THE UNIVERSITY OF MELBOURNE

Preliminary identification of Avon Ecoscapes

Terry Walshe
School of Botany, University of Melbourne

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Summary

This document reports the outcomes of analyses and deliberations of a Technical Panel regarding the selection of ecoscapes within the agricultural zone of the Avon Catchment Council's administrative boundary.

A systematic approach to ecoscape selection was employed. A notional target was set of capturing 1% of the pre-European extent of the 116 vegetation associations occurring in the study area. Candidate sites were restricted to 10,000 ha hexagons having greater than 20% remnant vegetation cover. A selection algorithm driven principally by richness (the number of vegetation associations in a candidate site) was found to perform best in providing a desirable trade-off between total amount of remnant vegetation captured and the number of vegetation associations captured.

The target of capturing at least 1% of the pre-European extent of each vegetation association is constrained by the observation that 3 of the 116 vegetation associations have less than 1% remaining, and application of an exclusion threshold for vegetation cover. It is also constrained by the management capacity of conservation organisations. The brief for this project anticipates sufficient resources will be made available for about 12 ecoscapes.

Application of the 20% remnant vegetation threshold resulted in poor representation of areas in the Avon Wheatbelt P2 sub-IBRA region. The threshold was relaxed to 10% to specifically accommodate the selection of a single additional ecoscape in this region.

Selected hexagons formed the nodes of 13 *draft* ecoscapes. Adding the two pre-existing ecoscapes Tarin Rock and Lake Bryde gives a total of 15 ecoscapes. In aggregate, these areas capture:

- A total of ~ 201,900 ha of remnant vegetation in 54 x 10,000 ha hexagons.
- 70 (of the original 116) vegetation associations are represented in the 15 draft ecoscapes, of which at least 1% of pre-European extent is achieved for 57.
- 28 vegetation associations have more than 10% of their pre-European extent represented, 16 have more than 20%, and 7 have more than 50%.

Some further work examining opportunities for capturing complementary assets and assessment of the social and physical feasibility of selected areas is required before the delineation of ecoscapes can be finalized.

1.0 BACKGROUND

The Avon Catchment Council (ACC) seeks to identify large-scale areas for conservation investment within the agricultural zone of its administrative boundary. Termed 'ecoscapes', the delineation of these areas is to be consistent with an objective of conserving the extent and integrity of landscapes that best represent the natural diversity of the Avon River Basin. Ecoscapes may be associated with private or public land. It is anticipated that sufficient resources will be available to manage about twelve ecoscapes, some of which may comprise areas up to 100 000 ha.

A Technical Panel was formed to develop an approach for delineating ecoscapes. Membership of the Panel is shown in Appendix 1. It was considered that a systematic approach to delineation should be adopted (rather than unstructured brainstorming or *ad-hoc* decision-making). Selected areas were required to

- contain areas of high remnant vegetation cover,
- include at least two ecoscapes within each sub-IBRA region, and
- include a range of severities for current and predicted salinity risk

2.0 APPROACH

The scale of threats to the Avon region's biodiversity and the high costs associated with effective treatment demands prioritisation and rigour in the investment of public resources (Pannell 2001). Patterns of biodiversity might be described in a number of ways, including richness, compositional dissimilarity, rarity and endemism. However, collation of comprehensive spatial data sets for all descriptors is commonly impractical, making a surrogate approach necessary (Burgman and Lindenmayer 1998, Ferrier 2002).

Systematic selection of ecoscapes requires specification of (a) the biodiversity features to be captured in selected areas, (b) a representation target for each feature, and (c) sites that will act as candidates for selection.

The Technical Panel decided:

- Beard's vegetation associations would be used as the biodiversity features to be captured.
- A notional target equivalent to capture of 1% of the pre-European extent of each vegetation association would be applied.
- Candidate sites were to be mutually exclusive 10 000 ha hexagons.

The selection process utilized the systematic conservation planning software tool, C-Plan (New South Wales National Parks and Wildlife Service 1999). C-Plan employs a heuristic approach to selection whereby candidate sites are ranked according to some criteria expressed as an algorithm and the highest ranking site is iteratively selected until the target(s) is achieved or resources are exhausted (Pressey *et al.* 1996). Early examples of the approach include work on remnant mallee in South Australia (Margules and Nicholls 1987), forest in southern New South Wales (Bedward *et al.* 1992, Belbin 1992, Nicholls and Margules 1993), vertebrates in subtropical northwestern Australia (Woinarski 1992) and semi-arid lands in western New South Wales (Pressey and Nicholls 1989).

The criteria employed for iterative site selection commonly involves measures of uniqueness, rarity, contribution, richness, or irreplaceability. The algorithm is 'greedy' in that it seeks to maximise the rate of progress toward achievement of the target at each iteration. Greedy algorithms inevitably result in a loss of optimality in the minimum set solution (Possingham *et al.* 2000). The extent of the departure from optimality will depend on interaction between the specific criteria used in the algorithm, targets, and the characteristics of the data (Pressey *et al.* 1997, Pressey *et al.* 1999).

Mapping of pre-1750 vegetation suggests a total of 116 associations were present in the agricultural zone of the ACC's administrative boundary prior to European settlement (Appendix 2). The extent of native vegetation has been reduced from ~8,845,000 ha prior to European settlement to ~1,444,000 ha today (Figure 1). Of the 116 vegetation associations, 68 have less than 25% of their original extent remaining; 15 associations have less than 5% remaining (Figure 2); and 3 associations have less than 1% remaining (Table 1).

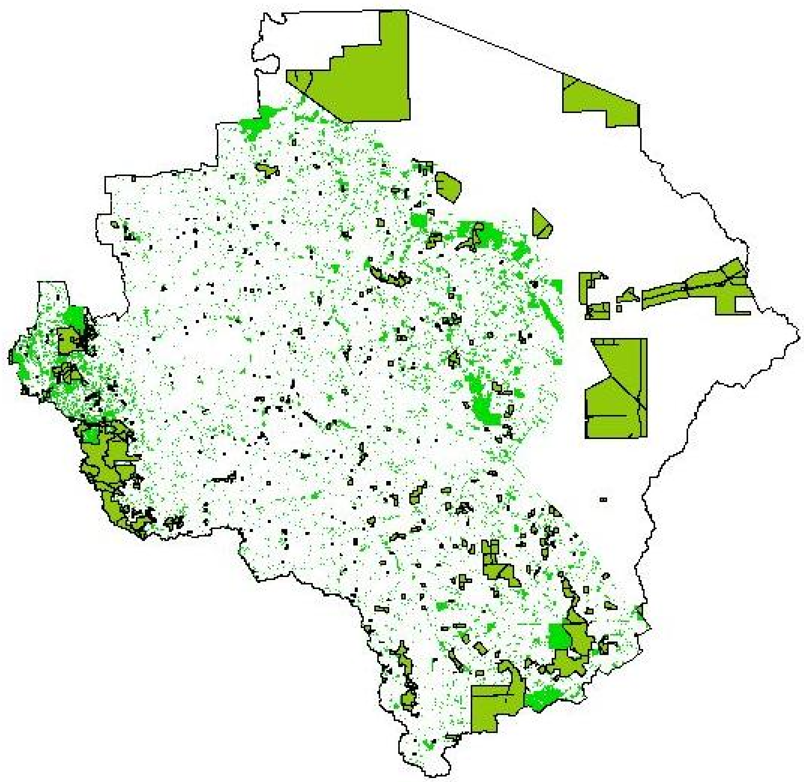


Figure 1. The current distribution of remnant vegetation in the agricultural zone of the ACC's administrative boundary (light green) and conservation reserves (olive green).

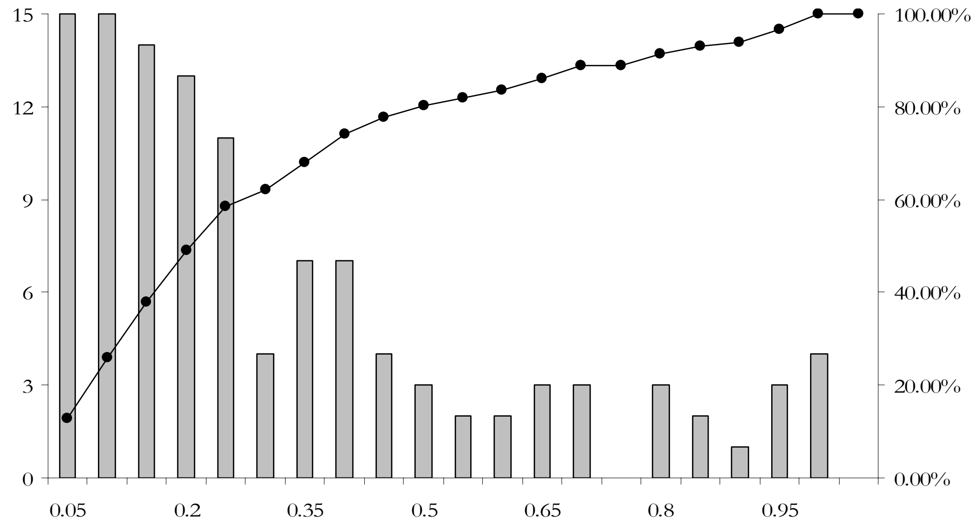


Figure 2. Histogram of proportional extent remaining of 116 vegetation associations present in the Avon Basin prior to European settlement. The left *y*-axis is raw frequency (columns) and the right *y*-axis is cumulative relative frequency (line).

Table 1. Vegetation associations with less than 1% of pre-European extent remaining. Analysis was restricted to the agricultural zone of the ACC's administrative boundary..

Vegetation association	Pre-European extent in the Avon basin	Current extent in the Avon basin	Current extent as a proportion of pre-European extent
942 Mosaic: Medium woodland; yate / Shrublands; mallee scrub, black marlock	36 ha	0 ha	0.000
1059 Mosaic: Medium woodland; salmon gum & gimlet / Shrublands; mallee *Eucalyptus longicornis* & *E. sheathiana* scrub	2260 ha	8 ha	0.003
1094 Mosaic: Medium woodland; York gum & salmon gum / Shrublands; mallee scrub *Eucalyptus eremophila* & black marlock	172 ha	1 ha	0.007

2.1 Two extreme 'solutions'

Ecoscapes should contain substantial remnant vegetation cover. The Technical Panel was interested in exploring scenarios where a minimum threshold of 10% to 20% cover was specified. That is, a hexagon would be excluded as a candidate if its vegetation cover fell below the threshold.

The target of capturing at least 1% of the pre-European distribution of each vegetation association in ecoscapes is notional. It is constrained by the observation that 3 of the 116 vegetation associations have less than 1% remaining, and application of an exclusion threshold for vegetation cover. It is also constrained by the management capacity of conservation organisations. The brief for this project anticipates sufficient resources will be made available for about 12 ecoscapes.

These constraints implicitly invoke a trade-off between the aggregate amount of habitat or remnant vegetation captured in ecoscapes and the number of vegetation associations represented. Two extreme approaches to selecting sites are presented here to illustrate this trade-off.

The minimum set solution for all associations for which the target can be achieved

Ignoring resource constraints for the moment, the minimum number of sites required to meet the 1% target (for all those vegetation associations for which the target can be achieved) is shown in Figure 3 below. Scenarios show minimum sets where the exclusion threshold for remnant vegetation ranges from 10% to 20%. The aggregate area of remnant vegetation and the number of vegetation associations for which the 1% target was achieved is shown in Figure 4.

In the scenario where a 10% exclusion threshold was employed, the 1% target was achieved for 92 of the 116 vegetation associations and a total of ~238 500 ha of remnant vegetation was captured in the selected hexagons. Increasing the exclusion threshold further constrains the number of vegetation associations for which the target can be achieved. Thresholds of 15% and 20% resulted in target achievement for 81 and 71 associations, respectively.

The 'cost' of achieving the 1% target is the requirement to manage numerous highly dispersed ecoscapes. The number and area of hexagons selected in the three scenarios were,
(a) 10% exclusion threshold = 83 x 10000 = 830 000 ha;
(b) 15% exclusion threshold = 62 x 10000 = 620 000 ha; and
(c) 20% exclusion threshold = 48 x 10000 = 480 000 ha

Clearly, this level of resourcing is not available for the delineation and management of ecoscapes.

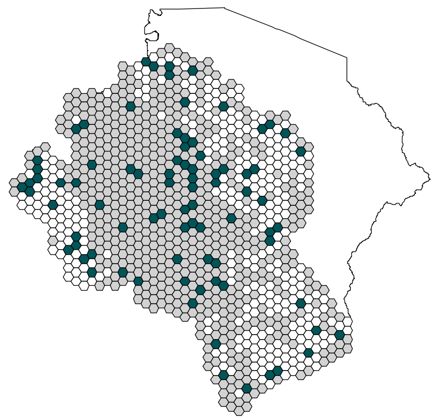
Selection based on capturing the greatest amount of vegetation within a resource constraint

An alternative approach is to ignore the representation of individual vegetation associations and select hexagons on the basis of the total amount of remnant vegetation cover.

Let's say (for the purposes of exploring alternative analytical approaches) we limit the area of ecoscapes to 20 × 10 000 = 200 000 ha. The 20 hexagons with the greatest amount of remnant vegetation are shown in Figure 5. No hexagon selected on this basis has less than 85% remnant vegetation cover, and the total area of remnant vegetation captured is 188 079 ha.

Cursory examination of the spatial arrangement of selected sites in Figure 5 suggests the approach performs poorly in capturing a range of the Avon Basin's vegetation associations and allied biological diversity. In total, only 20 of the 116 vegetation associations were found to have greater than 1% representation.

(a)



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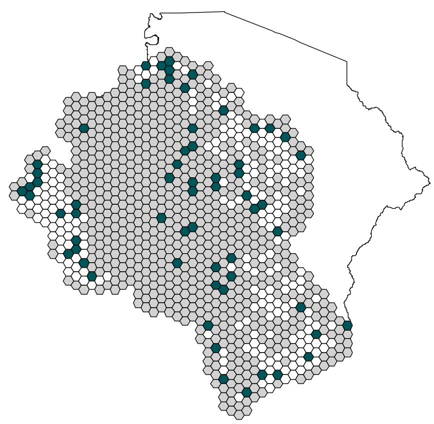

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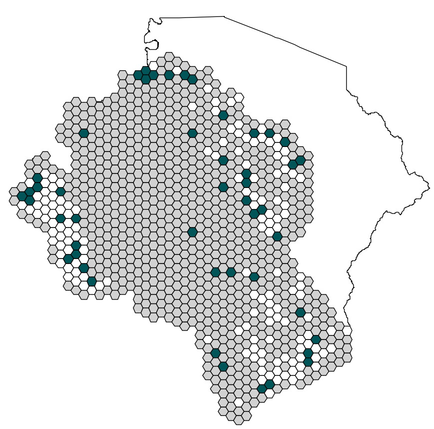

Figure 3. The number and spatial arrangement of selected hexagons in minimum set solutions where candidate hexagons are restricted to those having greater than (a) 10%, (b) 15% or (c) 20% remnant vegetation cover. Selected hexagons are shown green and excluded hexagons grey. White hexagons indicate areas that satisfy the vegetation cover threshold but are redundant in the context of the 1% target.

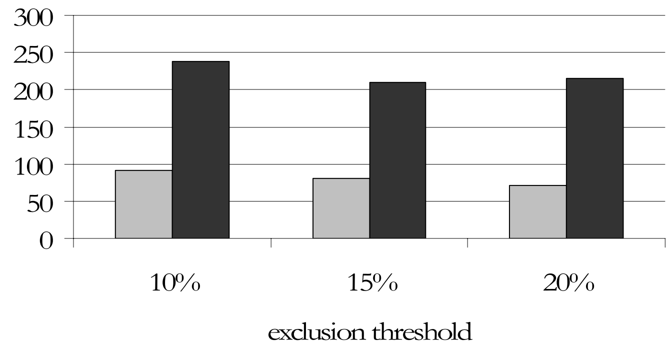

Figure 4. The number of vegetation associations for which the 1% target was achieved (grey columns) and aggregate area of remnant vegetation (000's ha; black columns) captured in minimum set solutions where candidate sites are restricted to those having greater than 10%, 15% or 20% remnant vegetation cover.

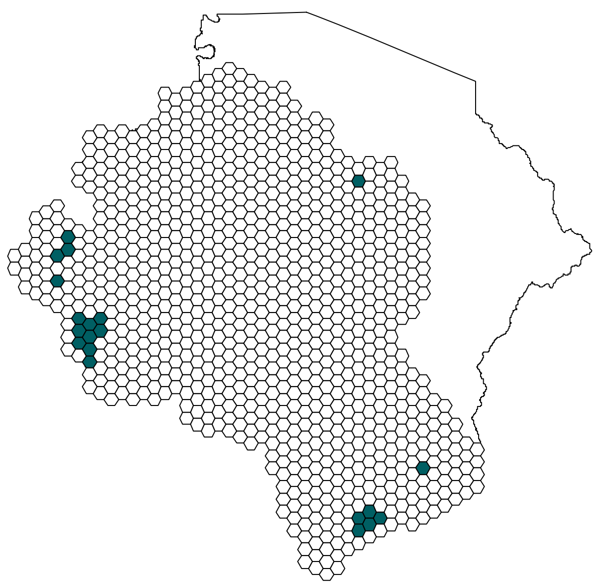

Figure 5. The number and spatial arrangement of selected hexagons where selection is made according to the 20 hexagons with greatest remnant vegetation cover.

2.2 Trading-off total remnant vegetation cover and representativeness

Three alternative algorithms were tested for their effectiveness in addressing the trade-off between capture of aggregate remnant vegetation and representation of individual vegetation associations. Selection of sites using the three algorithms was driven principally by:

A) Irreplaceability, or
B) Percent contribution, or
C) Richness.

All three criteria are dynamic. Their values change as an analysis progresses in the iterative selection of hexagons.

Irreplaceability is defined as the likelihood that a given hexagon will need to be protected to achieve a specified set of targets or, conversely, the extent to which options for achieving these targets are reduced if the hexagon is not 'reserved' (Pressey et al. 1994). Ferrier *et al.* (2000) refined the definition of irreplaceability and developed a statistical approach to its prediction. The selection of sites based on irreplaceability values will provide similar minimum set solutions to the relatively computationally demanding outcomes derived from linear programming. However, irreplaceability may not be the best criterion for selecting sites here, where it is recognized that achievement of a 1% target for all associations is unrealistic.

Percent contribution is the percentage of the total area of each hexagon that would contribute to remaining targets (i.e. vegetation associations for which the 1% target has not been reached) if the hexagon was 'reserved'.

In the context of our analysis, richness refers to the total number of vegetation associations present within a hexagon for which the 1% target has not been achieved.

Algorithms were applied in scenarios where exclusion thresholds for candidate hexagons ranged from 10% to 20% remnant vegetation cover. Scale effects in site selection were explored by conducting analyses using 5,000 ha hexagons as well as 10,000 ha hexagons. All analyses were restricted to the selection of an area of 200,000 ha (40 × 5,000 ha or 20 × 10,000 ha).

The outcomes of analyses shown in Figure 6 indicate:

- Selection using 5,000 ha hexagons consistently outperform analyses using 10,000 ha hexagons for both aggregate area of remnant vegetation and number of vegetation associations for which the 1% target is achieved (irrespective of algorithm used). However, the magnitude of difference is not great. The spatial arrangement of selected areas using 5,000 ha hexagons was qualitatively similar to analyses using 10 000 ha hexagons, but were notably more dispersed. Members of the Technical Panel were inclined to forego the small gains in performance associated with selection based on 5 000 ha hexagons to avoid over-dispersed and fragmented ecoscapes.
- The aggregate area of remnant vegetation captured in selected hexagons increases as the exclusion threshold increases (irrespective of the algorithm used).
- The number of vegetation associations for which the 1% target is achieved appears largely insensitive to the exclusion threshold used (irrespective of algorithm used).
- Percent contribution was the best performing criterion for aggregate area of remnant vegetation. However, the number of vegetation associations for which the 1% target was achieved using percent contribution was poor relative to the other two algorithms.
- Richness was the best performing criterion for achievement of the 1% representation target and was the second best performing criterion for aggregate area of remnant vegetation.

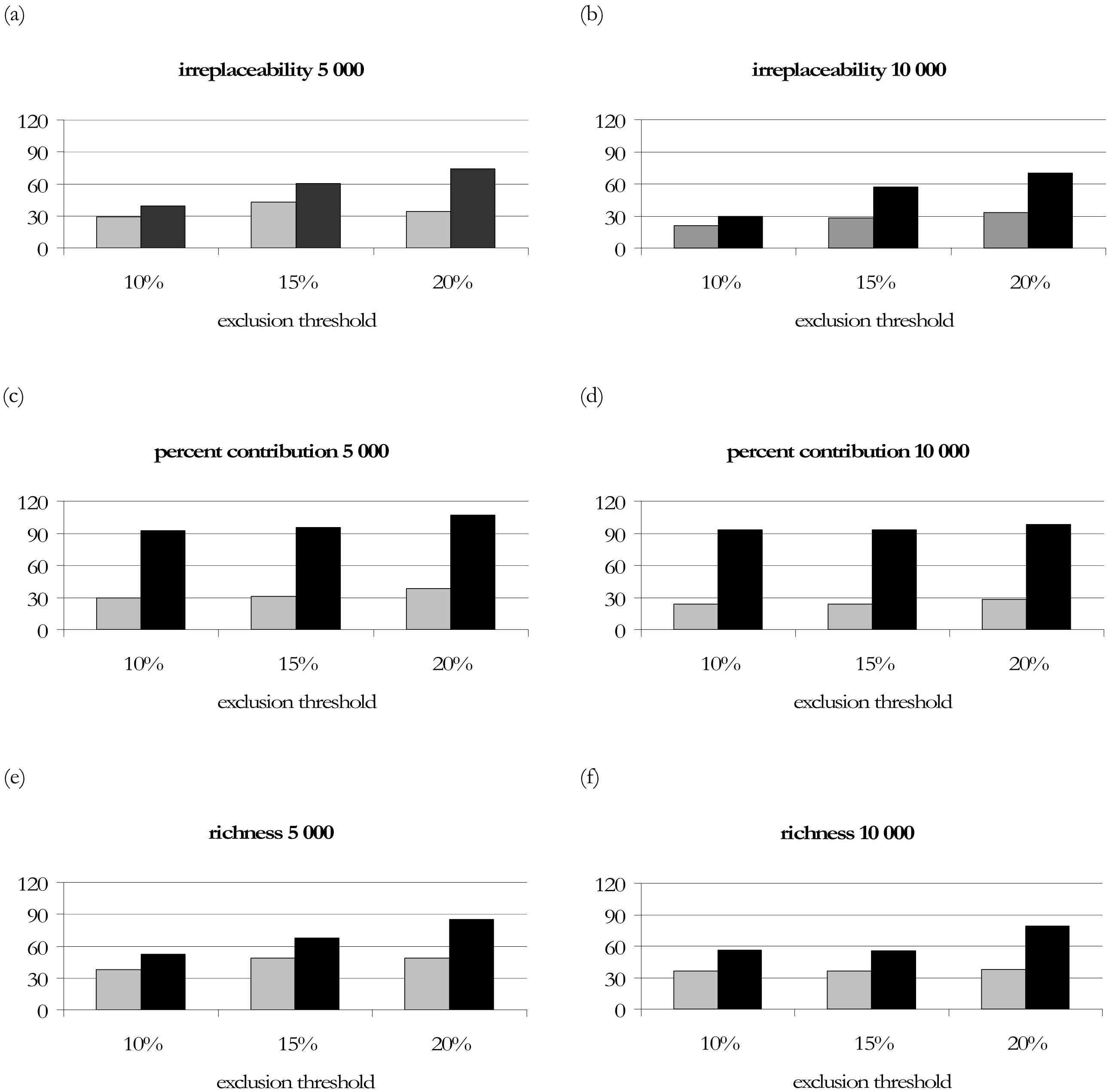

Figure 6. The number of vegetation associations for which the 1% target was achieved (grey columns) and aggregate area of remnant vegetation (000's ha; black columns) captured in analyses where candidate sites are restricted to those having greater than 10%, 15% or 20% remnant vegetation cover, and the process of selection is driven by (a) irreplaceability of 5000 ha hexagons; (b) irreplaceability of 10000 ha hexagons; (c) percent contribution of 5000 ha hexagons; (d) percent contribution of 10000 ha hexagons; (e) richness of 5000 ha hexagons; and (f) richness of 10000 ha hexagons.

3.0 RESULTS

Based on the relative performance of the three algorithms, members of the Technical Panel indicated a preference for outcomes provided by selection of 10,000 ha hexagons using richness as the principal criterion.

The spatial arrangement of the first 20 hexagons selected using an exclusion threshold of 20% for remnant vegetation cover is shown in Figure 7 below, with IBRA sub-regional boundaries overlaid. With a 20% exclusion threshold there is a dearth of selected (or candidate) hexagons in central parts of the Avon Basin. Only one hexagon is selected in the Avon Wheatbelt P2 IBRA sub-region. To improve evenness in the spatial arrangement of selected areas, the exclusion threshold was relaxed to 10% and an additional 3 hexagons selected (Figure 8).

A name for each selected hexagon is shown in Figure 9. Area statements for vegetation associations captured in selected hexagons are provided in Appendix 3. In summary:

- A total of ~ 83,800 ha of remnant vegetation is captured in 23 x 10,000 ha hexagons.
- 69 (of the original 116) vegetation associations are represented in the 23 selected hexagons, of which at least 1% of pre-European extent is achieved for 45.
- 17 vegetation associations have more than 10% of their pre-European extent represented, 8 have more than 20%, and 4 have more than 50%.

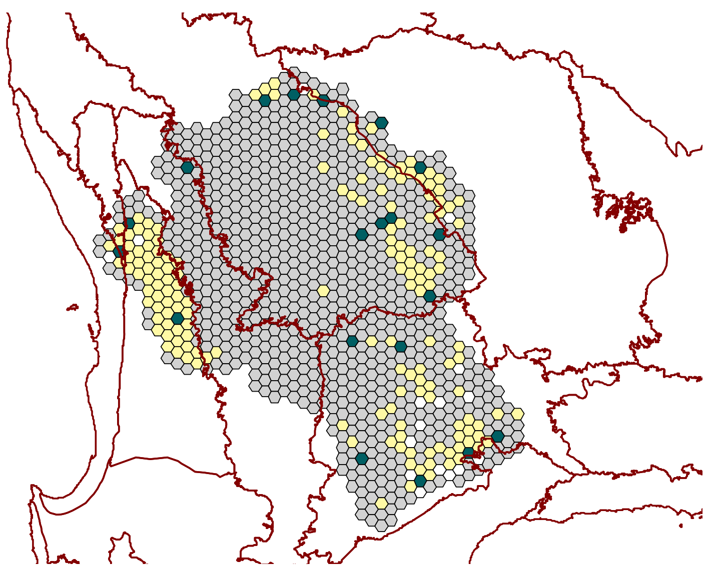

Figure 7. The spatial arrangement of the first 20 selected hexagons using richness as the primary criterion for selection, where candidate hexagons are restricted to those having greater than 20% remnant vegetation cover. Selected hexagons are shown green and excluded hexagons grey. White hexagons indicate areas that satisfy the vegetation cover threshold but are redundant in the context of the 1% target. Yellow hexagons satisfy the threshold and can contribute further to targets if selected. IBRA sub-regions are overlaid.

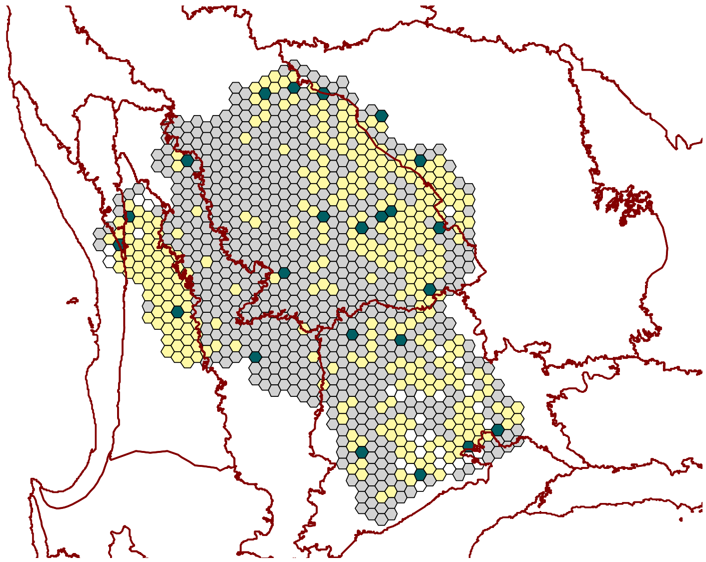

Figure 8. The spatial arrangement of a combination of the hexagons selected in Figure 6 plus the first three hexagons selected using richness as the primary criterion for selection, where candidate hexagons are restricted to those having greater than 10% remnant vegetation cover. Selected hexagons are shown green and excluded hexagons grey. White hexagons indicate areas that satisfy the vegetation cover threshold but are redundant in the context of the 1% target. Yellow hexagons satisfy the threshold and can contribute further to targets if selected. IBRA sub-regions are overlaid.

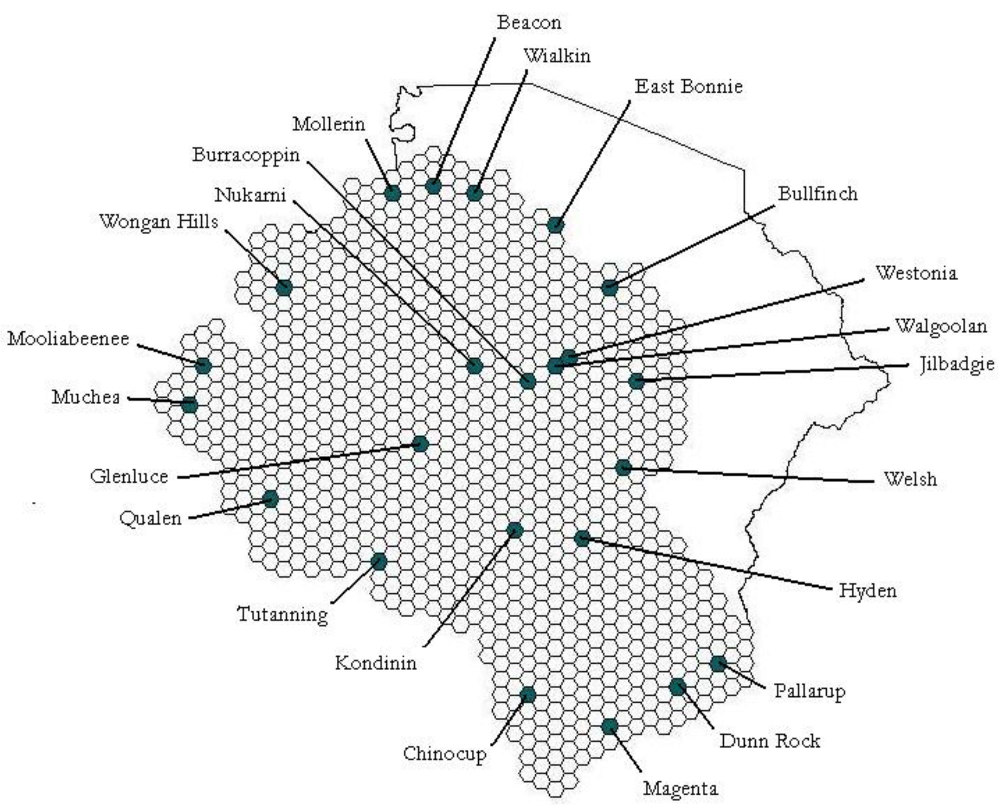

Figure 9. The names of selected hexagons corresponding to area statements provided in Appendix 3b.

It is noteworthy that the approach adopted in selecting hexagons does not recognize the extent of similarity or dissimilarity between vegetation associations. Beard's classification is hierarchical and at its coarsest resolution is based on structural attributes. It is possible that the method may inadvertently bias selection towards one or more vegetation structures. Figure 10 shows the representation of the Avon's common vegetation structures in selected hexagons relative to their pre-European and current extents. The native vegetation of today includes a relatively high proportion of medium forest, but representation in selected hexagons is more or less consistent with the pre-European distribution. Medium woodlands have been preferentially cleared. Although strong bias in selected hexagons is not evident, the under-representation of medium woodlands is noteworthy, particularly in the context of their preferential clearance.

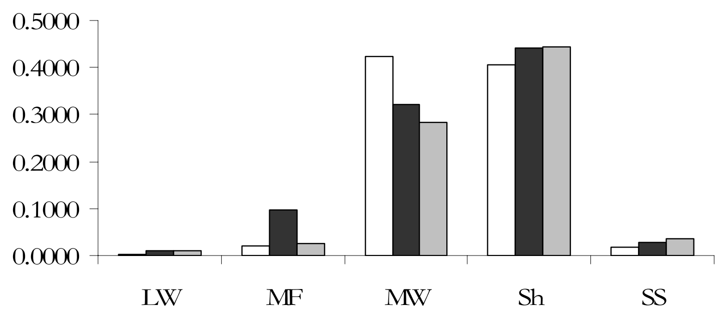

Figure 10. The proportional representation of coarse vegetation structures in the Avon agricultural zone prior to European settlement (white columns), in remnant vegetation today (black columns) and in selected hexagons shown in Figure 9 (grey columns). LW = low woodland, MF = medium forest, MW = medium woodland, Sh = shrublands, SS = succulent steppe. Note that columns do not add to 1 because uncommon vegetation types and mosaics are not included.

4.0 SUPPLEMENTARY ANALYSES

4.1 Refining selection and delineation

The hexagons selected in the preceding analysis represent preliminary nodes around which ecoscapes may be delineated. Exact and detailed delineation of ecoscapes is beyond the scope of this report, but factors that might be considered include:

- The spatial distribution of complementary assets (eg. threatened taxa and communities)
- How social capacity may affect the feasibility of management
- How resource constraints and threatening processes may affect the feasibility of management
- Any redundancy in representation of vegetation associations (because of reasonable representation outside the Avon Basin).
- The amount and connectivity of habitat within draft selected hexagons and surrounding areas.

As an initial attempt to assess areas where selected hexagons might be expanded into larger ecoscapes, the Technical Panel used spatial clustering of high irreplaceability values among candidate sites (hexagons with at least 20% remnant vegetation cover) as a guide (Figure 11). After omitting the two hexagons outside the Avon Wheatbelt P2 IBRA sub-region having less than 20% remnant vegetation, 13 draft ecoscapes were identified (Figures 12 and 13). Adding the two pre-existing ecoscapes Tarin Rock and Lake Bryde, gives a total of 15 ecoscapes

Area statements for vegetation associations captured in these draft ecoscapes are provided in Appendix 4. In summary:

- A total of ~ 201,900 ha of remnant vegetation is captured in 54 x 10,000 ha hexagons.
- 70 (of the original 116) vegetation associations are represented in the 15 draft ecoscapes, of which at least 1% of pre-European extent is achieved for 57.
- 28 vegetation associations have more than 10% of their pre-European extent represented, 16 have more than 20%, and 7 have more than 50%.

In Appendix 5, the spatial configuration of remnant vegetation, CALM reserves and salinity risk is shown for each draft ecoscape. Salinity risk mapping refers collectively to soil-landforms that are presently saline and those inferred to be a moderate to high risk of becoming saline (Ted Griffin, Department of Agriculture, *pers. comm.*). Mapping suggests draft ecoscapes where management of the salinity risk is likely to be a high priority includes East Bonnie, Chinocup, Lake Bryde and Wongan Hills. Those at relatively low salinity risk include Jilbadgie, Tarin Rock, Tutanning and Welsh.

Figure 14 shows the representation of the Avon's common vegetation structures in draft ecoscapes relative to their pre-European and current extents. The under-representation of medium woodlands highlighted above has been improved only marginally in the expanded area identified as draft ecoscapes.

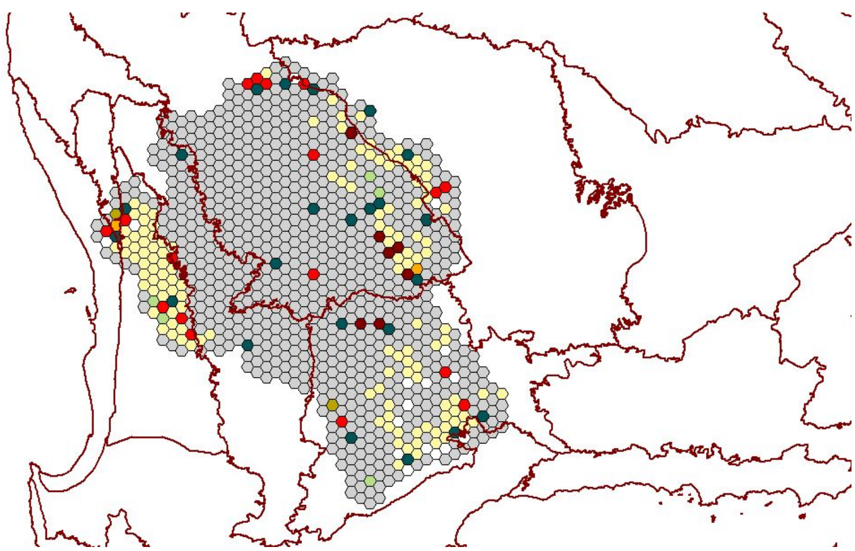

Figure 11. The spatial pattern of irreplaceability values for hexagons with greater than 20% remnant vegetation cover. Selected hexagons that may act as the core node of ecoscapes are shown dark green and excluded hexagons are shown grey. The rank order of irreplaceability from highest to lowest is red > dark brown > orange > light brown > light green > yellow > white. IBRA sub-regions are overlaid.

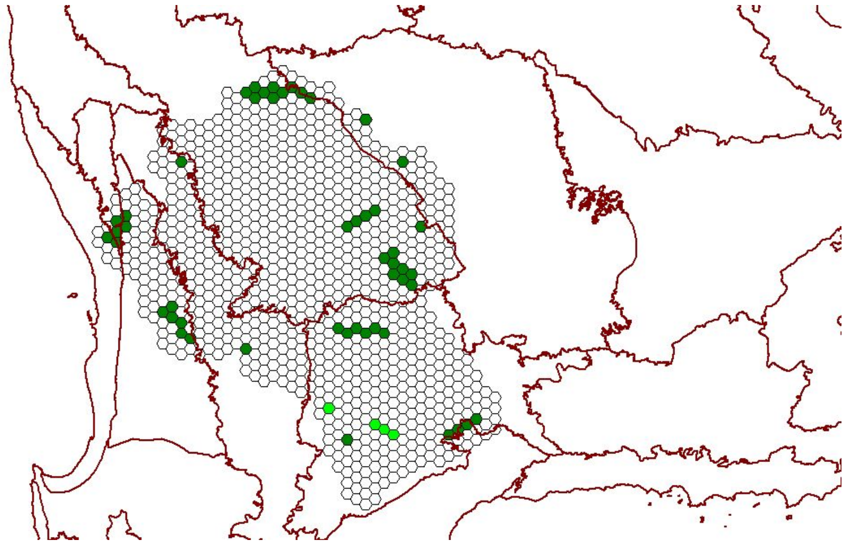

Figure 12. Draft ecoscapes. Dark green areas show ecoscapes selected in the process described in this report. Light green areas are the pre-existing ecoscapes, Tarin Rock and Lake Bryde. IBRA sub-regions are overlaid.

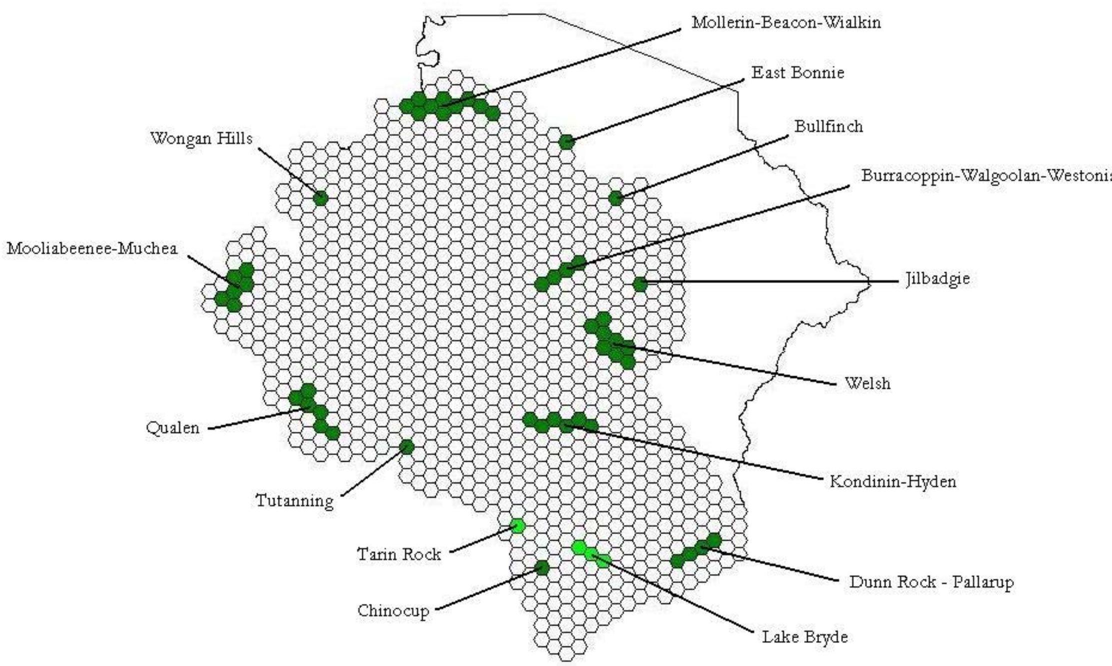

Figure 13. The names of draft ecoscapes corresponding to area statements provided in Appendix 4b.

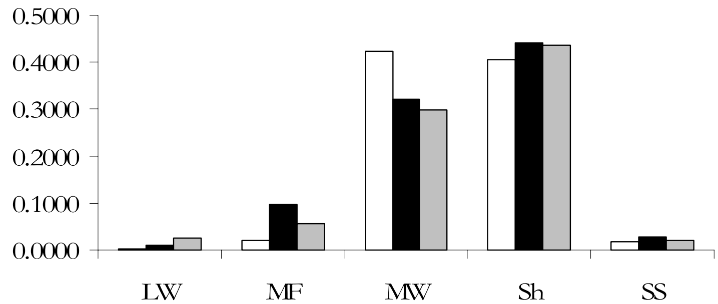

Figure 14. The proportional representation of coarse vegetation structures in the Avon agricultural zone prior to European settlement (white columns), in remnant vegetation today (black columns) and in draft ecoscapes shown in Figure 13 (grey columns). LW = low woodland, MF = medium forest, MW = medium woodland, Sh = shrublands, SS = succulent steppe. Note that columns do not add to 1 because uncommon vegetation types and mosaics are not included.

4.2 The broader geographic context

Analyses presented above have treated the agricultural zone of the Avon Basin as an 'island', such that representation of vegetation associations outside the study area is ignored. The broader geographic context of vegetation captured in draft ecoscapes can inform areas of lesser and greater importance in terms of custodial responsibility.

Appendix 6a provides area statements of Avon vegetation associations captured in draft ecoscapes relative to pre-European extent, the area remaining in the whole of Western Australia, and the area remaining within the Avon (CALM 2005). Note that a key limitation of these data is that the area statements describing extent of occurrence within and beyond the Avon are not consistent with the ACC administrative boundary. Rather, data refer to entire sub-IBRA regions (Appendix 6b), which encompass an area considerably greater than the ACC administrative boundary.

Let's say that vegetation associations of lesser priority are those with 20% of their pre-European extent outside Avon sub-IBRA regions, OR, those that have more than 10% of their pre-European extent in CALM reserves throughout the state. Using these criteria, 64 of the 116 vegetation associations occurring in the Avon are of low priority. The draft ecoscape East Bonnie entirely contains vegetation associations of low priority and may be omitted if resources for management are limited.

Now let's say that vegetation associations of high priority are those with less than 20% of their pre-European extent remaining in Western Australia AND less than 5% of their pre-European extent in CALM reserves throughout the estate. Under these criteria, 28 of the Avon's 116 vegetation associations are of high priority. Of these 28, five have more than 1% of their pre-European extent in draft ecoscapes (Table 2). These and the other 23 associations may be a focus for threatened community funding and capture in the formal comprehensive, adequate and representative reserve system (Table 3).

Table 2. High priority vegetation associations captured in draft ecoscapes. See text for details.

Code	Vegetation association	Occurrence and extent in draft ecoscapes
945	Mosaic: Medium woodland; salmon gum / Shrublands; mallee scrub, redwood & black marlock	Kondinin-Hyden (821 ha), Lake Bryde (196 ha), Welsh (1428 ha).
960	Shrublands; mallee scrub, redwood & black marlock	Kondinin-Hyden (8092 ha)
1055	Shrublands; York gum & Eucalyptus sheathiana mallee scrub	Burracoppin-Walgoolan-Westonia (116 ha), Jilbadgie (274 ha), Welsh (5395 ha)
1081	Shrublands; mallee scrub, Eucalyptus longicornis & E. sheathiana	Burracoppin-Walgoolan-Westonia (1334 ha)
3041	Mosaic: Low woodland; Allocasuarina huegeliana & jam around granite rocks	Tutanning (67 ha)

Table 3. Under-represented vegetation associations not captured in draft ecoscapes. See text for details.

Code	Vegetation association	WA Pre-European extent (ha)	WA % remaining	% pre-European extent in WA DCLM estate
7	Medium woodland; York gum (Eucalyptus loxophleba) & wandoo	179732	12.74	0.30
131	Mosaic: Medium woodland; salmon gum & gimlet / Shrublands; mallee scrub, redwood & black marlock	181157	5.42	0.78
145	Mosaic: Medium woodland; York gum & salmon gum / Shrublands; thicket, acacia-casuarina-melaleuca alliance	8054	4.00	0.00
352	Medium woodland; York gum	724296	16.56	1.75
948	Medium woodland; York gum & river gum	1441	7.97	0.47
955	Mosaic: Shrublands; scrub-heath (South East Avon) / Shrublands; Allocasuarina campestris thicket	139327	7.67	1.28
956	Shrublands; Allocasuarina campestris thicket with scattered wandoo	25556	10.74	4.50
962	Medium woodland; mallet (Eucalytpus astringens)	62	5.60	0.00
966	Succulent steppe with sparse woodland & thicket; salmon gum & morrell over teatree & samphire	7087	5.35	0.00
999	Medium woodland; marri	115712	13.10	2.53
1023	Medium woodland; York gum, wandoo & salmon gum (Eucalyptus salmonophloia)	1601637	6.43	1.19
1024	Shrublands; mallee & casuarina thicket	742968	9.41	0.92
1025	Mosaic: Medium woodland; York gum, salmon gum & morrel / Succulent steppe; saltbush & samphire	1920	1.67	0.00
1048	Mosaic: Shrublands; melaleuca patchy scrub / Succulent steppe; samphire	13815	17.18	0.26
1049	Medium woodland; wandoo, York gum, salmon gum, morrel & gimlet	833404	3.61	0.39
1056	Shrublands; thicket, acacia & Allocasuarina campestris	21073	14.70	4.73
1057	Mosaic: Shrublands; Medium woodland; salmon gum & gimlet / York gum & Eucalyptus sheathiana mallee scrub	145313	9.35	1.98
1058	Shrublands; York gum & Eucalyptus gonglocarpa mallee scrub	9363	2.61	0.00
1059	Mosaic: Medium woodland; salmon gum & gimlet / Shrublands; mallee Eucalyptus longicornis & E. sheathiana scrub	2260	0.58	0.00
1080	Succulent steppe with malle & thickets; Mallee and Melaleuca uncinata thickets on salt flats	3951	2.05	0.00
1094	Mosaic: Medium woodland; York gum & salmon gum / Shrublands; mallee scrub Eucalyptus eremophila & black marlock	70342	5.77	0.14
1147	Shrublands; scrub-heath in the south-east Avon-Wheatbelt Region	42856	5.68	0.53
1200	Mosaic: Medium woodland; salmon gum & morrel / Shrublands; mallee scrub Eucalyptus eremophila & black marlock (E. redunca)	162789	7.88	1.46

Analyses presented in this report provide an informed basis for decision-making in the final selection and delineation of ecoscapes. However, it should be noted that the thresholds used here for delimiting vegetation associations that may be considered low or high priority are arbitrary. The ACC may choose to use alternative thresholds or alternative protocols in establishing priorities and finalizing ecoscapes, together with broader concerns regarding complementary assets and the social and physical feasibility of managing selected areas.

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Appendix 1 Members of the Ecoscapes Technical Panel

Murray Penter, Greening Australia (Chair)
Mike Bamford, Consultant
Brett Beecham, Department of Conservation & Land Management
Bruce Bone, Department of Conservation & Land Management
Richard George, Department of Agriculture
Paul Gioia, Department of Conservation & Land Management
Ted Griffin, Department of Agriculture
Stuart Halse, Department of Conservation & Land Management
Richard Hobbs, Murdoch University
Greg Keighery, Department of Conservation & Land Management
Alan Kietzmann, Department of Conservation & Land Management
Elizabeth Kington, Avon Catchment Council
Robert Lambeck, Greening Australia
Damian Shepherd, Department of Agriculture

Appendix 2 Vegetation associations of the Avon Basin agricultural zone.

Code	Vegetation Association
3	Medium forest; jarrah-marri
4	Medium woodland; marri & wandoo
5	Medium woodland; wandoo & powderbark (Eucalytpus accedens)
7	Medium woodland; York gum (Eucalyptus loxophleba) & wandoo
8	Medium woodland; salmon gum & gimlet
13	Medium open woodland; wandoo
25	Low woodland; Allocasuarina huegeliana & York gum
36	Shrublands; thicket, acacia-casuarina alliance
37	Shrublands; teatree thicket
41	Shrublands; teatree scrub
47	Shrublands; tallerack mallee-heath
49	Shrublands; mixed heath
51	Sedgeland; reed swamps, occasionally with heath
59	Grasslands, high grass savanna sparse tree; bauhinia & coolabah over mitchell, blue & tall upland grasses
125	Bare areas; salt lakes
128	Bare areas; rock outcrops
129	Bare areas; drift sand
131	Mosaic: Medium woodland; salmon gum & gimlet / Shrublands; mallee scrub, redwood & black marlock
141	Medium woodland; York gum, salmon gum & gimlet
142	Medium woodland; York gum & salmon gum
145	Mosaic: Medium woodland; York gum & salmon gum / Shrublands; thicket, acacia-casuarina-melaleuca alliance
147	Succulent steppe with scrub; acacia species over saltbush
325	Succulent steppe; saltbush & samphire
352	Medium woodland; York gum
356	Succulent steppe with open woodland; eucalypts over saltbush
380	Shrublands; scrub-heath on sandplain
392	Shrublands; Melaeuca thyioides thicket
413	Shrublands; Acacia neurophylla & A. species thicket
435	Shrublands; Acacia neurophylla, A. beauverdiana & A. resinomarginea thicket
511	Medium woodland; salmon gum & morrel
516	Shrublands; mallee scrub, black marlock
519	Shrublands; mallee scrub, Eucalyptus eremophila
520	Shrublands; Acacia quadrimarginea thicket
535	Medium woodland; rough fruited mallee on greenstone hills
536	Medium woodland; morrell & rough fruited mallee (Eucalyptus corrugata)
537	Medium woodland; morrel (Eucalyptus longicornis)
538	Shrublands; Acacia brachystachya scrub
551	Shrublands; Allocasuarina campestris thicket
552	Shrublands; Casuarina acutivalvus & calothamnus (also melalueca) thicket on greenstone hills
631	Succulent steppe with woodland and thicket; York gum over Melaleuca thyoides & samphire
676	Succulent steppe; samphire
694	Shrublands; scrub-heath on yellow sandplain banksia-xylomelum alliance in the Geraldton Sandplain & Avon-Wheatbelt Regions
929	Low forest; moort (Eucalytpus platypus)
931	Medium woodland; yate
934	Shrublands; mallee scrub (Eucalyptus nutans)
936	Medium woodland; salmon gum
941	Mosaic: Medium woodland; salmon gum & morrel / Shrublands; mallee scrub, redwood

942	Mosaic: Medium woodland; yate / Shrublands; mallee scrub, black marlock
945	Mosaic: Medium woodland; salmon gum / Shrublands; mallee scrub, redwood & black marlock
946	Medium woodland; wandoo
947	Medium woodland; powderbark & mallet
948	Medium woodland; York gum & river gum
949	Low woodland; banksia
950	Medium woodland; Casuarina obesa
951	Succulent steppe with sparse woodland & thicket; york gum & Kondinin blackbutt over teatree thicket & samphire
952	Shrublands; dryandra heath
953	Succulent steppe with thicket; teatree over samphire (m5)
954	Shrublands; thicket, Jam & Allocasuarina huegeliana
955	Mosaic: Shrublands; scrub-heath (South East Avon) / Shrublands; Allocasuarina campestris thicket
956	Shrublands; Allocasuarina campestris thicket with scattered wandoo
959	Succulent steppe with sparse woodland & thicket; yorrell & Kondinin blackbutt over teatree & samphire
960	Shrublands; mallee scrub, redwood & black marlock
961	Mosaic: Shrublands; scrub-heath (South East Avon)/ Shrublands; Allocasuarina campestris thicket
962	Medium woodland; mallet (Eucalytpus astringens)
965	Medium woodland; jarrah & marri
966	Succulent steppe with sparse woodland & thicket; salmon gum & morrell over teatree & samphire
968	Medium woodland; jarrah, marri & wandoo
973	Low forest; paperbark (Melaleuca rhaphiophylla)
987	Medium woodland; jarrah & wandoo
988	Succulent steppe with thicket; Melaleuca thyoides over samphire
999	Medium woodland; marri
1002	Medium open woodland; jarrah
1003	Medium forest; jarrah, marri & wandoo
1004	Mosaic: Medium open woodland; wandoo / Shrublands; mixed heath
1005	Low woodland; Allocasuarina huegeliana
1006	Medium woodland; jarrah, wandoo & powderbark
1014	Mosaic: Low woodland; banksia / Shrublands; teatree thicket
1017	Medium open woodland; jarrah & marri, with low woodland; banksia
1018	Mosaic: Medium forest; jarrah-marri / Low woodland; banksia / Low forest; teatree / Low woodland; Casuarina obesa
1019	Medium sparse woodland; jarrah & marri
1020	Mosaic: Medium forest; jarrah-marri / Medium woodland; marri-wandoo
1023	Medium woodland; York gum, wandoo & salmon gum (Eucalyptus salmonophloia)
1024	Shrublands; mallee & casuarina thicket
1025	Mosaic: Medium woodland; York gum, salmon gum & morrel / Succulent steppe; saltbush & samphire
1027	Mosaic: Medium open woodland; jarrah & marri, with low woodland; banksia / Medium sparse woodland; jarrah & marri
1041	Low woodland; Allocasuarina huegeliana & Jam
1048	Mosaic: Shrublands; melaleuca patchy scrub / Succulent steppe; samphire
1049	Medium woodland; wandoo, York gum, salmon gum, morrel & gimlet
1053	Shrublands; Melaleuca uncinata thicket with scattered York gum
1055	Shrublands; York gum & Eucalyptus sheathiana mallee scrub
1056	Shrublands; thicket, acacia & Allocasuarina campestris
1057	Mosaic: Shrublands; Medium woodland; salmon gum & gimlet / York gum & Eucalyptus sheathiana mallee scrub
1058	Shrublands; York gum & Eucalyptus gonglocarpa mallee scrub
1059	Mosaic: Medium woodland; salmon gum & gimlet / Shrublands; mallee Eucalyptus longicornis & E. sheathiana scrub
1061	Mosaic: Medium sparse woodland; salmon gum & yorrell / Succulent steppe; saltbush & samphire
1062	Succulent steppe with open woodland & thicket; york gum over Melaleuca thyiodes & samphire
1063	Medium-Low woodland; York gum & cypress pine (Callitris columellaris)

1065	Mosaic: Shrublands;Medium woodland; wandoo & gimlet / York gum & Eucalyptus sheathiana mallee scrub
1067	Medium woodland; salmon gum, morrel, gimlet & rough fruited mallee
1068	Medium woodland; salmon gum, morrel, gimlet & Eucalyptus sheathiana
1075	Shrublands; mallee scrub, Eucalyptus eremophila & black marlock (Eucalyptus redunca)
1076	Mosaic: Medium woodland; salmon gum & morrel / Shrublands; mallee scrub Eucalyptus eremophila & bloodwood (E. dichromophloia)
1079	Mosaic: Medium open woodland; salmon gum & morrel / Succulent steppe; saltbush
1080	Succulent steppe with malle & thickets; Mallee and Melaleuca uncinata thickets on salt flats
1081	Shrublands; mallee scrub, Eucalyptus longicornis & E. sheathiana
1094	Mosaic: Medium woodland; York gum & salmon gum / Shrublands; mallee scrub Eucalyptus eremophila & black marlock
1098	Mosaic: Medium sparse woodland; salmon gum & morrel / Succulent steppe; samphire
1147	Shrublands; scrub-heath in the south-east Avon-Wheatbelt Region
1148	Shrublands; scrub-heath in the Coolgardie Region
1200	Mosaic: Medium woodland; salmon gum & morrel / Shrublands; mallee scrub Eucalyptus eremophila & black marlock (E. redunca)
1271	Bare areas; claypans
1413	Shrublands; acacia, casuarina & melaleuca thicket
2047	Shrublands; tamma & dryandra thicket
2048	Shrublands; scrub-heath in the Mallee Region
3003	Medium forest; jarrah & marri on laterite with wandoo in valleys, sandy swamps with teatree and Banksia
3041	Mosaic: Low woodland; Allocasuarina huegeliana & jam around granite rocks

Appendix 3a Overall areal representation of vegetation associations in selected 10,000 ha hexagons.

VA Code = Vegetation association (see Appendix 2).

* Figures for current extent are slightly under-estimated because patches of remnant vegetation less than 1 ha were excluded from analyses to reduce computational overheads.

VA Code	Pre-1750 extent (ha)	Current extent* (ha)	1% target (ha)	Area in identified ecoscapes (ha)	Proportion of target achieved
3	121986	98690	1220	249	0.20
4	270577	109905	2706	4818	1.78
5	15889	9739	159	0	0.00
7	2800	305	28	0	0.00
8	400975	35346	4010	287	0.07
13	392	210	4	93	23.70
25	8374	909	84	0	0.00
36	299345	64192	2993	3188	1.06
37	7232	2438	72	62	0.86
41	13772	4878	138	577	4.19
47	40504	14878	405	1039	2.57
49	1374	1133	14	331	24.10
51	63	60	1	46	72.96
59	25	3	0	0	0.00
125	150557	22554	1506	6928	4.60
128	64674	23873	647	1265	1.96
129	37	2	0	0	0.00
131	171466	8483	1715	0	0.00
141	200226	12219	2002	372	0.19
142	163865	14136	1639	976	0.60
145	7949	290	79	0	0.00
147	10310	9309	103	73	0.71
325	5657	5196	57	1032	18.24
352	348729	20576	3487	385	0.11
356	3321	951	33	0	0.00
380	32541	13618	325	2601	7.99
392	190	24	2	0	0.00
413	375	77	4	0	0.00
435	24335	10610	243	3	0.01
511	256307	51214	2563	3329	1.30
516	29	5	0	0	0.00
519	940947	231113	9409	11124	1.18
520	968	951	10	564	58.29
535	6768	5998	68	3588	53.01
536	11447	3964	114	1323	11.56
537	521	360	5	53	10.17
538	6787	3123	68	22	0.32
551	146537	27876	1465	2179	1.49
552	745	95	7	0	0.00
631	11812	3890	118	986	8.35
676	6968	434	70	1	0.01
694	149961	4687	1500	6	0.00

929	227	179	2	0	0.00
931	2216	634	22	0	0.00
934	259	87	3	0	0.00
936	29123	9795	291	239	0.82
941	23423	3606	234	543	2.32
942	36	0	0	0	0.00
945	168220	13652	1682	1849	1.10
946	44728	7989	447	69	0.15
947	12717	2730	127	590	4.64
948	1441	101	14	0	0.00
949	22439	15018	224	518	2.31
950	497	186	5	0	0.00
951	27508	8353	275	955	3.47
952	494	297	5	279	56.43
953	9457	1392	95	0	0.00
954	6502	999	65	234	3.60
955	130560	8947	1306	3	0.00
956	25556	2652	256	5	0.02
959	13093	3939	131	0	0.00
960	220444	22458	2204	808	0.37
961	27389	4188	274	913	3.33
962	62	3	1	0	0.00
965	724	268	7	89	12.29
966	7087	369	71	0	0.00
968	69069	53368	691	3285	4.76
973	242	8	2	0	0.00
987	146	22	1	22	15.09
988	49487	3215	495	0	0.00
999	1068	249	11	0	0.00
1002	361	361	4	0	0.00
1003	5760	4349	58	1826	31.70
1004	1658	1590	17	0	0.00
1005	155	2	2	0	0.00
1006	35904	19997	359	0	0.00
1014	1972	818	20	0	0.00
1017	1267	208	13	0	0.00
1018	7003	1527	70	158	2.26
1019	513	181	5	66	12.87
1020	5610	1678	56	841	14.99
1023	844128	36189	8441	839	0.10
1024	573810	37626	5738	3250	0.57
1025	1920	27	19	0	0.00
1027	16561	7747	166	1321	7.98
1041	2506	603	25	243	9.70
1048	13815	2355	138	0	0.00
1049	833403	28283	8334	564	0.07
1053	12706	1698	127	0	0.00
1055	126807	13509	1268	366	0.29
1056	21073	3042	211	81	0.38
1057	145312	13263	1453	915	0.63

1058	9363	211	94	0	0.00
1059	2260	8	23	0	0.00
1061	42748	12218	427	0	0.00
1062	19110	4534	191	0	0.00
1063	11605	1842	116	525	4.52
1065	863	445	9	178	20.63
1067	5932	4042	59	128	2.16
1068	167005	35027	1670	2187	1.31
1075	174470	29124	1745	2276	1.30
1076	11	11	0	0	0.00
1079	10119	3827	101	1163	11.49
1080	3951	75	40	0	0.00
1081	15148	2220	151	1192	7.87
1094	172	1	2	0	0.00
1098	13669	2943	137	85	0.62
1147	41057	2283	411	0	0.00
1148	4163	1918	42	0	0.00
1200	102556	7730	1026	675	0.66
1271	601	31	6	0	0.00
1413	500396	100947	5004	4973	0.99
2047	1463	939	15	199	13.60
2048	199520	38700	1995	1770	0.89
3003	61560	35929	616	0	0.00
3041	3945	785	39	67	1.70
Total	**8845482**	**1443862**		**83789**	

Appendix 3b Areal representation of vegetation associations in individual selected 10,000 ha hexagons.

VA Code = Vegetation association (see Appendix 2). BE = Beacon, WT = Westonia, MU = Muchea, WE = Welsh, QU = Qualen, KO = Kondinin, TU = Tutanning, DR = Dunn Rock, MO = Mollerin, WI = Wialki, EB = East Bonnie, WH = Wongan Hills, BF = Bullfinch, MB = Mooliabeenee, NU = Nukarni, WA = Walgoolan, BU = Burracoppin, JB = Jilbadgie, GL = Glenluce, HY = Hyden, PA = Pallarup, CH = Chinocup, and MG = Magenta.

VA Code	BE	WT	MU	WE	QU	KO	TU	DR	MO	WI	EB	WH	BF	MB	NU	WA	BU	JB	GL	HY	PA	CH	MG	Total
3	0	0	165	0	12	0	0	0	0	0	0	0	0	72	0	0	0	0	0	0	0	0	0	249
4	0	0	766	0	3091	0	0	0	0	0	0	0	0	961	0	0	0	0	0	0	0	0	0	4818
8	0	13	0	0	0	0	0	0	0	0	54	0	0	0	56	0	0	164	0	0	0	0	0	287
13	0	0	0	0	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93
36	0	547	0	0	0	0	0	0	0	0	0	0	0	0	0	1283	1358	0	0	0	0	0	0	3188
37	0	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62
41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	577	0	0	0	577
47	0	0	0	0	0	0	0	1039	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1039
49	0	0	0	0	331	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	331
51	0	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
125	0	0	0	0	0	0	0	0	6690	0	0	0	61	0	0	0	0	0	0	81	62	34	0	6928
128	0	87	0	0	33	202	0	61	0	0	117	176	0	0	0	28	0	307	0	158	84	12	0	1265
141	28	0	0	0	0	0	0	0	0	344	0	0	0	0	0	0	0	0	0	0	0	0	0	372
142	471	0	0	0	0	286	0	0	205	0	0	0	0	0	0	0	0	0	0	0	0	14	0	976
147	0	0	0	0	0	0	0	0	0	0	34	0	39	0	0	0	0	0	0	0	0	0	0	73
325	0	0	0	0	0	0	0	0	1032	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1032
352	0	0	0	0	0	0	0	0	0	0	0	0	0	385	0	0	0	0	0	0	0	0	0	385
380	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2601	2601
435	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
511	0	0	0	0	0	0	0	0	0	0	994	0	1942	0	0	0	0	0	0	393	0	0	0	3329
519	0	0	0	13	0	0	0	5667	0	0	0	0	0	0	0	0	0	0	0	492	1025	0	3927	11124
520	0	0	0	0	0	0	0	0	0	0	0	0	564	0	0	0	0	0	0	0	0	0	0	564
535	0	0	0	0	0	0	0	0	0	0	0	0	3588	0	0	0	0	0	0	0	0	0	0	3588
536	0	1268	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	0	1323
537	0	0	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	0	0	0	0	0	53
538	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	22

551	790	0	0	0	0	0	0	0	0	1389	0	0	0	0	0	0	0	0	0	0	0	0	0	2179
631	0	0	0	0	0	0	0	0	0	0	0	0	0	0	986	0	0	0	0	0	0	0	0	986
676	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
694	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	0	0	0	0	6
936	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	174	0	15	239
941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	543	0	0	543
945	0	0	0	1264	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	585	0	0	0	1849
946	0	0	0	0	0	0	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69
947	0	0	0	0	0	0	590	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	590
949	0	0	192	0	0	0	0	0	0	0	0	0	0	326	0	0	0	0	0	0	0	0	0	518
951	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	955	0	0	0	0	955
952	0	0	0	0	0	0	279	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	279
954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234	0	0	0	0	234
955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5
960	0	0	0	0	0	773	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	808
961	0	0	0	0	0	913	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	913
965	0	0	83	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	89
968	0	0	0	0	2864	0	0	0	0	0	0	0	0	421	0	0	0	0	0	0	0	0	0	3285
987	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	22
1003	0	0	0	0	1826	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1826
1018	0	0	158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158
1019	0	0	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	66
1020	0	0	841	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	841
1023	0	0	0	0	0	22	362	0	0	0	0	0	0	0	47	0	0	0	408	0	0	0	0	839
1024	1534	0	0	0	0	0	0	0	59	0	0	1657	0	0	0	0	0	0	0	0	0	0	0	3250
1027	0	0	1281	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	1321
1041	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	243	0	0	0	0	243
1049	0	0	0	0	0	0	0	0	0	0	0	361	0	0	117	0	0	0	86	0	0	0	0	564
1055	0	0	0	57	0	0	0	0	0	0	0	0	0	0	19	0	16	274	0	0	0	0	0	366
1056	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	0	0	0	0	0	0	0	0	81
1057	0	74	0	0	0	0	0	0	0	0	0	0	0	0	0	621	219	1	0	0	0	0	0	915
1063	0	0	0	0	0	0	0	0	0	525	0	0	0	0	0	0	0	0	0	0	0	0	0	525

1065	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	178	0	0	0	0	0	0	0	178
1067	0	0	0	128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128
1068	0	0	0	0	0	0	0	0	0	0	0	0	2010	0	0	0	0	177	0	0	0	0	0	2187
1075	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	183	2093	2276
1079	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1163	0	1163
1081	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1192	0	0	0	0	0	0	1192
1098	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	85
1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	675	0	675
1413	0	361	0	947	0	0	0	0	150	320	1564	0	0	0	0	107	0	1524	0	0	0	0	0	4973
2047	0	0	0	0	0	0	0	0	0	0	0	199	0	0	0	0	0	0	0	0	0	0	0	199
2048	0	0	0	0	0	0	0	1403	0	0	0	0	0	0	0	0	0	0	0	0	367	0	0	1770
3041	0	0	0	0	0	0	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67
																							Total	**83789**

Appendix 4a Overall areal representation of vegetation associations in draft ecoscapes.

VA Code = Vegetation association (see Appendix 2).
* Figures for current extent are slightly under-estimated because patches of remnant vegetation less than 1 ha were excluded from analyses to reduce computational overheads.

VA Code	Pre-1750 extent (ha)	Current extent (ha)*	1% target (ha)	Area in identified ecoscapes (ha)	Proportion of target achieved
3	121986	98690	1220	9717	7.97
4	270577	109905	2706	9742	3.60
5	15889	9739	159	3529	22.21
7	2800	305	28	0	0.00
8	400975	35346	4010	2725	0.68
13	392	210	4	93	23.70
25	8374	909	84	171	2.04
36	299345	64192	2993	26835	8.96
37	7232	2438	72	115	1.59
41	13772	4878	138	661	4.80
47	40504	14878	405	5348	13.20
49	1374	1133	14	331	24.10
51	63	60	1	46	72.96
59	25	3	0	0	0.00
125	150557	22554	1506	12537	8.33
128	64674	23873	647	2333	3.61
129	37	2	0	0	0.00
131	171466	8483	1715	18	0.01
141	200226	12219	2002	601	0.30
142	163865	14136	1639	6448	3.93
145	7949	290	79	0	0.00
147	10310	9309	103	73	0.71
325	5657	5196	57	3511	62.06
352	348729	20576	3487	1930	0.55
356	3321	951	33	0	0.00
380	32541	13618	325	0	0.00
392	190	24	2	0	0.00
413	375	77	4	0	0.00
435	24335	10610	243	3	0.01
511	256307	51214	2563	4205	1.64
516	29	5	0	0	0.00
519	940947	231113	9409	17187	1.83
520	968	951	10	564	58.29
535	6768	5998	68	3588	53.01
536	11447	3964	114	1323	11.56
537	521	360	5	53	10.17
538	6787	3123	68	22	0.32
551	146537	27876	1465	5773	3.94
552	745	95	7	0	0.00
631	11812	3890	118	0	0.00
676	6968	434	70	145	2.08

694	149961	4687	1500	1	0.00
929	227	179	2	0	0.00
931	2216	634	22	0	0.00
934	259	87	3	0	0.00
936	29123	9795	291	3547	12.18
941	23423	3606	234	700	2.99
942	36	0	0	0	0.00
945	168220	13652	1682	2445	1.45
946	44728	7989	447	1370	3.06
947	12717	2730	127	590	4.64
948	1441	101	14	0	0.00
949	22439	15018	224	4806	21.42
950	497	186	5	0	0.00
951	27508	8353	275	0	0.00
952	494	297	5	279	56.43
953	9457	1392	95	0	0.00
954	6502	999	65	0	0.00
955	130560	8947	1306	0	0.00
956	25556	2652	256	0	0.00
959	13093	3939	131	0	0.00
960	220444	22458	2204	8092	3.67
961	27389	4188	274	913	3.33
962	62	3	1	0	0.00
965	724	268	7	220	30.37
966	7087	369	71	0	0.00
968	69069	53368	691	11845	17.15
973	242	8	2	8	3.31
987	146	22	1	22	15.09
988	49487	3215	495	0	0.00
999	1068	249	11	82	7.68
1002	361	361	4	361	99.97
1003	5760	4349	58	1838	31.91
1004	1658	1590	17	0	0.00
1005	155	2	2	0	0.00
1006	35904	19997	359	0	0.00
1014	1972	818	20	782	39.65
1017	1267	208	13	0	0.00
1018	7003	1527	70	1063	15.18
1019	513	181	5	66	12.87
1020	5610	1678	56	841	14.99
1023	844128	36189	8441	384	0.05
1024	573810	37626	5738	4506	0.79
1025	1920	27	19	0	0.00
1027	16561	7747	166	7264	43.86
1041	2506	603	25	0	0.00
1048	13815	2355	138	0	0.00
1049	833403	28283	8334	361	0.04
1053	12706	1698	127	0	0.00
1055	126807	13509	1268	5685	4.48
1056	21073	3042	211	0	0.00

1057	145312	13263	1453	1353	0.93
1058	9363	211	94	0	0.00
1059	2260	8	23	0	0.00
1061	42748	12218	427	0	0.00
1062	19110	4534	191	263	1.38
1063	11605	1842	116	1229	10.59
1065	863	445	9	178	20.63
1067	5932	4042	59	3970	66.92
1068	167005	35027	1670	2187	1.31
1075	174470	29124	1745	197	0.11
1076	11	11	0	0	0.00
1079	10119	3827	101	1163	11.49
1080	3951	75	40	0	0.00
1081	15148	2220	151	1334	8.81
1094	172	1	2	0	0.00
1098	13669	2943	137	85	0.62
1147	41057	2283	411	0	0.00
1148	4163	1918	42	0	0.00
1200	102556	7730	1026	1077	1.05
1271	601	31	6	0	0.00
1413	500396	100947	5004	7158	1.43
2047	1463	939	15	199	13.60
2048	199520	38700	1995	3783	1.90
3003	61560	35929	616	0	0.00
3041	3945	785	39	67	1.70
Total	**8845482**	**1443862**		**201941**	

Appendix 4b Areal representation of vegetation associations in individual draft ecoscapes.

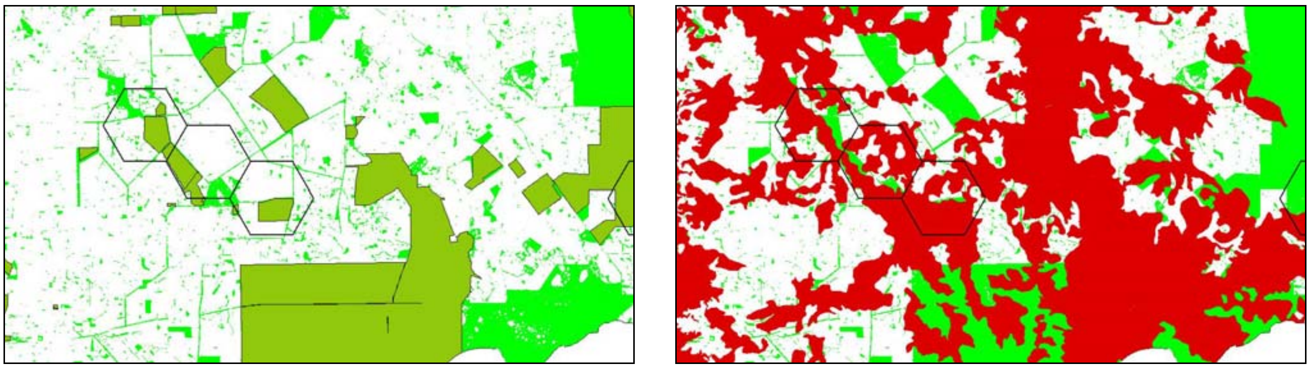
VA Code = Vegetation association (see Appendix 2). BF = Bullfinch, BWW = Burracoppin-Walgoolan-Westonia, CH = Chinocup, DRP = Dunn Rock – Pallarup, EB = East Bonnie, JB = Jilbadgie, KH = Kondinin-Hyden, LB = Lake Bryde, MBW = Mollerin-Beacon-Wialkin, MM = Mooliabeenee-Muchea, QU = Qualen, TR = Tarin Rock, TU = Tutanning, WE = Welsh, and WH = Wongan Hills.

VA Code	BF	BWW	CH	DRP	EB	JB	KH	LB	MBW	MM	QU	TR	TU	WE	WH	Total
3	0	0	0	0	0	0	0	0	0	1552	8165	0	0	0	0	9717
4	0	0	0	0	0	0	0	0	0	4061	5681	0	0	0	0	9742
5	0	0	0	0	0	0	0	0	0	0	3529	0	0	0	0	3529
8	0	13	0	0	54	164	0	0	0	0	0	0	0	2494	0	2725
13	0	0	0	0	0	0	0	0	0	0	93	0	0	0	0	93
25	0	0	0	0	0	0	0	0	0	0	171	0	0	0	0	171
36	0	3536	0	0	0	0	0	0	0	0	0	0	0	23299	0	26835
37	0	0	0	0	0	0	0	0	0	115	0	0	0	0	0	115
41	0	0	0	0	0	0	655	6	0	0	0	0	0	0	0	661
47	0	0	0	5348	0	0	0	0	0	0	0	0	0	0	0	5348
49	0	0	0	0	0	0	0	0	0	0	331	0	0	0	0	331
51	0	0	0	0	0	0	0	0	0	0	46	0	0	0	0	46
125	61	0	34	123	0	0	81	168	12070	0	0	0	0	0	0	12537
128	0	119	12	321	117	307	554	61	208	0	106	0	0	352	176	2333
131	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	18
141	0	0	0	0	0	0	0	0	601	0	0	0	0	0	0	601
142	0	0	14	0	0	0	327	0	6107	0	0	0	0	0	0	6448
147	39	0	0	0	34	0	0	0	0	0	0	0	0	0	0	73
325	0	0	0	0	0	0	0	0	3511	0	0	0	0	0	0	3511
352	0	0	0	0	0	0	0	0	0	494	1436	0	0	0	0	1930
435	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
511	1942	0	0	320	994	0	393	556	0	0	0	0	0	0	0	4205
519	0	0	0	13042	0	0	492	3640	0	0	0	0	0	13	0	17187
520	564	0	0	0	0	0	0	0	0	0	0	0	0	0	0	564
535	3588	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3588
536	0	1323	0	0	0	0	0	0	0	0	0	0	0	0	0	1323
537	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53
538	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	22
551	0	0	0	0	0	0	0	0	5773	0	0	0	0	0	0	5773
676	0	0	0	0	0	0	0	0	145	0	0	0	0	0	0	145
694	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
936	0	0	0	273	0	0	0	3274	0	0	0	0	0	0	0	3547
941	0	0	0	700	0	0	0	0	0	0	0	0	0	0	0	700
945	0	0	0	0	0	0	821	196	0	0	0	0	0	1428	0	2445
946	0	0	0	0	0	0	0	0	0	0	1301	0	69	0	0	1370
947	0	0	0	0	0	0	0	0	0	0	0	0	590	0	0	590
949	0	0	0	0	0	0	0	0	0	4806	0	0	0	0	0	4806
952	0	0	0	0	0	0	0	0	0	0	0	0	279	0	0	279
960	0	0	0	0	0	0	8092	0	0	0	0	0	0	0	0	8092
961	0	0	0	0	0	0	913	0	0	0	0	0	0	0	0	913
965	0	0	0	0	0	0	0	0	0	220	0	0	0	0	0	220
968	0	0	0	0	0	0	0	0	0	963	10882	0	0	0	0	11845

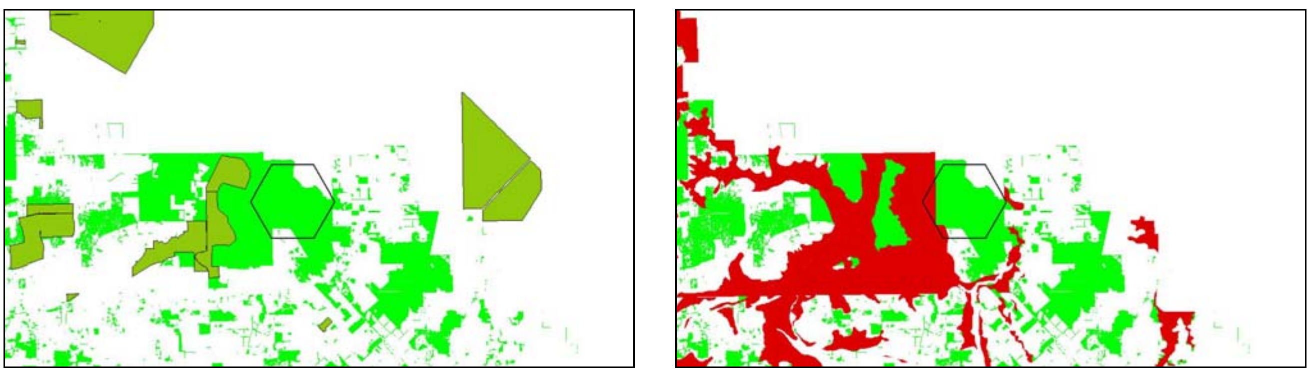
973	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	8
987	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	22
999	0	0	0	0	0	0	0	0	0	82	0	0	0	0	0	82
1002	0	0	0	0	0	0	0	0	0	0	361	0	0	0	0	361
1003	0	0	0	0	0	0	0	0	0	0	1838	0	0	0	0	1838
1014	0	0	0	0	0	0	0	0	0	782	0	0	0	0	0	782
1018	0	0	0	0	0	0	0	0	0	1063	0	0	0	0	0	1063
1019	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	66
1020	0	0	0	0	0	0	0	0	0	841	0	0	0	0	0	841
1023	0	0	0	0	0	0	22	0	0	0	0	0	362	0	0	384
1024	0	0	0	0	0	0	0	0	2849	0	0	0	0	0	1657	4506
1027	0	0	0	0	0	0	0	0	0	7264	0	0	0	0	0	7264
1049	0	0	0	0	0	0	0	0	0	0	0	0	0	0	361	361
1055	0	16	0	0	0	274	0	0	0	0	0	0	0	5395	0	5685
1057	0	1255	0	0	0	1	0	0	0	0	0	0	0	97	0	1353
1062	0	0	0	0	0	0	0	0	263	0	0	0	0	0	0	263
1063	0	0	0	0	0	0	0	0	1229	0	0	0	0	0	0	1229
1065	0	178	0	0	0	0	0	0	0	0	0	0	0	0	0	178
1067	0	0	0	0	0	0	0	0	0	0	0	0	0	3970	0	3970
1068	2010	0	0	0	0	177	0	0	0	0	0	0	0	0	0	2187
1075	0	0	183	0	0	0	0	0	0	0	0	14	0	0	0	197
1079	0	0	1163	0	0	0	0	0	0	0	0	0	0	0	0	1163
1081	0	1334	0	0	0	0	0	0	0	0	0	0	0	0	0	1334
1098	0	0	85	0	0	0	0	0	0	0	0	0	0	0	0	85
1200	0	0	675	0	0	0	0	4	0	0	0	398	0	0	0	1077
1413	0	500	0	0	1564	1524	8	0	607	0	0	0	0	2955	0	7158
2047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	199	199
2048	0	0	0	1865	0	0	26	0	0	0	0	1892	0	0	0	3783
3041	0	0	0	0	0	0	0	0	0	0	0	0	67	0	0	67
															Total	**201941**

Appendix 5 The spatial configuration of remnant vegetation and salinity risk for each draft ecoscape and surrounds.

For each draft ecoscape:
The left pane shows remnant vegetation (light green) overlaid by CALM reserves (olive green).
The right pane shows remnant vegetation overlaid by soil-landforms that are presently saline or inferred to be a moderate to high risk of becoming saline (collectively marked red).
Scale is indicated by the 10,000 ha hexagons.

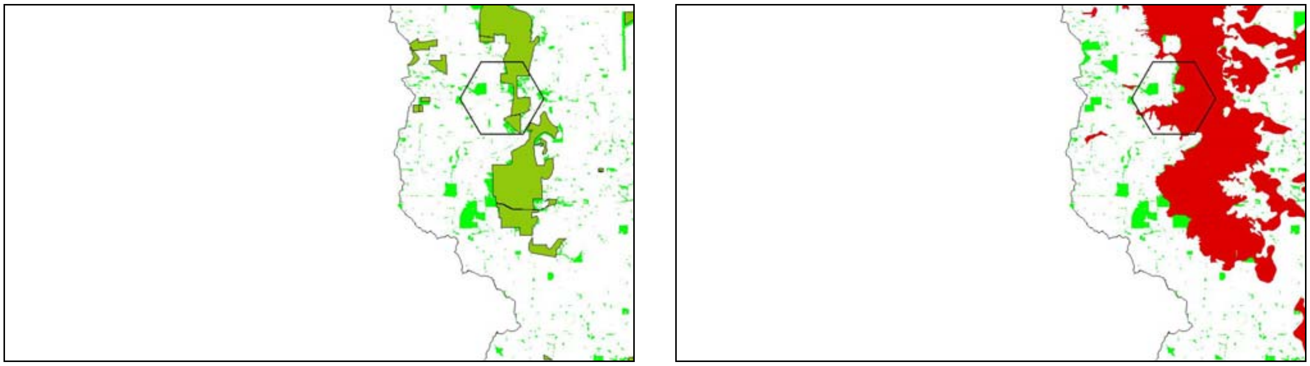


Lake Bryde

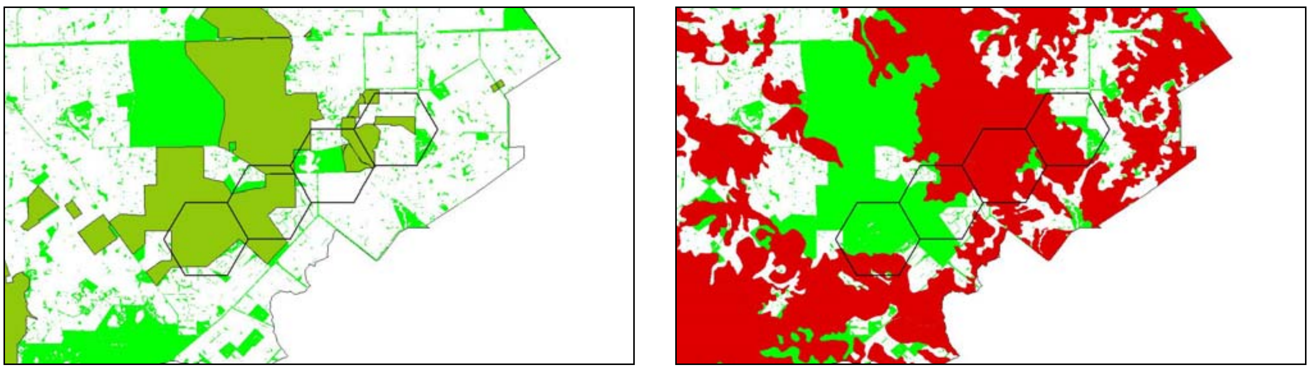


Bullfinch

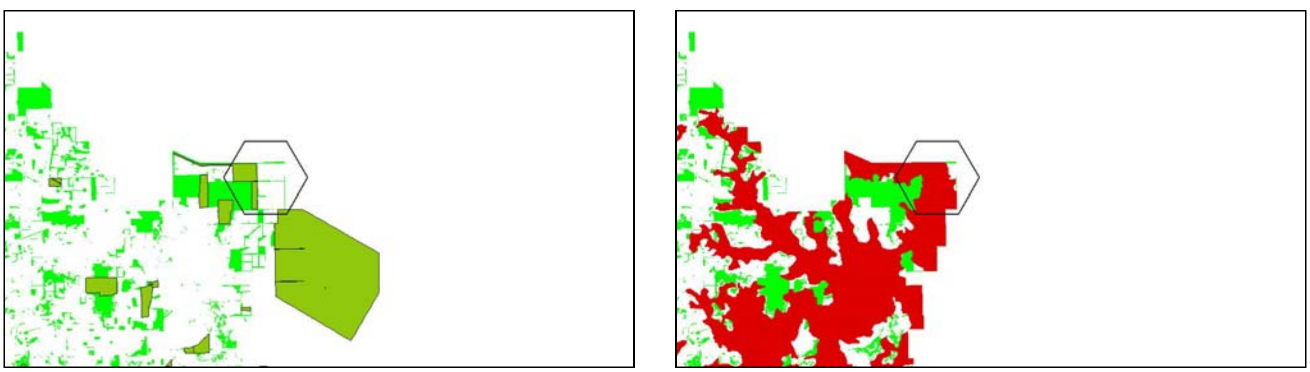
Burracoppin-Walgoolan-Westonia



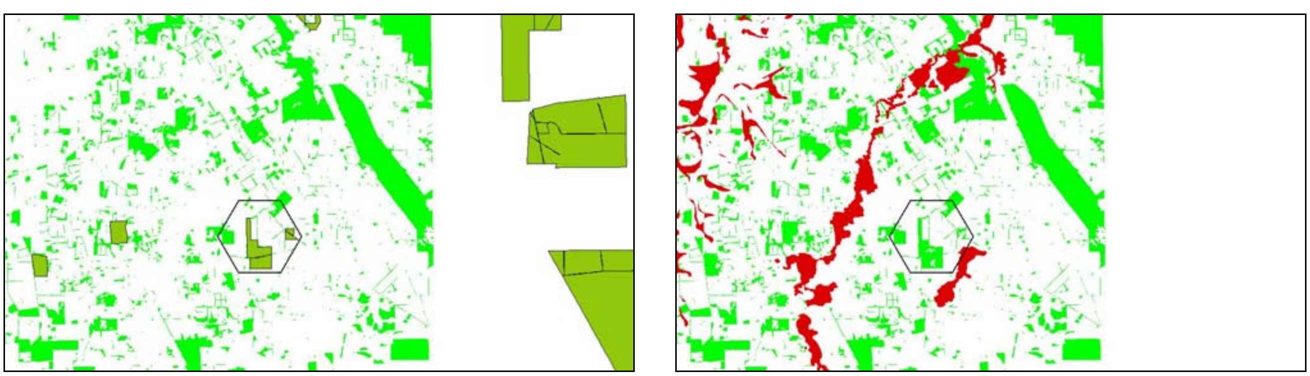
Chinocup



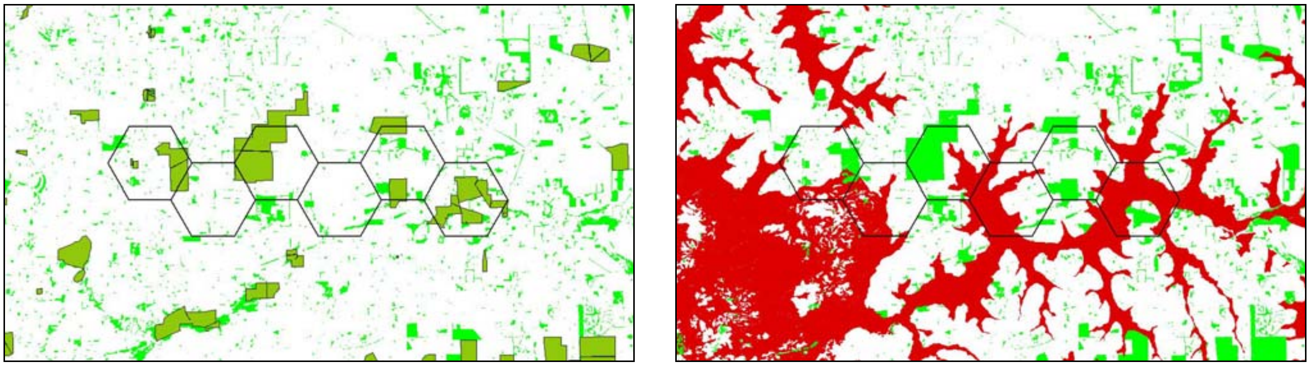
Dunn Rock – Pallarup

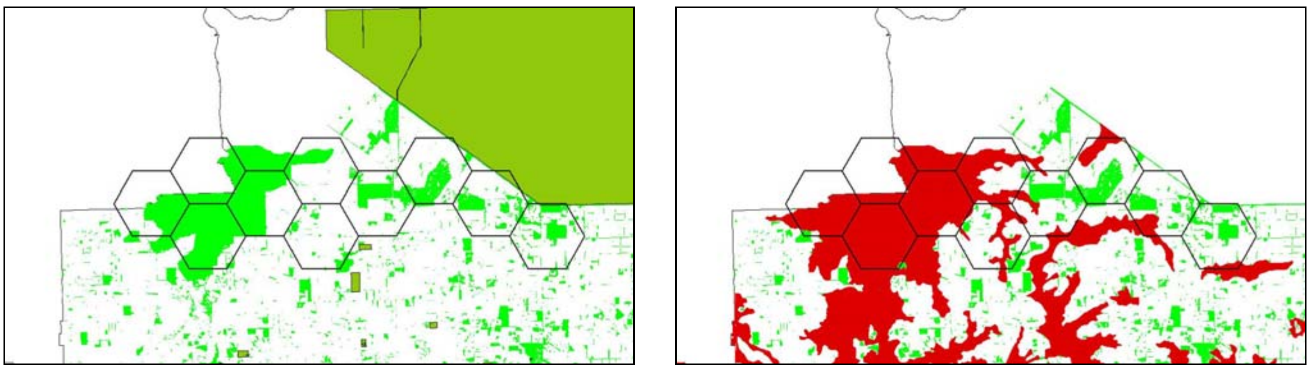


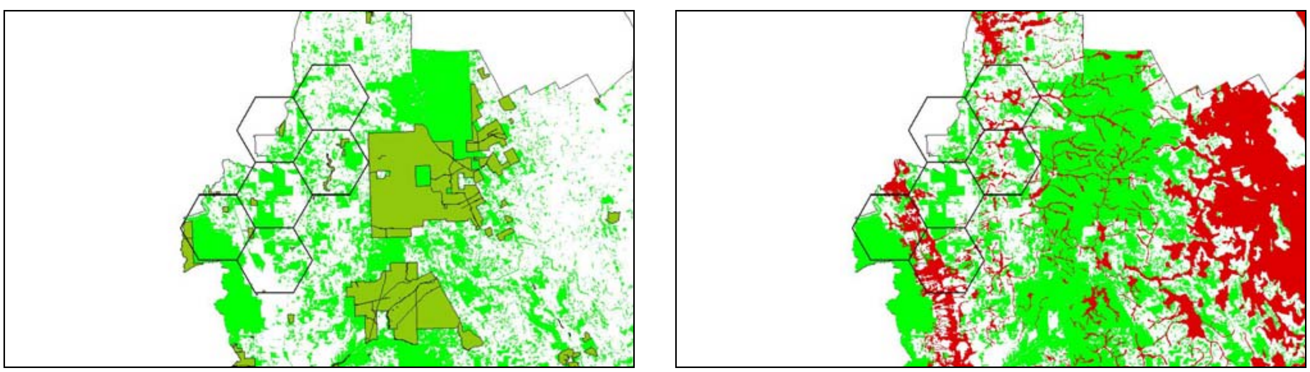
East Bonnie

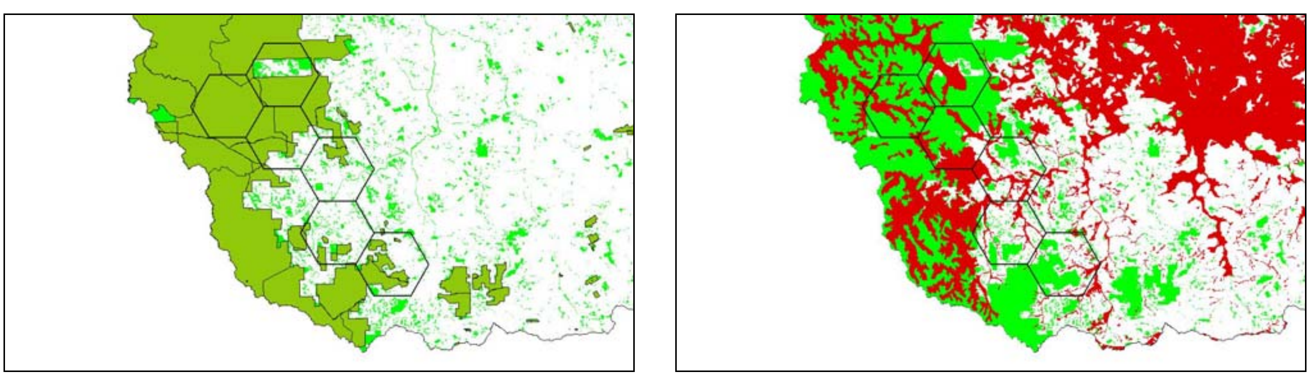


Jilbadgie


Kondinin-Hyden


Mollerin-Beacon-Wialki


Mooliabeenee-Muchea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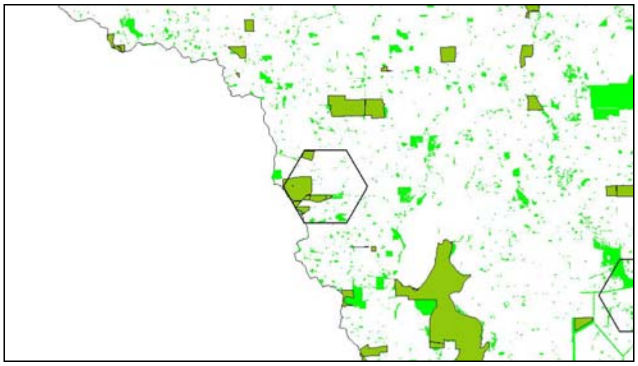
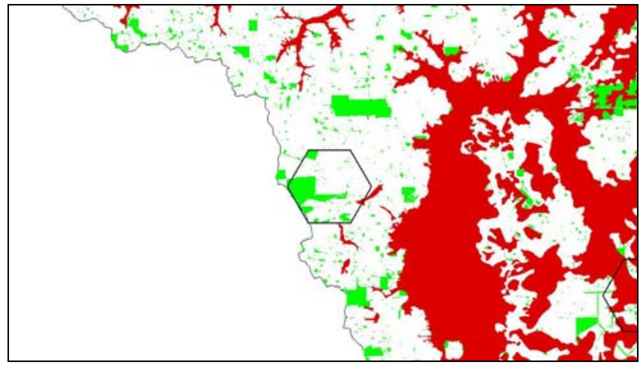
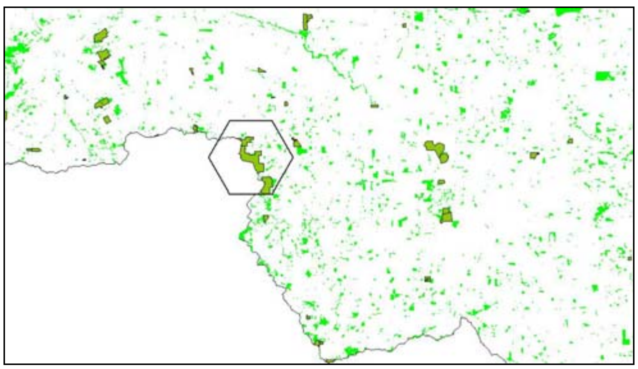
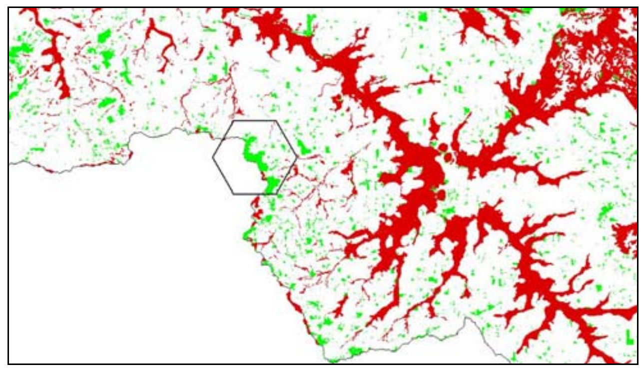


Tarin Rock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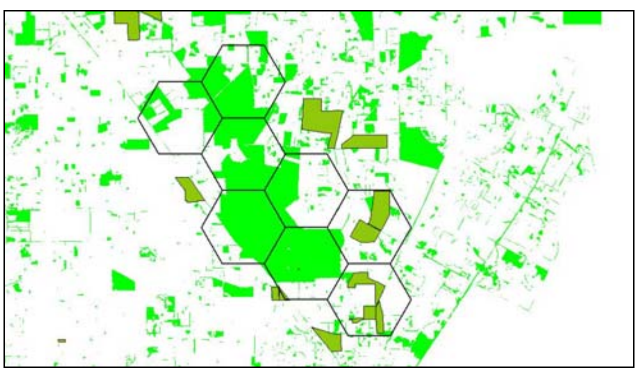
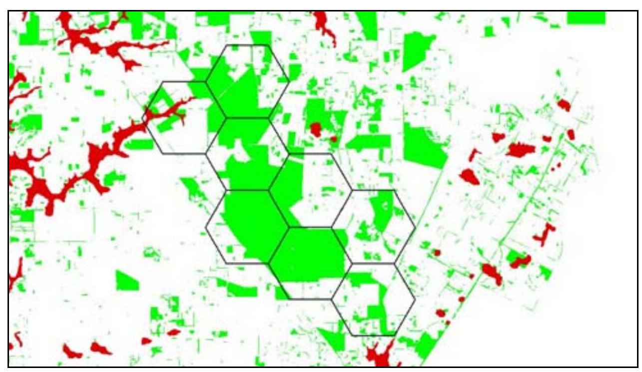
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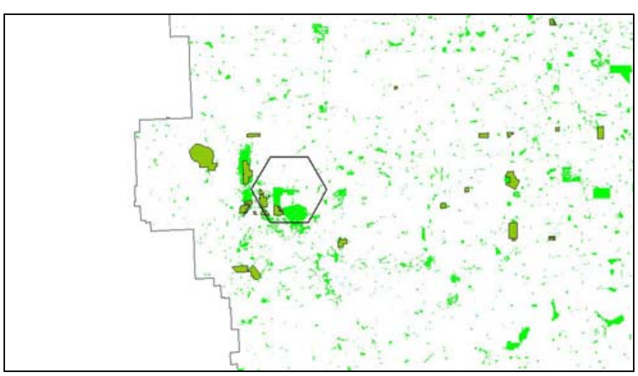
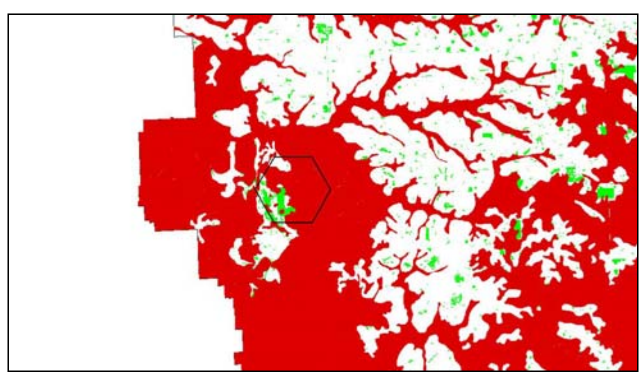
Wongan Hills

Appendix 6a The broader geographic context of representation of the Avon Basin agricultural zone's vegetation associations.

These data were extracted from an electronic database, CAR Reserve Analysis 2005 (CALM 2005).
VA Code = Vegetation association (see Appendix 2).

VA Code	WA Pre-European extent (ha)	WA % remaining	Avon sub-IBRA regions % remaining	non-Avon sub-IBRA regions % remaining	% pre-European extent in WA DCLM estate	% WA pre-European extent in draft ecoscapes
3	2661515	70.03	28.24	41.79	58.26	0.37
4	1054317	23.27	17.41	5.86	6.32	0.92
5	51732	44.66	44.66	0.00	41.05	6.82
7	179732	12.74	11.99	0.75	0.30	0.00
8	694644	47.45	12.59	34.86	6.29	0.39
13	392	53.44	53.44	0.00	39.12	23.70
25	13766	42.66	8.53	34.13	0.32	1.24
36	495445	43.66	13.30	30.36	5.15	5.42
37	39386	57.76	18.66	39.10	13.42	0.29
41	194251	92.31	2.57	89.74	11.34	0.34
47	1033061	35.60	1.76	33.83	17.54	0.52
49	52494	45.34	2.42	42.92	20.22	0.63
51	59088	58.48	1.33	57.15	41.51	0.08
59	139451	88.16	0.00	88.15	8.69	0.00
125	3491834	94.16	9.03	85.13	8.58	0.36
128	329872	85.17	57.91	27.26	17.81	0.71
129	95294	57.71	2.37	55.34	43.32	0.00
131	181157	5.42	5.42	0.00	0.78	0.01
141	1158771	82.24	80.10	2.15	24.53	0.05
142	711281	26.51	24.83	1.68	1.20	0.91
145	8054	4.00	4.00	0.00	0.00	0.00
147	35478	97.15	97.15	0.00	12.11	0.21
325	64633	93.05	11.87	81.18	18.58	5.43
352	724296	16.56	13.19	3.38	1.75	0.27
356	4330	45.45	45.45	0.00	3.66	0.00
380	580409	58.25	2.82	55.42	17.65	0.00
392	3070	44.95	3.68	41.26	9.02	0.00
413	3474	46.59	2.25	44.34	0.70	0.00
435	994586	76.13	75.48	0.65	14.74	0.00
511	700414	70.53	70.52	0.00	14.57	0.60
516	607436	56.52	0.69	55.83	24.15	0.00
519	2333452	60.03	37.80	22.23	10.46	0.74
520	37923	99.96	65.93	34.03	18.78	1.49
535	24346	96.88	96.88	0.00	0.00	14.74
536	13178	43.36	43.36	0.00	9.82	10.04
537	701	76.99	76.99	0.00	0.00	7.56
538	147823	97.55	84.54	13.01	20.09	0.01
551	302431	23.04	20.95	2.09	6.44	1.91
552	33909	93.84	80.03	13.81	0.89	0.00
631	106856	50.44	48.43	2.00	11.61	0.00
676	2063402	94.90	1.21	93.69	10.93	0.01
694	346506	17.42	1.85	15.57	9.31	0.00
929	10735	75.33	40.06	35.28	2.02	0.00

931	31390	42.70	7.44	35.26	7.73	0.00
934	9282	46.03	2.09	43.94	11.74	0.00
936	698754	96.69	43.13	53.56	3.57	0.51
941	34248	42.44	42.44	0.00	8.27	2.04
942	33447	25.10	3.94	21.15	0.27	0.00
945	176613	12.68	12.68	0.00	2.31	1.38
946	53227	21.27	19.57	1.70	8.67	2.57
947	34034	29.95	29.95	0.00	15.91	1.73
948	1441	7.97	7.97	0.00	0.47	0.00
949	218205	57.04	56.54	0.49	38.18	2.20
950	497	38.26	38.26	0.00	24.36	0.00
951	27508	30.69	30.69	0.00	16.17	0.00
952	58933	15.73	15.73	0.00	6.49	0.47
953	9928	16.25	16.25	0.00	7.19	0.00
954	6502	16.04	16.04	0.00	5.31	0.00
955	139327	7.67	7.67	0.00	1.28	0.00
956	25556	10.74	10.74	0.00	4.50	0.00
959	13093	30.58	30.58	0.00	22.76	0.00
960	220444	10.45	10.45	0.00	4.75	3.67
961	27800	15.47	15.47	0.00	10.36	3.28
962	62	5.60	5.60	0.00	0.00	0.00
965	9357	54.98	16.98	38.01	39.73	2.35
966	7087	5.35	5.35	0.00	0.00	0.00
968	296889	32.73	21.62	11.11	18.35	3.99
973	5003	32.52	5.95	26.57	6.04	0.16
987	3595	36.30	0.62	35.67	20.74	0.61
988	96639	23.96	23.25	0.71	5.55	0.00
999	115712	13.10	9.59	3.51	2.53	0.07
1002	15949	97.34	2.26	95.08	93.29	2.26
1003	20109	41.47	36.62	4.85	22.36	9.14
1004	9768	36.71	36.71	0.00	16.71	0.00
1005	787	26.01	26.01	0.00	0.00	0.00
1006	44910	50.38	50.38	0.00	22.38	0.00
1014	41066	52.91	52.91	0.00	28.35	1.90
1017	17529	64.67	12.61	52.06	46.51	0.00
1018	14060	20.73	20.73	0.00	1.57	7.56
1019	804	44.12	44.12	0.00	0.00	8.20
1020	5610	30.50	30.50	0.00	1.81	14.99
1023	1601637	6.43	6.43	0.00	1.19	0.02
1024	742968	9.41	9.41	0.00	0.92	0.61
1025	1920	1.67	1.67	0.00	0.00	0.00
1027	39811	55.45	55.45	0.00	17.44	18.25
1041	4781	24.81	24.81	0.00	6.73	0.00
1048	13815	17.18	17.18	0.00	0.26	0.00
1049	833404	3.61	3.61	0.00	0.39	0.04
1053	13824	16.01	16.01	0.00	7.03	0.00
1055	126807	10.88	10.88	0.00	0.90	4.48
1056	21073	14.70	14.70	0.00	4.73	0.00
1057	145313	9.35	9.35	0.00	1.98	0.93
1058	9363	2.61	2.61	0.00	0.00	0.00
1059	2260	0.58	0.58	0.00	0.00	0.00
1061	42748	29.23	29.23	0.00	17.84	0.00

1062	22528	33.03	33.03	0.00	10.79	1.17
1063	172484	94.36	93.74	0.62	73.83	0.71
1065	863	51.89	51.89	0.00	45.37	20.63
1067	15272	87.65	87.65	0.00	10.19	26.00
1068	268901	50.53	50.53	0.00	6.24	0.81
1075	527029	11.87	11.85	0.03	5.41	0.04
1076	11	100.00	100.00	0.00	100.00	0.00
1079	10119	38.35	38.35	0.00	45.86	11.49
1080	3951	2.05	2.05	0.00	0.00	0.00
1081	15148	14.96	14.96	0.00	2.82	8.81
1094	70342	5.77	5.77	0.00	0.14	0.00
1098	13669	21.73	21.73	0.00	20.21	0.62
1147	42856	5.68	5.68	0.00	0.53	0.00
1148	260385	98.91	98.91	0.00	17.63	0.00
1200	162789	7.88	7.88	0.00	1.46	0.66
1271	86687	99.35	0.61	98.73	0.37	0.00
1413	1679930	74.23	64.58	9.65	12.30	0.43
2047	1463	64.59	64.59	0.00	32.26	13.60
2048	322222	48.40	48.04	0.36	6.98	1.17
3003	66454	61.29	61.29	0.00	28.59	0.00
3041	6374	19.85	19.85	0.00	1.77	1.05

Appendix 6b Sub-IBRA region-specific representation of vegetation associations occurring in the Avon agricultural zone as a percentage of statewide pre-European extent.

VA Code = Vegetation association (see Appendix 2).

VA Code	Avon Wheatbelt 1	Avon Wheatbelt 2	Dandarragan Plateau	Northern Jarrah Forest	Perth	Southern Cross	Western Mallee	Total
3	0.00	0.03	0.01	28.10	0.10	0.00	0.00	28.24
4	0.00	0.12	0.10	16.98	0.21	0.00	0.00	17.41
5	0.00	15.56	0.00	29.10	0.00	0.00	0.00	44.66
7	0.00	8.29	0.01	3.63	0.00	0.00	0.07	11.99
8	4.85	0.04	0.00	0.00	0.00	7.27	0.42	12.59
13	0.00	15.72	0.00	37.73	0.00	0.00	0.00	53.44
25	0.00	8.20	0.00	0.05	0.00	0.00	0.29	8.53
36	13.13	0.00	0.00	0.00	0.00	0.18	0.00	13.30
37	0.02	1.57	0.98	1.70	11.10	0.00	3.28	18.66
41	0.00	0.00	0.00	0.00	0.00	0.00	2.57	2.57
47	0.00	0.17	0.00	0.00	0.00	0.00	1.60	1.76
49	0.00	0.12	0.00	2.30	0.00	0.00	0.00	2.42
51	0.00	0.00	0.00	0.10	1.23	0.00	0.00	1.33
59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	2.08	0.04	0.00	0.00	0.04	6.58	0.28	9.03
128	4.82	0.50	0.00	1.20	0.00	47.14	4.25	57.91
129	0.00	0.00	0.00	0.00	2.37	0.00	0.00	2.37
131	1.81	0.00	0.00	0.00	0.00	0.00	3.61	5.42
141	5.96	0.00	0.00	0.00	0.00	74.14	0.00	80.10
142	6.88	1.53	0.00	0.00	0.00	16.28	0.12	24.83
145	4.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00
147	9.87	0.00	0.00	0.00	0.00	87.28	0.00	97.15
325	11.87	0.00	0.00	0.00	0.00	0.00	0.00	11.87
352	9.63	2.65	0.04	0.72	0.00	0.07	0.07	13.19
356	45.45	0.00	0.00	0.00	0.00	0.00	0.00	45.45
380	0.39	0.00	0.00	0.00	0.00	0.00	2.43	2.82
392	3.48	0.20	0.00	0.00	0.00	0.00	0.00	3.68
413	2.25	0.00	0.00	0.00	0.00	0.00	0.00	2.25

435	2.67	0.00	0.00	0.00	0.00	72.81	0.00	75.48
511	1.64	0.00	0.00	0.00	0.00	62.22	6.66	70.52
516	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.69
519	0.21	0.00	0.00	0.00	0.00	5.72	31.87	37.80
520	0.00	0.00	0.00	0.00	0.00	65.93	0.00	65.93
535	0.00	0.00	0.00	0.00	0.00	96.88	0.00	96.88
536	29.94	0.00	0.00	0.00	0.00	13.42	0.00	43.36
537	0.00	0.00	0.00	0.00	0.00	76.99	0.00	76.99
538	0.04	0.00	0.00	0.00	0.00	84.50	0.00	84.54
551	11.90	0.37	0.00	0.00	0.00	8.60	0.08	20.95
552	32.97	0.00	0.00	0.00	0.00	18.20	28.86	80.03
631	48.19	0.24	0.00	0.00	0.00	0.00	0.00	48.43
676	1.17	0.00	0.00	0.00	0.01	0.02	0.01	1.21
694	0.91	0.93	0.01	0.00	0.00	0.00	0.00	1.85
929	0.00	0.00	0.00	0.00	0.00	0.00	40.06	40.06
931	0.00	1.36	0.00	0.00	0.00	0.00	6.08	7.44
934	0.00	0.00	0.00	0.00	0.00	0.00	2.09	2.09
936	0.01	0.01	0.00	0.02	0.00	39.48	3.61	43.13
941	0.00	0.00	0.00	0.00	0.00	31.60	10.84	42.44
942	0.00	0.00	0.00	0.00	0.00	0.00	3.94	3.94
945	2.27	0.00	0.00	0.00	0.00	0.00	10.41	12.68
946	2.41	8.27	0.00	7.41	0.00	1.48	0.00	19.57
947	0.00	29.91	0.00	0.04	0.00	0.00	0.00	29.95
948	0.00	7.97	0.00	0.00	0.00	0.00	0.00	7.97
949	0.01	0.30	6.77	0.15	49.32	0.00	0.00	56.54
950	0.73	37.53	0.00	0.00	0.00	0.00	0.00	38.26
951	30.67	0.01	0.00	0.00	0.00	0.00	0.00	30.69
952	0.00	8.97	6.35	0.41	0.00	0.00	0.00	15.73
953	0.00	3.27	0.00	0.00	0.00	0.00	12.99	16.25
954	15.94	0.10	0.00	0.00	0.00	0.00	0.00	16.04
955	3.87	2.48	0.00	0.00	0.00	0.00	1.32	7.67
956	10.74	0.00	0.00	0.00	0.00	0.00	0.00	10.74
959	6.45	0.00	0.00	0.00	0.00	0.00	24.13	30.58
960	0.39	0.00	0.00	0.00	0.00	0.00	10.06	10.45
961	1.09	0.00	0.00	0.00	0.00	0.00	14.37	15.47

962	0.00	5.60	0.00	0.00	0.00	0.00	0.00	5.60
965	0.00	0.00	0.74	0.08	16.16	0.00	0.00	16.98
966	0.00	0.00	0.00	0.00	0.00	0.00	5.35	5.35
968	0.00	0.13	0.00	18.65	2.84	0.00	0.00	21.62
973	0.00	0.00	0.00	0.26	5.69	0.00	0.00	5.95
987	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.62
988	20.37	2.76	0.12	0.00	0.00	0.00	0.00	23.25
999	0.00	0.00	9.44	0.00	0.15	0.00	0.00	9.59
1002	0.00	0.00	0.00	2.26	0.00	0.00	0.00	2.26
1003	0.00	0.00	0.00	36.62	0.00	0.00	0.00	36.62
1004	0.00	20.38	0.00	16.34	0.00	0.00	0.00	36.71
1005	0.00	0.00	0.00	17.81	0.00	0.00	8.20	26.01
1006	0.00	0.00	0.00	50.38	0.00	0.00	0.00	50.38
1014	0.00	0.00	0.08	0.00	52.83	0.00	0.00	52.91
1017	0.00	0.00	11.18	0.44	0.98	0.00	0.00	12.61
1018	0.00	0.00	0.14	0.00	20.58	0.00	0.00	20.73
1019	0.00	0.00	42.27	1.85	0.00	0.00	0.00	44.12
1020	0.00	0.00	28.16	2.27	0.07	0.00	0.00	30.50
1023	1.14	4.97	0.00	0.16	0.00	0.00	0.16	6.43
1024	8.38	0.68	0.00	0.00	0.00	0.34	0.00	9.41
1025	1.34	0.33	0.00	0.00	0.00	0.00	0.00	1.67
1027	0.00	0.00	54.88	0.21	0.37	0.00	0.00	55.45
1041	11.90	12.92	0.00	0.00	0.00	0.00	0.00	24.81
1048	13.42	3.76	0.00	0.00	0.00	0.00	0.00	17.18
1049	2.36	1.25	0.00	0.00	0.00	0.00	0.00	3.61
1053	12.35	3.65	0.00	0.00	0.00	0.00	0.00	16.01
1055	10.88	0.00	0.00	0.00	0.00	0.00	0.00	10.88
1056	14.70	0.00	0.00	0.00	0.00	0.00	0.00	14.70
1057	9.35	0.00	0.00	0.00	0.00	0.00	0.00	9.35
1058	2.61	0.00	0.00	0.00	0.00	0.00	0.00	2.61
1059	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.58
1061	29.23	0.00	0.00	0.00	0.00	0.00	0.00	29.23
1062	33.03	0.00	0.00	0.00	0.00	0.00	0.00	33.03
1063	0.23	0.00	0.00	0.00	0.00	93.50	0.00	93.74
1065	51.89	0.00	0.00	0.00	0.00	0.00	0.00	51.89

1067	27.12	0.00	0.00	0.00	0.00	60.53	0.00	87.65
1068	12.49	0.00	0.00	0.00	0.00	38.03	0.01	50.53
1075	0.00	0.16	0.00	0.00	0.00	0.00	11.69	11.85
1076	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00
1079	0.00	0.00	0.00	0.00	0.00	0.00	38.35	38.35
1080	1.24	0.80	0.00	0.00	0.00	0.00	0.00	2.05
1081	14.96	0.00	0.00	0.00	0.00	0.00	0.00	14.96
1094	0.00	0.43	0.00	0.00	0.00	0.00	5.33	5.77
1098	0.00	0.00	0.00	0.00	0.00	0.00	21.73	21.73
1147	0.76	4.92	0.00	0.00	0.00	0.00	0.00	5.68
1148	0.01	0.00	0.00	0.00	0.00	96.81	2.09	98.91
1200	0.00	0.04	0.00	0.00	0.00	0.00	7.84	7.88
1271	0.57	0.00	0.00	0.00	0.00	0.00	0.04	0.61
1413	8.05	0.00	0.00	0.00	0.00	55.58	0.95	64.58
2047	0.00	64.59	0.00	0.00	0.00	0.00	0.00	64.59
2048	0.03	0.10	0.00	0.00	0.00	1.36	46.55	48.04
3003	0.00	0.00	0.00	61.29	0.00	0.00	0.00	61.29
3041	3.30	16.55	0.00	0.00	0.00	0.00	0.00	19.85