



Roy Hill Revised Development Envelope

***Rhagodia* sp. Hamersley (M. Trudgen 17794) Memo**

Roy Hill Holdings Pty Ltd

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1. Introduction and Background

Roy Hill Holdings Pty Ltd (Roy Hill) are seeking additional information regarding the current known extent of *Rhagodia* sp. Hamersley (M. Trudgen 17794), a Priority 3 taxon, within the Pilbara bioregion. This is required to provide further context with regards to the potential impacts of the Roy Hill Revised Development Envelope (RDE) on the local and regional extent of *Rhagodia* sp. Hamersley (M. Trudgen 17794) in the Pilbara.

The current understanding on *Rhagodia* sp. Hamersley (M. Trudgen 17794) within the RDE suggests that more than 4,296 extant individuals occur across the RDE, with this number increasing due to ongoing targeted survey work in the RDE. Roy Hill is proposing to potentially impact approximately 30 % of these individuals. To reduce the impact on *Rhagodia* sp. Hamersley (M. Trudgen 17794), Roy Hill has been completing targeted surveys across the RDE to better define significant flora occurrence and extents, with this work ongoing.

2. *Rhagodia* sp. Hamersley (M. Trudgen 17794) Knowledge

Rhagodia sp. Hamersley (M. Trudgen 17794) is a Priority 3 (P3) taxon known to occur in the Pilbara bioregion of Western Australia, with several occurrences located to the south of the Pilbara within the Gascoyne bioregion (DBCA, 2021; WAH, 1998-). Priority 3 taxa are poorly known species and can be listed as P3 for various reasons including: species that are known from several locations, and the species do not appear to be under imminent threat; or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat; species may be included if they are comparatively well known from several locations, but do not meet adequacy of survey requirements and known threatening processes exist that could affect them (such species are in need of further survey).

The current knowledge on the extent and distribution of *Rhagodia* sp. Hamersley (M. Trudgen 17794), obtained from publicly available datasets, suggests that it is widespread in the south-central and eastern Pilbara, with a concentration of records from the south-central Pilbara, near Rhodes Ridge, West Angelas and Hope Downs 4 (Figure 1). The current extent stretches greater than 300 km in an east-west direction from Brockman mine in the west to near Jigalong in the east, and greater than 155 km in a north south direction from Roy Hill in the north to south of Newman.

A review of the data and specimens held by the Department of Biodiversity, Conservation and Attractions (DBCA) within Florabase (WAH, 1998-) and NatureMap (DBCA, 2021) indicates that 67 and 68 records, respectively, are held for *Rhagodia* sp. Hamersley (M. Trudgen 17794). The information for each record on Florabase (WAH, 1998-) is limited, however, information available suggests that the number of individuals ranges from singletons to populations in excess of 100. This is likely to be an under-representation and reflects the number of individuals in the immediate vicinity of the specimen record. This is further supported following a review of available literature and Biologic's private database.

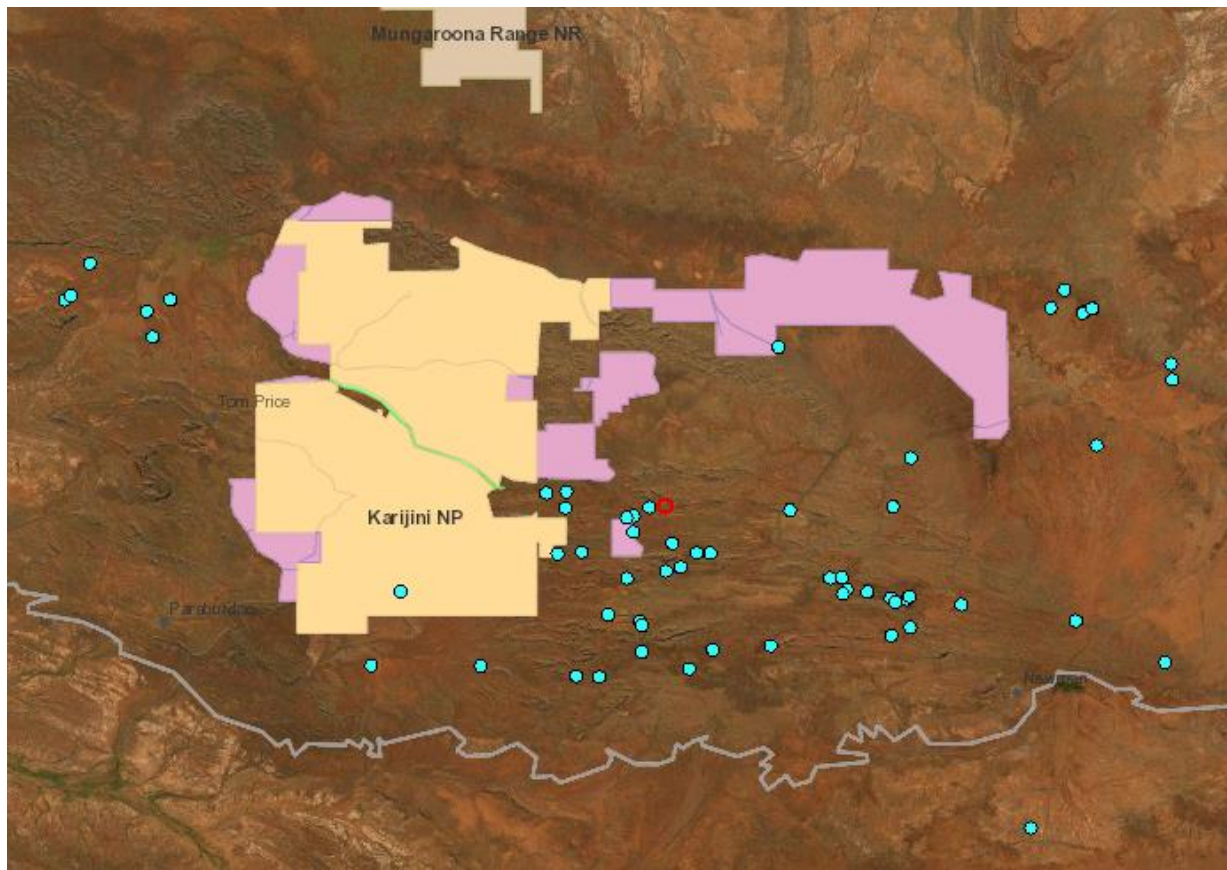


Figure 1: *Rhagodia* sp. Hamersley (M. Trudgen 17794) (blue points) occurrence (DBCA, 2021)

(DBCA managed lands represented by yellow polygon; DBCA land of interest [ex-pastoral lease] represented by pink polygons; and bioregions represented by grey line)

Based on a limited review of available literature (11 reports in total) and databases (Florabase and Biologic’s internal private database), population and number of individual estimates ranges from several individuals to estimates exceeding 17,000 (Table 1). The number of individuals potentially occurring in the Pilbara is likely to exceed 32,000 (Table 1), however, this is an under-estimation based on the data available and the limited reports reviewed. It is likely that the DBCA hold additional information on the size and extent of populations, while there will be additional data held by mining companies and environmental consultancies company that is not publicly available.

Table 1: *Rhagodia* sp. Hamersley (M. Trudgen 17794) population extents (Roy Hill project highlighted)

Report	Reference	Distance from Roy Hill	Estimate of No. of individuals
Rhodes Ridge targeted survey	Astron (2019b)	68 km SW	17,518
Roy Hill RDE	RHIO (2020)	N/A	4,296
Flora, Vegetation and Fauna Habitat Assessment at Ophthalmia	Rio Tinto (2017)	77 km SW	3,083
Priority Flora Searches at Rhodes ridge	Eco Logical (2019)	68 km SW	2,212
Targeted Priority Flora Surveys – Rhodes Ridge Trip 1	Biologic private database	70 km SW	1,774
Targeted Priority Flora Surveys – Rhodes Ridge Trip 4	Biologic private database	70 km SW	1,213

Report	Reference	Distance from Roy Hill	Estimate of No. of individuals
Targeted Priority Flora Surveys – Rhodes Ridge Trip 2	Biologic private database	72 km SW	800
Florabase ¹	WAH (1998-)	Online database	~700
East Jimblebar and Caramulla Flora & Vegetation Survey	Biologic (2019)	83 km SE	405
Targeted Priority Flora Surveys – Rhodes Ridge Trip 3	Biologic private database	70 km SW	389
Bakers Syncline 19 Vegetation, Flora and Fauna Survey	Astron (2019a)	68 km SW	376
Mining Area C Southern Flank Flora and Vegetation Impact Assessment	Onshore (2017)	105 km SW	274
Rhodes Ridge - Priority flora survey to meet the requirements of CPS 8270/1	GHD (021)	67 km SW	114
Level 2 Flora and vegetation Survey - South Flank	Onshore (2012)	105 km SW	100
Eliwana Consolidated Detailed Flora and Vegetation Phase 2	Biota (2018)	311 km W	23
Level 1 Vegetation, Flora and Fauna Assessment, and Targeted Conservation Significant Flora and Fauna Survey: Mt Macleod West	Ecoscape (2013)	228 km W	2
Christmas Creek flora and vegetation survey	ENV (2010)	1 km S	1
Total			33,280

¹ – the number of individuals is an under-estimation based on the information provided on submissions to the Western Australian Herbarium.

Rhagodia sp. Hamersley (M. Trudgen 17794) is commonly recorded from hardpan plains dominated by mulga shrubs and trees with the understorey consisting of scattered *Eremophila* spp., *Ptilotus* spp., *Senna* spp. shrubs over annual and perennial grasses. Although this may be the predominant habitat and vegetation community, individuals have been recorded from low hillslopes, stony plains, gullies, low hills, floodplains and claypans. Vegetation communities are variously dominated by shrublands and woodlands of *Acacia* spp. with individuals frequently observed from hummock grasslands.

Based on the information obtained from the brief literature review and the publicly available databases, *Rhagodia* sp. Hamersley (M. Trudgen 17794) does not have a specific habitat that is important for the persistence of populations. Although, the mulga hardpan plains are the predominant habitat where individuals are recorded. This habitat is extensive in the south-central and eastern Pilbara.

The review of the publicly available databases indicates that there are several occurrences of *Rhagodia* sp. Hamersley (M. Trudgen 17794) within the conservation estate. A population is known to occur in Karijini National Park (DBCA, 2021; Onshore, 2015; WAH, 1998-) and several other occurrences within ex-Pastoral Leases managed by the DBCA (DBCA, 2021; WAH, 1998-). The author of this document is also aware of additional occurrences within Karijini National Park, while anecdotal evidence suggests it also occurs within the Fortescue Marsh management zone (Markey, 2017).

3. Final Statement

It would be reasonable to assume that due to the number of occurrences recorded, including the records within conservation tenure, that *Rhagodia* sp. Hamersley (M. Trudgen 17794) may warrant a downgrade in its conservation listing to Priority 4, and potentially off the priority list completely (Dr Stephen van Leeuwen, pers. comm.). This is supported by the large number of flora species in the Pilbara that are known from less occurrences (based on vouchers submitted to the Western Australian Herbarium) over a similar or smaller range that are not on the Priority Flora list or are listed as Priority 4 (Dr Stephen van Leeuwen, pers. comm.). For example, *Acacia arrecta* and *Acacia bromilowiana* (P4) are both known from 29 records and have a comparable range (WAH, 1998-).

Based on the data and literature available for *Rhagodia* sp. Hamersley (M. Trudgen 17794) and the author's extensive experience completing surveys in the Pilbara, it is the opinion of the author that *Rhagodia* sp. Hamersley (M. Trudgen 17794) is widespread in the south-central and eastern Pilbara. There are known large occurrences of *Rhagodia* sp. Hamersley (M. Trudgen 17794) within the Newman region, and it is highly likely that populations are more extensive than current knowledge suggests. This statement is accurate for the occurrences of *Rhagodia* sp. Hamersley (M. Trudgen 17794) within the Roy Hill RDE. Habitat that supports known populations is extensive in the local region of the Roy Hill RDE and it is likely that more individuals would be recorded.

The taxonomy of *Rhagodia* sp. Hamersley, and *Rhagodia* in general, is in need of review, with the taxonomy of *Rhagodia* sp. Hamersley (M. Trudgen 17794) uncertain. A review of the taxonomy may find that it is not circumscribed as a good entity and fits within the natural variation of *Rhagodia eremaea*, which it grows sympatrically with at many locations in the Pilbara.

If you have any further queries regarding the content of this document, please do not hesitate to contact the author Clinton van den Bergh (Manager of Botany and Principal Botanist at Biologic Environmental Survey) on 0439 910 881.

4. References

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