

Australian Seed Bank Partnership Seeds of Hope project report

Conostylis micrantha population surveys and seed collection

Surveys: 31st July to 3rd August 2023

Seed collection: 11th to 13th October 2023

Andrew Crawford, Alanna Chant and Casper Human



Department of **Biodiversity,
Conservation and Attractions**



**Biodiversity and
Conservation Science**

Survey Description

All known populations of *Conostylis micrantha* were surveyed between the 31st July and 3rd August 2023. The surveys were led by DBCA science and regional nature conservation staff (Andrew Crawford, Alanna Chant and Casper Human), assisted by additional departmental staff and volunteers at some populations. At this time plants were in bud or flowering making locating plants relatively easy. If plants were not in bud or flowering, it is likely that they will have been missed in these surveys. Also, due to the small size of plants and the often-large areas that needed to be covered in surveying for the species, it is probable that some plants were missed. The location of all plants found was recorded with a GPS and the plants were marked with pink flagging tape to facilitate easy relocation to allow for seed collection later in the year.

Seed collection

All populations where extant plants were located in the surveys, were targeted for seed collection between the 11th and the 13th October 2023. Seed collections were conducted by DBCA science staff (Andrew Crawford) with assistance from regional nature conservation staff (Alanna Chant and Jessica Gillespie). Mature fruit were harvested by hand, taking no more than 20% of the available fruit, with the fruit of each individual kept separate. The flagging tape used to mark the location of plants was removed after seed collection.

Seed was placed into the dehumidifying room (15% relative humidity at 15°C) of the Western Australian Seed Centre, Kensington on the 17th October 2023. A rubber rubbing mat was used to break up the *Conostylis* fruit, which was then sieved to separate the seed from other non-seed material using a 1mm upper sieve and a 425µm lower sieve. Seed was then hand sorted and counted. Seed will be stored in the vault of the Western Australian Seed Centre, Kensington.

Survey Results

Population 1

The location description for this population is “ [REDACTED] ”, however it was unclear whether the species occurs along all of the 1.9 km or in patches. Threatened flora markers were only present for a ca. 550 m stretch of road at the northern end of the population and this area was the focus of the survey effort at this population (Map 1). This area was traversed with a total of 72 *C. micrantha* plants found (Table 1, Pop. 1 north). Weeds pose a threat to the species and were most evident near the edges (road and farmland) of the roadside vegetation. Rabbit activity was also apparent and likely to pose a threat to the species.

The southern end of the described population i.e., [REDACTED] was searched but this location was much more degraded than the northern end of the population with the native herb layer largely grazed out and replaced by weeds (Fig 1). No plants were found in this location (Table 1, Pop. 1 south).

Areas of habitat likely to be suitable for *C. micrantha* were checked between the northern and southern ends of the population. Fifteen plants were found ca. 550m south of the southernmost plant found in the northern portion of the population. The vegetation in this area was also impacted by grazing and weeds but still had some of the herb layer intact, including the *Conostylis*. *C. micrantha* plants seen in this location were all healthy. There are no Threatened flora markers in place on the roadside covering these plants.

8.5 FTE hours were spent survey this population (surveyed by A. Crawford).

This population is described as “ [REDACTED] ”. The roadside vegetation on the east side of [REDACTED] was traversed from the intersection with [REDACTED] (Map 2).

Weeds and grazing by rabbits were threats to the species at this location. Roadside maintenance, particularly to manage water runoff, is also a potential threat to these plants. No Threatened flora markers were evident for this population.

Population 3

Population 4

No plants were seen at this location.

0.25 FTE hours were spent surveying this population (surveyed by A. Crawford).

Population 5

The vegetation in the vicinity of [REDACTED] was traversed searching for *C. micrantha* (Map 3) but no *C. micrantha* plants were located.

The herb layer beneath shrub where the *Conostylis* would be found was largely missing. Weeds and grazing by rabbits were a threat to the species at this site.

1.25 FTE hours were spent surveying this population (surveyed by A. Crawford).

Population 6

This population is located on [REDACTED]. The roadside vegetation on both sides of the road between the Threatened flora markers was traversed searching for *C. micrantha* (Map 4) but no plants were found at this location.

Weeds and grazing/digging by rabbits are threats to the species at this location. Due to the narrow width of the roadside vegetation, road maintenance is also considered a threat, however Threatened flora markers are in place delineating the population.

1.5 FTE hours were spent surveying this population (surveyed by A. Crawford).

Population 7

A traverse of this population was undertaken starting from the [REDACTED] [REDACTED]. There was a change in vegetation ca. [REDACTED] where the easterly search was ceased. A northerly search was then conducted along two axes originating from areas of high *Conostylis* plant numbers from the original W to E traverse (Map 5). A total of 345 plants were seen (Table 1, Pop. 7), however it is probable that there are many more in this population, particularly N of the NE extent of this search. It is considered highly probable that the population extends south of the area traversed in this survey.

The plants in this population appear to be in good condition. Rabbit and pig activity is evident throughout the population, but because of the large area over which the plants occur, did not appear to be a major problem at this stage.

66 FTE hours were spent surveying this population (surveyed by A. Crawford, A. Chant, C. Human, five additional DBCA staff (Yamatji and NACC indigenous rangers) and four regional herbarium volunteers).

Population 8

No plants were located at this population. The vegetation was highly degraded with the herb layer largely missing from this location.

0.25 FTE hours were spent surveying this population (surveyed by A. Crawford).

Population 9

An easterly traverse of this population was started on the [REDACTED] [REDACTED] midway between the Threatened flora markers. The vegetation [REDACTED] appeared unsuitable for *C. micrantha* so a SE path was taken to try and locate more suitable habitat. One small, non-flowering, *C. micrantha* was located ca. [REDACTED], but no further plants were seen on the outward leg of the traverse. At a point ca. [REDACTED] a return traverse was conducted in a SW direction, following vegetation that appeared suitable for the *Conostylis*. At a point ca. [REDACTED] *C. micrantha* plants were found and

continued to be found for ca. 270m in a SW direction (Map 6). In total 20 plants were located, but many more are likely as this was only a partial survey.

Whilst the vegetation where most of the plants were found was healthy and in good condition, the W edge where the first plant was found show signs of degradation, with an edge effect from the adjacent farmland with weeds and rabbit grazing/digging.

1.25 FTE hours were spent surveying this population (surveyed by A. Crawford).

Population 10

The survey of this population was restricted to the [REDACTED] (Map 7). This area is marked [REDACTED] with Threatened flora markers.

A total of 56 *C. micrantha* plants were found in the area surveyed (Table 1, Pop. 10) however, it is considered probable that the species also occurs in the vegetation to the north of the [REDACTED] but was not surveyed.

Weeds and grazing/digging by rabbits are apparent threats at this population, particularly near road edges, and in the [REDACTED].

2.75 FTE hours were spent surveying this population (surveyed by A. Crawford).

Population 11

This population is located either side [REDACTED]. The whole of the area to the south of [REDACTED] were burnt in a wildfire in December 2021. Monitoring of *C. micrantha* in this population was divided into two portions: a survey of plants in the burnt area S of [REDACTED]; and plants in the unburnt area to the N [REDACTED] (Map 8). Both surveys were partial, covering only a small proportion of the likely habitat at this location.

In the burnt area, plants have resprouted from their underground rhizomes, and a large number are flowering. In a subset of the plants seen, 80% were flowering. A total of 273 plants were located (Table 1, Pop. 11 unburnt) [REDACTED]. Plants of *C. micrantha* ceased being located at ca. [REDACTED].

In the unburnt area a total of 237 plants were seen (Table 1, Pop. 11 unburnt). Plants were found from [REDACTED]. The burnt vegetation to the east of this location [REDACTED] was not surveyed but *C. micrantha* is likely to occur in this area.

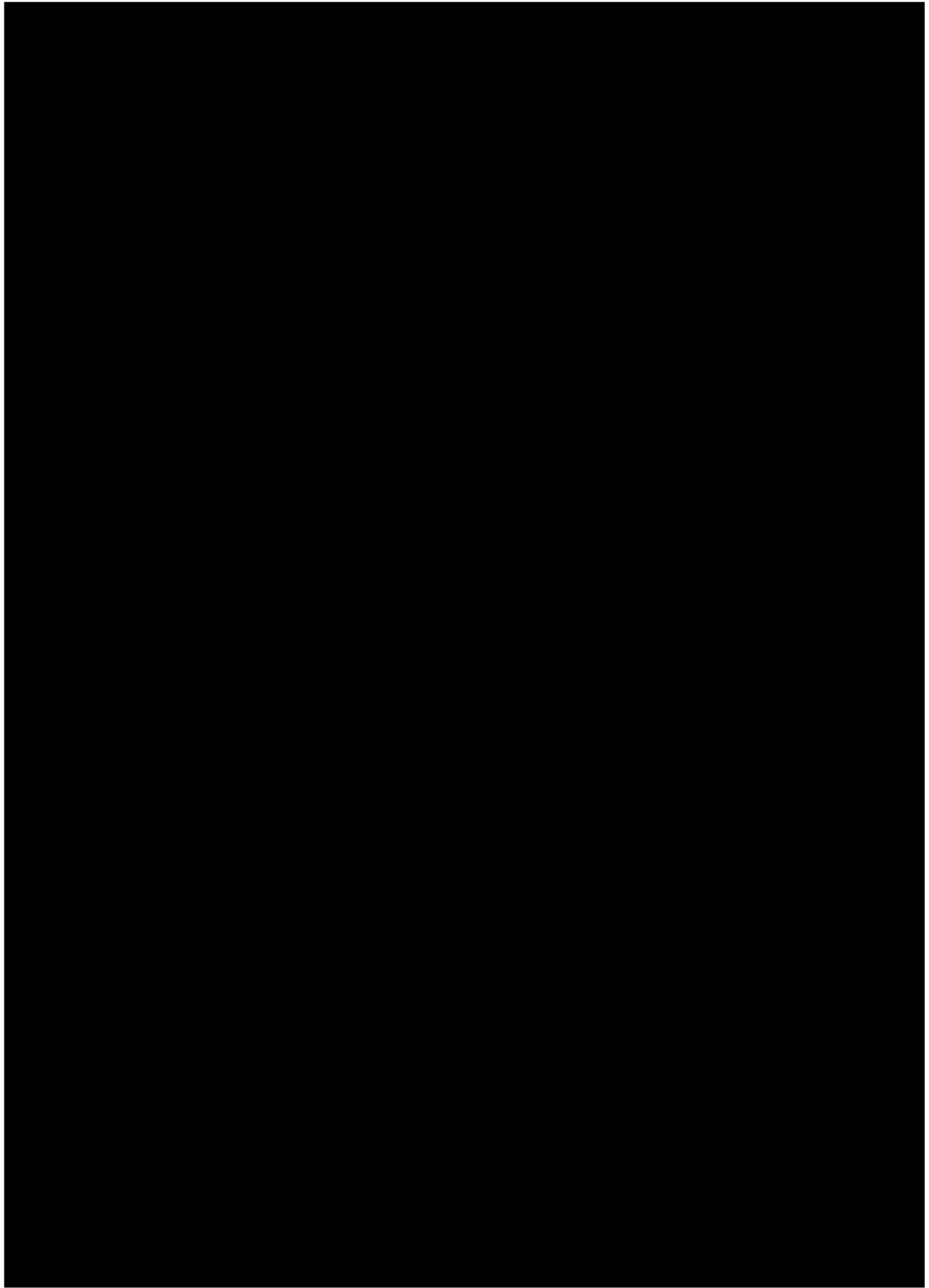
26.5 FTE hours were spent surveying this population (surveyed by A. Crawford, A. Chant, C. Human, two additional DBCA staff (Yamatji and NACC indigenous rangers) and three DWER staff).



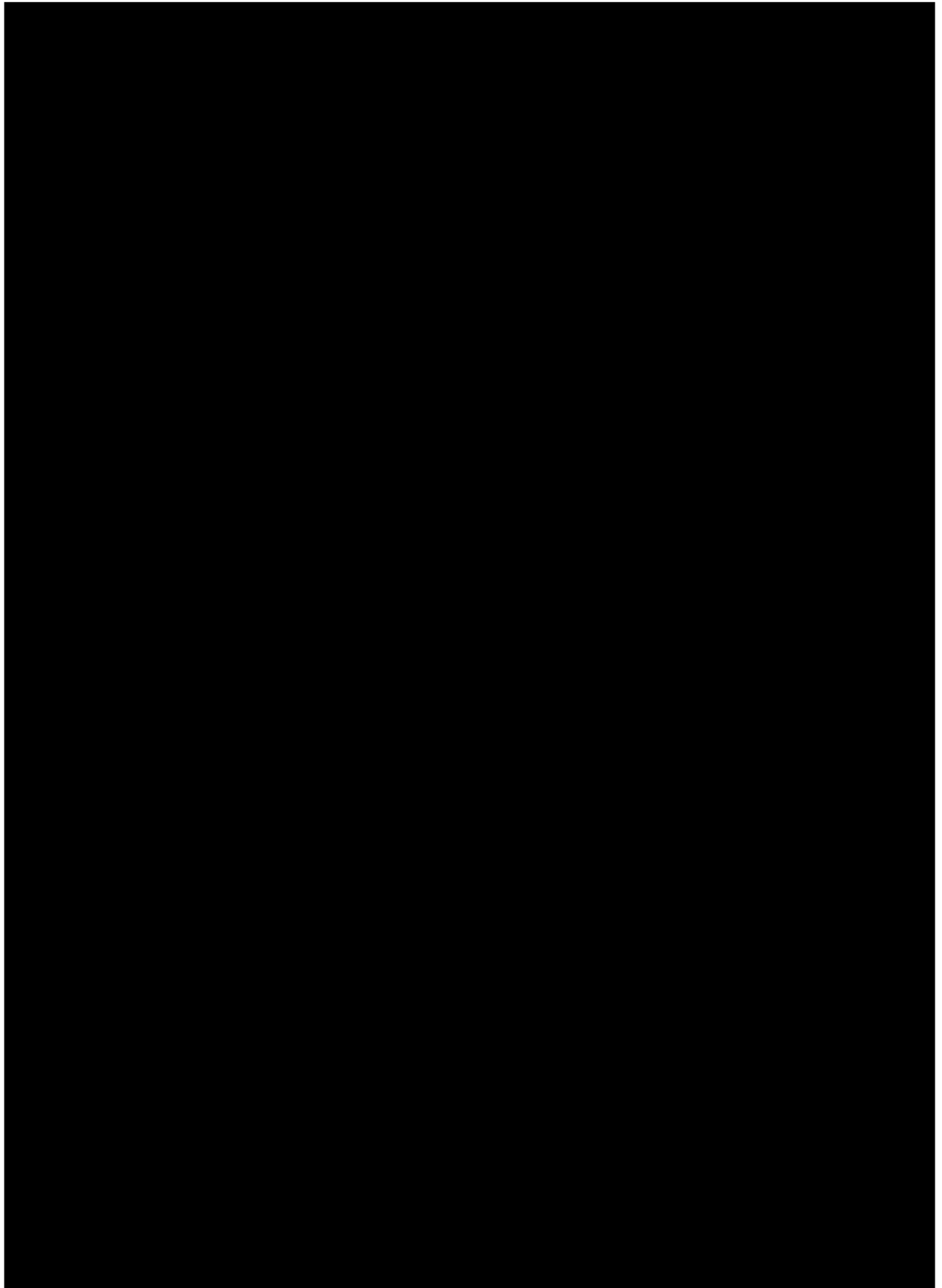
Fig. 2. *Conostylis micrantha* resprouting from its underground rhizome after fire. Note the plant is flowering ca. 18 months after the fire.

Table 1. *Conostylis micrantha* survey summary (July/August 2023).

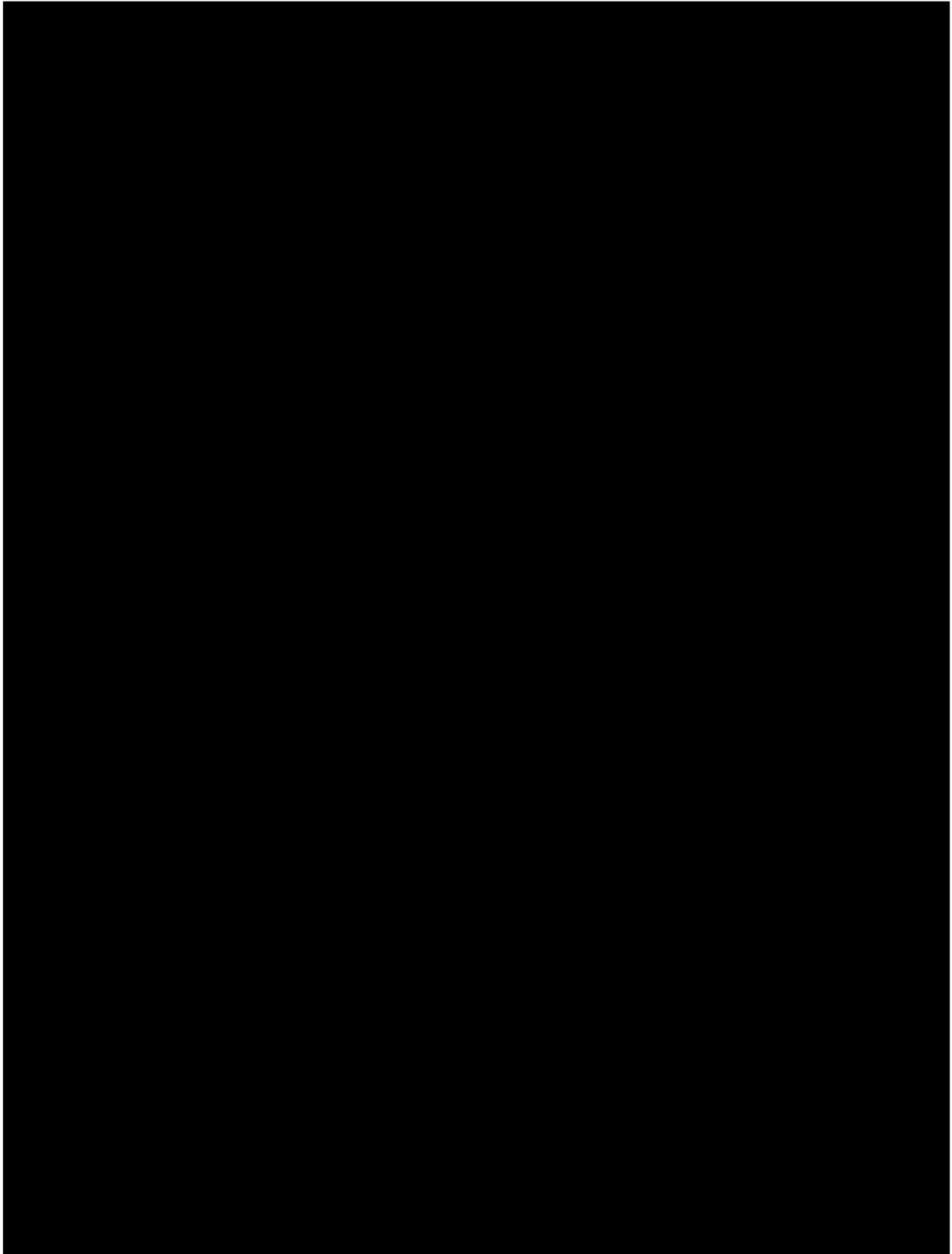
Population		Location (from TPFL)	No. plants	Site condition	Management action required
1	North	[REDACTED]	72	Poor to good	Weed control, grazing control
	Middle		15	Poor	Weed control, grazing control, install Threatened flora markers
	South		0	Degraded	
2		[REDACTED]	3	Poor	Weed control, grazing control, install Threatened flora markers
4		[REDACTED]	0	Degraded	
5		[REDACTED]	0	Poor to degraded	
6		[REDACTED]	0	Poor	
7		[REDACTED]	345	Very good	Weed control near firebreak
8		[REDACTED]	0	Degraded	Weed control, grazing control, install Threatened flora markers
9		[REDACTED]	20	Poor to very good	Weed control near firebreak
10		[REDACTED]	56	Good	Weed control, grazing control
11	Unburnt	[REDACTED]	237	Very good	
	Burnt		273	Very good	



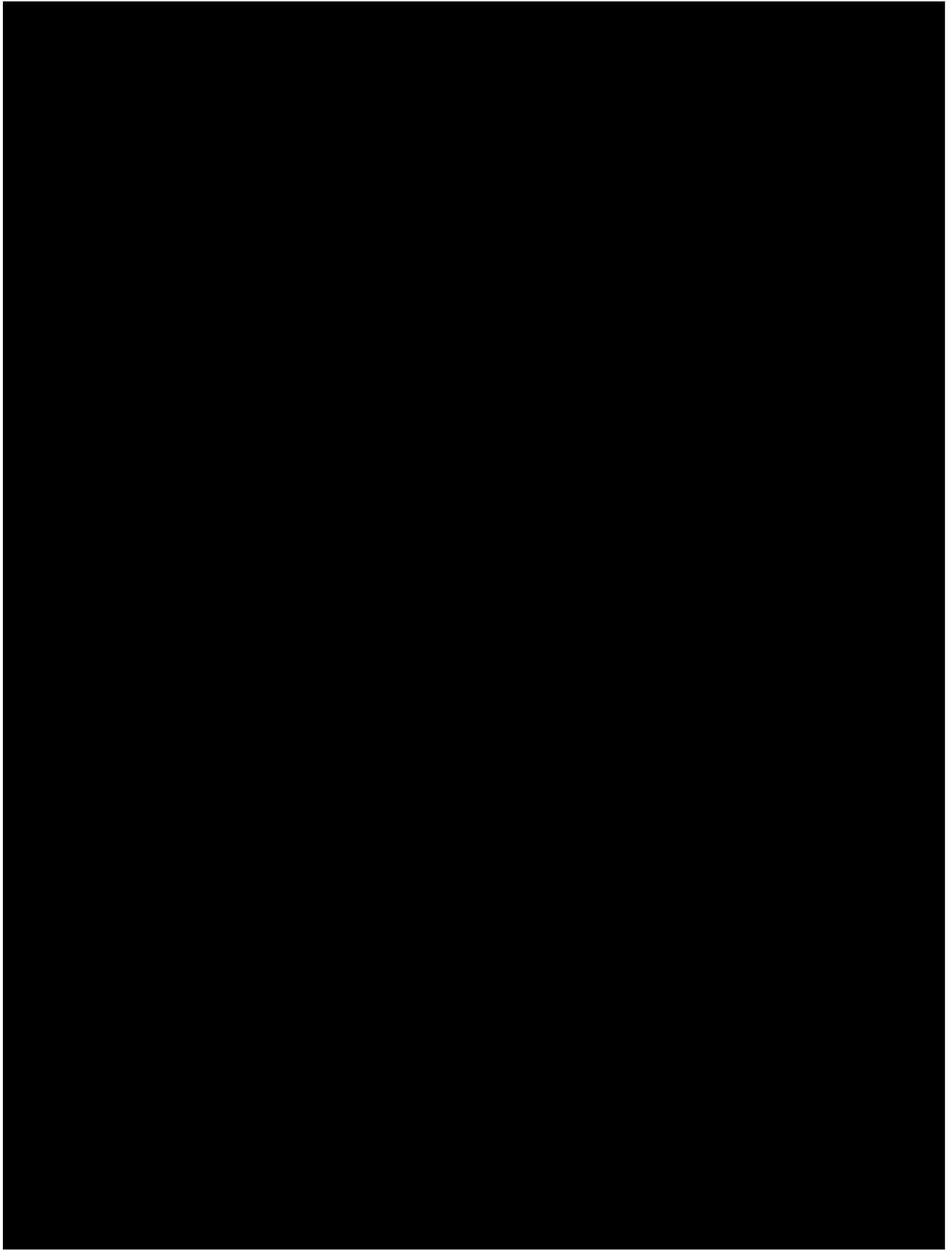
Map 1. *Conostylis micrantha* population 1 survey 31/7/2023 and 3/8/2023.



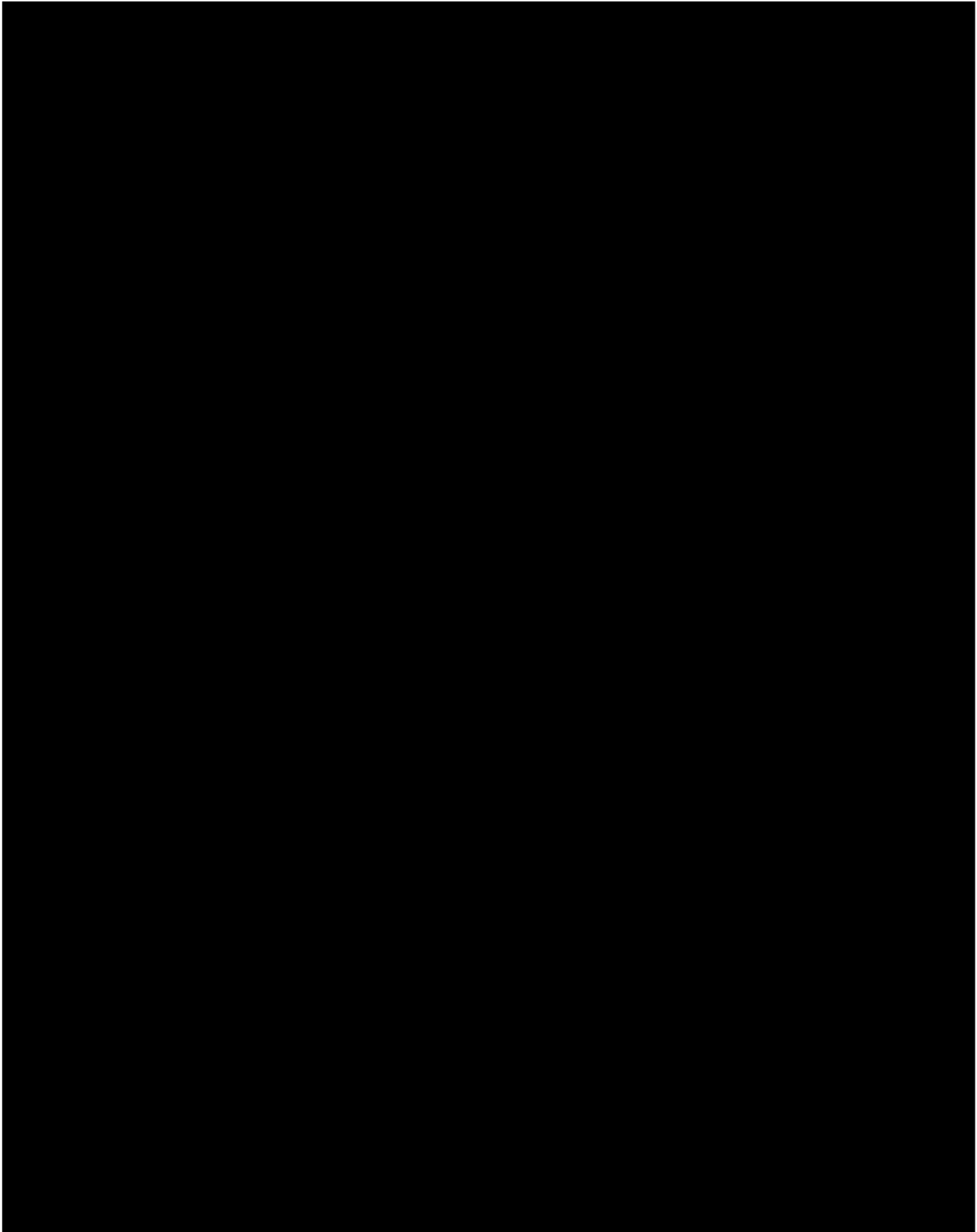
Map 2. *Conostylis micrantha* population 2 survey 31/7/2023.



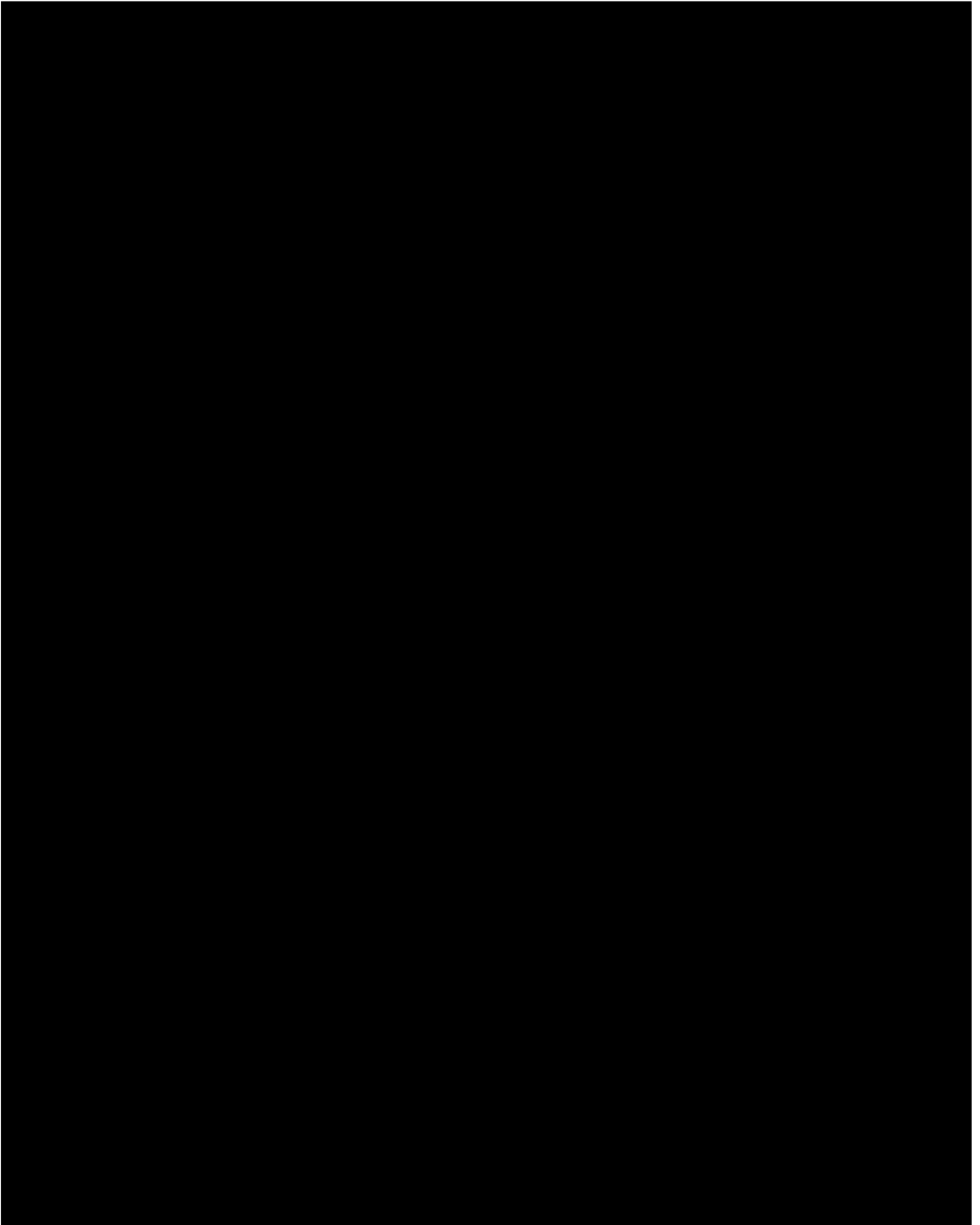
Map 3. *Conostylis micrantha* population 5 survey 1/8/2023.



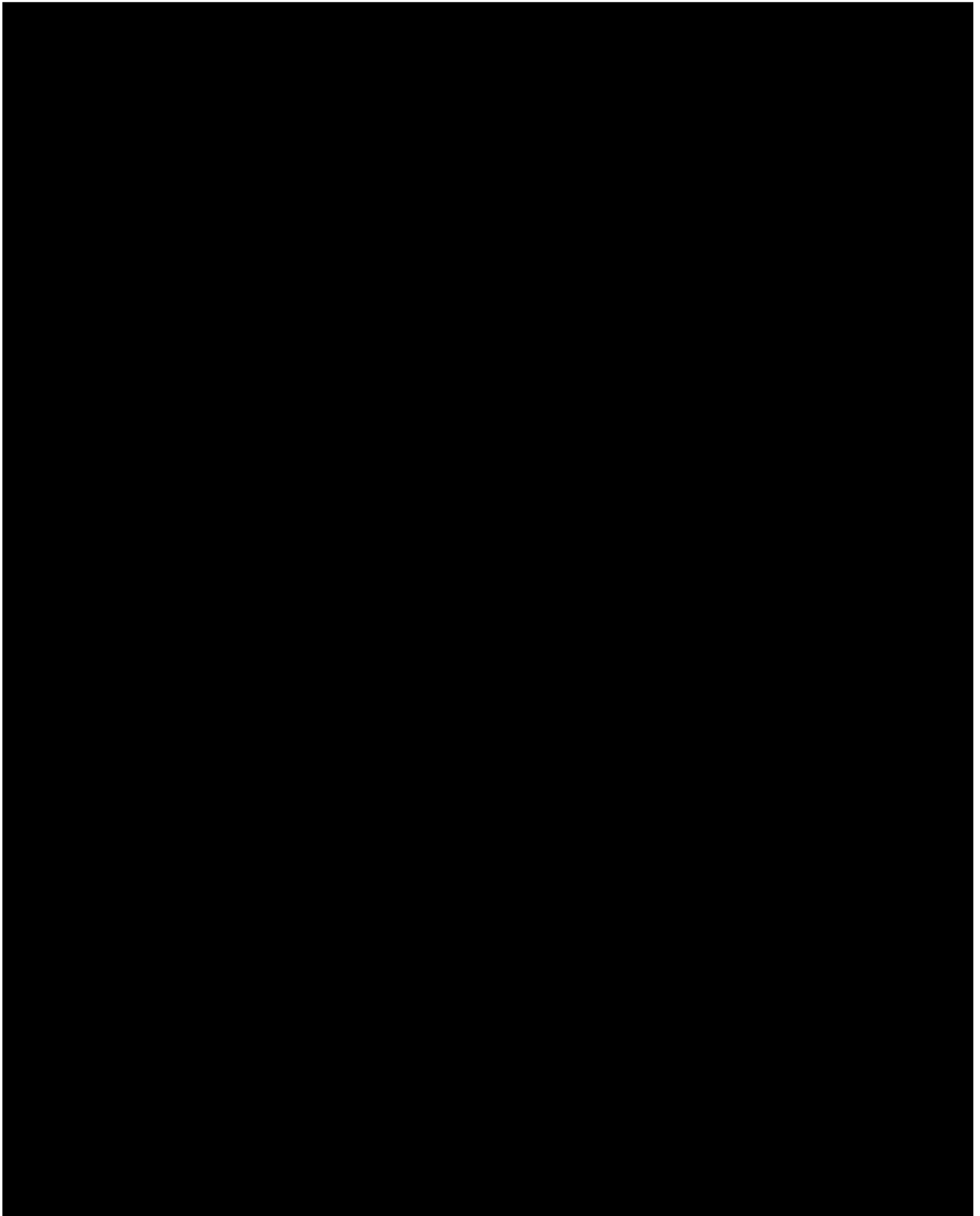
Map 4. *Conostylis micrantha* population 6 survey 31/7/2023.



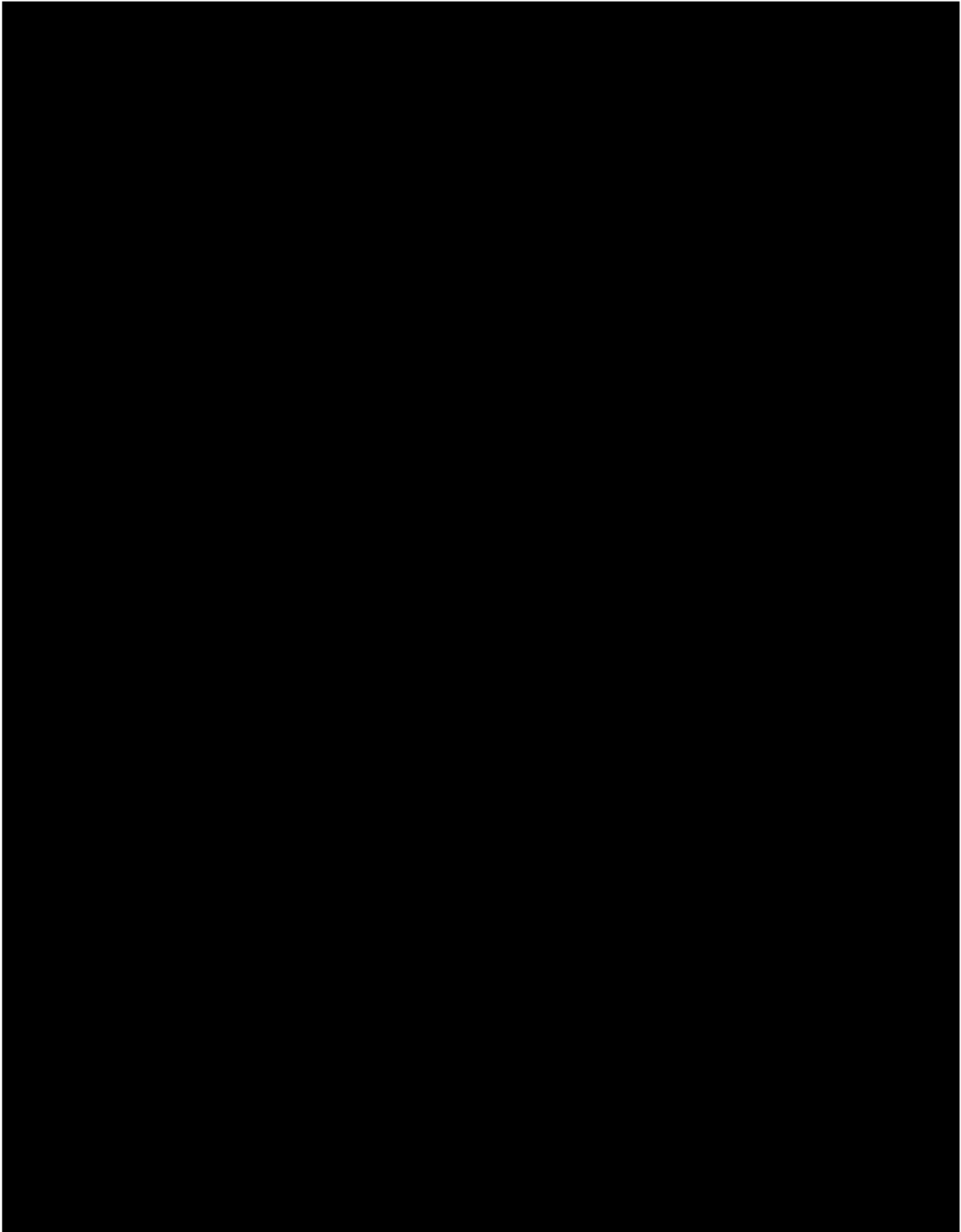
Map 5. *Conostylis micrantha* population 7 survey 1/8/2023.



Map 6. *Conostylis micrantha* population 9 survey 1/8/2023.



Map 7. *Conostylis micrantha* population 10 survey 2/8/2023.



Map 8. *Conostylis micrantha* population 11 survey 2/8/2023.

Seed collection results

Seed was collected from all populations where living plants of *C. micrantha* were located. Although fruit was collected from a relatively large number of plants at each population, the quantity of seed collected was generally very low averaging just 2.7 to 9.5 seeds per plant across the six populations (Table 2). It is not clear whether this is due to low fecundity of the species, a trait often seen for re-sprouting species, a poor season for seed production, or sub-optimal timing of the seed collections. A total of 926 seed was collected, with the number of seed obtained from each population ranging from 5 up to 322 (Table 2).

94 FTE hours were spent conducting the seed collections (collected by A. Crawford, with assistance from A. Chant and J. Gillespie).

33.75 hours were spent processing the seed collections (processed by A. Crawford).

Table 2: Seed collection information for six populations of *Conostylis micrantha* collected in October 2023.

Population no.	Accession	No. plants sampled	No. plants with seed	Total seed collected	Average seed collected per plant \pm SE
1	07011	48	17	106	6.2 ± 2.8
2	07010	3	1	5	5.0 ± 0
7	07006	181	67	321	4.8 ± 0.7
9	07009	18	13	60	4.6 ± 1.5
10	07007	49	34	322	9.5 ± 2.1
11	07008	154	41	112	2.7 ± 0.5



Figure 3: Seed of *Conostylis micrantha*.

Summary

Plants were unable to be located at four of the ten known populations of *C. micrantha*. Three of these populations are located on road verges. Due to the degraded condition of all these populations, with the native herb layer largely missing and replaced with weeds, it is considered highly unlikely that the species will recover at these sites.

Population 1, due to the length of the population and differing vegetation condition along its length, presents a range of monitoring and management challenges. Unless plants can be found between the areas where plants were found (northern and middle sections) it would be useful to split the population into three to facilitate easier monitoring and management. The southern portion of the population is highly degraded, and it is considered highly unlikely that the species will recover at this site. The middle portion of this population is in moderate condition and with weed and grazing control the species may be able to persist at this site. The northern portion of the population is in better condition than the other two, however is showing signs of degradation, particularly along the edge between the vegetation and farmland. Weed and grazing control is required to prevent further degradation of the location. Population 2 is on a narrow road verge already in poor condition due to grazing and weeds. Weed and grazing management will be required to prevent further degradation of this location.

The vegetation in population 10 is of mixed condition being more degraded near the edges with the road/track and particularly along the edge adjoining farmland.

The other populations located [REDACTED] (7, 9 and 11) are in good condition and present the best opportunity for persistence of the species. Weed control along the western portion of populations 7 and 9 will be required to prevent further ingressions [REDACTED], but due to the size of the populations, grazing is not considered a major threat.

Despite seed being collected from all populations at which living plants were located, the quantity of seed collected is still very low, and the number of plants from which seed was able to be obtained is also low. Further seed collections of the species will be required to ensure that sufficient seed is stored at the Western Australian Seed Centre to facilitate any future seed-based recovery actions.

Acknowledgements

We acknowledge the Yamatji people, the traditional owners of the land upon which this work was undertaken.

This work was made possible through funding provided by the Council of Heads of Australian Botanic Gardens' Seeds of Hope appeal.

Thanks to all those who contributed to this project; the DBCA staff including Yamatji and NACC indigenous rangers, volunteers from the Geraldton Regional Herbarium, and staff from Department of Water and Environmental Regulation.