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Reference: Karratha Solar Project Targeted Northern Quoll and Bird Survey

Introduction

Rio Tinto Iron Ore (Rio Tinto) seeks to develop the Karratha Solar Project (the Project) located approximately 5 km southwest of Karratha in the Pilbara region of Western Australia. The Survey Area comprises approximately 1824.8 ha and encompasses the Yurralyi Maya Power Station. Previous fauna survey work (Aecom, in prep) and habitat mapping identified the Rocky Hill habitat (36.4 ha) in the Survey Area as having potential to support the Northern Quoll (*Dasyurus hallucatus*; En, En). Additionally, the Aecom (in prep) survey identified potential Northern Quoll scat records at six locations.

Stantec Australia Pty Ltd (Stantec) was appointed by Rio Tinto to undertake a Targeted Northern Quoll and Bird Survey (the Survey) to inform potential impacts of the Project. The overarching objectives of this work were:

- to determine the presence of Northern Quoll within the Rocky Hill habitat and assess the Survey Area's suitability to support the species;
- conduct targeted bird surveys throughout the Survey Area to determine species assemblages present.

The methods used in the Survey were aligned with the following guidelines:

- Technical Guidance: Terrestrial Fauna Surveys for Environmental Impact Assessment (EPA 2020);
- Environmental Factor Guideline – Terrestrial Fauna (EPA 2016);
- EPBC Act Referral Guideline for the Endangered Northern Quoll (DotE 2016);
- Survey Guidelines for Australia's Threatened Mammals (DSEWPac 2011);

Methodology

The Survey was conducted from the 19th to the 20th of January 2023. Field work was conducted by Stantec zoologist Caitlin Roberts and specialist sub-consultant Sam Lostrom (senior zoologist). All units were retrieved on the 25th of January 2023 by Caitlin Roberts and Claire Webster (Rio Tinto).

Northern Quoll Survey Methods

Survey methods comprised habitat assessments, deployment of baited motion cameras and targeted searches for secondary signs. In total, four habitat assessments were undertaken across the Survey Area to determine its suitability to support Northern Quoll. Three habitat assessments were undertaken in Rocky Hill habitat, and one was undertaken in a Minor Drainage Line.

To target Northern Quoll, nine baited motion cameras were each deployed for a minimum of five nights (total of 52 trap nights). Eight cameras were deployed in Rocky Hill habitat, and one camera was deployed in a Minor Drainage Line (Figure 1). Motion cameras were baited with universal bait (peanut butter, oats, sardines) in non-reward cannisters. Additionally, targeted searches for signs of Northern Quoll (e.g. scats, tracks) were conducted at each Rocky Hill site. Motion camera data was analysed internally by Stantec zoologists.

Bird Survey Methods

Avifauna censuses were conducted at four locations across the Survey Area. Three avifauna censuses were conducted along Minor Drainage Lines, while one was conducted at a man-made trough which acted as a temporary water source (Figure 1). Each avifauna census was conducted with two observers and was 20 minutes in length. Additionally, all novel opportunistic bird sightings made while traversing the Survey Area were recorded.

Opportunistic Sightings

All significant species, including secondary signs (e.g., scats, tracks) observed while traveling through the Survey Area were recorded.

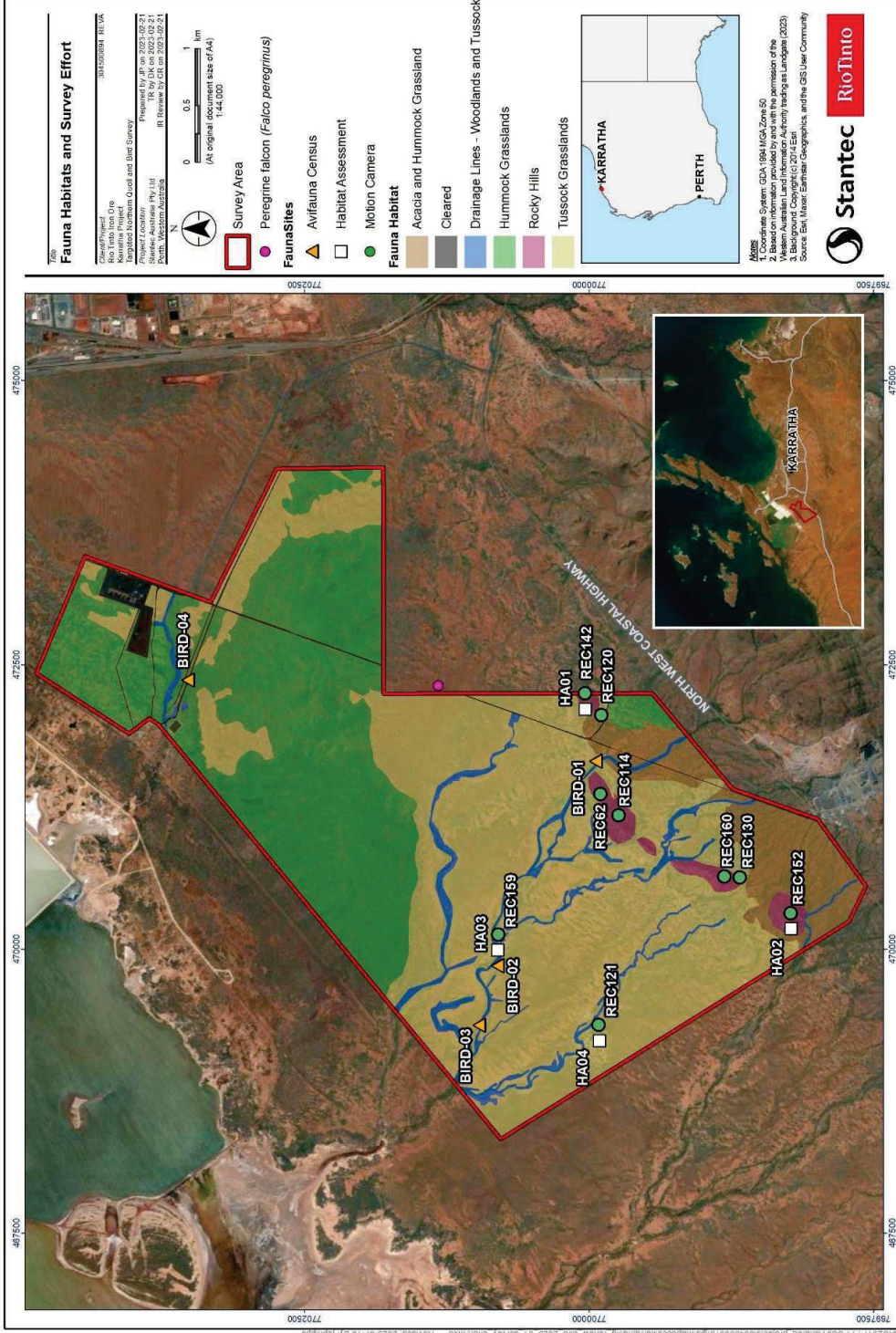


Figure 1. Karraatha Project Survey Area (habitat mapping from Aecom in prep)

Results and conclusions

Northern Quoll

No signs of Northern Quoll were recorded during the targeted searches in Rocky Hill habitat. Additionally, Northern Quoll were not recorded on any of the nine motion cameras deployed during the Survey (Table 1, Figure 1). Based on the limited scat records found during the previous survey (Aecom, in prep) and lack of records from the current survey, the Survey Area does not appear to support a Northern Quoll population which meets the criteria of being important to the long-term survival of the species (DotE 2016).

Rocky Hill habitat within the Survey Area has been previously assessed as having potential to support the Northern Quoll. While this habitat may provide some suitable refuge, it has less complexity compared to other rocky habitat types found in the Pilbara that are known to support the Northern Quoll (e.g., ranges, gorges/gullies, mesas, breakaways) and provides limited shelter. A larger expanse of Rocky Ridge habitat is present approximately 1 km southeast of the Survey Area and may represent more suitable habitat for the species. Additionally, Minor Drainage habitat within the Survey Area is sparsely vegetated and does not contain large hollow-forming trees or logs that would be suitable for denning. Critical habitat for Northern Quoll is defined in the *EPBC Act referral guide for the endangered northern quoll* (DotE 2016) as:

- rocky habitats such as ranges, escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines or treed creek lines;
- structurally diverse woodland or forest areas containing large diameter trees, termite mounds or hollow logs.

Based on the DotE (2016) criteria and the habitats assessments conducted within the Survey Area (Appendix A), the Rocky Hill habitat is considered unlikely to represent habitat critical to the survival of the species.

Table 1. Summary of motion camera units deployed during the Survey and Northern Quoll detections.

| Site | Habitat | Date of deployment | Date of collection | Trap nights | Northern Quoll detections |
|--------|----------------|--------------------|--------------------|-------------|---------------------------|
| REC120 | Rocky Hill | 19/01/23 | 25/01/23 | 6 | None |
| REC142 | Rocky Hill | 19/01/23 | 25/01/23 | 6 | None |
| REC152 | Rocky Hill | 19/01/23 | 25/01/23 | 6 | None |
| REC160 | Rocky Hill | 19/01/23 | 25/01/23 | 6 | None |
| REC130 | Rocky Hill | 19/01/23 | 25/01/23 | 6 | None |
| REC114 | Rocky Hill | 19/01/23 | 25/01/23 | 6 | None |
| REC62 | Rocky Hill | 19/01/23 | 25/01/23 | 6 | None |
| REC159 | Minor Drainage | 20/01/23 | 25/01/23 | 5 | None |
| REC121 | Rocky Hill | 20/01/23 | 25/01/23 | 5 | None |

Bird Species

Twenty-five bird species were recorded during the Survey (Table 2). Of these, only one significant species was recorded, a single Peregrine Falcon (*Falco peregrinus*, OS) was observed flying adjacent to the Survey Area. No migratory shorebirds or waterbird species were recorded in the Survey Area. One seabird species, the White-bellied Sea Eagle was recorded in the Survey Area. Additionally, zoologists verified the presence of a White-bellied Sea Eagle nest within the Survey Area by the presence of skeletal remains of a chick at the base of the nest.

While no shorebird or waterbird species were recorded, it was noted that Grassland habitat present in the Survey Area may become seasonally inundated and support suitable conditions for foraging shorebirds. However, additional survey work after heavy rains would be required for verification.

Table 2. Avian species recorded during the Survey.

| Family | Common Name | Scientific Name | Record Type | | |
|---------------|---------------------------|--------------------------------|-----------------|---------------|---------------|
| | | | Avifauna Census | Opportunistic | Motion Camera |
| Accipitridae | Black-shouldered Kite | <i>Elanus axillaris</i> | | X | |
| | White-bellied Sea-Eagle | <i>Haliaeetus leucogaster</i> | | X | |
| | Wedge-tailed Eagle | <i>Aquila audax</i> | X | | |
| Alaudidae | Horsfield's Bushlark | <i>Mirafra javanica</i> | X | X | X |
| Alcedinidae | Sacred Kingfisher | <i>Todiramphus sanctus</i> | | X | |
| Artamidae | Black-faced Woodswallow | <i>Artamus cinereus</i> | X | X | |
| | Australian Magpie | <i>Gymnorhina tibicen</i> | | X | |
| Cacatuidae | Cockatiel | <i>Nymphicus hollandicus</i> | X | X | |
| Columbidae | Diamond Dove | <i>Geopelia cuneata</i> | X | X | X |
| | Crested Pigeon | <i>Ocyphaps lophotes</i> | X | | |
| | Spinifex Pigeon | <i>Geophaps plumifera</i> | X | | X |
| Corvidae | Torresian Crow | <i>Corvus orru</i> | | X | |
| Cuculidae | Horsfield's Bronze-Cuckoo | <i>Chalcites basalis</i> | X | | |
| Estrildidae | Painted Finch | <i>Emblema pictum</i> | X | X | |
| | Australian Zebra Finch | <i>Taeniopygia guttata</i> | X | X | |
| Falconidae | Brown Falcon | <i>Falco berigora</i> | | X | |
| | Australian Kestrel | <i>Falco cenchroides</i> | X | | |
| | Peregrine Falcon | <i>Falco peregrinus</i> | | X | |
| Locustellidae | Rufous Songlark | <i>Megalurus mathewsi</i> | | X | |
| | Spinifex-bird | <i>Eremiornis carteri</i> | | X | |
| Meliphagidae | White-plumed Honeyeater | <i>Ptilotula penicillatus</i> | | X | |
| | Singing Honeyeater | <i>Gavicalis virescens</i> | X | | X |
| Motacillidae | Australian Pipit | <i>Anthus australis</i> | X | X | |
| Psittacidae | Budgerigar | <i>Melopsittacus undulatus</i> | X | X | |
| Turnicidae | Little Button-quail | <i>Turnix velox</i> | X | X | |

Limitations

There are a number of possible limitations and constraints that can impinge on the adequacy of a fauna survey (EPA 2020). During this Survey, it was not possible to perform a thorough search for signs of Northern Quoll at the north-western Rocky Hill site (vicinity of REC121) due to the presence of many swarming, biting ants. However, this site was still able to be adequately surveyed via the deployment of a motion camera. During the Survey, an avifauna census could not be completed at the salt flats adjacent to the Survey Area as required permissions were not provided prior to the survey. As a result, it was not possible to assess the presence of shorebird and waterbird species on the salt flats adjacent to the Survey Area.

Yours Sincerely

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References

- DotE, Department of the Environment, (2016) *EPBC Act referral guideline for the endangered Northern Quoll Dasyurus hallucatus*; EPBC Act Policy Statement. Commonwealth of Australia, Canberra, Australian Capital Territory.
- DSEWPaC, Department of Sustainability, Environment, Water, Population and Communities. (2011) *Survey Guidelines for Australia's Threatened Mammals*. Commonwealth of Australia, Canberra, Australian Capital Territory.
- EPA, Environmental Protection Authority. (2016) *Environmental Factor Guideline - Terrestrial Fauna*. Environmental Protection Authority (EPA), Perth, Western Australia.
- EPA, Environmental Protection Authority, (2020) *Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. Environmental Protection Authority, Perth, Western Australia.

Appendix A Habitat Assessments

| | | Site Photograph |
|-------------------------|-----------------------|---|
| Site | Name | HA01 |
| | Habitat Type | Rocky Hill |
| | Landform | Ironstone outcrop |
| Habitat Features | Slope | Moderately inclined (21-45°) |
| | Aspect | North-east |
| | Woody Debris | None |
| | Tree Hollows (>50 cm) | None |
| Condition | Condition | Good |
| | Disturbance Type | Access tracks |
| | Fire Age | Very Old (10+ yrs) |
| | Rock | Evenly spread |
| Ground Cover | Soil | Scarce |
| | Leaf Litter | Few small patches |
| | Type | Ironstone |
| Rocks | Size | Large Rocks (21-60cm) |
| | Exposed Bedrock | Moderate outcropping |
| Soil | Type | Sandy clay loam |
| | Colour | Red/brown |
| | | <p>Dominant vegetation was <i>Ficus brachypoda</i> scattered low shrubs over <i>Triodia</i> sp. closed tussock grassland.</p> |



| Site Photograph | |
|-------------------------|---|
| Site | <p>Name: HA02</p> <p>Habitat Type: Rocky Hill</p> <p>Landform: Ironstone outcrop</p> <p>Slope: Moderately inclined (21-45°)</p> <p>Aspect: North-east</p> <p>Woody Debris: None</p> <p>Tree Hollows (>50 cm): None</p> <p>Condition: Very good</p> <p>Disturbance Type: Access tracks, litter</p> <p>Fire Age: No evidence</p> <p>Rock: Evenly spread</p> <p>Soil: Scarce</p> <p>Leaf Litter: Few small patches</p> <p>Type: Ironstone</p> |
| Habitat Features | |
| Condition | |
| Ground Cover | |
| Rocks | <p>Size: Large Rocks (21-60cm)</p> |
| Soil | <p>Exposed Bedrock: Major outcropping</p> <p>Type: Sandy clay loam</p> <p>Colour: Red/brown</p> <p>Dominant vegetation was <i>Eremophila longifolia</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> low open shrubland over <i>Triodia</i> sp. closed tussock grassland.</p> |

| Site Photograph | |
|---|---|
| Site | Name Habitat Type Landform Slope Aspect Woody Debris Tree Hollows (>50 cm) Condition |
| Habitat Features | HA03 Minor Drainage Minor Drainage Flat (0°) N/A Rare None Poor |
| Condition | Disturbance Type Fire Age |
| Ground Cover | Access tracks, weed invasion, cattle grazing No evidence Scarce Evenly Spread Few small patches |
| Rocks | Rock Soil Leaf Litter Type Size |
| Soil | Ironstone Pebbles (5-10cm) Abundance Exposed Bedrock Type Colour |
| Vegetation Description | |
| Dominant vegetation was <i>Acacia inaequilatera</i> and <i>Hakea loreus</i> subsp. <i>loreus</i> shrubland over <i>Triodia</i> sp. closed tussock grassland. Non-native species present: * <i>Vachellia farnesiana</i> and * <i>Cenchrus ciliaris</i> . | |



| Site Photograph | |
|-------------------------|---|
| Site | Name Habitat Type Landform Slope Aspect Woody Debris Tree Hollows (>50 cm) Condition Disturbance Type Fire Age |
| Habitat Features | HA04 Rocky Hill Quartz outcrop Steep (46-75°) N/A None None Good Weed invasion No evidence |
| Condition | Evenly spread Scarce Few large patches Quartz |
| Ground Cover | Rock Soil Leaf Litter Type |
| Rocks | Size Boulders (>61cm) |
| Soil | Exposed Bedrock Type Colour |



Dominant vegetation was *Ficus brachypoda* scattered low trees over *Capparis spinosa* subsp. *nummularia* open shrubland over *Triodia* sp. open tussock grassland. Non-native species present **Cenchrus ciliaris*.