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Great Western Woodlands Project



Overview

Fire is a recurrent disturbance across Mediterranean-climate landscapes. Fire shapes vegetation patterns, community composition and community diversity. Understanding how communities change with aspects of the fire regime, such as time since fire, is crucial for the identification of appropriate fire return intervals for biodiversity conservation.

The Great Western Woodlands (GWW) is an internationally significant area with great biological and cultural richness. This 16 million ha region of south-western Australia arguably comprises the largest and most intact area of contiguous temperate woodland remaining on Earth. The woodlands of the GWW are typically fire sensitive and are at risk from inappropriate fire regimes.



Project Aims

The project addresses fire ecology and management in the GWW, by using space-for-time surveys to investigate the effects of time since fire on assembly and recovery of plant

community composition, development of ecosystem structure, and fuel dynamics. These components of the project are ongoing, with a journal paper on assembly and recovery of plant community composition under review. The 'Fire in Gimlet woodlands' webpages will be updated with this new information when it becomes available.

A key component of the research has been the development of methods to estimate the time since fire of long-unburnt vegetation.

The research will deliver critical information for the ecological management of fire in the GWW.

Study location

The GWW are located in south-western Australia, between the largely cleared wheatbelt to the west and arid rangelands to the east and north. Our study was conducted in the western portion of the GWW.



We identified woodlands dominated by gimlet (Eucalyptus salubris) as being an important community to investigate the effects of time since fire on vegetation composition. Gimlet is a tree killed by complete canopy scorch and is a dominant canopy species in woodlands across the breadth of the GWW. Please follow the links for full details on how plot time since fire was determined and how vegetation composition and soil characteristics were measured.



Resources and publications

Follow these links for access to project data, metadata and resources and publications.

Contacts, project team and recommended citation

Click here for further details.





Acknowledgements

This project was jointly supported by the Department of Environment and Conservation's (DEC) Great Western Woodlands Conservation Strategy, CSIRO Ecosystem Sciences (CES) and the Australian Supersite Network, part of the Australian Government's Terrestrial Ecosystems Research Network, a research infrastructure facility established under the National Collaborative Research Infrastructure Strategy and Education Infrastructure Fund - Super Science Initiative - through the Department of Industry, Innovation, Science, Research and Tertiary Education. Georg Wiehl (CES), Paul Gioia, Aminya Ennis, Lachie McCaw and Glen Daniel (all DEC) contributed to various aspects of the project.

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Great Western Woodlands Project



Estimating the time since fire of long-unburnt Eucalyptus salubris plots - Methods

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The full details of the methods, results and management implications of this research can be found in Gosper et al. (2013), but the methods are briefly summarized here.

Aims

Establishing the time since disturbance is a significant challenge in infrequently-disturbed communities. We aimed to characterise the relationship between observable tree rings, plant age and plant size in Eucalyptus salubris, to extend the ability to determine the time since fire of woodland stands beyond that available from satellite imagery. We then estimated the age of long-unburnt E. salubris stands and the age class distribution of Eucalyptus woodlands more broadly.

Study location

Eucalyptus salubris woodlands in semi-arid Mediterranean climate southwestern Australia, in the western parts of the Great Western Woodlands in the districts of Karroun Hill (30°14'S, 118°30'E), Yellowdine (31°17'S, 119°39'E) and Parker Range (31°47'S, 119°37'E).



Plot selection

In each district, 50 m x 50 m plots were placed in relatively uniform E. salubris woodland in each of the following time since fire age classes: < 10 years (4-8 plots per district), 38-60 years (3-5 plots per district) and long-unburnt (> 60 years; 11-13 plots per district). An additional 3 plots 10-38 years post-fire were sampled where such fires had occurred, giving a total of 72 plots.

Determining time since fire of sample plots

At each plot we sampled 16 trees by use of a modified version of the point-centred quarter method, measuring the diameter at the base of trunks (D₁₀) and plant height of the nearest tree in each of the four compass quadrants radiating from the four corners of each plot. At 39 of the 72 sites, we randomly selected three individual E. salubris, and measured plant height and diameter at their base (D₁₀). We then took either a basal trunk section using a hacksaw (n = 100 trees, 34 sites; sanded prior to scoring for growth rings) or a 12 mm diameter core using a motorised tree corer (n = 17 trees, seven sites; two sites has a combination of sections and cores), depending on plant size. As nearly all trees sufficiently large as to require coring were hollow, only sections were used in analyses.

Regression analyses were used to test for relationships between:

- 1. plant age (assumed to be equal to plot time since fire, as determined from Landsat imagery for plots burnt since 1972) and mean number of growth rings per trunk. Linear relationships were strong and positive, indicating growth rings can be used to estimate plant
- 2. mean number of growth rings per trunk and various combinations of plant size (plant diameter at the base and/or plant height) and plot location. For relationships between ring count and plant size and location variables, linear models were tested on untransformed, and square-root and log₁₀ transformed ring counts, to test if plant growth rate declined with plant age. Models were compared on the basis of maximising adjusted r² and (within transformation alternatives) minimizing AIC (Akaike information criterion). Plant height reached a plateau shortly beyond the tallest trees with a complete growth ring record, indicating that tree height was likely to be a poor predictor of growth rings in old trees. The best performing plausible models were: (1) untransformed growth rings predicted by tree diameter + location; and (2) square-root growth rings predicted by tree diameter + location. These are the two models used for generating alternative time since fire estimates for long-unburnt plots.

The effectiveness of the models in estimating growth rings was tested using the plant size data from the point-centred quarter measurements, using all 23 plots of known age (burnt after 1972). Pearson's correlation coefficient indicated a moderately strong correlation between known age and estimated age from the best-performing models.

Plant size data from the point-centred quarter measurements was used at plots not burnt since 1972 and without a complete growth ring record to estimate their time since fire. The two best-performing plausible models produced large differences in estimated plot times since fire of the longest-unburnt plots (with the model of untransformed growth rings (Model 2) producing much lower estimates (range 88-370 years) than the model of square-root transformed growth rings (Model 5; range 110-1460 years)), with uncertainty in time since fire estimates increasing especially beyond 200 years post-fire.





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Great Western Woodlands Project



Plant diversity in fire-sensitive temperate eucalypt woodlands - Methods

The full details of the methods, results and management implications of this research will be available in a journal publication shortly, but are briefly summarized here.

Aim

To better understand the impacts of time since fire on plant composition and diversity in fire-sensitive eucalypt woodlands, using a space-for-time approach.

Study location

Eucalyptus salubris woodlands in semi-arid Mediterranean climate south-western Australia, in the western parts of the Great Western Woodlands near Karroun Hill (30°14'S, 118°30'E), Yellowdine (31°17'S, 119°39'E) and Parker Range (31°47'S, 119°37'E).

Plot selection

Each of the 72 plots was 50 x 50 m (unless as noted on sites table), with sides aligned north-south and east-west and with a steel dropper placed in the north-west corner. Plots were placed in relatively uniform vegetation within 1 km of vehicular tracks on public land; Nature Reserves, Unallocated Crown Land or Unmanaged Reserves. Plots were spaced at least 250 m apart, and at least 500 m apart for plots of the same time since fire. Plot location was taken with a GPS. Plot times since fire were determined using a combination of Landsat imagery, growth ring counts and growth ring-plant size relationships. The time since fire range of samples was 3-370 years (using Model 2 of Gosper et al. (2013); using an equally valid alternative model for estimating time since fire this range was 3-1460 years; Gosper et al. (2013)).







Flora sampling

In each plot we recorded the vascular plant taxa present by tallying all species detected in nested plots of 1, 5, 10, 25, 100, 500, 1000 and 2500 m². Abundance was estimated by systematically placing a 12.5 mm diameter pole vertically at 50 points per plot, each 3 m apart, and recording the identity of all plants with live parts intercepting the pole. Sixteen of these points were placed along each of the two sides of the 50 x 50 m plot commencing at the north-west corner, with the remaining 18 points placed along the diagonal starting in the same corner. This technique provided an objective measure of abundance reflecting but not equivalent to projective cover. Species that were present but not recorded at point intercepts were allocated a nominal proportional abundance of 1%.

Diversity indices

Diversity indices were calculated per plot. We tallied total species number per plot (species density), and using cover data, calculated the Shannon diversity index (logex) and Pielou's evenness index.

Soil sampling

A single bulked sample of the top 10 cm of soil was taken from aggregation of multiple 2 cm diameter sub-samples collected from a subset of 52 plots. Samples were stored at ~4°C until delivery to the CSBP Futurefarm analytical laboratories (Bibra Lake, WA), where they were thoroughly mixed, air dried at 40°C, and ground to pass through a 2 mm sieve. Analyses were undertaken on each bulked sample to determine available phosphorus, potassium, ammonium, nitrate, organic carbon, extractable sulphur, pH (CaCl₂) and conductivity.





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Great Western Woodlands Project



Data downloads

Two data files are available for download, in Microsoft Excel format. Metadata associated with this information is available. These data are currently being used for research into the impacts of fires on Eucalyptus salubris woodlands. These data have been used to support one journal publication, with a second under review at present. While these data are freely available for use, we request that potential users contact the project team to discuss opportunities for collaboration. Note that some of these data are duplicates of data available at the TERN Data Discovery Portal, lodged under the project "Time-since-fire plots. Great Western Woodlands (1) Floristic composition and diversity".

- 1. A table listing the plots sampled, their location, their estimated time since fire and the sample data collected at each.
- 2. A table containing data on plot diversity indices, species-area relationships, floristic cover and soil nutrient composition.
- A representative photo from each plot is below. Note that all photos are copyright 'Carl Gosper and Georg Wiehl, Department of Environment and Conservation and CSIRO Ecosystem Sciences'





Site photos

Click on each site number for a site photograph. All photos are copyright 'Carl Gosper and Georg Wiehl, Department of Environment and Conservation and CSIRO Ecosystem Sciences.'

GIM01 GIM02 GIM03 GIM04

GIM05 GIM06 GIM07 GIM08

GIM09 GIM10 GIM11 GIM12

GIM13 GIM14 GIM15 GIM16

GIM17 GIM18 GIM19 GIM20

GIM21 GIM22 GIM23 GIM24

GIM25 GIM26 GIM27 GIM28

GIM29 GIM30 GIM31 GIM32

GIM33 GIM34 GIM35 GIM36

GIM37 GIM38 GIM39 GIM40

GIM41 GIM42 GIM43 GIM44

GIM45 GIM46 GIM47 GIM48

GIM49 GIM50 GIM51 GIM52

GIM53 GIM54 GIM55 GIM56

GIM57 GIM58 GIM59 GIM60 GIM61 GIM62 GIM63 GIM64

GIM65 GIM66 GIM67 GIM68

GIM69 GIM70 GIM71 GIM72





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Great Western Woodlands Project



Resources and publications

The following publications describe the results, outcomes and management implications of the project. Additional publications will be added as they become available. Some publications are downloadable as PDFs, others have links to websites hosting the publication.

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Estimating the time since fire of gimlet woodlands

Journal paper

This contains the technical details of the research and has undergone peer-review.

Gosper, C.R., Prober, S.M., Yates, C.J. and Wiehl, G. (2013) Estimating the time since fire of longunburnt Eucalyptus salubris (Myrtaceae) stands in the Great Western Woodlands. Australian Journal of Botany 61, 11-21. doi: 10.1071/BT12212

DEC Science Division Information Sheet

This provides a 2-page summary of the key findings and management implications of our research.

Gosper, C., Yates, C. and Prober, S. (2013) Ageing long-unburnt gimlet woodlands. Science Division Information Sheet 65/2013.







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Great Western Woodlands Project



Metadata

Title

Fire regimes and effects of fire in gimlet (Eucalyptus salubris) woodlands

Abstract

Disturbances are important ecosystem processes affecting patterns of species diversity (including species richness, diversity and evenness) and community composition. Determining appropriate disturbance regimes for particular ecosystems is thus an important issue for natural resource management. There have been few studies of the response of plant species composition and diversity to fire in 'fire-sensitive' Mediterranean-climate woodlands, where the dominant overstorey trees are typically killed by fire, resulting in dense post-fire recruitment. The Great Western Woodlands (GWW) region of south-western Australia supports the world's largest remaining area of Mediterranean-climate woodland, which in mosaic with mallee, shrublands and salt lakes cover an area of 160 000 km2. Eucalyptus woodlands in this region are typically fire-sensitive, and fire return intervals recorded over recent decades have been much shorter than the long-term average. This has led to considerable conservation concern regarding the loss of mature woodlands, and has highlighted a need to better understand how plant species composition and diversity changes with time since fire. We established a series of plots in gimlet woodlands within the Great Western Woodlands TERN Supersite at a range of times since fire (72 50 x 50 m plots). To estimate plot ages for this study we used satellite imagery, growth ring counts and relationships between growth ring counts and plant size.

Keywords

Ecological fire management; fire interval; Mediterranean-type ecosystem; obligate seeder; space-for-time; succession

Owners and Contacts

Name: Dr Carl Gosper

Organisation: Science Division, Department of Environment and Conservation and CSIRO Ecosystem Sciences

Address: Locked Bag 104, Bentley Delivery Centre, WA 6983, Australia

Phone:+61 893336442

Email: carl.gosper@dec.wa.gov.au

Name: Dr Suzanne Prober

Organisation: CSIRO Ecosystem Sciences

Address: Private Bag 5, Wembley WA 6913 Australia

Phone: + 61 893336789 Email: Suzanne.prober@csiro.au

Name: Dr Colin Yates

Organisation: Science Division, Department of Environment and Conservation Address: Locked Bag 104, Bentley Delivery Centre, WA 6983, Australia

Phone: +61 892199079

Email: colin.yates@dec.wa.gov.au

Funding Sources

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- 2. Australian Supersite Network, part of the Australian Government's Terrestrial Ecosystems Research Network, a research infrastructure facility established under the National Collaborative Research Infrastructure Strategy and Education Infrastructure Fund - Super Science Initiative - through the Department of Industry, Innovation, Science, Research and Tertiary Education.

Usage Rights

These data are currently being used for research into the impacts of fires on Eucalyptus salubris woodlands. These data have been used to support one journal publication, with a second under review at present. These data are freely available for use, however, we request that potential users contact the project team to discuss opportunities for collaboration. Note that some of these data are duplicates of data available at the TERN Data Discovery Portal, lodged under the project "Time-since-fire plots. Great Western Woodlands (1) Floristic composition and diversity".

Geographic coverage

The western half of the Great Western Woodlands, south-western Western Australia. Plots were established in the vicinities of Karroun Hill (30°14'S, 118°30'E); Yellowdine (31°17'S, 119°39'E) and Parker Range (31°47'S, 119°37'E).

Temporal coverage

1 July 2010 to 1 December 2012

Taxonomic coverage

All vascular flora. Taxonomy follows Florabase, Western Australian Herbarium (1998-2012) as at 4 January 2011.

Methods

See links for methods for estimating the time since fire of E. salubris plots and measuring floristic diversity.

Description of columns in data files

1. Plot details table

Column Header Descriptor Plot number Datum Zone UTM NB - in text format to preserve 0 Easting Northing Latitude Longitude Location accuracy Elevation Metres above sea level (measured with GPS) Aspect Topo position Topographic position Location Written description of plot location Tenure UCL = Unallocated Crown land; NR = Nature Reserve Date established Same as date plot sampled for flora Vegetation Lists dominant canopy species Surface soil description Written description Soil sample Sample number Photos Y = Yes for plot photo(s)Species-area Y = Yes for species-area data (nested subplots within 50 x 50 m) Flora_richness Y = Yes for species density determined per 2500 m² plot Flora_cover Y = Yes for floristic cover measured Veg_structure Y = Yes for vegetation structure measured Fuel Y = Yes for VESTA fuel assessment conducted

LS Fire year Year of fire from Landsat image analysis LS Yrs since fire Years since fire from Landsat image analysis (i.e. time since fire truncated at 60 years for plots with no

evidence of fire in the oldest (1972) Landsat image.

Model 2 fire date Year of fire (= number of growing seasons post-fire, not necessarily calendar year) of plots from Landsat

image analysis, estimates from growth ring counts, and growth ring-size relationships using Model 2 of

Gosper et al. (2013). Model 2 and Model 5 were the best-fitting plausible models.

Model 2 yrs since fire Years since fire (growth seasons) from estimates from Landsat image analysis, growth ring counts and

growth ring-size relationships using Model 2 of Gosper et al. (2013).

Year of fire (= number of growing seasons post-fire, not necessarily calendar year) of plots from Landsat Model 5 fire date

image analysis, estimates from growth ring counts, and growth ring-size relationships using Model 5 of

Gosper et al. (2013). Model 2 and Model 5 were the best-fitting plausible models.

Model 5 yrs since fire Years since fire (growth seasons) from estimates from Landsat image analysis, growth ring counts and

growth ring-size relationships using Model 5 of Gosper et al. (2013).

Method used for determining 'Model 2 (or 5) yrs since fire': L = Landsat, R = growth ring count, E = estimate Dating method

from growth ring-size relationships

Notes

2. Diversity-floristics table: Diversity indices worksheet

Column Header Descriptor

Plot Plot number. NB - All indices per 2500 m2 area

Species density Number of species per plot

Evenness Pielou's evenness calculated on cover data

Diversity Shannon diversity index (logex) calculated on cover data

3. Diversity-floristics table: Species-area worksheet

Column Header Descriptor

Plot Plot number

Cumulative number of species per subplot area

Cumulative number of species per subplot area 5m²

10m² Cumulative number of species per subplot area

25m² Cumulative number of species per subplot area

100m² Cumulative number of species per subplot area Cumulative number of species per subplot area 500m²

1000m² Cumulative number of species per subplot area

2500m² Cumulative number of species per plot area

^{4.} Diversity-floristics table: Floristic cover worksheet

Column Header Descriptor

Plot Plot number

Acacia andrewsii Cover of Acacia andrewsii (0 = absent, 1% = present but not recorded at point intercepts, 2% = recorded at

1 of 50 intercepts etc)

etc

5. Diversity-floristics table: Soils data

Column Header Descriptor (see methods)

Plot Number Ammonium

Nitrate

P Available phosphorus

K Potassium

Sulphur Extractable sulphur Organic_C Organic carbon

Conductivity Conductivity (1:5 soil:water extract)

pH (CaCl₂) pH (1:5 soil/0.01M CaCl₂)





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Contact information

Please contact us for further information on any aspect of the study.

Recommended citation

To cite the study methodology, please cite the relevant publication(s). Citation for the data:

Gosper CR, Yates CJ and Prober SM (2013). Fire in gimlet woodlands. NatureMap, Department of Environment and Conservation. On-line: http://naturemap.dec.wa.gov.au/Query.aspx?querytype=content&content=gimlet

Project team

Carl Gosper

Science Division, Department of Environment and Conservation and CSIRO Ecosystem Sciences Locked Bag 104 Bentley Delivery Centre, WA 6983

Australia

Telephone: +61 893336442 Email: carl.gosper@dec.wa.gov.au

Colin Yates

Science Division, Department of Environment and Conservation

Locked Bag 104 Bentley Delivery Centre, WA 6983 Australia +61 892199079 colin.yates@dec.wa.gov.au

Suzanne Prober

CSIRO Ecosystem Sciences

Private Bag 5 Wembley WA 6913 Australia +61 893336789 Suzanne.prober@csiro.au







Plot	Species_density	Evenness	Diversity
GIM01	18	0.522	1.509
GIM02	42	0.6629	2.478
GIM03	28	0.7673	2.557
GIM04	23	0.728	2.283
GIM05	26	0.7342	2.392
GIM06	41	0.826	3.068
GIM07	57	0.8756	3.54
GIM08	53	0.8413	3.34
GIM09	29	0.6924	2.331
GIM10	21	0.678	2.064
GIM11	43	0.8351	3.141
GIM12	41	0.8278	3.074
GIM13	42	0.7051	2.635
GIM14	24	0.6957	2.211
GIM15	27	0.7147	2.356
GIM16	37	0.7056	2.548
GIM17	40	0.7548	2.784
GIM18	32	0.7713	2.673
GIM19	50	0.8497	3.324
GIM20	35	0.6966	2.477
GIM21	49	0.7743	3.013
GIM22	43	0.6931	2.607
GIM23	27	0.6483	2.137
GIM24	18	0.7141	2.064
GIM25	37	0.8233	2.973
GIM26	62	0.8228	3.396
GIM27	41	0.8502	3.157
GIM28	33	0.8865	3.1
GIM29	40	0.7805	2.879
GIM30	34	0.7779	2.743
GIM31	27	0.6603	2.176
GIM32	31	0.7399	2.541
GIM33	28	0.7165	2.387
GIM34	25	0.608	1.957
GIM35	27	0.7632	2.515
GIM36	32	0.7373	2.555
GIM37	40	0.7477	2.758
GIM38	32	0.7812	2.708
GIM39	55	0.7393	2.963
GIM40	44	0.7864	2.976
GIM41	40	0.8038	2.965
GIM42	34	0.7417	2.615
GIM43	59	0.7385	3.011
GIM44	33	0.6627	2.317
GIM45	27	0.7407	2.441
GIM46	52	0.8451	3.339
GIM47	53	0.793	3.148
GIM48	30	0.5569	1.894
GIM49	20	0.7529	2.256

36	0.849	3.042
41	0.7598	2.822
33	0.7661	2.679
46	0.6759	2.588
55	0.7189	2.881
49	0.7245	2.82
31	0.7851	2.696
56	0.8225	3.311
71	0.872	3.717
38	0.7228	2.629
28	0.6637	2.211
62	0.828	3.417
25	0.6761	2.176
49	0.8467	3.295
47	0.7162	2.757
36	0.8321	2.982
41	0.769	2.856
39	0.7924	2.903
24	0.8048	2.558
35	0.7995	2.842
61	0.9328	3.835
52	0.8842	3.494
31	0.8857	3.042
	41 33 46 55 49 31 56 71 38 28 62 25 49 47 36 41 39 24 35 61 52	41 0.7598 33 0.7661 46 0.6759 55 0.7189 49 0.7245 31 0.7851 56 0.8225 71 0.872 38 0.7228 28 0.6637 62 0.828 25 0.6761 49 0.8467 47 0.7162 36 0.8321 41 0.769 39 0.7924 24 0.8048 35 0.7995 61 0.9328 52 0.8842

Notes to accompany diversity indices spreadsheet

Date custodian Carl Gosper <u>carl.gosper@dec.wa.gov.au</u>

All indices per 2500 m2 area

Species_density Number of species per plot (2500m2)

Evenness Pielou's evenness calculated on cover data

Diversity Shannon diversity index (log_ex) calculated on cover data

Plot	1 m2	5m2	10m2	25m2	100m2	500m2	1000m2	2500m2
GIM01	2	3	4	4	8	10	15	18
GIM02	1	3	5	7	10	21	29	42
GIM03	4	5	6	7	11	18	26	28
GIM04	4	5	6	7	9	14	16	23
GIM05	6	7	7	8	9	17	19	26
GIM06	5	9	13	14	22	30	35	41
GIM07	8	18	26	34	39	48	55	57
GIM08	0	20	23	25	42	48	52	53
GIM09	4	6	9	11	15	20	23	29
GIM10	4	6	7	7	11	13	13	21
GIM11	1	3	4	8	16	25	32	43
GIM12	4	8	11	14	18	24	33	41
GIM13	0	5	6	12	22	27	31	42
GIM14	1	1	1	2	7	11	20	24
GIM15	7	10	11	12	13	19	23	27
GIM16	3	5	10	11	13	27	29	37
GIM17	5	5	5	6	13	19	25	40
GIM18	2	3	6	6	12	20	24	32
GIM19	1	5	7	7	20	40	45	50
GIM20	6	6	9	12	18	31	34	35
GIM21	2	5	8	9	19	37	43	49
GIM22	0	4	7	12	19	31	33	43
GIM23	3	6	9	11	12	13	17	27
GIM24	3	4	5	5	7	11	15	18
GIM25	2	4	9	12	24	32	35	37
GIM26	3	6	7	11	16	25	40	62
GIM27	1	7	10	14	18	28	34	41
GIM28	2	5	7	12	15	21	24	33
GIM29	2	4	6	8	14	25	28	40
GIM30	3	6	9	12	17	23	27	34
GIM31	3	4	7	8	10	17	19	27
GIM32	4	7	8	11	18	22	25	31
GIM33	3	3	4	10	13	19	24	28
GIM34	2	5	7	9	11	13	16	25
GIM35	3	5	6	6	9	16	19	27
GIM36	3	7	8	9	14	19	20	32
GIM37	2	4	5	13	16	28	34	40
GIM38	2	3	7	9	15	22	26	32
GIM39	3	5	7	8	19	38	47	55
GIM40	4	9	10	12	22	29	35	44
GIM41	2	4	7	7	18	30	32	40
GIM42	4	6	10	13	13	22	30	34
GIM43	3	13	16	21	30	36	51	59
GIM44	2	4	5	6	9	15	20	
GIM45	1	2	3	7	8	15	20	27
GIM46	1	5	8	15	20	26	47	52
GIM47	2	4	6	7	27	39	46	53
GIM48	1	3	3	6	7	12	24	
GIM49	1	1	2	4	8	14	17	20
GIIVITJ		_	2	4	o	14	1/	20

GIM50	0	4	6	7	11	22	27	36
GIM51	0	1	3	8	10	21	32	41
GIM52	2	4	4	7	11	16	30	33
GIM53	3	5	8	9	14	28	30	46
GIM54	2	5	11	17	23	38	42	55
GIM55	4	9	9	12	18	29	32	49
GIM56	1	5	6	10	20	28	29	31
GIM57	8	13	16	20	29	39	44	56
GIM58	4	19	21	30	46	52	57	71
GIM59	0	3	7	10	14	16	22	38
GIM60	1	5	7	10	18	24	26	28
GIM61	8	13	17	27	40	55	59	62
GIM62	1	1	2	3	6	15	19	25
GIM63	0	3	6	12	25	37	43	49
GIM64	3	3	6	7	15	21	26	47
GIM65	7	8	8	10	16	27	33	36
GIM66	3	5	8	13	19	23	28	41
GIM67	8	14	19	20	25	29	33	39
GIM68	1	3	4	12	16	17	22	24
GIM69	3	4	4	5	6	16	17	35
GIM70	1	1	1	6	15	45	55	61
GIM71	2	3	10	15	23	41	44	52
GIM72	1	1	5	6	9	17	21	31

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Date custodian

Carl Gosper <u>carl.gosper@dec.wa.gov.au</u>

Methods for floristic sampling

Plots were sampled in spring 2010 or spring 2011, with each time since fire class sampled in each year. For each plot we recorded the vascular plant taxa present and estimated their abundance.

To measure abundance we systematically placed a 12.5 mm diameter pole vertically at 50 points per plot (along two sides of the plot and the diagonal), each 3 m apart, and recorded the identity of all plants with live parts intercepting the pole.

Species that were present but not recorded at point intercepts were allocated a nominal proportional abundance of 1%.

Taxonomy follows the Western Australian Herbarium (1998-2012) as at Jan 2012.

Plot_Number	Ammonium	Nitrate	Р	K	Sulphur	Organic C	Conductivity	pH (CaCl2)
GIM01	1	1	4	223	5.29	1.27	0.122	6.4
GIM02	0.5	1	1	187	2.16	0.85	0.075	6.4
GIM03	1	0.5	5	130	10.6	0.99	0.21	6.4
GIM04	1	3	2	373	4.21	1.83	0.157	7.8
GIM05	1	1	1	225	1.98	0.91	0.146	7.8
GIM06	1	2	1	211	2.73	0.97	0.075	7.2
GIM07	1	4	2	221	3.77	0.77	0.099	6.5
GIM08	1	3	1	404	2.05	0.78	0.12	7.6
GIM09	1	1	1	176	3.88	1.13	0.127	7.1
GIM10	1	1	2	185	12.5	0.97	0.259	6.5
GIM11	1	1	2	197	1.93	0.94	0.031	5.7
GIM12	1	4	2	274	2.08	1.03	0.1	6.9
GIM13	0.5	1	2	147	1.07	0.44	0.02	6.6
GIM14	1	4	4	475	2.46	1.28	0.071	6.7
GIM15	1	5	4	466	5.49	1.9	0.195	7.7
GIM16	1	3	3	448	3.09	1.2	0.186	7.6
GIM17	1	7	6	356	4.24	1.31	0.283	7.7
GIM18	1	2	2	371	2.04	0.89	0.065	6.3
GIM19	1	0.5	2	243	1.6	0.68	0.145	7.7
GIM20	1	2	3	186	3.13	1.15	0.081	5.6
GIM21	1	1	1	86	0.92	0.42	0.018	6.3
GIM22	2	2	2	40	1.53	0.72	0.044	6.3
GIM23	1	1	1	88	1.96	0.67	0.028	6.3
GIM24	2	2	4	264	6.43	1.27	0.183	6.2
GIM25	1	2	2	163	2.04	0.71	0.075	5.9
GIM26	2	4	4	193	9.51	1.82	0.098	6.1
GIM27	1	2	1	237	1.73	0.79	0.156	7.1
GIM28	1	1	3	198	3.22	0.48	0.065	7.2
GIM29	2	3	5	180	2.37	0.47	0.019	5.1
GIM30	1	6		176	3.94	0.98	0.1	5.8
GIM31	2	9	5	172	20.7	1.93	0.253	5.8
GIM32	2	8	9	400	3.6	1.46	0.115	6.5
GIM33	1	2	5	223	1.39	0.85	0.046	6.1
GIM34	1	1	4	421	1.4	0.77	0.161	7.2
GIM35	1	7	3	169	2.64	1.05	0.086	6.5
GIM36	1	9	4	248	3.04	1.19	0.069	5.9
GIM37	1	1	6	394	1.09	0.87	0.112	7.4
GIM38	1	2		352	1.91	0.91	0.123	7.6
GIM39	1	2	5	245	2.87	0.83	0.074	7
GIM40	1	1	4	221	1.32	0.55	0.018	5.8
GIM41	1	1	3	132	1.37	0.6	0.028	6.1
GIM42	1	2	3	143	1.37	0.77	0.049	5.9
GIM43	1	1		148	0.96	0.59	0.02	5.8
GIM44	1	6	6	252	9.93	1.12	0.296	6.2
GIM45	2	23	5	246	9.04	1.78	0.247	6.2
GIM46	1	1	2	409	1.31	0.71	0.105	7.1
GIM47	1	2	3	197	1.56	0.47	0.036	6
GIM48	1	1	4	229	2.41	1.18	0.101	6.8
GIM49	1	3		311	5.48	0.99	0.205	6.6
.			٠		55	0.55	0.200	5.0

GIM50 GIM51 GIM52

1	1	2	216	3.15	0.62	0.075	5.2
1	3	3	204	10.8	0.84	0.233	6.1
1	3	8	255	6.33	1.43	0.221	6.2

Date custodian

Carl Gosper

carl.gosper@dec.wa.gov.au

Methods for soil sampling

We analysed a single bulked sample of the top 10 cm of soil from aggregation of multiple 2 cm diameter sub-samples collected from throughout each of 52 50 x 50 m plots sampled in spring 2010.

Samples were stored at ~4°C until delivery to the CSBP Futurefarm analytical laboratories (Bibra Lake, WA), where they were thoroughly mixed, air dried at 40 °C, and ground to pass through a 2 mm sieve.

Analyses were undertaken on each bulked sample as follows (where given, method numbers apply to Rayment and Higginson 1992)

available phosphorus (Colwell method, bicarbonate-extractable phosphorus - manual colour, 9B1)

potassium (Colwell method, bicarbonate-extractable potassium, 18A1) ammonium and nitrate (measured simultaneously using Lachat Flow Injection Analyser, soil:solution ratio 1:5, 1M KCl, indophenol blue, Searle 1984, and with copperized-cadmium column reduction) organic carbon (Walkley and Black method, 6A1)

extractable sulphur (40°C for 3 hours, 0.25M KCl, measured by ICP; Blair et al. 1991) pH (1:5 soil/0.01M CaCl₂, 4B2) conductivity (1:5 soil:water extract, 3A1)

Blair GJ, Chinoim N, Lefroy RB, Anderson GC, Crocker GJ (1991) A soil sulfur test for pasture and crops. Aust J Soil Res 29:619–626 Rayment GE, Higginson FR (1992) Australian Laboratory Handbook of Soil and Water Chemical Methods. Inkata Press, Melbourne Searle PL (1984) The berthelot or indophenol reaction and its use in the analytical chemistry of nitrogen. A review. Analyst 109:549-568

Plot number Datum Zone Easting Northing Latitude Loneitude Location accuracy		_					_											
			on Location	Tenure	Date established Vegetation	Surface soil description	Soil san	mole Photos	Species-area	Flora_richness	Flora cover Ver struct	are Fuel 15 Fire year 15 Yrs		re date Model 2 yrs since fire	Model 5 fire o		Dating method	Notes
GIM01 WGS 84 50 H 0711824 6454154 -32"164.27672" 119"14'34.93127" <5 GIM02 WGS 84 50 H 0710180 6452953 -32"2'10.33820" 119"26'15.19153" <5	414 NI 430 NI		E side of Emu fence Rd, N of Soldier's Rd junction S side of Kine Inexam Rd	UCL	30-Sep-10 Gimlet-Salmon Gum 01-Oct-10 Gimlet-Eucalvotus sheathlana	Pale brown-grey sandy loam - no rock Brownish sandy loam, no rock	SM2					Y 1952-1972 1952-1972	38 1972				S L	
GM03 WGS 84 SO H 0747155 6447629 -32"4"50.17585" 129"37"6.89599" <5	433 NI		N side of Kine Ingram Rd	UCL	01-Oct-10 Gimlet-dense Melaleuca undenstorey	Grev-brown sandy loam, quartz pebbles on surface	SM3					Y 1952-1972	38 1972	1908 4			a L	
GIM04 WGS 84 50 J 0746019 6484219 -31*45'3.89330" 119*35'49.96808" <5	391 NI		W side Forrestania-Marvel Loch Rd, N of Dunbar Rd	UCI	02-Oct-10 Girelet-Morrel	Red sandy loam, laterite surface pebbles	SU1	Y	Y	Y	Y Y	Y Pre-2952	60 1870	1.0			0 E	
GIMOS WGS 84 SO J 0749599 6477326 -31"46"44.74495" 129"36"12.25249" <5	355 NI		E side of Forrestania-Maryel Loch Rd. N of Cheriton's Mine	UCI	02-Oct-10 Gimlet-Salmon Gum	Red sandy loam, laterite surface pebbles	581	Y	Y	Y	Y Y	Y 2001	9 2001				9 R&L	
GIM06 WGS 84 50 J 0750950 6472203 -31"51"29.89203" 129"39"8.34051" <5		Upslope	S of cleared line running E of Forrest-Marvel Loch Rd, S of Cheriton's Mine, Jilbadji NR	NR	02-Oct-10 Girnlet-Merrit	Orange sandy loam, laterite surface pebbles	582	Y	Y	Y	Y Y	2008	2 2007				3 R&L	
GIM07 WGS 84 50 J 0750770 6470214 -31"52"34.56556" 119"39"3.34625" <5	419 NI		E of Forrest-Marvel Loch Rd, 5 of Cheriton's Mine, Albadji NR	NR	02-Oct-10 Gimlat-Eucalyptus moderata	Orange sandy loam, laterite surface pebbles	583	Y	Y	Y	Y Y	2008	2 2007			907	3 R&L	
GIMOB WGS 84 50 J 0749349 6478071 -31"46"20.77019" 129"36"2.06720" <5	393 NI	Flat	N of cleared line running E of ForrestMarvel Loch Rd. N of British India Rd	UCL	03-Oct-10 Gimlet-Salmon Gum	Red sandy loam, no pebbles	SU2	Y	Y	Y	Y Y	Y Pre-2952	60 1750	26		240 77	0 E	
GIM09 WGS 84 50 J 0750556 6465872 -31"54"55.60809" 119"38"59.24672" <5	441 NI	Flat	E of ForrestMarvel Loch Rd, 5 of Cheriton's Mine, Albadji NR	NR	03-Oct-10 Gimlet-dense Melaleuca understorey	Orange-brown sandy loam	SM4	Y	Y	Y	Y Y	Y 1952-1972	38 1965	4			5 R	
GIM10 WGS 84 SO J 0750336 6457290 -31"59"34.23662" 119"38"58.87384" <5	418 NI		E of ForrestMarvel Loch Rd. 5 of Cheriton's Mine, Albadii NR	NR	03-Oct-10 Gimlet-Merrit	Orange-brown sandy loam	SU3	Y	Y	Y	Y Y	Y Pre-2952	60 1941			941 6	9.8	
GIM11 WGS 84 50 J 0750618 6469344 -31"53"2.91264" 119"38"58.37547" <5	422 NI		W side Forrestania-Marvel Loch Rd. S of Cheriton's Mine	NR	03-Oct-10 Gimlet-dense Melaleuca undenstorey	Orange sandy loam, laterite surface pubbles	SMS	Y	Y	Y	Y Y	Y 1952-1972	38 1966	4			4 B	
GIM12 WGS 84 50 J 0740541 6480726 -31"47"1.42877" 119"32"25.05112" <5	387 NI		5 side of Dunbar Rd	UCL	04-Oct-10 Gimlet-Salmon Gum	Orange sandy loam, quartz surface pebbles	584	Y	Y	Y	Y Y	Y 2003	7 2002				E FAL	
GIM13 WGS 84 50 J 0734203 6480901 -31"47"0.49274" 119"28"24.13181" <5	382 NI		S side of Dunbar Rd	UCL	04-Oct-10 Gimlet-Salmon Gum-Yornell	Orange sandy loam	SU4	Y	Y	Y	Y Y	Y Pre-1952	60 1820	19			0 E	
GIM14 WGS 84 50 J 0744481 6495454 -31"39"0.53839" 119"34"41.47249" <5	379 SE		W side of Forrestania-Marvel Loch Rd. 5 of Parker Range Rd	Unmanged reserve	04-Oct-10 Gimlet-Salmon Gum	Orange sandy loam	SUS	Y	Y	Y	Y Y	Y Pre-1952	60 1940				0.8	
GIM15 WGS 84 SD J 0744153 6494551 -31"39"30.08968" 119"34'29.83941" <5		Upslope	W side of Forrestania-Marvel Loch Rd, S of Parker Range Rd	Unmanged reserve	04-Oct-10 Gimlet-Morrel	Brownish sandy loam, surface quartz pebbles	585	Y	Y	Y	Y Y	2003	7 2002				E RAL	
GM16 WGS 84 SO J 0755005 6545264 -31"11"56.17431" 119"40"14.59843" <5	381 NI		E side Lake Seubrook-Yellowdine Rd	Unmanged reserve	05-Oct-10 Gimlet-Yornell	Orange-red sandy loam with quartz pebbles	CB1	Y	Y	Y	Y Y	2003	7 2002				S RAL	
GM17 WGS 84 50 0755878 6547552 -31"10"41.24881" 120"41"5.45414" <5 GM18 WGS 84 50 0756511 6552117 -31"8"12.62980" 110"41"25.15417" <5			E side Lake Seabrook-Yellowdine Rd. Duladnin NR E side Lake Seabrook-Yellowdine Rd. Yellowdine NR	NR	05-Oct-10 Gimlet-Salmon Gum 05-Oct-10 Gimlet-Salmon Gum	Orange-red sandy loam with surface laterite and quartz pebbles	CU1		Y	Y	Y Y	Pre-1952 Pre-1952	60 1890 60 1780	12			0 E	
		Upslope		Unmanged reserve		Orangy sandy loam	CU2	Y						28			0 E	
GIM10 WGS 84 50 J 075480 654602 -31'12'18.0659" 129'40'15.38510' <5 GIM20 WGS 84 50 J 0747909 6523080 -31'24'1.50780" 129'10'26.54789" <5	425 W		Off sepodoutters track W of Yellowdine-Lake Seabrook Rd Suide of Rd from Palmer's Rind to Emu Pence Rd	OUR STREET	05-Oct-10 Gimlet-Morrel 05-Oct-10 Gimlet-dense Melaleuca undentorey	Orange sandy loam, surface quartz Orange sandy loam	CB2 CM1				v v	2003 1952-1972	7 2002 38 1968				E R&L 2 R	25 x 100m // to road
GIM21 WG5 84 50 J 0751292 6520977 -31"25"7.12134" 129"36"36.43709" <5	373 NI		E side of Manuel Loch-Yellowdine Rd. S of Palmer's Find	UCL	06-Oct-10 Gimlet-Salmon Gum-Yornell	Orange sandy loam	CM2	Ý	·			1952-1972	38 1960				0 8	23 x 20011/) 10 1020
GM22 WG5 84 50 J 0753302 6522875 -31°24'3.96234" 119°39'30.76475" <5			S side of Rd heading W of Palmer's Find to salt lake	UCL	05-Oct-10 Gimlet-Salmon Gum	Oranie sandy loam	CUI	Y	·			Pre-1952	60 1860	100			0 E	
GIM23 WGS 84 50 J 0754656 6522950 -31*24'0.46096" 119'40'41.89447" <5	370 NI		Mt Palmer townsite, immediatly east of Mt Palmer Hotel.	UCL	06-Oct-10 Girnlet-Salmon Gum	Orange sandy loam	CM3	Y	Y	Y	Y Y	1952-1972	38 1962	4				No dropper.
GIM24 WGS 84 50 J 0743131 6536639 -31"16"45.16852" 119"31"13.89362" <5			E of track running 5 off power line eastment. 5 of Great Eastern Hwy. W of Yellowdine	UCL	07-Oct-10 Gimlet-Salmon Gum	Orange sandy loam	CM4	Y	Y	Y	Y Y	1952-1972	35 1960				0 B	
GIM25 WGS 84 501 0754299 6542988 -31"13"10.65642" 129"40"6.24897" <5			W side Lake Seabrook-Yellowdine Rd	Unmaneed reserve	07-Oct-10 Girnlet-Morrel	Orange sandy loam	CB3	Y	Y	Y	Y Y	2003	7 2002				S RAL	
GIM26 WGS 84 50 J 0754809 6545776 -31"11"99.71531" 129"40"26.73244" <5			S of track running W off Lake Seabrook-Yellowdine Rd	Unmanged reserve	07-Oct-10 Gimlet-Salmon Gum	Orange sandy loam with large quartz surface rocks	C84	Y	Y	Y	Y Y	2003	7 2003					25 x 100m perpendicular to road
GIM27 WGS 84 50.1 0752782 6538037 -31"15"52.41118" 119"39"17.24455" <5	369 NI		E of Lake Seabrook-Yellowdine Rd	Unmanged reserve	07-Oct-10 Gimlet-Yorrell	Orange sandy loam with surface quartz pebbles	CUA	Y	Y	Y	Y Y	Pre-2952	60 1810	20		520 49	0 E	
GIM28 WGS 84 50 J 0753076 6533851 -31"18'8.00504" 129"39'32.16317" <5	377 NI		E of Yellowdine-Palmer's Find Rd. across water pipeline trench. Yellowdine NR	NR	07-Oct-10 Gimlet-Eucalyptus moderata-Yornell	Orange sandy loam	CUS	Y	Y	Y	Y Y	Pre-1952	60 1770	24			0 E	
GIM29 WGS 84 50 J 0645838 6632824 -30"25"40.28985" 138"31"6.83020" <5	411 NI	Flat	W of Rabbit Proof Fence Rd (N-S section), S of Mailee track junction	UCL	25-Oct-10 Gimlet	Orange sandy loam	NU1	Y	Y	Y	Y Y	Pre-2952	60 1770	24		320 69	0 E	
GIMBO WGS 84 50 J 0546020 6641714 -30"20"51.50588" 118"31"9.18106" <5	476 SE	Upslope	W of Rabbit Proof Fence Rd (N-S section), btwn Mallee & Adam's track junctions	UCL	26-Oct-10 Gimlet-Wheatbelt Wandoo-Eucalvotus sheathlana	Pale grange sandy loam, surface quartz rock	NB1	Y	Y	Y	Y Y	2003	7 2003			001	7 L	
GIM11 WGS 84 50 J 0540553 6654518 -30"13"58.03068" 138"27"38.30534" <5	503 S	Upslope	S of Rabbit Proof Fence Rd (E-W section), UCL S of Kerroun Hill NR	UCL	26-Oct-10 Gimlet-Yorrell-Wheathblet Wandoo	Pale grange sandy loam, surface quartz rock	NU2	Y	Y	Y	Y Y	Pre-2952	60 1780	23		320 69	0 E	
GIM32 WGS 84 50 J 0628258 6654252 -30"14"11.53257" 118"19"58.55626" <5	490 W	Upslope	N of Rabbit Proof Fence Rd (E-W section), Karroun Hill NR	NR	26-Oct-10 Gimlet-Salmon Gum-Yornell	Orange sandy loam, surface quartz	NB2	Y	Y	Y	Y Y	2003	7 2003			001	7 L	25 x 100m // to fence
GIMSS WGS 84 50 J 0635137 6648813 -30"17"5.50973" 118"24"18.37388" <5	492 5		5 of Adam's track. W of 12 mile track junction	UCL	26-Oct-10 Gimlet-Eucalyptus moderata-Yornell	Orange sandy loam	NE3	Y	Y	Y	Y Y	2003	7 2002				S R&L	
GIM34 WGS 84 50 J 0543634 6648823 -30"17"1.66418" 118"29"36.33606" <5	471 Nii		5 of Adam's track, E of 12 mile track junction	UCL	26-Oct-10 Gimlet-Yorrell	Orange-red sandy loam, some surface laterite and quartz pebbles	NU3	Y	Y	Y	Y Y	Pre-2952	60 1810	20			3 0	
GIM35 WGS 84 SO J 0637459 6636024 -30"23"59.91399" 128"25"51.30635" <5	454 NI		E of 12 mile track, just N of mallee track junction	UCL	27-Oct-10 Gimlet-Eucalyptus moderata-Yornell	Pale orange sandy loam	NU4	Y	Y	Y	Y Y	Pre-1952	60 1830	18			0 E	
GIM16 WGS 84 SO J 0614612 6654586 -30"14"5.62118" 118"11"27.98141" <5	451 NI		N of Rabbit Proof Fence Rd (E-W section) E of Boundary Rd junction. Karroun Hill NR	NR	27-Oct-10 Gimlet-Eucalvotus moderata-Salmon Gum	Orange sandy loam with little gravel	NM1	Y	Y	Y	Y Y	1952-1972	38 1972	1				25 x 100m perpendicular to fence
GIM37 WGS 84 50 J 0594944 6661283 -30"10"34.19892" 117"59"10.07338" <5	377 NI		N of Rabbit Proof Pence Rd (E-W section) W of Clark Rd junction, Karroun Hill NR	NR	27-Oct-10 Gimlet-Morrel-Yornell	Orange sandy loam	NM2	Y	Y	Y	Y Y	1952-1972	38 1965	4			5 R	
GIM18 WGS 84 50 J 0592624 6663150 -30"9"34.19691" 117"57"42.74715" <5	367 NI		N of Rabbit Proof Fence Rd (E-W section) at Beacon N Rd junction, Karroun Hill NR	NR	27-Oct-10 Gimlet-Salmon Gum-Yornell	Orange sandy loam, small surface quartz pebbles	NUS	Y	Y	Y	Y Y	Pre-2952	60 1830	18			0 E	
GIM10 WGS 84 50 J 0608329 6654611 -30"14"6.88720" 138"7"32.94527" <5 GIM40 WGS 84 50 J 0629175 6648825 -30"17"7.46236" 138"20"35.25488" <5	451 E 481 NI	Upslope	N of Rabbit Proof Fence Rd (E-W section), blwn Clark and Boundary Rd junctions, Karroun Hill NR 5 of Adam's track, W of 12 mile track junction	NR	27-Oct-10 Gimlet-Eucalvotus moderata-Salmon Gum 28-Oct-10 Gimlet-Salmon Gum-Yornell	Pale orange sandy loam	NM3	Y	Y	Y	Y Y	1952-1972	38 1954 60 1870					25 x 100m // to fence
GRM40 WGS 84 SO J 0629175 0648825 -30"17"7.46236" 138"20"35.25488" <5 GRM41 WGS 84 SO J 0636541 0648792 -30"17"5.62478" 138"25"30.92400" <5			S of Adam's track, W of 12 mile track junction	UCL	28-Oct-10 Gimlet-Samon Gum-romes 28-Oct-10 Gimlet-Eucalvotus moderata	Orange sandy loam Pale orange sandy loam	NU6 NB4	Y				Pre-1952	00 1870	2001			0 E 7 R&L	
	485 5			OCL				-				2003		2003			7 R&L	
GRM42 WGS 84 SO J 0637768 0649145 -30"16"53.68031" 138"25"56.67880" <5 GRM43 WGS 84 SO J 0637393 0640387 -30"21"44.74138" 138"25"66.86492" <5	500 NI 444 NI		N of Adam's track, near 12 mile track junction E of 12 mile track, 5 of Adam's track junction	UCL	28-Oct-10 Girnlet-Eucalyotus moderata-Euc lox. liss. 28-Oct-10 Girnlet-Eucalyotus moderata-Euc lox. liss.	Pale orange sandy loam Pale orange sandy loam	NU7				v v	2003 Pre-1952	60 1850	203			O E	
GIMM4 WGS 84 50.1 0637337 6637729 -30°23'4.59361" 138°25'45.92914" <5		Midslope	W of 12 mile track, 5 of Adam's track junction	UCL	28-Oct-10 Gimlet-Eucalyptus moderata-Yorreli	Orange sandy loam, some laterite pubbles	NM4	·	·			Pre-2952	60 1932				8 B	
GM45 WG5 84 50 J 0637462 6634923 -30"24"35.66930" 138"25"53.94030" <5	476 NI		E of 12 mile track, 5 of Mallee track junction	UCL	28-Oct-10 Gimlet-Eucalvotus moderata-Yornell	Pale orange sandy loam, some surface laterite and quartz pebbles	NUS		·			Pre-1952	60 1850	10			0 E	
GIM46 WGS 84 50 J 0754317 6529034 -31"20'43.32597" 119"40'23.47691" <5	306 NI		W of Yellowdon, Palmer's End Ed Yellowdone NE	NR.	29-Oct-10 Girnlet-Morrel	Orange sandy loam	CUS	Y	Y	Y	Y Y	Pre-2952	60 1800	23			0 E	
GIMA7 WGS 84 50 J 0754783 6524078 -31"23"23.76344" 119"40"45.65831" <5	373 NI		E of Yellowdine-Palmer's Find Rd. N of Mt Palmer	UCL	29-Oct-10 Gimlet-Yorrell	Orange sandy loam, small surface quartz pebbles	CU7	Y	Y	Y	Y Y	Pre-2952	60 1927				3 8	
GIM48 WGS 84 50 J 0751098 6518749 -31"26"19-56426" 119"38"31.12527" <5	372 NI		E side of Marvel Loch-Yellowdine Rd. S of Palmer's Find	UCL	29-Oct-10 Girnlet-Yorrell	Orange sandy loam	CMS	Y	Y	Y	Y Y	1952-1972	35 1972	1			S L	
GIM49 WGS 84 50 J 0750184 6512386 -31"29"46.73591" 129"38"2.31867" <5	365 NI		E side of Marvel Loch-Yellowdine Rd, S of Palmer's Find	UCL	29-Oct-10 Gimlet-Salmon Gum	Orange sandy loam, some surface laterite and quartz pebbles	cus	Y	Y	Y	Y Y	Pre-1952	60 1922				0 E	
GIMSO WGS 84 50.1 0745113 6486094 -31"44"3.75631" 119"35"13.87297" <5	367 NI		W side of Forrestania-Marvel Loch Rd. S of Parker Ranse Rd	UCL	29-Oct-10 Yorrell-Gimlet	Orange sandy loam	SU6	Y	Y	Y	Y Y	Y Pre-2952	60 1790	22			o t	
GIM51 WGS 84 SD J 0743365 6497793 -31"37"45.49691" 129"33"57.05534" <5		Upslope	N of Parker Range Rd	Unmanged reserve	29-Oct-10 Gimlet-Salmon Gum-Merrit	Orange sandy loam with large laterite pebbles	SU7	Y	Y	Y	Y Y	Y Pre-1952	60 1938	7.			2 R	
GIM52 WGS 84 50.1 0742344 6498387 -31"37'26.99971" 119"33"17.80853" <5	411 50	Upslope	S of Parker Range Rd	Unmanged reserve	29-Oct-10 Gimlet-Salmon Gum	Orange sandy loam, small surface quartz pebbles	SUB	Y	Y	Y	Y Y	Y Pre-2952	60 1810	20		540 47	3.0	
GIM53 WGS 84 50 J 0637170 6648914 -30"17"1.40667" 118"25"34.40494" <5			N of Adam's track. W of 12 mile junction	UCL	18-Oct-11 Gimlet-Yornell	Orange sandy loam with medium laterite pubbles		Y	Υ	Y	Y Y	Pre-2952	60 1910	10			0 E	
GIM54 WG5 84 50 J 0618570 6666465 -10"7"18.42006" 118"13"51.23416" <5	391 NI		W of internal track running into Karroun Hill NR from 5 boundary	NR	18-Oct-11 Girnlet-Yorrell	Orange sandy loam, no gravel	_	Y	Y	Y	Y Y	1973-1980	35 1974				7 R	
GIMSS WGS 84 SQ J 0618624 6665959 -30"754.83623" 118"13"53.45589" <5	389 NI		E of internal track running into Karroun Hill NR from 5 boundary	NR	18-Oct-11 Girelet	Orange sandy loam with no gravel	_	Y	Y	Y	Y Y	Pre-1952	60 1780	23			3.0	
GIM56 WG5 84 50 J 0644981 6657148 -30"12"30.72279" 118"30"22.61453" <5		Upslope	W of Rabbit Proof Fence Rd. Karroun Hill NR	NR		Orange sandy loam, no gravel	_	Y	Y	Y	Y Y	1973-1980	35 1974		-		7 R	
GM57 WGS 84 50 J 0645021 6652310 -30"15"7.82536" 118"30"26.50689" <5			W of Rabbit Proof Fence Rd, N of Adam's track junction	UCL	19-Oct-11 Gimlet-Yornell	Orange sandy loam, no gravel	_	Y	Y	Y	Y Y	Pre-1952	60 1800	21			0 E	
GIMSB WGS 84 50 J 0637493 6638967 -30"22"24.32166" 138"25"51.38703" <5	438 NI		E of 12 mile track, 5 of Adam's track junction	UCL	19-Oct-11 Gimlet-Yorrell	Orange sandy loam, no gravel	_	Y	Y	Y	Y Y	Pre-2952	60 1640	32	-		0 E	
GM59 WGS 84 50 J 0664389 6628993 -30"27"36.08735" 138"42"44.15447" <5	369 NI		North of State Barrier Fence. W of Mt Jackson Rd Junction	UCL	20-Oct-11 Gimlet-Yornell	Orange sandy loam, no gravel	_	Y	Y	Y	Y Y	Unknown	1995	-	-		6 R	
GM60 WGS 84 50 J 0714823 6496978 -31"38"32-43936" 129"15"55.13877" <5	409 NW		N of P. Guederi Rd	UCL	20-Oct-11 Girolet-Merrit-dense Melaluca understorey 20-Oct-11 Girolet	Orange-brown sandy loam	_	- 14	7		, Y	Y 1977	34 1976 60 1860	1			5 R&L	
GM61 WGS 84 50 J 0720836 5496688 31"3873.74499" 119"19'43.48123" <5 GM62 WGS 84 50 J 0736149 5481997 -31"46'23.48623" 119"29'37.10203" 50	387 NI		S of P. Guederi Rd Near chained strip running N off Dunbar Rd	ncr.	20-Oct-11 Gimlet 21-Oct-11 Gimlet-Salmon Gum	Orange-brown sandy loam, no gravel	_	- 1	7		. Y	Pre-1952 Pre-1952	60 1840	17				No dropper, note lower expreferencing accuracy
GIM62 WGS 84 50 J 0736149 6481997 31"46"23.48623" 129"29"37.10203" 50 GIM63 WGS 84 50 J 0723086 6493275 31"40"26.95395" 129"21"10.86937" <5	380 NI	Midslope	Near chained strip running N off Dunbar Rd E side of Panizza Rd. N of Brennard Rd junction	ucuf	21-Oct-11 Gimlet-Salmon Gum 21-Oct-11 Gimlet-Eucalyptus moderata	Orange sandy loam Brown-orange sandy loam	_					Pre-1952 Y 2003	80 1945 8 2002				S R 9 R&L	Au unapper, note lower georenerencing accuracy
GM63 WGS 84 SO J 0723086 6493275 -31"40"26.95385 139"21"10.88937" -5 GM64 WGS 84 SO J 0722874 6495958 -31"39"9.75326' 139"21"163503" -5	418 NW		E side of Panizza Rd, N of Brennard Rd junction W off Panizza Rd, N of Brennard Rd junction	DCI	21-Oct-11 Gimlet-Eucalyptus moderata 21-Oct-11 Gimlet-Salmon Gum	Brown-orange sandy loam Orange sandy loam w quartz & laterite pebbles	_					Y 2003 Y 1977	8 2002 34 1976				S RAL	
GIM65 WGS 84 SD H 0758871 6425477 -32"16"39.34026" 129"21 1.01088 -S		Upslope	E of Marvel Loch-Forrestania Rd, 5 of Bounty Mine junction	UCI	21-Oct-11 Gimlet-Eucalyptus extensa-Eucalyptus polita	Orange sandy loam, large and small laterite pebbles.		Y	Y	Y	v v	Y 1994	17 1993	- 1			S R&L	
GM66 WGS 84 S0.1 0750744 6475350 -31"49"47.95360" 129"38"57.5897" <5			E of Marvel Loch-Forrestania Rd, 5 of Cheritons mine	NR	22-Oct-11 Gimlet-Merrit-Yornell	Orange sandy loam, sarge and small laterite peoples Orange sandy loam w continuous surface laterite & quartz pebbles		· v	Y	Y	v v	Y 2001	10 2001				D R&L	
GM67 WGS 84 S0.1 0750721 6472590 -31*51*17.51504" 129*859.35198" <5			E of Marvel Loch-Forrestania Rd. S of Cheritons mine	NR	22-Oct-11 Gmlet-Salmon Gum	Orange sandy loam w continuous surrace laterite & duartz deposes Orange sandy loam, a little surface laterite		v	Y	Y	v v	2008	3 2007				4 PåL	
GIM68 WGS 84 50.1 0747522 6481226 -31"46"29.83605" 129"36"49.77035" <5	392 NW		E of Marvel Loch-Forrestania Rd, N of Dunbar Rd junction	UCL	22-Oct-11 Gimlet-Morrel	Orange sandy loam w surface laterite & quartz		Y	Y	Y	Y Y	Pre-2952	60 1820	19			O E	
GIM09 WGS 84 50 J 0744580 6497415 -31"37'56.83323" 119"34'43.47023" <5			S of Parker Runse Rd	Unmaneed reserve	22-Oct-11 Gimlet-Morrel-Salmon Gum	Orange sandy loam w some quartz gravel		Y	Y	Y	Y Y	Pre-2952	60 1800	21			0 E	
GIM70 WGS 84 50 J 0754857 6523104 -31"23"55.30527" 119"40"49.35565" <5		Flat	E of Yellodine-Palmer's Find Rd	UCL	22-Oct-11 Gimlet-Salmon Gum	Ornage-brown sandy loam		Y	Y	Y	Y Y	Pre-2952	60 1710	30			0 E	
GIM71 WGS 84 50 J 0757629 6549251 -31"9"44.73824" 129"42"9.96706" <5		Flat	N of Duladgin Rks-Lake Eva Rd, Duladgin NR	Unmanged reserve	23-Oct-11 Girnlet-Salmon Gurn-Eucalyptus celastroides	Orange sandy loam w quartz pebbles		Y	Y	Y	Y Y	Pre-1952	60 1760	25			0 E	
GIM72 WGS 84 50.1 0756274 6551621 -31"8"28.91030" 119"41"16.66829" <5			W of Yellowdine-Lake Seabrook Rd	NR	23-Oct-11 Gimlet-Salmon Gum-Merrit	Orange sandy loam with surface quartz pebbles		Y	Y	Y	Y Y	Pre-2952	60 1740	27			0 E	

Date custodian Carl Gosper <u>carl.gosper@dec.wa.gov.au</u>

Steel dropper in NW corner of plot. Plot 50 x 50 m, sides aligned N-S & E-W (except see notes)

All plots

All plots	N-3 & E-W (except see notes)
Plot number	
Datum	
Zone	
Easting	NB - in text format to preserve 0
Northing	
Latitude	
Longitude	
Location accuracy	
Elevation	metres ASL
Aspect	
Topo position	
Location	
	UCL = unallocated crown land; NR
Tenure	= Nature Reserve
Date established	
Vegetation	Lists dominant canopy species
Surface soil description	., .
Soil_sample	Sample number
Photos	Y = Yes for plot photo(s)
	Y = Yes for species-area curve
Species-area	data collected
·	Y = Yes for species richness
Flora richness	determined per 2500 m2 plot
Flora cover	Y = Yes for floristic cover
_	Y = Yes for vegetation structure
Veg_structure	measured
3_	Y = Yes for fuel assessment
Fuel	conducted
	Year of fire from Landsat image
LS Fire year	analysis (if known)
	Years since fire from Landsat
LS Yrs since fire	image analysis
	Year of fire (= number of growing
	seasons post-fire, not necessarily
	calendar year) from estimates
	from growth ring counts and
	growth ring-size relationships.
	Using Model 2 of Gosper et al.
Model 2 fire date	(2013).
	Years since fire (growth seasons)
	from estimates from growth ring
	counts and growth ring-size
	relationships. Using Model 2 of
Model 2 yrs since fire	Gosper et al. (2013).

	Year of fire (= number of growing seasons post-fire, not necessarily calendar year) from estimates
	from growth ring counts and
	growth ring-size relationships.
	Using Model 5 of Gosper et al.
Model 5 fire date	(2013).
	Years since fire (growth seasons)
	from estimates from growth ring
	counts and growth ring-size
	relationships. Using Model 5 of
Model 5 yrs since fire	Gosper et al. (2013).
	Method used for determining
	'Model 2 (or 5) yrs since fire': L =
	Landsat, R = growth ring count, E
	= estimate from growth ring-size
Dating method	relationship
Notes	

See: Gosper, C.R., Prober, S.M., Yates, C.J. and Wiehl, G. (2013) Estimating the time since fire of long-unburnt *Eucalyptus salubris* stands in the Great Western Woodlands. *Australian Journal of Botany 61, 11-21.*