorotheae*) at Tanumbirini Station remains possible but unconfirmed. Analysis of the site's location, habitat characteristics, and fire history indicates that conditions are broadly consistent with those known to support the species elsewhere within its range. However, confirmation of the species at this location would be unexpected given it is approximately 100 km from any known historical records, the species' apparent extirpation from the surrounding region since the 1990s, and the absence of recent verified records from the northern extent of its former range.

The conservation implications of a confirmed occurrence would be significant. If present, the Tanumbirini population could represent a remnant of an otherwise extirpated northern population and may function as a critical wildfire refuge. Conversely, it remains possible, and perhaps more likely, that the December 2024 record reflects a misidentification, particularly in the absence of high-veracity supporting evidence. No detailed description of the observation, photographic documentation, audio recordings, or diagnostic field notes was provided, limiting the capacity to assess the reliability of the record.

Several species may be confused with the Carpentarian Grasswren under brief or suboptimal observation conditions. Superficially similar species do not appear in the Environmental Management Plan (EMP) species list, and fairywrens of the genus *Malurus* almost certainly occur at the site. In particular, Red-backed Fairywren (*Malurus melanocephalus*) and Purple-backed Fairywren (*M. assimilis*) are both regionally common and to the untrained observer can be difficult to distinguish when not in breeding plumage, or when identification is based on call. Given that fairywrens are also members of the family Maluridae and are far more likely to be encountered during standard fauna surveys than the highly cryptic Carpentarian Grasswren, it is plausible that a fairywren species was observed and incorrectly attributed to the genus *Amytornis*.

### **4.2 Conservation Significance**

Before impact assessment and mitigation strategies can be meaningfully developed, it is essential to determine whether the Carpentarian Grasswren is present and, if so, whether additional groups persist within the surrounding landscape. Should the species be confirmed within EP161, this occurrence would likely meet the definition of a "critical occurrence of a threatened species" under Section 8.4.1 of the Scientific Inquiry into Hydraulic Fracturing in

the Northern Territory (Pepper Inquiry) Final Report. This designation would be justified on the basis that the population would represent a remnant of an apparently extirpated northern population and may constitute an important refuge from wildfire impacts. In such circumstances, identifying the spatial extent of occupancy and the location of additional groups would be critical to informing tailored, population-level management.

### 4.3 Implications for impact Assessment

The proposed works have the potential to impact the Carpentarian Grasswren, if present, through direct and indirect mechanisms including clearing of suitable habitat, disturbance from noise and activity, degradation of water quality, increased predation pressure from feral cats, and the introduction or spread of invasive weeds. Fire also represents a substantial risk; accidental ignitions or inappropriate fire regimes could result in extensive loss of mature spinifex habitat.

The species has also been observed drinking from water sources, likely as part of hydration-mediated thermoregulation during periods of extreme heat. While the extent to which reliance on local water sources influences population viability remains uncertain, project activities that modify or degrade natural water sources could represent an additional impact if the species occurs at the site. This potential impact pathway remains poorly understood and would require further investigation should the species be confirmed.

### 4.4 Recommended Next Steps

The primary recommendation of this report is the implementation of a targeted verification program. This should comprise call-playback surveys conducted by experienced observers, using a standardised protocol and repeated site visits under appropriate seasonal and weather conditions. Such surveys are necessary to confirm or refute the presence of the Carpentarian Grasswren and to determine the appropriate next steps for impact assessment, mitigation planning, and regulatory decision-making.

If the species is confirmed, a site-specific fire management program designed to retain suitably sized patches of mature *Triodia* across the landscape would be required to buffer the effects of wildfire. The extent to which the proposed works may impact the species cannot be determined with confidence until targeted verification surveys are undertaken.

## 5. References

- Amatulli, G., S. Domisch, M.-N. Tuanmu, B. Parmentier, A. Ranipeta, J. Malczyk, and W. Jetz. 2018. A suite of global, cross-scale topographic variables for environmental and biodiversity modeling. *Scientific data* 5:1-15.
- Amatulli, G., D. McInerney, T. Sethi, P. Strobl, and S. Domisch. 2019. Geomorpho90m-global high-resolution geomorphometry layers: empirical evaluation and accuracy assessment. 2167-9843, PeerJ Preprints.
- Armstrong, G. 2012. Regeneration Strategies of *Triodia* Spp. in Response to Fire in the Kimberley, Western Australia. Charles Darwin University (Australia).

- Armstrong, G., and S. T. Garnett. 2011. Landscape partitioning among *Triodia* spp.(Poaceae) in the fire prone Kimberley, north-west Australia. *Austral Ecology* **36**:849-857.
- Beruldsen, G. 1992. Another Queensland locality for the Carpentarian Grasswren. *Sunbird: Journal of the Queensland Ornithological Society, The* **22**:49-50.
- Christidis, L. 1999. Evolution and biogeography of the Australian grasswrens, *Amytornis* (Aves: Maluridae): biochemical perspectives. *Australian journal of zoology* **47**:113-124.
- Christidis, L., F. Rheindt, W. Boles, and J. Norman. 2013. A re-appraisal of species diversity within the Australian grasswrens *Amytornis* (Aves: Maluridae). *Australian Zoologist* **36**:429-437.
- Christidis, L., F. E. Rheindt, W. E. Boles, and J. A. Norman. 2010. Plumage patterns are good indicators of taxonomic diversity, but not of phylogenetic affinities, in Australian grasswrens *Amytornis* (Aves: Maluridae). *Molecular Phylogenetics and Evolution* **57**:868-877.
- Fleming, M., and B. Strong. 1990. The discovery of the Carpentarian Grasswren-the original location. *S. Aust. Ornithol* **31**:50-53.
- Garnett, S. T. 2021. *The Action Plan for Australian Birds 2020*. CSIRO publishing.
- Harrington, G. N., and S. A. Murphy. 2015. The distribution and conservation status of Carpentarian grasswrens (*Amytornis dorotheae*), with reference to prevailing fire patterns. *Pacific Conservation Biology* **21**:291-297.
- Harris, P. L., and D. Stewart. 2009. Grasswren *Amytornis dorotheae* surveys near Mt Isa (1990-1995). *Sunbird: Journal of the Queensland Ornithological Society, The* **39**:3-13.
- Leseberg, N. P., S. A. Murphy, N. A. Jackett, P. T. Webster, C. MacColl, H. J. Stoetzel, and J. E. Watson. 2020. Recognising the impact of sight record assessment on the scientific record and a species' conservation status. *Emu-Austral Ornithology* **120**:181-183.
- McKean, J., and K. Martin. 1989. Distribution and status of the Carpentarian Grasswren *Amytornis dorotheae*. *Northern Territory Naturalist* **11**:12-19.
- Perry, J., A. Fisher, and C. Palmer. 2011. Status and habitat of the Carpentarian Grasswren (*Amytornis dorotheae*) in the Northern Territory. *Emu-Austral Ornithology* **111**:155-161.
- Raymond, O., S. Liu, R. Gallagher, W. Zhang, and L. Highet. 2012. Surface geology of Australia 1: 1 million scale dataset 2012 edition. *Geoscience Australia, Canberra* **10**:74619.
- Rice, B., and M. Westoby. 1999. Regeneration after fire in *Triodia* R. Br. *Australian Journal of Ecology* **24**:563-572.
- Stoetzel, H. J., N. P. Leseberg, S. A. Murphy, M. E. Andrew, K. J. Plant, G. N. Harrington, and J. E. Watson. 2020. Modelling the habitat of the endangered Carpentarian Grasswren (*Amytornis dorotheae*): The importance of spatio-temporal habitat availability in a fire prone landscape. *Global Ecology and Conservation* **24**:e01341.

## **6. Expert Witness Declaration and Statement of Compliance**

I, Henry J. Stoetzel, of Conservation Partners, 98 Landry Road, Malanda, Queensland 4885, Australia, state as follows.

I am the primary author of this report and the expert witness responsible for the opinions expressed herein. As part of Conservation Partners policy, a final peer review was conducted by colleague Nick Leseberg. The opinions contained in this report are my own and are based on my professional expertise, experience, and analysis of the available evidence.

I acknowledge that I have read the relevant Expert Evidence Code of Conduct and agree to be bound by it. I understand that my paramount duty is to the Court, not to any party to the proceedings.

I am a conservation ecologist specialising in threatened avifauna, fire ecology, and habitat assessment in northern Australia. I have extensive experience researching the Carpentarian Grasswren (*Amytornis dorotheae*), including long-term field studies, spatial habitat modelling, and post-fire monitoring across Queensland and the Northern Territory. I completed a Bachelor of Science majoring in ecology and zoology followed by an Honours in geographical sciences. Now PhD candidate I began work on Carpentarian Grasswren in 2017 and have been conducting intensive research on the species since 2019.

The opinions expressed in this report are based on the assumptions and material facts set out in the report, including information contained in the Environmental Management Plan, published scientific literature, spatial datasets, and unpublished expert datasets. Where information was incomplete or unavailable, this has been explicitly identified and considered in a precautionary manner.

The reasons for my opinions are provided throughout the report and are supported by peer-reviewed scientific literature, government datasets, spatial analyses, and unpublished expert research, all of which are cited in the References section.

Where questions fall outside my field of expertise, including legal interpretation, regulatory decision-making, or engineering assessments, no opinion is offered.

This report relies on desktop analyses, review of existing survey data, spatial analyses, and prior field investigations undertaken by qualified ecologists, including myself. No new field surveys were conducted specifically for this report unless stated otherwise.

Where I have relied on the opinions or data of other experts, including unpublished datasets from BirdLife Australia and collaborative research with other ecologists, this reliance is identified and acknowledged in the report.

I declare that I have made all inquiries that I believe are desirable and appropriate for the purposes of this report which are detailed in the Expert Brief included as an annexure at the end of this report, and that no matters of significance which I regard as relevant have, to my knowledge, been withheld from the Court.

The opinions expressed in this report are subject to the qualifications, limitations, and uncertainties identified within the report, particularly in relation to the absence of diagnostic evidence confirming species identification.

Where opinions are not concluded, this is due to insufficient data, including the absence of photographic, acoustic, or repeat-detection evidence. These limitations are clearly stated in the report.

Given the length and complexity of the report, a brief summary of key findings is provided at the beginning of the report.

I confirm that this declaration is true and correct to the best of my knowledge and belief.

Signed: 

Henry J. Stoetzel

Date: 19 December 2025

## EXPERT BRIEF

### CONFIDENTIAL AND LEGALLY PRIVILEGED

**Date:** 12 December 2025

**To:** Henry Stoetzel  
Conservation Partners  
University of Queensland

**By e-mail only:** [henry.stoetzel@conservationpartners.org.au](mailto:henry.stoetzel@conservationpartners.org.au); [h.stoetzel@uq.net.au](mailto:h.stoetzel@uq.net.au)

---

## ENVIRONMENT CENTRE NT

### SANTOS – BEETALOO BASIN APPRAISAL PILOT EMP

---

**From:** Johnson Legal  
Level 21, 8 Chifley Square  
SYDNEY NSW 2000

Dear Henry

## **Environment Centre NT (ECNT) – Santos QNT Pty Ltd Beetaloo Basin Appraisal Pilot Environment Management Plan (EMP)**

1. We confirm that we act for ECNT in the above matter, who wish to provide submissions in relation to the EMP currently under assessment with the Northern Territory Government.
2. We wish to brief you to provide a preliminary expert report for ECNT in relation to the likely environment impacts and risks associated with the carrying out of the Project, within your scope of expertise.

### **The EMP**

3. As part of the assessment process, the EMP was published for comment on 21 November 2025.
4. Comments on the EMP will close on **19 December 2025**.
5. The key documents subject to assessment are linked below:
  - a. [EMP](#) currently open to comment and relevant appendices, including:
    - [Appendix A-K](#) - Summary of Approved Regulated Activities
    - [Appendix L](#) – Cultural Heritage Assessment
    - [Appendix M](#) - Emergency Response Plan – Mcarthur and Ameadeus Basins

### **The Project**

6. Santos is an Interest Holder and operator of Exploration Permit (**EP**) 161 located in the Beetaloo Basin, approximately 350 kilometres south-east of Katherine in the Northern Territory.
7. Santos proposes to drill and test petroleum appraisal wells across two locations within EP 161, collectively referred to as the Beetaloo Appraisal Pilot.
8. The subject EMP covers the installation of up to twelve new petroleum appraisal wells at two separate well pads within EP 161. Some of the proposed activities include:
  - a. Clearing and earthworks for 2 new well pad locations – The clearing and construction to create two new well pads and ancillary infrastructure at well pad locations referred;
  - b. Drilling up to 12 appraisal wells, either vertical or horizontal well types;

- c. Operating, testing, maintenance and decommissioning and hydraulic fracture stimulation of up to 12 appraisal wells;
  - d. Wastewater management – each well pad will include evaporation tanks, storage tanks, drilling sumps, cutting pits and any transfer infrastructure within the well pad. This also includes transportation onsite and disposal of these wastes (unless otherwise approved for reuse or burial).
9. The approval criteria are set out in reg 9 of the [Petroleum \(Environment\) Regulations 2016](#) (**the Regulations**) and include that the EMP must demonstrate that the Project will be carried out in a manner by which the environmental impacts and environmental risks will be reduced to a level that is 'as low as reasonably practicable' (ALARP) and 'acceptable'.
10. In determining whether or not to approve the EMP, the Minister must consider whether the EMP for the Project should be approved pursuant to the [Petroleum Act 1984](#) and the Regulations and if so, on what conditions.

### Your brief

11. We request that you:
- a. Provide an expert report for ECNT by **16 December 2025** in relation to:
    - i. The likelihood of occurrence for the Carpentaria Grasswren (identified in site surveys as *Amytornis sp.* as found in Appendix J to the EMP) at the proposed site on EP161 and significance of this habitat. This would include your assessment of the likelihood of any risks identified and the impacts and consequences if those risks crystallise;
    - ii. Whether the species in the area is likely to be impacted by relying on local water sources;
    - iii. Whether there is potential for the occurrence of the Carpentaria Grasswren on the EP161 site to represent a "critical occurrence of threatened species" as per section 8.4.1 of the [Scientific Inquiry into Hydraulic Fracturing in the Northern Territory](#) (Pepper Inquiry) Final Report in the context of species population trends;
    - iv. Any recommended conditions or recommended amended conditions for the EMP to ameliorate the impacts and risks you have identified above. This aspect should address the degree to which the EMP and proposed works meet the standards set by legislation and the standards recommended by the Pepper Inquiry.

12. We ask that you prepare your opinion in accordance with the [NT Supreme Court's Practice Direction No. 6 of 2015 – Expert Reports](#).
13. We note that under the Practice Direction, an expert witness is not an advocate for a party and has a paramount duty, overriding any duty to the party to the proceedings or other person retaining the expert witness, to assist the Court impartially on matters relevant to the area of expertise of the witness.

### Your fees

12. Please provide us with an estimate of your fees for carrying out this work at your earliest convenience.

Yours faithfully  
**Johnson Legal Pty Ltd**



Matt Floro  
**Principal Lawyer**

Encl.

### INDEX TO BRIEF

An index to the materials briefed is below. A copy of the annexures is contained at this [Dropbox](#) link.

No.	Document	Date
1	<a href="#">Beetaloo Basin Appraisal Pilot Environmental Management Plan</a>	November 2025
2	<a href="#">Appendix A-K</a>	November 2025
3	<a href="#">Appendix L</a>	November 2025
4	<a href="#">Appendix M-P</a>	November 2025