Survey of the Priority 4 species *Conospermum undulatum*

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For
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Contents

1.0 Introduction

The purpose of this survey was to assess the status and future of the populations of *Conospermum undulatum* Lindley. Currently scheduled as a Priority Four taxon, it is being considered for upgrading to Threatened Flora (declared rare flora). Though there are many populations of this species, it is restricted in it's distribution and under threat from urban development.

This report will detail the following;

a. The current status of the species
b. The status of the remnant bush in which *C. undulatum* occurs.
c. Recommendations regarding *C. undulatum*.

2.0 Taxonomy

First collected by James Drummond in 1829, *Conospermum undulatum* Lindley is a relatively small shrubby plant growing to approximately 1.5m in height (Sainsbury, 1991). *C. undulatum* was described by Lindley in 1839 and then later reduced to *C. triplinervium*, and raised back to the species level by Dr Eleanor Bennett in the Flora of Australia (1995). Its main distinctive feature is the undulating margins of the leaves, which reach about 15cm in length. The typical greyish- white flowers form into loose panicles of axillary spikes, reaching to approximately 25cm long (with peduncles). Flowering begins in May/June and extends for a lengthy period into October (Sainsbury, 1991).

Figure 1. Conospermum undulatum.

3.0 Distribution

Conospermum undulatum has a range of only 14km, all of which is found under urban pressure in the sandy soil of the eastern Swan Coastal Plain of the Perth metropolitan area. The Swan coastal Plain consists of a narrow plain, never more than 30km wide, which extends from Jurien in the north to Dunsborough in the south. The climate is warm mediterranean with warm, dry summers and cool, rainy winters.

In all there were 60 known populations prior to this survey, most occurring on private land and none in any sort of reserve solely dedicated to nature conservation. The populations vary in size from only one or two plants to a few thousand. Though locally abundant on the larger remnants, the restricted distribution of *C. undulatum* and constant threat from urban development mean that the species is now being considered for scheduling as declared rare flora. Also, even though there are a large number of populations, many individual populations are in fact sub- sets of now dissected larger populations (eg. the Hartfield Park populations).

Figure 2. Distribution.

4.0 Habitat and associated species

Conospermum undulatum is mostly found on well drained sandy soils on the eastern coastal plain in Banksia woodland, though some of the more eastern populations are found in Jarrah/Marri woodlands as the area gradually rises into the foothills. Typically associated species include *Lambertia multiflora*, *Adenanthos cygnorum*, *Hibbertia hypericoides*, *Hakea* spp., *Banksia mensiesii*, *B. attenuata, B. grandis, Eucalyptus marginata, E. calophylla, Anigozanthos manglesii*, *Stirlingia latifolia*, *Mesmolaena* spp. and *Dampiera linearis*.

5.0 Previous surveys

In 1990 Consultant Botanists Margaret Langley, Ann Taylor and Ann Kelly and Eastern Hills Wildflower society member T. Bierne surveyed intensively for *Conospermum undulatum*. With earlier surveys having been conducted by Dr Eleanor Bennett. Other surveys since had been undertaken during the preparation of the Metropolitan Wildlife Management Program No. 10 in 1991, Consultant Botanists Bronwyn Keighery and Malcom Trudgeon in 1992, for the Swan Coastal Plain Survey and by the Department of Environmental Protection while updating the System Six Reserve system 1994-1996. Unfortunately no new populations were recorded.

6.0 Survey methodology

The field survey was commenced on the 13th of August and concluded on the 21st of August 1997. The survey included all known populations of *Conospermum undulatum* and any new populations that may have been discovered (two new populations were discovered). CALM Rare Flora Report Forms were completed for all of the populations as well as a standard condition index and plant health index. Mud maps of each remnant were also made and applied later to 1:5000 scale shire vesting maps in this report.

The survey was undertaken with consideration to the "Guidelines for Surveys of Plants Proposed for listing on the Schedule of Endangered Flora" (Hopper et al, 1990). *C. undulatum* was flowering/in bud at the time of the survey at the majority of sites and as such was conspicuously identifiable.

Nomenclature and taxonomy is based on Green (1985).

7.0 New populations

Two new populations of *Conospermum undulatum* were discovered in the course of this survey. The first (4Z), on Brae road High Wycombe, consisted only of 4 plants just inside private property and on the road verge. The other new population (12G) was found on private property at 246 Kelvin road and consisted of ten plants.

8.0 Populations (Table 1.)

No.	Location	Lat/Long	Zone	Vesting
1A	Maida Vale Recreation Reserve, uncleared reserve on E side of Ridge Hill Rd, Maida Vale.	31^56'50"S, 116^01'39"E	Rural	Shire
1B	NW cnr and verge of public recreation reserve, NE cnr. of Watsonia and Goosebury Hill Rd.	31^57'05"S, 116^01'55"E	Rural	Shire/MFP
1C	NE cnr and verge of public recreation reserve, NW cnr. of Watsonia and Goosebury Hill Rd.	31^57'00"S, 116^01'55"E	Rural	Shire
1D	Watsonia Rd, verge on W side of Rd at junction with John Farrant Rd.	31^57'00"S, 116^01'55"E	Rural	Shire
1E	SE side of Kalamunda and Midland Rds intersection, WAWA pump station site.	31^56'57"S, 116^01'13"E	Rural	WAWA
2	Hawkwevale Farm Village (Activ Foundation), Hawkevale Rd, High Wycombe.	31^56'15"S, 116^00'50"E	Urban	Private
3	Fleming Reserve, bounded by Newburn Rd, Upton Rd and Smith Cres, High Wycombe.	31^56'40"S, 115^59'40"E	Urban	Shire
4A	52 Brand Rd (Lot 29), High Wycombe.	31^57.608'S, 116^00.327'E	Rural	Private
4B	42 Brand Rd (Lot 30), High Wycombe.	31^57.640'S, 116^00.260'E	Rural	Private
4C	32 Brand Rd (Lot 31), High Wycombe.	31^57'43"S, 116^00'07"E	Rural	Private
4D	22 Brand Rd (Lot 32), High Wycombe.	31^57.709'S, 116^00.247'E	Rural	Private
4E	Between Brand (no.9?) and Ravenswood Rds and 150m NE of Sultana Rd W, High Wycombe	31^57'50"S, 116^00'03"E	Rural	Private
4F	Ravenswood Rd, 150m from Sultana Rd W, High Wycombe.	31^57'52"S, 116^00'03"E	Rural	?Shire verge
4G	Roe Hwy, E verge, 500m N from Berkshire Rd intersection.	31^58.227'S, 116^00.036'E	CAH	MRD verge
4H	Lot 497. W side of Sultana Rd W, opposite Ravenswood and Brand Rds, High Wycombe.	31^57.847'S, 116^00.080'E	Rural	Private
4I	Lot 498. W side of Sultana Rd W, opposite Ravenswood and Brand Rds, High Wycombe.	31^57'55"S, 116^00'10"E	Rural	Private
4J	Lot 499. W side of Sultana Rd W, opposite Ravenswood and Brand Rds, High Wycombe.	31^57'55"S, 116^00'10"E	Rural	Private
4K	Sewerage Treatment Works and Effluent Disposal site, cnr Dundas Rd &Bedford Cr, Forrestfield.	31^58.743'S, 115^59.287'E	Special Uses	WAWA
4L	Lot 1 Bedford Cres, Forrestfield.	31^58'50"S, 115^59'15"E	Urban	Private
4M	Lot 40 Bedford Cres, Forrestfield.	31^59.087'S, 115^59.239'E	Urban	?MFP
4N	Lot 42 Bedford Cres, Forrestfield.	31^59.087'S, 115^59.239'E	Urban	MFP
4O	Lot 43 Bedford Cres, Forrestfield.	31^59.087'S, 115^59.239'E	Urban	MFP
4P	Lot 44 Bedford Cres, Forrestfield.	31^59.087'S, 115^59.239'E	Urban	MFP
4Q	WA Fire Brigades Training School between Dundas Ave and Roe Hwy, Forrestfield.	31^58.703'S, 115^59.436'E	Special Uses	WA Fire
4R	Agriculture WA Forrestfield Research Section, Bougainvillea Ave, Forrestfield.	31^58.785'S, 116^00.050'E	Urban	AgWA
4S	Pioneer Park Rubbish Tip, between ?Roe Hwy and the tip, both sides of the fence, Forrestfield.	31^58.552'S, 115^59.696'E	Rural	Shire/MRD
4T	Pioneer Park Rubbish Tip, between Roe Hwy and the tip, both sides of the fence, Forrestfield.	31^58.552'S, 115^59.696'E	Rural	Shire/MRD
4U	Pioneer Park Rubbish Tip, between Dawson Ave and the tip, both sides of the fence	31^58.832'S, 115^59.718'E	Rural	Shire
4V	c. 150m and c.400m (verge) on Brae Rd from Sultana Rd W, High Wycombe. Private/Shire	31^57.529'S, 116^00.109'E	Rural	
4W	c. 500m N of Tonkin Hwy along track/fence bordering the Forrestfield Marshalling Yards. Comm.Govt.	31^58.599'S, 115^58.728'E	Public Purposes	

4X	Roe Hwy extension - SW of Roe and Tonkin Hwys junction, between Tonkin Hwy & Hardey Rd.	31^59'25"S, 115^59'04"E	CAH	MRD
4Y	Lot 1, W cnr of Sultana Rd W and Roe Hwy, High Wycombe.	31^57'55"S, 116^00'22"E	Rural	Private
*4Z	Lot 79 Brae Rd, c. 150m from Brand Rd, High Wycombe.	31^57.632'S, 116^00.581'E	Rural	?Private
5	Edney Primary School, cnr. Newburn and Edney Rds, High Wycombe.	31^56.766'S, 116^00.294'E	Urban	Dep.Educ.
6	231 Maida Vale Rd, High Wycombe.	31^57.196'S, 115^59.770'E	Rural/Urban	Private
7	NW side of Milner Rd (Edney Rd), 250m SW of junction with Sultana Rd W.	31^57.660'S, 115^59.558'E	Rural	Private
8A	SE cnr. of Brewer and Kent Rds, under SEC transmission lines, Maida Vale.	31^57.970'S, 116^00.869'E	Urban	SEC
8B	Lot 5, c. 200m W on Bruce Rd from Brewer Rd, Maida Vale.	31^58.095'S, 116^00.694'E	Urban	Private
9	Small bush remnant on Berkshire Rd, c. 200m NW of Passiflora Dr intersection.	31^59'00"S, 116^00'45"E	Urban	Private
10A	Hartfield Park, N and W of Reid Oval, E of Hale Rd - Tonkin Hwy intersection.	31^59'48"S, 115^59'34"E	Parks & Recr.	Shire
10B	Hartfield Park, S cnr. of Hale and Hartfield Rd intersection.	31^59'30"S, 115^59'52"E	Parks & Recr.	Shire
10C	Hartfield Park, c. 500m N on Tonkin Hwy from Welshpool Rd, N side of the Hwy, Wattle Grove.	32^00'03"S, 115^59'45"E	Parks & Recr.	Shire
10D	200m NW and SE of the entrance to the Hartfield Country Club Golf Course.	32^00.007'S, 116^00.327'E	Parks & Recr.	Private
10E	S side of Welshpool Rd, directly S of Schofield Rd, under the SEC power lines.	32^00.318'S, 116^00.885'E	Rural	Private
10F	N side of Welshpool Rd, at the S end of Schofield Rd, under the SEC power lines.	32^00.315'S, 116^00.885'E	Rural	?SEC
10G	S side of Tonkin Hwy, c. 450m S of Hale Rd (Veterans Car Club lease).	32^00'00"S, 115^59'36"E	Parks & Recr.	Shire
11A	Lot 501 (no.711) Welshpool Rd, area bounded by Boundary Rd, Welshpool Rd and Tonkin Hwy.	32^00.584'S, 115^59.829'E	Parks & Recr.	MFP
11B	30 and 38 Brentwood Rd, Wattle Grove.	32^00.779'S, 115^59.967'E	Rural	Private
11C	Lot 30 Crystal Brook Rd, Wattle Grove.	32^00.770'S, 116^00.205'E	Rural	Private
11D	Lot 42 (?209) Crystal Brook Rd, Wattle Grove (next door to 11C).	32^00.770'S, 116^00.205'E	Rural	Private
12A	46 Kelvin Rd, c. 200m S of Crystal Brook Rd, Wattle Grove.	32^00'57"S, 116^01'10"E	Rural	Private
12B	Lot 12. c. 200m S on track off Kelvin Rd, opposite Orange Grove Caravan Park.	32^01.245'S, 116^01.250'E	Parks &Recr.	?MFP
12C	Lots 11, 12, 13 & 14, remnant bush on N side of Kelvin Rd, E from White Rd intersection.	32^01'24"S, 116^00'45"E	Rural	Shire
12D	Lot 27 and 28 White Rd, E side, S of Kelvin Rd, Orange Grove.	32^01'30"S, 116^00'50"E	Rural	Private
12E	Lot 29 White Rd, E side, Orange Grove.	32^01'30"S, 116^00'50"E	Rural	Private
12F	Lot 30 White Rd, E side, Orange Grove.	32^01'30"S, 116^00'50"E	Rural	Private
*12G	246 Kelvin Rd, Orange Grove.	32^01.708'S, 116^00.449'E	Rural	Private
13A	Lots 109 and 110 Clifford St, between Clifford St and Tonkin Hwy, Orange Grove.	32^01.847'S, 116^00.252'E	Rural/CAH	MRD
13B	Lot 107 Clifford St, Orange Grove.	32^01.847'S, 116^00.252'E	Rural	Private
13C	Lot 105 Clifford St, Orange Grove.	32^01.847'S, 116^00.252'E	Rural	Private
14	250m N on Pitt Rd from Haywood Rd (c. 200m S of Gosnells Rd E).	32^03'23"S, 116^01'10"E	Rural	Private
15	N side of Welshpool Rd at the intersection with Treasure Rd, Welshpool.	31^59.830'S, 115^56.677'E	Urban	Private

*new population

CAH=Controlled Access Highway; MFP=Ministry For Planning; WAWA=WA Water Authority; MRD= Metro Roads Dept.; AgWA= Agriculture WA.

9.0 Conservation indicators and status (Table 2.)

No.	Population size survey 1990	Population size August 1997	Remnant size	Standard Condition Index*	Plant Health Index**	
1A	>2000	>1000	10ha	2	3	-
1B	300	120	2.5ha	1	3	
1C	200	30+	2.5ha	1		
1D	?	11	<0.1ha	4	1	
1E	50	4	0.3ha	2	3	
2	>100	n/a	+20ha	n/a	n/a	
3	15	0	1ha	2	-	
4A,B,C,D	100	35+	3ha	2(A,B,D)cleared(C)	2	
4E	-	-	?	?	?	
4F	-	-	?05ha	?	?	
4G	50	14	0.5ha	2	3	
4H,I,J,Y	400	200	12ha	1	3	
4K	1000	265	20ha	1	3	
4L,M	250	40	1.5ha	2(L)cleared(M)	3	
4N,O,P	250	55	16ha	1	3	
4Q	>750	750	20ha	1	3	
4R	150	200	8ha	1	2	
4S	600	-	?4ha	?	?	
4T	200	65	4ha	2(Roe verge)1(inside)	3	
4U	50	90	1.5ha	1	3	
4V	50	2	0.5ha	3	3	
4W	21	10	+20ha	3	3	
4X	2	0	0ha	cleared	-	
#4Z	-	4	<0.1ha	2	2	
5	<10	1	0.1ha	2	3	
6	<10	11	1.5ha	2	3	
7	300	0	0	cleared	-	
8A	<10	1	0.5ha	2	3	
8B	<10	5	<0.5ha	3	2	
9	<20	1	5m2	4	3	

10A,B	100+	30	1.5ha	2		2
10C	50	47	5ha	2		2
10D	100+	80	1.5ha	2		2
10E	<10	10	0.5ha	1		3
10F	50	45	2ha	1		3
10G	60	17	+6ha	1		2
11A	10	0	0.5ha	3		-
11B	40	26	1ha	3		3
11C,D	500	120	8ha	2		3
12A	50	5	<0.1ha	3		3
12B	500	120	+7ha	1		3
12C	150	100	3ha	1		3
12D,E,F	>500	300	10ha	1		3
#12G	-	10	<0.1ha	3		2
13A,B,C	250	250	8ha	1		3
14	1	2	0.5ha	2		3
15	-	0	0ha	cleared	-	
Total	9269	4076				

#new population
*Standard Condition Index (Hussey and Wallace 1993). 1=Undisturbed remnant; 2=Moderately disturbed remnant; 3=Partly degraded remnant; 4=Degraded remnant.
**Plant Health Index (Hussey and Wallace 1993). 0=dead; 1=poor health; 2=moderatley healthy; 3=very healthy.

10.0 Population/remnant conservation value (Table 3.)

Conservation value	Population no.
1 Excellent	1A, 1B, 2, 4H, 4I, 4J, 4N, 4O, 4P, 4Q, 4R, 10C, 10G, 11D, 12B, 13A
2 Moderate	1E, 4M, 4S, 4T, 4W, 4Y, 6, 8A, 10A, 10D, 10E, 10F, 11C, 12C, 14
3 Poor	1D, 3, 4A, 4B, 4C, 4D, 4E, 4F, 4G, 4K, 4L, 4S, 4V, 4X, 4Z, 5, 7, 8B, 9, 10B, 11A, 11B, 12A, 12E, 12F, 12G, 13B, 13C, 15.

1 Excellent=Large remnant and large healthy *C. undulatum* population.
2 Moderate=Moderate to small remnant with mid sized, relatively healthy *C. undulatum* population.
3 Poor=Small remnant with insignificant population of *C. undulatum*/no plants remaining/remnant cleared.

10.0 Populations affected by proposed zone amendments and subdivisions

- Proposed Parks and Recreation (from Rural).

  4H, 4I, 4J (all private)

- Proposed Special Rural (1acre blocks) (from Rural).

  12D, 12E, 12F (all private)

- Other proposed amendments to aid the conservation of the species (majority are shire or government vesting).

  1B, 1C, 1E, 4R, 4T, 4U, 4W, 10A, 10B, 10C, 10G, 13A, 13B, 13C

11.0 Survey results

- *Conospermum undulatum* is now known from only 53 viable sub-populations (those sites that still have *C.undulatum* present) and 14 populations over 14km known range of the species totalling 4076 plants. This compares with 60 populations and 9269 plants

recorded from the last survey in 1990. This is a significant decline since the previous survey.
(NB. The populations of *C. undulatum* were considered by previous surveyors and myself to mostly be sub- populations of once larger populations, now dissected by urban development).

- No known population occurs on land dedicated solely to nature conservation. A number do occur on land vested to government agencies that have in the past given an undertaking to conserve bush remnants/other threatened species on their land (eg. 4Q at the WA Fire Training site on Dundas road).

- Populations 4C, 4M, 7 and 15 have been cleared and built on (9 has been mostly cleared and built on). Populations 4E, 4F and 4S were not adequately located and most likely cleared as well.

- Populations 3 and 11A still had bush remnants remaining but no *C. undulatum* plants were found.

- Access was denied (or no reply was given to a request for access) to 2, 4I, 4J, 4Y and 13B. Some owners were untraceable (eg. 4M) and the survey had to be conducted from the roadside (except 2 which was too large).

- Populations 1A, 1B, 1C, 2, 4K, 4Q, 4R, 12B and 13A have the highest conservation value due to the size and condition of the remnant, the vesting of the remnant and the size of the population.

- Threats.

Population	**Threats**
1	Fire breaks, recreational, road works, weeds.
2	?Fire breaks, recreational, weeds,development.
3	Recreational.
4	Fire breaks, recreational, weeds, development.
5	Weeds.
6	Fire breaks, recreational, weeds.
7	No longer exists.
8	Fire breaks, recreational, weeds, development.
9	Development.
10	Fire breaks, recreational, road works, grazing, weeds.

11	Fire breaks, recreational, road works, grazing, weeds.
12	Fire breaks, recreational, road works, weeds.
13	Fire breaks, recreational, road works, weeds.
14	Fire breaks, weeds.
15	No longer exists.

NB. Sub- populations included together as one population.

The biggest threats observed to *C. undulatum* are clearly weeds,. recreational use (in the form of horse riding and four wheel driving), fire breaks, road works and future urban development. Few large remnants remain in the area and thankfully those that do remain (eg. Maida Vale recreation reserve) have populations of *C. undulatum* on them.

12.0 Recommendations

- Endorse the recommendation to threatened flora (Declared rare).
- Inform the shires of status of the species, the location and condition of the populations/sub- populations. Mic McCarthy, Environmental Officer at Kalamunda, has produced a management plan for the population on the Maida Vale Recreation reserve and was unaware of this and other surveys.
- More liaison with land owners.
- Road side markers/management for exposed roadside populations (eg. 1E at the corner of Kalamunda and Midland roads).
- A specific fire management regime as the species responds to fire (see the Rare Flora Report form for population 12B in this report).

13.0 References

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Appendix 1. Rare Flora Report forms (with maps)