



8 July 2022

Gerrit Göedecke
Managing Director
K Plus S Salt Australia
Perth WA 6000
Via email

Dear Gerrit

Ashburton Salt Targeted Flora Survey 2022

1.0 Background and Scope

K plus S Salt Australia Pty Ltd (K+S) proposes to construct and operate a solar salt project (the proposed Ashburton Salt Project), located on the Western Australian (WA) coast approximately 40 km southwest of Onslow. The project has been referred under Section 38 of the *Environmental Protection Act 1986* (EP Act) and to the Commonwealth Minister for the Environment in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Biota Environmental Sciences (Biota) was engaged to undertake targeted flora searches in the Ashburton Salt study area (comprising the development envelope and road survey area; Attachment 1) and surrounds in the post-wet season in 2022, following a period of sufficient rainfall. This work will supplement the two-phase detailed botanical survey that was undertaken by Biota in November 2018 and March 2019, and a previous targeted survey in August 2019. Conditions were unfavourable for the collection of annual species at the time of the earlier surveys, which represents a limitation for the assessment of the project.

This report documents the methods, results and key findings of the 2022 targeted flora survey and is intended for use as a supporting document for the environmental impact assessment.

2.0 Methodology

2.1 Field Survey

The targeted flora survey was undertaken in accordance with Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016).

The field survey was conducted on May 18th and May 20th 2022 by Rachel Warner (Principal Scientist) and Ayesha Lapinski (Botanist), both of Biota.

Contextual targeted searches along Onslow Road (outside the study area) were conducted on May 18th. As a part of this work, historical records of *Eleocharis papillosa* (listed as Vulnerable at the Federal level and a Priority 3 species for WA) were re-visited and the surrounding area searched.

Targeted searches were undertaken on May 20th within the study area. Due to the remote location, the study area was accessed by helicopter, and foot traverses were undertaken at selected locations considered prospective for conservation significant flora species. (see Attachment 2 for survey effort map).

Locations of species of conservation significance or unknown taxa were recorded using an electronic tablet with <2 m accuracy. The number of individuals and extent of the population were also recorded for each location, along with the habitat and associated species.

Total monthly rainfall data for Onslow were compiled and compared with the long-term monthly median values (Figure 1). These data were obtained from the Bureau of Meteorology weather recording station at Onslow Airport (station #5017). The data show that rainfall in the six months prior to the survey (November 2021 – April 2022) totalled 86.0 mm, which is almost double the long-term median recorded for the same period (48.1 mm). The majority of this rainfall was recorded in the month prior to the field survey (April; 63.2 mm). Conditions at the time of the survey were considered optimal for the collection of annual and cryptic perennial flora species. We note that a significant amount of rainfall was recorded in May (310.4 mm; Figure 1), however most of this fell in the week prior to, or after the survey. Therefore, this rainfall would not have significantly impacted the collecting conditions at the time of the survey.

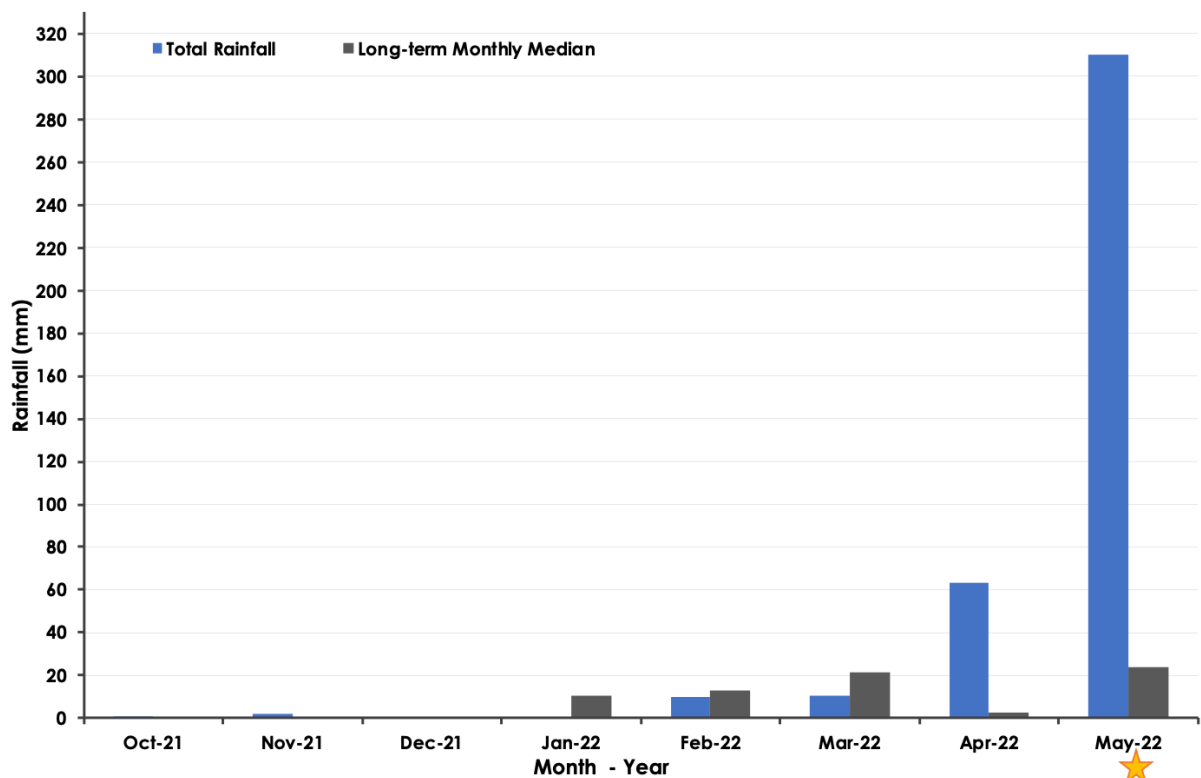


Figure 1: Total monthly rainfall from November 2021 to May 2022 compared to the long-term monthly median rainfall (Onslow Airport WA).

Star indicates survey timing.

2.2 Specimen Identification, Nomenclature and Data

Species that were well known to the survey botanists were identified in the field. Voucher specimens of all other species were collected and later identified using flora keys, consulting appropriate publications, using voucher reference collections and comparison to the collections held at the WA Herbarium.

The specimens were identified by Biota botanists, with confirmations made by Pierre-Louis de Kock (Specialist Taxonomist at dK Botanical). A small number of specimens were submitted to the WA Herbarium for final confirmations by a specialist taxonomist (Mike Hislop).

All data from the current survey were entered into an Access database structure held at Biota (the Site Species Database, developed by Ted Griffin at the request of Malcolm Trudgen of M.E. Trudgen and Associates).

A full flora species list is provided in Attachment 3. Nomenclature used in this report is consistent with the current listing of WA flora recognised by the WA Herbarium on FloraBase¹ at the time of preparation of this report.

2.3 Limitations

The targeted survey was conducted in late May, which is within the recommended primary survey timing as per EPA (2016), and under optimal sampling conditions (Section 2.1). However, there are limitations to this study that must be considered when reviewing and applying the results detailed in this report. These are:

- The survey was not exhaustive – several small sections of the development envelope considered likely to provide habitat for the target species were surveyed. Due to significant rainfall and road closures at the time of the survey, the access road survey area (Attachment 1) was unable to be assessed by vehicle as planned.
- The survey effort was less than intended, due to heavy rainfall which commenced on the day of the field mobilisation, which resulted in various logistical issues (road closures and a delay to the arrival of the helicopter).

3.0 Results and Discussion

No species listed as Threatened flora under State legislation were recorded, and none would be expected to occur.

One Priority flora species was recorded during the targeted survey, *Abutilon* sp. Pritzelianum (S. van Leeuwen 5095) (Priority 3). This species is described below and a map of locations in the study area is provided in Attachment 4 (2022 records only).

***Abutilon* sp. Pritzelianum (S. van Leeuwen 5095)**

Priority 3

Abutilon sp. Pritzelianum (S. van Leeuwen 5095) is a perennial shrub growing to 1.5 m tall with yellow-orange flowers in August (WA Herbarium 2021). This species occurs on sand plains with orange-brown sandy loam substrate and is distributed over a range of more than 700 km, extending from the southern Carnarvon bioregion through to Port Hedland in the Pilbara (WA Herbarium 2022). Three records of scattered individuals (in total seven individuals) were recorded during the 2022 survey from coastal dune habitat (Table 1; Attachment 4; Plate 1). These records represent additional records for the study area; previously 29 individuals of the same species were recorded by Biota (2020) during the Phase 1 and Phase 2 surveys (across 12 locations), and a further 53 individuals were recorded during the August 2019 targeted survey (85 individuals in total).

Table 1: Records of *Abutilon* sp. Pritzelianum (S. van Leeuwen 5095) recorded during the 2022 survey.

Easting (mE)	Northing (mN)	No. of individuals
264080	7582607	1
266191	7558482	1
263837	7582819	5
	Total	7

¹ <https://florabase.dpaw.wa.gov.au>



Plate 1: An individual of *Abutilon* sp. *Pritzelianum* (S. van Leeuwen 5095) recorded in the study area.

The location of the single record of ?*Minuria tridens* from the Phase 1 survey in 2018 (Biota 2020) was re-visited and the surrounding area searched, however no individuals were located. *Minuria tridens* is listed as Threatened under Commonwealth legislation, Vulnerable under the EPBC Act, and is a Priority 1 species in WA. The original 2018 specimen was in poor condition and therefore only tentatively identified as *M. tridens* by WA Herbarium Taxonomist Mike Hislop.

No records of *Eleocharis papillosa* (listed as Vulnerable at the Federal level, and a Priority 3 species for WA) were located in the study area during the 2022 survey. No records were located during the contextual searches, undertaken targeting historical records along Onslow Road. A number of other flowering sedges were noted throughout the study area, and along Onslow Road, e.g. *Bulbostylis barbata*, *Cyperus bulbosus*, *B. rigidellus* and *C. squarrosus*. Conditions at the time of the May 2022 targeted survey were optimal for the detection of annual sedges.

We trust this information is sufficient for your current purposes. Please contact us if you have any queries.

Yours sincerely,

Biota Environmental Sciences Pty Ltd

Rachel Warner
Principal Scientist/General Manager – Biological Services

Attachment 1: Map of Ashburton Salt Study Area
 Attachment 2: Map of Survey Effort (2022 Targeted)
 Attachment 3: Species List (2022)
 Attachment 4: Map of Conservation Significant Flora (2022)

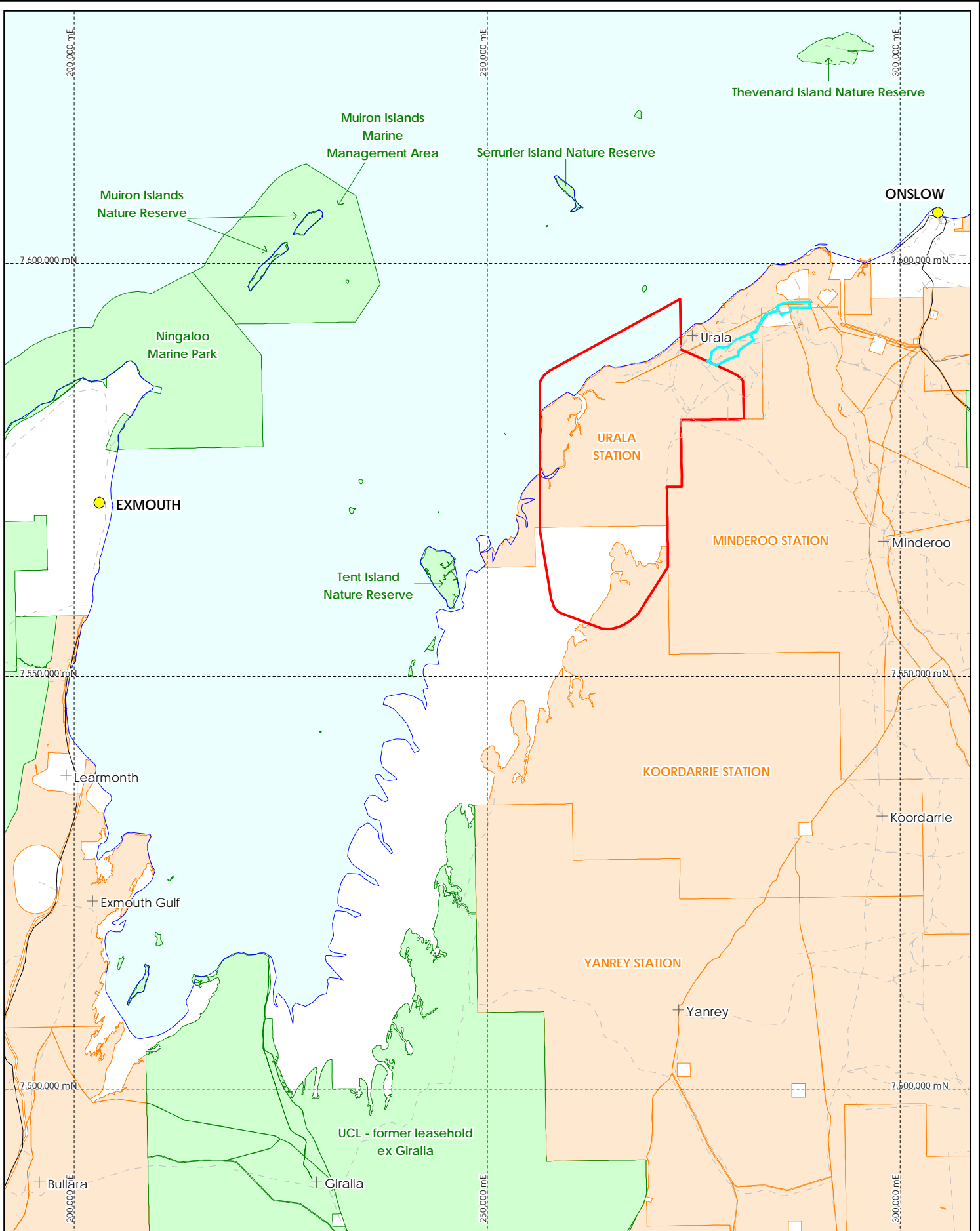
References

Biota (2020). Ashburton Salt Project Detailed Flora and Vegetation Survey. Unpublished report prepared for EnviroWorks and K Plus S, June 2020, Biota Environmental Sciences, Leederville, Western Australia.

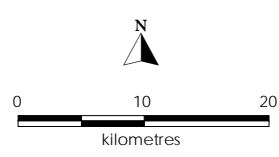
EPA (2016). *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*. Environmental Protection Authority, Western Australia.

WA Herbarium (2021). Florabase - the Western Australian Flora [WWW Document]. Department of Biodiversity, Conservation and Attractions, . Retrieved from <http://florabase.dpaw.wa.gov.au/>.

WA Herbarium (2022). Florabase - the Western Australian Flora [WWW Document]. Department of Biodiversity, Conservation and Attractions, . Retrieved from <http://florabase.dpaw.wa.gov.au/>.

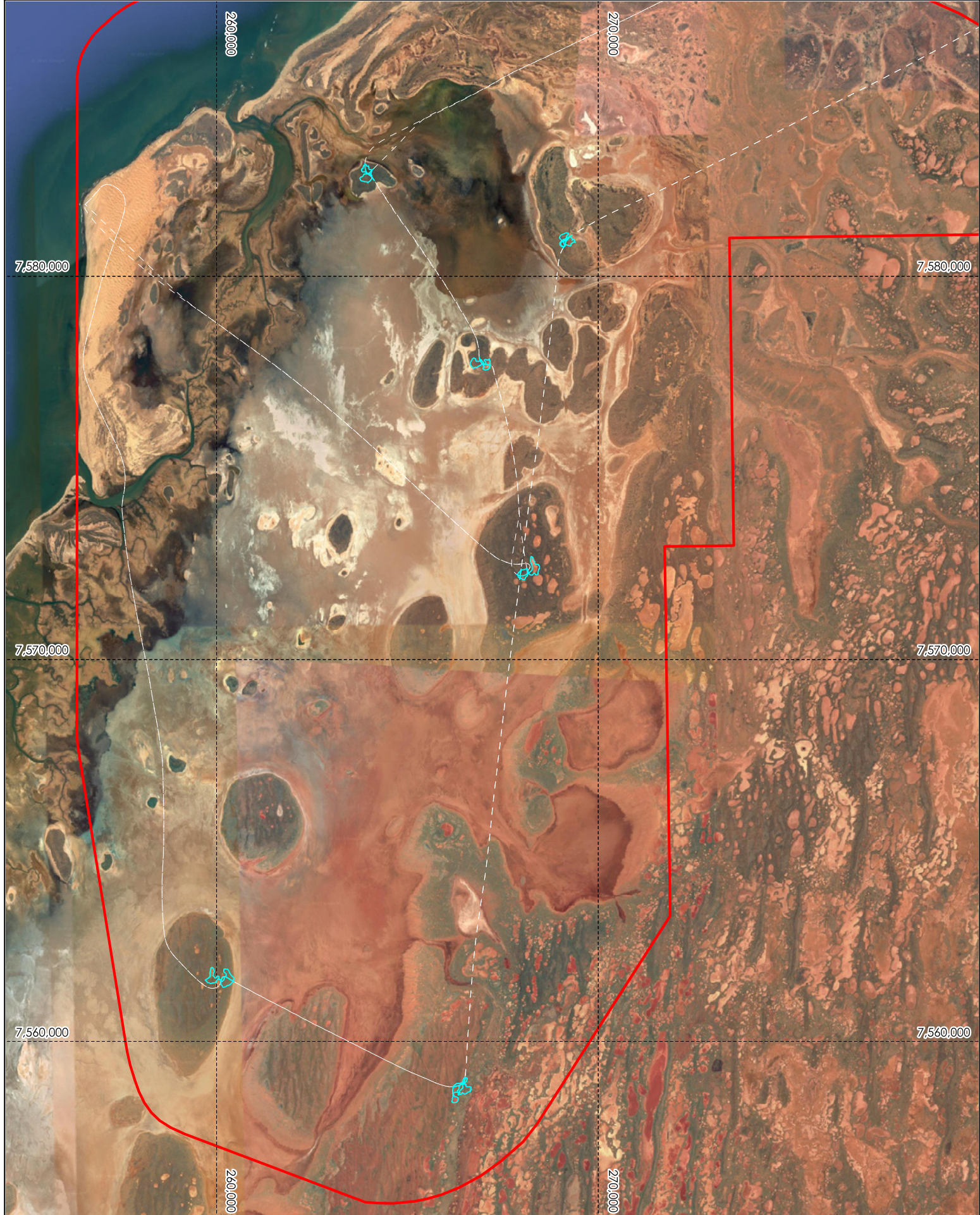


- Development envelope
- Road survey area
- Dept. of Biodiversity, Conservation and Attractions managed lands and waters
- Pastoral lease area

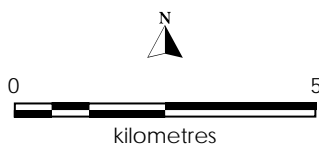


**Ashburton Salt
Location Map**

Biota
Environmental
Sciences



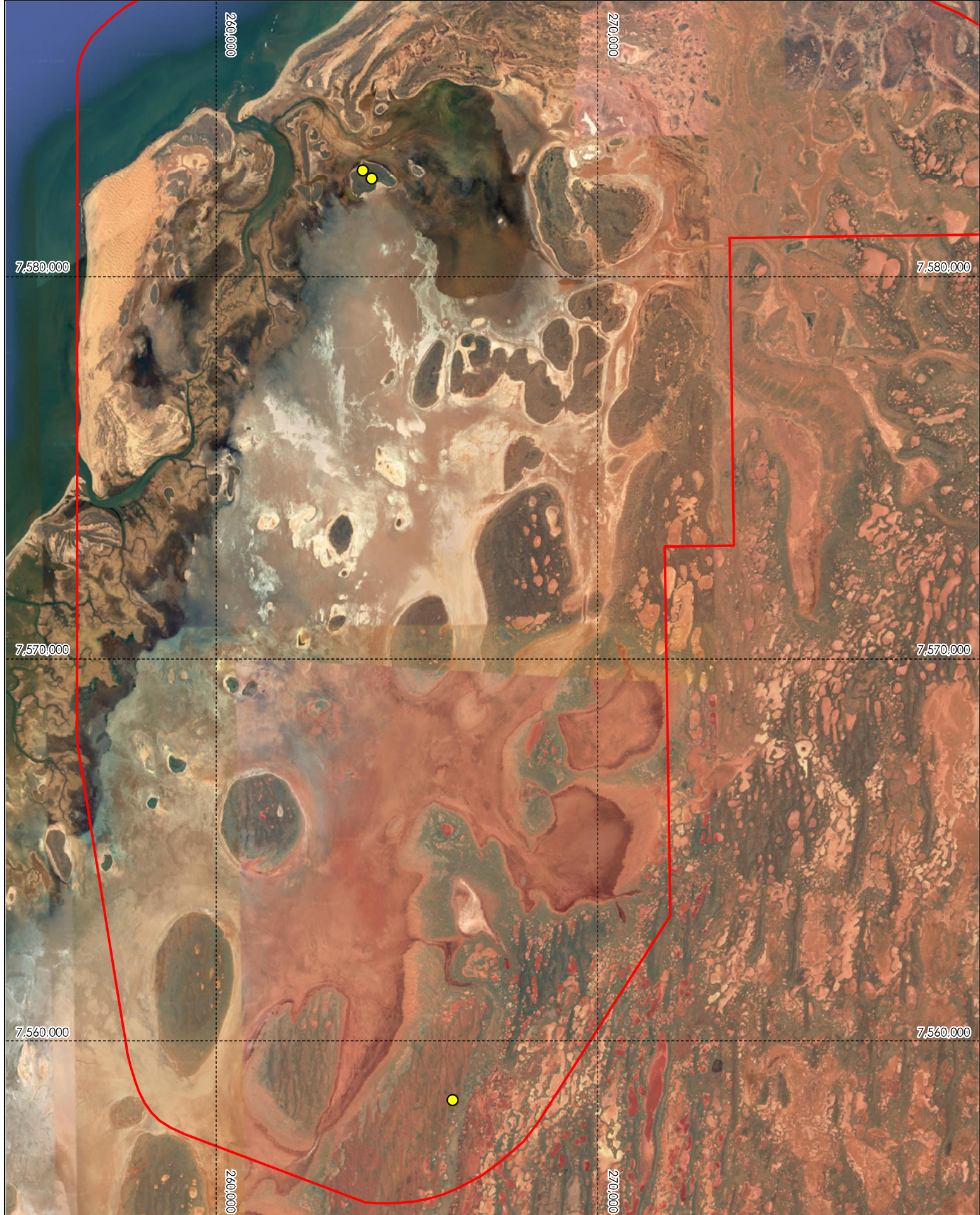
- Development envelope
- Foot traverse



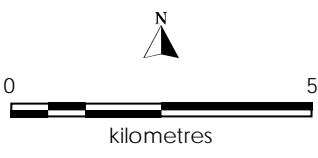
Ashburton Salt Flora Survey Effort



Family	Species
Asteraceae	<i>Calotis plumulifera</i>
	<i>Olearia</i> sp. Kennedy Range (G. Byrne 66)
	<i>Pluchea dunlopii</i>
Boraginaceae	<i>Euploca transformis</i>
	<i>Heliotropium crispatum</i>
Brassicaceae	<i>Lepidium platypetalum</i>
Campanulaceae	<i>Wahlenbergia tumidifructa</i>
Convolvulaceae	<i>Cressa australis</i>
	<i>Ipomoea coptica</i>
Cyperaceae	<i>Bulbostylis barbata</i>
	<i>Cyperus bulbosus</i>
	<i>Cyperus rigidellus</i>
	<i>Cyperus squarrosus</i>
Elatinaceae	<i>Bergia trimera</i>
Euphorbiaceae	<i>Adriana tomentosa</i> var. <i>tomentosa</i>
	<i>Euphorbia vaccaria</i> var. <i>vaccaria</i>
Fabaceae	<i>Acacia coriacea</i> subsp. <i>coriacea</i>
Frankeniaceae	<i>Frankenia ambita</i>
Goodeniaceae	<i>Scaevola pulchella</i>
	<i>Scaevola sericophylla</i>
Hemerocallidaceae	<i>Corynotheca pungens</i>
Lamiaceae	<i>Quoya loxocarpa</i>
Lauraceae	<i>Cassytha capillaris</i>
Malvaceae	<i>Abutilon</i> sp. <i>Pritzelianum</i> (S. van Leeuwen 5095) (P3)
	<i>Hannafordia quadrivalvis</i> subsp. <i>recurva</i>
	<i>Lawrenzia densiflora</i>
	<i>Sida rohlenae</i> subsp. <i>rohlenae</i>
Phymaceae	<i>Mimulus gracilis</i>
Plumbaginaceae	<i>Muellerolimon salicorniaceum</i>
Poaceae	<i>Eragrostis falcata</i>
	<i>Triodia avenoides</i>
	<i>Whiteochloa airoides</i>
Scrophulariaceae	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>
	<i>Eremophila setacea</i>
	<i>Myoporum montanum</i>
Solanaceae	<i>Nicotiana heterantha</i>



- Development envelope
- Priority 3 Flora Recorded**
- *Abutilon* sp. Pritzelianum (S. van Leeuwen 5095)



Ashburton Salt Significant Flora Records

