Vegetation Monitoring of Toolibin Lake: Additional Lake Bed Monitoring Plots.

May 2000

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Prepared for the Department of Conservation and Land Management

1. Introduction

To supplement the present system of 33 vegetation monitoring plots on Toolibin Lake and in the associated reserves, 5 additional monitoring plots have been established on the Toolibin Lake bed. Of the 13 existing monitoring plots located on the lake bed, relatively few occur in close proximity to the groundwater abstraction wells on the west side of the lake, and none occur near the new groundwater wells in the centre, southern and eastern areas of the lake bed. To monitor the effect of groundwater abstraction on vegetation near the wells, 2 plots were established next to operating wells on the western side of the lake (Pumps 1 and 2), and 3 plots next to new wells in the southern (Pump 13), central (Pump 12) and eastern areas (Pump 15). The latter 3 pumps are due to begin operation within the next year allowing baseline data to be gathered in this survey.

The requirements for establishing and monitoring these additional vegetation plots were:

1. Locate 5 vegetation monitoring plots in close proximity to current and future groundwater abstraction wells.
2. Construct and monitor plots following the methodology described in the November 1998 Vegetation Monitoring of Toolibin Lake and Reserves report.
3. Database all collected data and update GIS map of plot locations and vegetation units.

2. Methods

Plot Design

Each plot consists of a single 20 x 20m quadrat which is marked at each corner with a steel fence post. All plots were established using tape measures and an optical square to ensure plot size and shape was uniform. Plot number is indicated on an aluminium tag attached to the north-west post of each plot. Compass bearings and GPS location were also recorded at this point to assist in relocating and re-establishing plots if posts are stolen or damaged.

Each 20 x 20m plot is further divided into five 4 x 20m subplots for overstorey measurement and 4 x 4m subplots for understorey measurement (Fig. 2.1). The overstorey subplots enable trees within the whole plot to be separated according to distribution along an elevation gradient. Within each 4 x 20m plot, a 4 x 4m plot is located at the left side for assessment of all understorey plants. The 4 x 4m understorey plots were not individually marked as it was felt that this made the plots too visible.

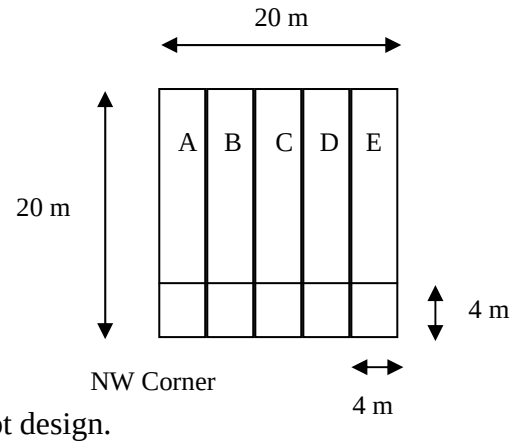

Figure 2.1: Plot design.

Vegetation Monitoring

Tree Species

All trees were tagged with numbered aluminium tags. Tags were attached at breast height (approx. 1.5m) with a galvanised roofing nail or a large loop of galvanised wire if the stem was too narrow to nail. For each tree within each plot, the species, diameter at tag height and crown condition was recorded. Stem diameter was measured directly under the tag if nailed or at breast height if wired onto the tree. In the case of individual trees with multiple stems, all stems were measured at the same height as the position of the tag or at breast height. In addition to tracking growth and vigour of trees in the future, stem diameter also permits size class analysis of the populations.

Crown assessment was carried out using a subjective three-part scale where a score is recorded for crown density, dead branches and epicormic growth. Using diagrams for comparison, crown density is given a score out of nine, dead branches a score out of nine and epicormic growth a score out of five (Ladd, 1996) (Fig. 2.2). The higher the overall score, the better the condition of the tree. In dense stands of trees, stand height was measured with a clinometer and tape measure and presented as a height range for each species present. In open woodlands, height was directly measured for each tree. Number, species and height of seedlings was also measured within the 4 x 20m subplots.

Understorey Species

Within the 4 x 4m subplots, all understorey plants were identified and percentage foliage cover determined by direct measurement (two foliage measurements at right angles) or percentage estimate. Height ranges for each species was also recorded.

Physico-chemical Parameters

EM38 measurements, which determines soil conductivity over 1-1.5m depths were taken at three points across each plot, every 4m along the transect. Adequate distance was always allowed when measuring near the fence posts or other metallic objects in the plots. EM38 data was validated against direct conductivity measurement of soil samples.

Elevations

The gradient of each monitoring plot was measured using an auto level and staff, with measurements taken at 4m intervals along the transects.

Photographs

Two colour photographs of each plot were taken from the NW corner post facing diagonally across the plot to the far post, and from the far post back to the NW post. Digital copies of the photographs have been loaded onto the CD-ROM attached to this report as well as reproduced in the results section.

GIS Mapping

Plot locations were placed on the vegetation map produced in the November 1998 Vegetation Monitoring report using the GPS determined co-ordinates.

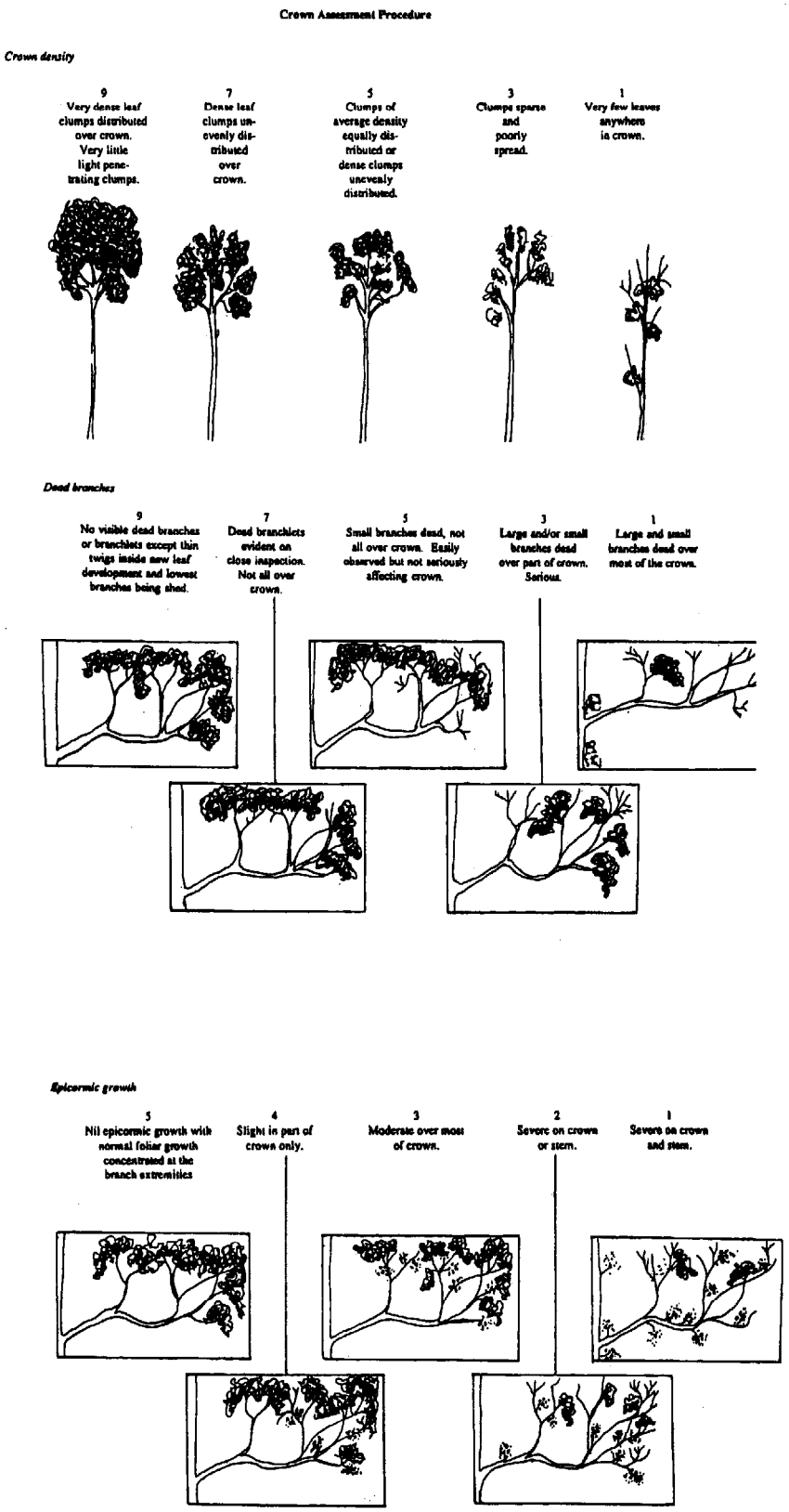

Figure 2.2: Crown Assessment Procedure Diagrams (Ladd, 1996).

3. Results

Plot 34

Location: 556892 E, 6358156 N
Approx. 25m east of Pump 1.
Compass Bearings: Left 72^0, Right 162^0

Vegetation Description:
Dense *C. obesa* and *M. strobophylla* stand on undulating gilgai mounds. Scattered *Halosarcia sp.* understorey.

Vegetation Condition:
Very dense stands of trees on raised gilgai mounds with highly suppressed smaller stems. The dominant trees are generally stressed with most *M. strobophylla* dead or highly stressed. Mean crown is score 7.4. Some *M. strobophylla* in better condition occur east of the plot. Soil salinity is moderately high with *Halosarcia sp*. in depressions.

Plate 1. Facing diagonally across plot 34.

Plot 35

Location: 556737 E, 6356542 N
Approx. 50m south west of Pump 13.
Compass Bearings: Left 56^0, Right 26^o

Vegetation Description:
Open woodland of *C. obesa*. Generally large trees occurring on flat ground. Occasional *Carpobrotus sp.*, otherwise no understorey present.

Vegetation Condition:
This plot samples the southern end of the lake, characterised by an open woodland of large *C. obesa* stems. Most trees show some signs of stress however the vegetation is in comparatively good condition. Mean crown is score 10.3. This plot has the lowest soil salinity levels of all five plots.

Plate 2. Facing diagonally across plot 35.

Plot 36

Location: 557253 E, 6356983 N
Approx. 80m west of Pump 15.
Compass Bearings: Left 128^0, Right 216^0

Vegetation Description:
Woodland of *C. obesa* and *M. strobophylla*. Density of stems ranges from high on the raised gilgai mounds to low in and around depressions. Understorey consists of occasional *Halosarcia sp.* and *Wilsonia rotundifolia*.

Vegetation Condition:
The vegetation in this plot is generally stressed with many highly stressed individuals. A significant number of *M. strobophylla* stems are living, however these are generally in poor condition. Mean crown score is 6.8 with soil salinity moderate to fairly high in depressions.

Plate 3. Facing diagonally across plot 36.

Plot 37

Location: 556702 E, 6357021 N
Approx. 50m south of Pump 12.
Compass Bearings: Left 140^0, Right 234^0

Vegetation Description:
Plot samples one stand of *C. obesa* in an open woodland of *C. obesa*. The majority of trees to the south of Pump 12 are restricted to areas of higher elevation (ie. on gilgai mounds) with scattered *Halosarcia sp.* in the understorey. One *C. obesa* seedling present.

Vegetation Condition:
Many stressed and highly stressed trees present. Mean crown score 7.8. Relatively few dead stems apparent despite high soil salinities.

Plate 4. Facing diagonally across plot 37.

Plot 38

Location: 556681 E, 6357863 N
Approx. 50m west of Pump 2.
Compass Bearings: Left 64^0, Right 210^0

Vegetation Description:
Open woodland of *C. obesa* with low open shrubland of *Halosarcia sp.* and *Wilsonia rotundifolia.*

Vegetation Condition:
The majority of larger stems in fair to good condition with evidence of stress generally restricted to smaller stems. No dead stems are present and soil salinity is moderate. Mean crown score is 10.2.

Plate 5. Facing diagonally across plot 38.

GIS **MAP**

References

Froend, R.H., Pettit, N. E. & Ogden, G. (1998). *Vegetation Monitoring of Toolibin Lake and Reserves: November 1998*. Unpublished report prepared for the Department of Conservation and Land Management.

Ladd, P.G. (1996). *Ecology/Ecological Principles – Unit Manual*. Murdoch University, Perth, Western Australia.

Appendix 1.
Overstorey Vegetation Data

Refer to methods section for transect design.
Refer to methods section for crown health and DBH assessment.
Multiple DBH measurements represent multi-stemmed trees.
Tree height is recorded for each tree in open stands and as a height range in dense stands.

Plot 34 Tag No.	Subplot	Species	DBH (cm)	Ht (m)	Crown Health
469	A	*C. obesa*	10.9	10.0 - 12.5	4
470		*C. obesa*	9.05, 5.4		9
471		*C. obesa*	12.5		6
472		*C. obesa*	8.05		6
473		*C. obesa*	9.2		5
474		*C. obesa*	8.2, 15.75		4
475		*C. obesa*	10.6		8
476	B	*C. obesa*	7.75, 5.2	9.0 - 12.5	4
477		*C. obesa*	4.2		8
478		*M. strobophylla*	8.5, 6.6, 3.7, 4.7	6.5	9
479		*C. obesa*	9.4		12
480		*C. obesa*	14.1		9
481		*C. obesa*	5.6		4
482		*C. obesa*	4.8		6
483		*C. obesa*	4.7		3
484		*C. obesa*	5		6
485		*C. obesa*	6.2, 3.7		6
486		*C. obesa*	10.7		11
487		*C. obesa*	3.85		6
488		*C. obesa*	6.4		8
489		*C. obesa*	7.1		3
490		*C. obesa*	7.7		13
491		*C. obesa*	7.45		5
492		*M. strobophylla*	6.7	6.5	9
493		*C. obesa*	5		7
494		*C. obesa*	<2		3
495		*C. obesa*	7.2		8
496		*C. obesa*	7.4		8
497		*C. obesa*	11.4		9
498		*C. obesa*	11.9		11
499		*C. obesa*	19.5		13
500		*C. obesa*	9.5		3
501		*C. obesa*	9.2		12
502		*C. obesa*	9.6		6
503		*C. obesa*	15.3, 8.0		9
504		*C. obesa*	11.7		6
505		*C. obesa*	5.5		4
506		*C. obesa*	6.9		8
507		*C. obesa*	7.7		11
508		*C. obesa*	2.9		6
509		*C. obesa*	8		6
510		*C. obesa*	6.35		5

511		*C. obesa*	7.1, 7.5, 4.7		6
512		*C. obesa*	9.3		6
513		*C. obesa*	9.3		7
514		*C. obesa*	11.6		6
515		*C. obesa*	10.4		3
516		*C. obesa*	9.5		7
517		*C. obesa*	9.6		6
		C. obesa	6 DEAD		
		M. strobophylla	1 DEAD		
518	C	*C. obesa*	6	7.0 - 13.0	9
519		*C. obesa*	8.3		8
520		*C. obesa*	5.1		6
521		*C. obesa*	2.6, 3.3		5
522		*C. obesa*	5.4		4
523		*C. obesa*	3.1		4
524		*C. obesa*	6.6, 4.0		6
525		*C. obesa*	8.2, 3.5		9
526		*C. obesa*	7.4, 4.4		4
527		*C. obesa*	<2		3
528		*C. obesa*	4.6		3
529		*C. obesa*	3.25		5
530		*C. obesa*	3.3		3
531		*C. obesa*	5		8
532		*C. obesa*	<2		3
533		*C. obesa*	13.9		11
534		*C. obesa*	6.7		6
535		*C. obesa*	3.9		5
536		*C. obesa*	4.7		6
537		*M. strobophylla*	5.8	6.5	9
538		*C. obesa*	<2		3
539		*C. obesa*	4.3		6
540		*C. obesa*	5.4		9
541		*C. obesa*	3.1		8
542		*C. obesa*	6.7		5
543		*C. obesa*	5.8		7
544		*C. obesa*	6.2		6
545		*C. obesa*	6		6
546		*C. obesa*	6.9		4
547		*C. obesa*	5.1		4
548		*C. obesa*	5.4		8
549		*C. obesa*	13.2		4
550		*C. obesa*	7.3		8
551		*C. obesa*	6.6		8
552		*C. obesa*	12.6		11
553		*C. obesa*	4.5		7
554		*C. obesa*	9.2		6
555		*C. obesa*	15		8
		M. strobophylla	3 DEAD		
556	D	*M. strobophylla*	6.7, 5, 5.2	5.5 - 7.0	7
557		*M. strobophylla*	5.7, 5.2, 7		7
558		*M. strobophylla*	11.2		7
559		*C. obesa*	9	7.0 - 13.0	11
560		*C. obesa*	2.7		3
561		*M. strobophylla*	6.4		7

562		*C. obesa*	4.1		6
563		*C. obesa*	5.2		8
564		*C. obesa*	4.1, 4.7		4
565		*C. obesa*	3.9		9
566		*C. obesa*	7.6		11
567		*C. obesa*	5.9		7
568		*C. obesa*	6.3		7
569		*C. obesa*	5.9		9
570		*C. obesa*	3.1		3
571		*C. obesa*	3.6		8
572		*C. obesa*	3.9		6
573		*C. obesa*	4.9		3
574		*C. obesa*	5		6
575		*C. obesa*	3.7		6
576		*C. obesa*	5.05		8
577		*C. obesa*	5.8		6
578		*C. obesa*	5.3		5
579		*M. strobophylla*	12.2, 16.3		7
580		*C. obesa*	5.5, 5.3		8
581		*C. obesa*	4.9		4
582		*M. strobophylla*	4.8		7
583		*C. obesa*	5, 3.8		9
584		*C. obesa*	4.3		6
585		*C. obesa*	7.4		6
586		*C. obesa*	2.7		3
587		*C. obesa*	3.7		3
588		*C. obesa*	3.7		5
589		*C. obesa*	2.9		5
590		*C. obesa*	3.7		6
591		*C. obesa*	2.9		3
592		*C. obesa*	10.7		8
593		*C. obesa*	10.2		11
594		*C. obesa*	7.3		6
595		*C. obesa*	5.3		3
596		*C. obesa*	2.9		3
597		*C. obesa*	7.3		6
598		*C. obesa*	5.5		5
599		*C. obesa*	11.8		6
600		*C. obesa*	10.3		6
601		*C. obesa*	2.7		3
602		*C. obesa*	8.2		8
603		*C. obesa*	7.9		8
604		*C. obesa*	3		3
605		*C. obesa*	5.1		3
606		*C. obesa*	8.1		11
607		*M. strobophylla*	7.7		7
		M. strobophylla	13 DEAD		
		C. obesa	16 DEAD		
608	E	*M. strobophylla*	8.8, 4.9	5	9
609		*C. obesa*	6.3	6.0 - 12.5	9
610		*C. obesa*	4.3		7
611		*C. obesa*	2.3		3
612		*C. obesa*	<2		3
613		*C. obesa*	7.1, 6.3		13
614		*C. obesa*	6.9		9

615		*C. obesa*	4.05		8
616		*C. obesa*	5.1		3
617		*C. obesa*	4.7		9
618		*C. obesa*	3.5		4
619		*C. obesa*	9.7		12
620		*C. obesa*	3.4		6
621		*C. obesa*	3.8		7
622		*C. obesa*	4.2		6
623		*C. obesa*	3.4		5
624		*C. obesa*	3.2		6
625		*C. obesa*	5		4
626		*C. obesa*	2.8		3
627		*C. obesa*	4.1		5
628		*C. obesa*	3.8		6
629		*C. obesa*	5.3		9
630		*C. obesa*	4.3		6
631		*C. obesa*	3.5		4
632		*C. obesa*	3.4		3
633		*C. obesa*	<2		3
634		*C. obesa*	3.1, 3.0		3
635		*C. obesa*	4.6		5
636		*C. obesa*	3.6		3
637		*C. obesa*	5.5		3
638		*C. obesa*	5.2		6
639		*M. strobophylla*	6.3	5.5	9
640		*C. obesa*	4		7
641		*C. obesa*	2.55		4
642		*C. obesa*	6.8		8
643		*C. obesa*	3.5		6
644		*C. obesa*	3.7		4
645		*C. obesa*	3.1		4
646		*C. obesa*	6.5		9
647		*M. strobophylla*	4.4		11
648		*C. obesa*	3.9		4
649		*C. obesa*	3.65		7
650		*C. obesa*	5		6
651		*C. obesa*	2.9		3
652		*C. obesa*	4.2		3
653		*C. obesa*	3		3
654		*C. obesa*	3.8		4
655		*C. obesa*	4.9		3
656		*C. obesa*	2.9		3
657		*C. obesa*	9.3, 8.9		4
658		*C. obesa*	4.4		4
659		*C. obesa*	3.9		4

Plot 35 Tag No.	**Subplot**	**Species**	**DBH (cm)**	**Ht (m)**	**Crown Health**
273	A	*C.obesa*	7.2	6.5	4
274		*C.obesa*	23.25	13	9
275		*C.obesa*	18.35, 12.2	11.8	14
276		*C.obesa*	16.4	7.8	11
		C.obesa	2 DEAD		
277	B	*C.obesa*	24.5	13	13
278		*C.obesa*	27.9	14.8	16

279		*C.obesa*	18.3	10.5	6
280		*C.obesa*	22.3	11	9
281		*C.obesa*	15.6	9.5	8
			1 DEAD		
282	C	*C.obesa*	18.7	8.8	10
283		*C.obesa*	20	13.5	9
284		*C.obesa*	16.4	7.8	13
285		*C.obesa*	23.9, 17.6	15	9
286		*C.obesa*	17.7	11.5	14
299		*C.obesa*	9.5	7.5	7
		C.obesa	3 DEAD		
287	D	*C.obesa*	31.3	13.5	17
288		*C.obesa*	26.4	13	7
289		*C.obesa*	16.8	13.5	12
290		*C.obesa*	16.5	7.5	8
291		*C.obesa*	15.2	12	3
292		*C.obesa*	26.4	12.5	9
293		*C.obesa*	15.3	7.5	8
294		*C.obesa*	38.7	12.5	16
295		*C.obesa*	16.5	12.5	11
300		*C.obesa*	19.9	10	11
296	E	*C.obesa*	22.3	11.5	13
297		*C.obesa*	29.6	13.5	14
298		*C.obesa*	18.7	9	7
		C.obesa	2 DEAD		

Plot 36 Tag No.	**Subplot**	**Species**	**DBH (cm)**	**Ht (m)**	**Crown Health**
337	A	*M. strobophylla*	10.4	5.4 - 11.0	7
338		*C. obesa*	11.1, 7.0		3
339		*C. obesa*	9.7		5
340		*C. obesa*	11		6
341		*M. strobophylla*	12.4		11
342		*M. strobophylla*	9.45		11
343		*M. strobophylla*	8.4		7
344		*M. strobophylla*	10.5, 5.7, 10.4, 12.5		11
345		*C. obesa*	22.05		9
		M. strobophylla	1 DEAD		
346	B	*C.obesa*	14	4.2 - 9.2	6
347		*C.obesa*	11.8		11
348		*C.obesa*	12.5		3
349		*C.obesa*	9.2		3
350		*C.obesa*	12.4		11
351	C	*C. obesa*	6.9	5.4 - 10.6	5
352		*C. obesa*	8.5		6
353		*M. strobophylla*	7		11
354		*C. obesa*	5.1		3
355		*M. strobophylla*	4.8		3
356		*C. obesa*	5.6		3
357		*C. obesa*	9		3
358		*C. obesa*	6.6		3

359		*C. obesa*	11		6
360		*C. obesa*	6.8		4
361		*C. obesa*	6.4		8
362		*C. obesa*	7.2		5
363		*C. obesa*	9.3		6
364		*C. obesa*	10.6		3
409		*C. obesa*	7		5
410		*M. strobophylla*	6.5		7
365		*C. obesa*	13.6		5
366		*C. obesa*	10.1		3
367		*C. obesa*	4.5		3
368		*C. obesa*	6.8		3
369		*C. obesa*	6.4		6
370		*C. obesa*	5.3		4
371		*C. obesa*	4.9		7
372		*M. strobophylla*	4.4		11
373		*M. strobophylla*	7.6		11
374		*M. strobophylla*	4.7		11
375		*M. strobophylla*	5.5, 3.9		11
376		*C. obesa*	6.7		5
377		*C. obesa*	4.7		3
378		*C. obesa*	4.8		3
379		*C. obesa*	4.55		3
380		*C. obesa*	8.8		5
381		*C. obesa*	8.7		3
382		*M. strobophylla*	17.8		9
383		*C. obesa*	8.9, 6.3		8
384		*C. obesa*	9.3		3
385		*M. strobophylla*	9.2		DEAD
386		*M. strobophylla*	5.9		DEAD
387		*M. strobophylla*	6.2		DEAD
388		*C. obesa*	5.8		3
389		*C. obesa*	4.8		3
390		*M. strobophylla*	17.5		11
391		*C. obesa*	6.7		5
392		*C. obesa*	6.5		7
393		*C. obesa*	11.0, 6.0		9
394		*M. strobophylla*	7.75		11
395		*C. obesa*	9.3		11
396		*M. strobophylla*	8.7		11
397		*C. obesa*	11.9		12
398		*C. obesa*	6.4		5
399		*C. obesa*	7.0, 4.3		9
400		*C. obesa*	12		7
401		*C. obesa*	10.5, 8.9		11
		C. obesa	2 DEAD		
		M. strobophylla	8 DEAD		
402	D	*C. obesa*	7	4.2 - 9.8	3
403		*M. strobophylla*	14.5, 7.8		11
404		*C. obesa*	5.9		3
406		*C. obesa*	10.4		3
405		*C. obesa*	9.3		3
407		*C. obesa*	7.2		3
408		*C. obesa*	7		9
411		*C. obesa*	4.2		5

412		*M. strobophylla*	9.7		13
413		*C. obesa*	4.9		3
414		*C. obesa*	12.6		3
415		*C. obesa*	4.5		5
416		*C. obesa*	7.3		3
417		*C. obesa*	10.4		13
418		*M. strobophylla*	6.0, 4.6		11
419		*C. obesa*	7.05		5
420		*C. obesa*	6.4		8
421		*C. obesa*	7.8		3
422		*C. obesa*	17.5		4
423		*M. strobophylla*	9.5		9
424		*C. obesa*	10.7		9
425		*C. obesa*	9.1		7
426		*C. obesa*	12.4		6
427		*C. obesa*	8.7		6
428		*C. obesa*	10.6		9
		C. obesa	8 DEAD		
		M. strobophylla	1 DEAD		
429	E	*M. strobophylla*	12.7	5.1 - 10.1	11
430		*C. obesa*	8.3, 7.3, 9.8		9
431		*M. strobophylla*	9.9		11
432		*M. strobophylla*	7.4, 10.0		11
433		*C. obesa*	5.4		5
434		*M. strobophylla*	6.7, 11.0		13
435		*M. strobophylla*	13.5		13
436		*C. obesa*	10.9		9
437		*C. obesa*	13		9
438		*C. obesa*	7.6, 10.6, 6.9		9
439		*M. strobophylla*	9.2		11
		C. obesa	1 DEAD		

Plot 37 Tag No.	**Subplot**	**Species**	**DBH (cm)**	**Ht (m)**	**Crown Health**
301	A	*C. obesa*	19.2	9	7
302		*C. obesa*	10.5	9	6
303		*C. obesa*	11.4	10.5	9
304		*C. obesa*	11.5	9	11
305		*C. obesa*	7.5	9	3
306		*C. obesa*	12.8	9	13
307		*C. obesa*	9.05	9.8	11
308		*C. obesa*	18.9	11	6
309		*C. obesa*	12.1	11.5	6
310		*C. obesa*	8.4	9	6
311		*C. obesa*	17.35	11.5	6
312		*C. obesa*	14.2	11.5	8
313		*C. obesa*	10.8	8.8	8
314		*C. obesa*	13.2	9	11
315		*C. obesa*	23.4	12.5	14
		E. rudis	1 DEAD		
316	B	*C. obesa*	16.1, 8.6, 18.4, 13.4	10	15
317	C	*C. obesa*	19.6	10	4
318		*C. obesa*	11.25	10	8

319		*C. obesa*	16.85	10.5	5
320		*C. obesa*	12.5	10	6
321		*C. obesa*	13	10.5	10
322		*C. obesa*	14.4, 10.25	10.5	6
323		*C. obesa*	12.25	10.5	3
324		*C. obesa*	10	10	5
325		*C. obesa*	11.9	6	4
326		*C. obesa*	19.35	7.8	7
327	D	*C. obesa*	18.1	10	6
328		*C. obesa*	10.3, 4.6	10.5	10
329		*C. obesa*	8.4	9	12
330		*C. obesa*	13.3	11	11
331		*C. obesa*	11.3	9	8
332		*C. obesa*	13.7	10	4
333		*C. obesa*	13.2	10.5	8
334		*C. obesa*	17.6	10.5	7
		E. rudis	1 DEAD		
335	E	*C. obesa*	18.7	7	4
336		*C. obesa*	18.4, 14.9	10.5	13
		C. obesa	1 SEEDLING	0.2	Healthy

Plot 38 Tag No.	**Subplot**	**Species**	**DBH (cm)**	**Ht (m)**	**Crown Health**
440	A	*C. obesa*	10.2	8.3	16
441		*C. obesa*	16	10.5	8
442		*C. obesa*	16.4	9.3	14
443		*C. obesa*	12.1	9.8	9
444		*C. obesa*	10.45	10.5	12
445		*C. obesa*	5.45	6.5	8
446		*C. obesa*	5.7	6	4
447	B	*C. obesa*	15.25	9.2	13
448		*C. obesa*	9.2, 7.2, 6.3	7.5	12
449		*C. obesa*	11.8	8.7	11
450		*C. obesa*	12.6	10.5	9
451		*C. obesa*	7.7	7	10
452		*C. obesa*	11.4	10.5	10
453		*C. obesa*	10	9	8
454		*C. obesa*	14.0, 8.0	10.5	10
455	C	*C. obesa*	10.6	9.3	12
456		*C. obesa*	10.9, 12.4	10.5	9
457		*C. obesa*	12.2	9	9
458		*C. obesa*	12.1	10.5	11
459		*C. obesa*	6.7	6.5	8
460	D	*C. obesa*	14.9, 21.5	8.5	18
461		*C. obesa*	7.8	7.8	10
462		*C. obesa*	18.1	10.5	13
463		*C. obesa*	12.7, 2 DEAD	7	4
464		*C. obesa*	17.1	10	9
465		*C. obesa*	11.3	9.5	14
466		*C. obesa*	13.2	10	9

467 468	E	*C. obesa* *C. obesa*	22.3 7.95, 9.6	13 9	7 9

Appendix 2.
Understorey Vegetation Data

Refer to methods section for transect design.

Plot	Species	Number	% Cover	Height (m)
Plot 34				
A	*Halosarcia sp.*	5	5.7	0.4 - 0.4
B	*Halosarcia sp.*	24	30	0.3 -0.5
C	*Halosarcia sp.*	16	10	0.3
D	*Halosarcia sp.*	18	18	0.2 - 0.4
E	*Halosarcia sp.*	32	28	0.3 - 0.5
Plot 35				
A	*No Understorey*			
B	*Carpobrotus sp.*	1	0.25	0.05
C	*Carpobrotus sp.*	1	0.75	0.05
D	*Carpobrotus sp.*	2	1.9	0.05
E	*Carpobrotus sp.*	2	0.1	0.05
Plot 36				
A	*Halosarcia sp.*	4	0.4	0.1 - 0.2
B	*Halosarcia sp.*	3	1.3	0.1 - 0.45
C	*Halosarcia sp.*	3	1.6	0.1 - 0.6
D	*Halosarcia sp.*	3	0.5	0.1 - 0.15
E	*Halosarcia sp.*	3	0.08	0.05 - 0.1
	Wilsonia rotundifolia		1	0.02
Plot 37				
A	*Halosarcia sp.*	3	1.06	0.25 - 0.36
B	*Halosarcia sp.*	3	0.2	0.15 - 0.3
C	*Halosarcia sp.*	1	0.6	0.3
D	*Halosarcia sp.*	1	0.02	0.1
E	*Halosarcia sp.*	1	0.04	0.15
	Wilsonia rotundifolia		3	0.02
Plot 38				
A	*Halosarcia sp.*	1	0.09	0.2
	Wilsonia rotundifolia		8	0.02
B	*Halosarcia sp.*	1	1.04	0.4
	Wilsonia rotundifolia		10	0.02
C	*Halosarcia sp.*	1	0.02	0.1
	Wilsonia rotundifolia		6	0.02
D	*Halosarcia sp.*	15	1.7	0.1 - 0.45
	Wilsonia rotundifolia		2	0.02
E	*Halosarcia sp.*	7	9	0.3 - 0.5
	Wilsonia rotundifolia		8	0.02

Appendix 3.
EM38 Data

Data presented as direct EM38 measurement (mS/m).
Vertical and Horizontal refers to orientation of EM38 when measured.

Plot 34	Distance Across (m)					
	0		10		20	
Distance (m)	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
0	498	367	475	335	460	322
4	519	355	495	349	533	357
8	538	371	481	320	453	305
12	482	323	522	317	503	287
16	485	317	528	354	394	273
20	484	325	568	364	468	333

Plot 35	Distance Across (m)					
	0		10		20	
Distance (m)	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
0	408	303	439	365	429	351
4	435	342	435	327	418	323
8	432	327	435	331	416	336
12	412	318	398	291	399	304
16	376	270	402	295	382	269
20	403	297	412	317	394	292

Plot 36	Distance Across (m)					
	0		10		20	
Distance (m)	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
0	568	458	559	460	630	491
4	627	506	657	542	548	453
8	620	577	597	419	539	394
12	640	533	556	405	513	374
16	614	527	511	382	682	540
20	680	575	717	576	604	438

Plot 37	Distance Across (m)					
	0		10		20	
Distance (m)	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
0	649	503	633	520	608	451
4	779	636	803	700	548	383
8	724	663	615	515	616	460
12	662	551	589	488	533	400
16	632	533	560	439	549	414
20	754	612	590	473	593	442

Plot 38	Distance Across (m)					
	0		10		20	
Distance (m)	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
0	561	426	553	398	594	476
4	696	530	543	421	627	487
8	704	578	544	411	644	513
12	589	454	583	446	535	367
16	579	451	523	353	571	383
20	792	346	668	511	621	457

Appendix 4.
Elevation Data

Point elevations recorded in meters relative to common tripod point at each plot. Not expressed as mAHD.

Plot 34	Distance Across (m)		
Distance (m)	0	10	20
0	1.708	1.699	1.704
4	1.863	1.704	1.529
8	1.781	1.65	1.621
12	1.582	1.436	1.435
16	1.577	1.473	1.572
20	1.558	1.812	1.73

Plot 35	Distance Across (m)		
Distance (m)	0	10	20
0	1.692	1.701	1.7
4	1.683	1.67	1.665
8	1.677	1.685	1.674
12	1.657	1.674	1.674
16	1.658	1.669	1.661
20	1.656	1.663	1.687

Plot 36	Distance Across (m)		
Distance (m)	0	10	20
0	1.525	1.747	1.655
4	1.612	1.86	1.632
8	1.607	1.487	1.465
12	1.61	1.555	1.635
16	1.599	1.485	1.78
20	1.734	1.702	1.604

Plot 37	Distance Across (m)		
Distance (m)	0	10	20
0	1.599	1.668	1.649
4	1.992	2.036	1.55
8	1.949	1.723	1.675
12	1.759	1.652	1.625
16	1.659	1.637	1.765
20	2.098	1.731	1.814

Plot 38	Distance Across (m)		
Distance (m)	0	10	20
0	1.628	1.638	1.653
4	1.632	1.63	1.654
8	1.631	1.631	1.66
12	1.62	1.639	1.654
16	1.633	1.65	1.7
20	1.7	1.87	1.792