Miscellaneous publication 20/93
Agdex 301
ISSN 0725-847X

A SIMPLIFIED KEY FOR ASSESSING THE ECOLOGICAL SIGNIFICANCE OF ON-FARM BUSH REMNANTS IN THE WHEATBELT

By F. Mollemans

Spatial Resource Information Group
Land Management Branch
Division of Regional Operations

Results of a project funded by the 'Save the Bush' program

March 1993

DEPARTMENT OF AGRICULTURE
WESTERN AUSTRALIA

INTRODUCTION

Many farms today still contain areas of natural bush, yet there is little knowledge about the condition and value of this bush. There is also a wider interest by farmers in this bush because of its perceived value in assisting to combat on-farm salinity, and for diverse other reasons. As a response to the general interest by farmers and others in on-farm bush, a key, produced for use in a remnant vegetation survey of the southern wheatbelt (Mollemans, 1992), and which may be used to assess the value of on-farm bush, is being reproduced here.

This key may be used to assess the ecological significance of on-farm remnant vegetation. It utilises broadly applicable, objective criteria to point to the ecological significance of bush remnants within a hierarchy of seven classes. These seven classes were selected to enable the best use of available resources, by applying attainable management objectives to each level of the hierarchy.

Setting the limits of these classes required an understanding of the types of bush present in the Wheatbelt, and a knowledge of the disturbance factors that have affected these bush remnants. Other factors considered, included: presence of communities which are not adequately conserved in Western Australia, and whether gazetted rare flora, priority species or important geographically restricted species are present; whether or not disturbances that may affect bush remnants are of a permanent nature; and the time of year such an assessment is made, the best time being in spring when the majority of plants, including annuals, are represented.

Gazetted rare flora, Banksia cuneata

So little is known about the content of most on-farm bush remnants in Western Australia, that it was considered unwise to include in the assessment a consideration of area. After having surveyed in greater or lesser detail about 3000 bush remnants in the Wheatbelt, it is evident that there are many large areas of bush comprised only of a single dominant gum tree, such as white gum, with a grassy understorey, while there are a significant number of quite small areas which carry substantially undisturbed natural bush. To set a limit that excludes the smaller natural areas would not be sound, because, although small, these areas may contain important examples of plant communities which are no longer common or of rare flora populations of species which, because the areas have not been surveyed, are currently thought to be on the verge of extinction.

The key has already been successfully applied to bush remnants surveyed in the wheatbelt during 1991.

TERMINOLOGY

For those not familiar with the terminology, gazetted rare flora (soon to be called gazetted threatened flora) are Western Australian native plant species that have been shown by survey to be of such low numbers in the wild state that special effort is required to protect them from further decline; these species are protected by legislation with a large fine for any breach of the legislation, and the list of species afforded such protection is reviewed annually.

Priority species are Western Australian native species which are thought to require protection under the same legislation which covers gazetted flora, but which require urgent high priority survey to confirm their conservation status. Currently there are 263 species gazetted as rare in Western Australia, while a further 1 200 species are included on the priority species list because they are thought to be under threat but require further survey; incidentally a further 43 species are also gazetted as presumed extinct.

Geographically restricted species are those which have populations spread over a limited geographic area, within which they may be either common or rare. Some geographically restricted species may occur in more than one such area and be separated by distances of hundreds or even thousands of kilometres, and such species tend to have special importance to researchers involved in the study of phytogeography (plant geography) and the origins of Western Australian plants.

In the Western Australian Department of Agriculture three categories of bush are recognised within areas of on-farm bush, namely: remnant vegetation, modified vegetation and scattered trees. Remnant vegetation tends to most closely resemble the former natural vegetation cover, modified vegetation is as the name implies modified to a particular extent by disturbance, and scattered tree remnants are those areas which have been so modified that all there is remaining is the former tree layer of a once complex community (up to a maximum of 700 trees per hectare based on field assessments).

WHAT IS ECOLOGICAL SIGNIFICANCE?

Before an attempt is made to assess ecological significance, it is useful to consider what it is.

Firstly, natural bush is inherently complex; by complexity I refer to all the different types of bush occurring within a remnant, such as a salmon gum area and some white gum along with some bush associated with a granite outcrop, and not to the complexity of, for example, a salmon gum community. So, a bush remnant containing two communities, say a woodland community and a mallee over scrub community, can be considered as having greater ecological significance, than one in which there is only one such community, such as a woodland or a mallee over scrub community on its own. Therefore when attempting to assess ecological significance, an important division can be made on the basis of the number of communities within the bush remnant.

The other important factor to take into account in assessing ecological significance is the condition of the remnant. How disturbed is it? Ecological significance is reduced with increasing disturbance e.g. the dust effect of roads on adjacent bush is an important determinant of the health of the vegetation in that bush, particularly to those plants which exude oils to which the dust can adhere. Remnants divided by roads are more prone to degradation than those which are not and are therefore of lesser ecological significance.

Once you have begun to categorise bush remnants based on complexity and condition, further, finer divisions can be made on the basis of such attributes as presence of gazetted rare flora and inadequately conserved plant communities.

In relation to remnant bush therefore, ecological significance can be considered as being proportional to the number and arrangement of the complex of communities making up a remnant and inversely proportional to the degree of disturbance e.g. more natural, more complex, and less disturbance, means more ecological significance. If the bush contains gazetted rare flora then it can be considered as having a greater degree of ecological significance than a similarly complex, natural, little disturbed area which does not contain gazetted rare flora.

ASSESSING THE ECOLOGICAL SIGNIFICANCE OF ON-FARM REMNANT BUSH

To assess the ecological significance of on-farm remnant bush the methodology must consider the attributes of ecological significance discussed above. There is also a need to use objective criteria that are broadly applicable. In addition, to optimise available resources, it is desirable to have a number of separate classes of ecological significance in a hierarchical framework so that management objectives can be set for each level of the hierarchy.

For the purposes of the present work, seven classes of ecological significance have been selected for this hierarchy, namely:

- extremely high ecological significance,
- very high ecological significance,
- high ecological significance,
- moderate ecological significance,
- low ecological significance,
- very low ecological significance, and
- extremely low ecological significance.

Setting the limits of these classes required an understanding of the types of bush present in the wheatbelt, and a knowledge of the disturbance factors that have affected these bush remnants.

It is rare now-a-days to find a bush remnant which in its entirety is not modified in some way. Certainly larger remnants contain parts which are still in their natural condition, but their fringe zones are generally always disturbed in some manner. The remnant vegetation category is applied to those areas which for the most part are still in their natural state. Therefore in a hierarchy considering ecological significance, such areas should necessarily be within one of the upper levels, while modified vegetation and scattered tree bush remnants will fall within one of the lower levels depending on the degree of complexity and the degree of disturbance.

Applying these factors to the remnant vegetation, modified vegetation and scattered trees categories, it is considered that remnant vegetation, being comprised of bush in a superior condition, should be rated as having a high ecological significance or better; presence of inadequately conserved plant species, gazetted flora species, priority species or important geographically restricted plant species would place such a bush remnant in a category of very high ecological significance, and if the area is completely undisturbed, it should be considered as being of extremely high ecological significance.

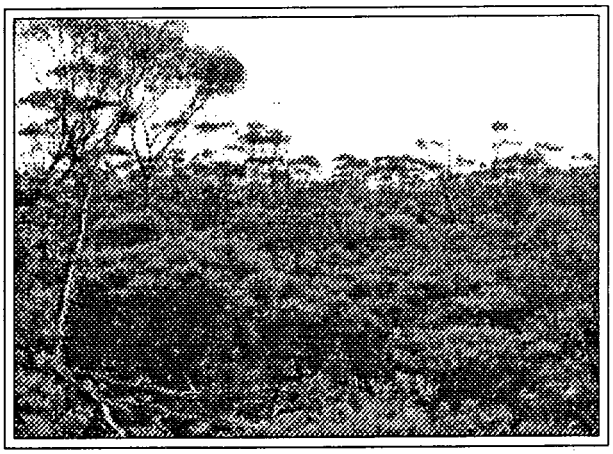
For modified remnant vegetation, bush remnants of this category should be rated as having moderate or higher ecological significance. Modified remnants containing sufficient area of natural vegetation to warrant preservation even though parts may be substantially disturbed should be rated as having high ecological significance. Presence of inadequately conserved plant species, gazetted flora species, priority species or important geographically restricted plant species would place such a bush remnant in a category of very high ecological significance. Being modified it is not possible for such areas to achieve a level of extremely high ecological significance.

In some cases bush remnants in the remnant vegetation and modified vegetation categories may be found through detailed surveys to be so substantially disturbed or degraded that they are not even of moderate ecological significance. These may then be classified as being of low ecological significance or in more extreme cases in a lower category.

Bush remnants in the scattered trees category are generally recognised on the basis of a total absence of understorey, and depending on the density of the canopy cover, should be rated as having either low, very low or extremely low ecological significance. However, there are situations where further consideration is necessary. For example, some mallet areas lacking an understorey may still be in a natural state so recognition of this will require the placement of such areas in a higher category of ecological significance.

In addition, massive white gum remnants may be seen from all fringes to have no understorey, but may in a central core area still possess a small patch of scrub or heath that may be poorly conserved in its own right or which contains a rare orchid or *Grevillea*, for example. Again a higher level of ecological significance will be appropriate.

In addition to the above a final necessary consideration was to take account of the fact that structurally complex bush is of equal ecological significance to structurally simple bush, so long as the structurally complex or simple bush is the natural climax vegetation cover for the particular area (defined on the basis of geological, soil, and climatic influences) within which it occurs. Putting all the factors together it was decided that the best means of assessing ecological significance of on-farm bush was through the use of a key.



Bush remnant of very high ecological significance

HOW TO USE A KEY

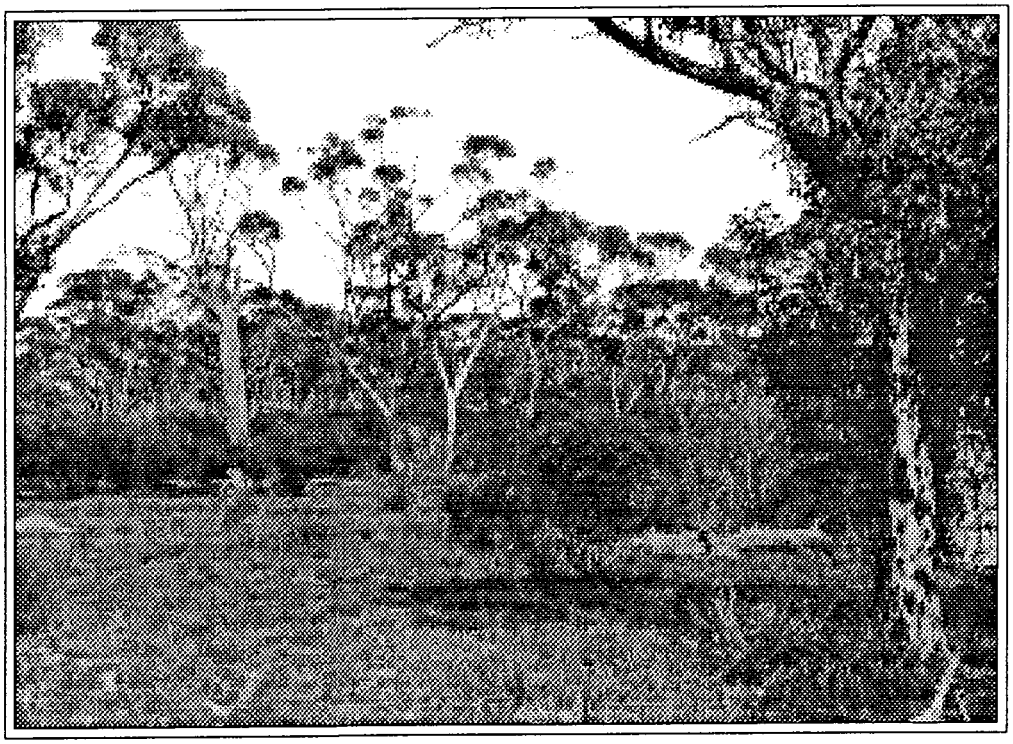
A key is a type of table designed to identify an item (in this case the ecological significance of a bush remnant) by answering relatively simple questions, which are followed through in step-wise fashion. Generally the questions are grouped as alternative possibilities in couplets or triplets and by following through the steps the key leads to the appropriate identity of the item being considered.

The following key was constructed taking into account the previous discussion on ecological significance. In order to use the key, begin by considering the statement after the number 1a. i.e. "Bush remnant simple - comprised of only one type of community." If this statement applies to the bush remnant under consideration then the key points to the fact that you should next consider the statements under section 2. If, on the other hand, the statement at 1a does not apply, then 1b will and the key will point to the fact that you should next consider the statements under section 22. This being the case you should then move to section 22 of the key and consider the statements made there, before proceeding on through several more steps to a statement which indicates the level of ecological significance of your bush.

In some instances you will not know whether a statement applies, for example, if you are not certain whether the bush contains gazetted rare flora. In such a case you should proceed on the assumption that the bush does not contain gazetted rare flora, and this will lead you to a level of ecological significance which is determined by your current level of knowledge about the bush. Having got this far you may then be able to get assistance to determine if indeed the bush does actually contain gazetted rare flora, and if the answer is affirmative, then the ecological significance of the bush will increase.

The results of a survey of remnants in 11 shires of the Great Southern in the latter half of 1991, suggest that at least one-third of remnants that appear from observation to be in the remnant vegetation category, contain at least one priority species, while at least 1.6% of such remnants contain a gazetted rare flora species (Mollemans, 1992).

Now try the key out on the bush of interest. If you are still a bit uncertain, try it first on a patch of trees and see where it leads. Then as you get more confidence try it on the bush of interest.



Bush remnant of high ecological significance

KEY ENABLING AN ASSESSMENT OF THE ECOLOGICAL SIGNIFICANCE OFON-FARM BUSH REMNANTS

1a. Bush remnant simple - comprised of only one type of community 2

1b. Bush remnant complex - comprised of more than one type of community 22

2a. Bush remnant comprised of scattered trees 3

2b. Bush remnant comprised of more closely spaced trees 11

2c. Bush remnant treeless 18

3a. Bush remnant comprised of scattered trees with a pasture, grass or weed understorey 4

3b. Bush remnant comprised of scattered trees with no understorey 5

3c. Bush remnant comprised of scattered trees with native species in the understorey 7

4a. Tree cover generally absent ..... **Extremely low ecological significance**

4b. Moderate tree cover present ..... **Very low ecological significance**

4c. Tree cover generally present ..... **Low ecological significance**

5a. Stocking pressure apparently heavy 4

5b. Stocking pressure not apparently heavy 6

6a. Mallet slope in isolation ..... **Low ecological significance**

6b. Tree cover other than mallet 4

7a. Bush remnant is not disturbed 8

7b. Bush remnant is partly or substantially disturbed 9

8a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or one or more of the contained communities are not adequately conserved in WA ..... **Very high ecological significance**

8b. Bush remnant is not known to contain gazetted rare flora, priority flora species, important geographically restricted plant species or it is unknown whether the contained communities are adequately conserved in WA ..... **High ecological significance**

9a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or one or more of the contained communities are not adequately conserved in WA. ..... **High ecological significance**

9b. Bush remnant is not known to contain gazetted rare flora, priority flora species, geographically restricted plant species or it is unknown whether the contained communities are adequately conserved in WA. 10

10a. Understorey native species widespread, but up to 50% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Moderate ecological significance**

10b. Understorey native species widespread, but 51-80% of bush remnant is area affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Low ecological significance**

10c. Understorey native species present, but 81-100% of bush remnant is affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Very low ecological significance**

11a. Bush remnant comprised of more closely spaced trees with a pasture, grass or weed understorey 4

11b. Bush remnant comprised of more closely spaced trees with no understorey 12

11c. Bush remnant comprised of more closely spaced trees with native species in the understorey 14

12a. Stocking pressure heavy 4

12b. Stocking pressure not heavy 13

13a. Mallet slope in isolation ..... **Low ecological significance**

13b. Tree cover other than mallet 4

14a. Bush remnant is not disturbed 15

14b. Bush remnant is partly or substantially disturbed 16

15a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or one or more of the contained communities are not adequately conserved in WA. ..... **Very high ecological significance**

15b. Bush remnant is not known to contain gazetted rare flora, priority flora species, important geographically restricted plant species or it is unknown whether the contained communities are adequately conserved in WA ..... **High ecological significance**

16a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or one or more of the contained communities are not adequately conserved in WA. ..... **High ecological significance**

16b. Bush remnant is not known to contain gazetted rare flora, priority flora species, geographically restricted plant species or it is unknown whether the contained communities are adequately conserved in WA. 17

17a. Understorey native species widespread, but up to 70% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion....**Moderate ecological significance**

17b. Understorey native species widespread, but 71-90% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Low ecological significance**

17c. Understorey native species widespread, but 91-100% of bush remnant is area affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion.....**Very low ecological significance**

18a. Bush remnant is not disturbed 19

18b. Bush remnant is partly or substantially disturbed 20

19a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or the contained community is not adequately conserved in WA. .....**Very high ecological significance**

19b. Bush remnant is not known to contain gazetted rare flora, priority flora species, important geographically restricted plant species or it is unknown whether the contained community is adequately conserved in WA .....**High ecological significance**

20a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or the contained community is not adequately conserved in WA. .....**High ecological significance**

20b. Bush remnant is not known to contain gazetted rare flora, priority flora species, geographically restricted plant species or it is unknown whether the contained community is adequately conserved in WA. 21

21a. Up to 70% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion..... **Moderate ecological significance**

21b. 71-80% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Low ecological significance**

21c. 81-90% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion.....**Very low ecological significance**

21d. 91-100% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion..... **Extremely low ecological significance**

22a. Bush remnant comprised entirely of scattered trees 23

22b. Bush remnant comprised entirely of more closely spaced trees 31

22c. Bush remnant entirely treeless or is a combination of scattered trees and/or more closely spaced trees and/or treeless communities 35

23a. Bush remnant comprised of scattered trees with a pasture, grass or weed understorey 4

23b. Bush remnant comprised in part of scattered trees with no understorey 24

23c. Bush remnant comprised entirely of scattered trees with native species in the understorey 29

24a. Stocking pressure heavy 4

24b. Stocking pressure not heavy 25

25a. Bush remnant includes a mallet slope 26

25b. Tree cover other than mallet 4

26a. Communities occurring with mallet area all with a pasture grass or weed understorey 4

26b. Communities occurring with mallet area generally with no understorey (heavy stocking rates evident) 4

26c. Communities occurring with mallet area have native species in the understorey 27

27a. Bush remnant is not disturbed 28

27a. Bush remnant is partly or substantially disturbed 29

28a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or one or more of the contained communities are not adequately conserved in WA ..... **Extremely high ecological significance**

28b. Bush remnant is not known to contain gazetted rare flora, priority flora species, important geographically restricted plant species or it is unknown whether the contained communities are adequately conserved in WA ..... **Very high ecological significance**

29a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or one or more of the contained communities are not adequately conserved in WA ..... **High ecological significance**

29b. Bush remnant is not known to contain gazetted rare flora, priority flora species, geographically restricted plant species or it is unknown whether the contained communities are adequately conserved in WA 30

30a. Understorey native species widespread, but up to 50% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **High ecological significance**

30b. Understorey native species widespread, but 51-70% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion .....

Moderate ecological significance

30c. Understorey native species widespread, but 71-80% of bush remnant is affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Low ecological significance**

30d. Understorey native species widespread, but 81-90% of bush remnant is area affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Very low ecological significance**

30e. Understorey native species present, but 90-100% of bush remnant is affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Extremely low ecological significance**

31a. Bush remnant comprised of more closely spaced trees with a pasture, grass or weed understorey 4

31b. Bush remnant comprised in part of more closely spaced treeswith no understorey 32

31c. Bush remnant comprised entirely of more closely spaced trees with native species in the understorey 35

32a. Stocking pressure heavy 4

32b. Stocking pressure not heavy 33

33a. Bush remnant includes a mallet slope 34

33b. Tree cover other than mallet 4

34a. Communities occurring with mallet area all with a pasture grass or weed understorey 4

34b. Communities occurring with mallet area generally with no understorey (heavy stocking rates evident) 4

34c. Communities occurring with mallet area have native species in the understorey 35

35a. Bush remnant is not disturbed 36

35a. Bush remnant is partly or substantially disturbed 37

36a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or one or more of the contained communities are not adequately conserved in WA ..... **Extremely high ecological significance**

36b. Bush remnant is not known to contain gazetted rare flora, priority flora species, important geographically restricted plant species or it is unknown whether the contained communities are adequately conserved in WA ..... **Very high ecological significance**

37a. Bush remnant contains gazetted rare flora, priority flora species, important geographically restricted plant species or one or more of the contained communities are not adequately conserved in WA **Very high ecological significance**

37b. Bush remnant is not known to contain gazetted rare flora, priority flora species, geographically restricted plant species or it is unknown whether the contained communities are adequately conserved in WA 38

38a. Understorey native species widespread, but up to 50% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **High ecological significance**

38b. Understorey native species widespread, but 51-70% of bush remnant is affected by one or more disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion..... **Moderate ecological significance**

38c. Understorey native species widespread, but 71-80% of bush remnant is affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Low ecological significance**

38d. Understorey native species widespread, but 81-90% of bush remnant is area affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, salinity and water erosion ..... **Very low ecological significance**

38e. Understorey native species present, but 90-100% of bush remnant is affected by disturbance factors of feral animals (rabbits/foxes), timber cutting, gravel extraction, grazing, rubbish dumping, chaining, weed invasion, and water erosion ..... **Extremely low ecological significance**

Bush remnant of moderate ecological significance

CHARACTERISTICS OF THE KEY

Almost two-thirds of bush remnants will be keyed out quite early as one of the classes of ecological significance applying to those areas comprising scattered trees (low, very low and extremely low ecological significance). In setting the percentage limits for Sections 10 and 17 (10 relates to scattered trees, 17 relates to more closely spaced trees), relating to disturbed areas, the assumption is that if you have a lesser tree cover more understorey must remain to achieve a certain level of ecological significance than an area with more tree cover.

Similarly, in regard to communities containing trees, remnant bush of least ecological significance (extremely low ecological significance) could only apply to scattered trees with no natural understorey left. Therefore, apart from certain mallet areas (where the understorey is normally rare or absent), any community that has a natural understorey, no matter how disturbed, must be considered to have at least very low ecological significance.

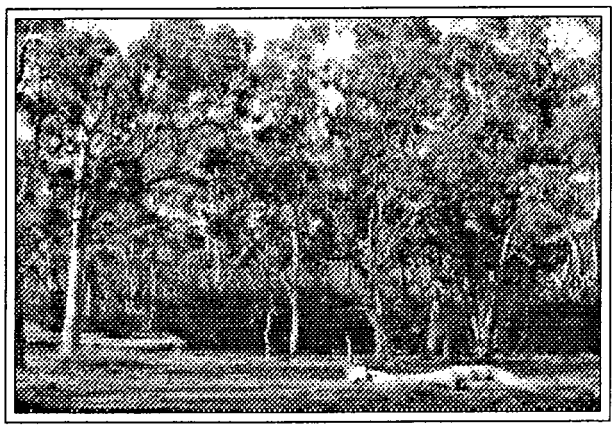
In the case of treeless communities, the highest structural level present, even, for example, 80 cm shrubs in a heath community, could be considered equivalent to scattered trees if (through disturbance) the amount of cover was sufficiently low. Hence treeless communities can achieve a level of extremely low ecological significance, and this is reflected in the key (see Section 21). Where a combination of treeless communities occurs in a more complex remnant, it is deemed that this greater degree of complexity makes the remnant of greater ecological significance than a scattered tree or simple, treeless remnant in isolation, so in such a case the least level of ecological significance achievable is very low ecological significance (see Section 38).

Problems arise in setting limits for complex remnants (multiple communities) as opposed to simple ones (one community). In simple communities disturbance effects apply to the one community, which is the only one present. In complex communities, however, disturbance effects may affect one or all communities present, with different degrees of disturbance applying to all communities or only one or a few.

Necessarily a key designed to accommodate all the possible combinations of disturbance effects would be exceedingly complex to construct and then to apply, and may in the longer term with further refinement of the present key be the goal. But, application of a complex remnant vegetation assessment technique may in itself require more resources than are reasonably available, a factor which must also be considered. Nevertheless, application of the key has been quite satisfactory for the present circumstances.

In Section 10a. of the key, which relates to divisions based on disturbance, it seemed advisable to err on the side of caution and broaden the width of the disturbance level applicable to an assessment of moderate ecological significance so that certain more significant bush remnants are not summarily written off. With currently available resources it is likely that only those bush remnants having moderate or greater ecological significance can be managed. So, in time as more bush remnants are surveyed some or even many remnants assessed as moderately ecological significant will be downgraded. Others, in instances where gazetted flora species, priority flora species, important geographically restricted plant species or inadequately conserved communities are encountered, will be upgraded. This will then enable limited resources to be expended where there is the greatest need.

It will be evident that once the assessment of ecological significance of remnants in a particular area is achieved then, as most effort is limited to areas of higher ecological significance, the number under review will be far more manageable and factors such as areal extent can be considered.



Bush remnant of low ecological significance – one major understorey dominant remaining

USING THE KEY

The plant species making up our native bush are quite resilient and even those areas which have been heavily grazed for relatively short periods are apt to recover quite remarkably, given the opportunity. However, sustained grazing pressure over successive seasons will result in the destruction of new growth as it emerges, so that once the store of seed in the soil is substantially used up, the time it takes for an area to recover will be far greater.

This recovery time will then be dependent on the degree of invasion by fast growing grasses and weeds, which can readily restrict regrowth of native species by competing more effectively for moisture and nutrients, and by blotting out the necessary light for photosynthesis. Recovery time will also be dependent on the proximity of other protected vegetation of the same type that can provide the necessary propagules.

These factors will need to be considered when using the key i.e. if the vegetation is disturbed, is it so disturbed that it will not recover or is recovery possible or is the disturbance relevant to a particular part of the remnant for which conservation may be mandatory, for example, a core area of undisturbed, inadequately conserved natural bush (which may not be evident through external observation) may remain in the centre of the remnant, which in the longer term may prove to be more ecologically significant than may be indicated by the significantly disturbed area occurring along with it.

Assessments can be made at any time of the year so long as the assessor is familiar with, and keeps in mind, the potential for other species, particularly annuals, within the particular community during the winter-spring period. Salt lakes, for example, can be, and appear to be, extreme habitats in the height of summer, but given a cool spring day with water and waterfowl present and abundant herbage and wildflowers the picture is markedly different.

HAVING DETERMINED THE ECOLOGICAL SIGNIFICANCE OF A PIECE OF BUSH, WHAT NEXT?

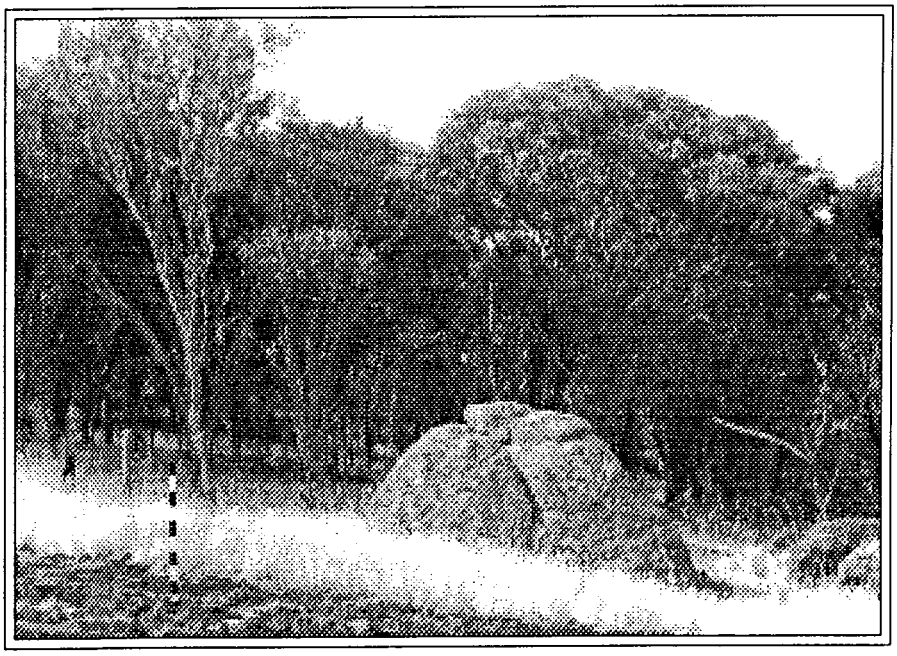
Having determined the level of ecological significance of a piece of bush what does each level specify about the bush remnants and what is the required action at each for each level of ecological significance? Starting from worst to best categories the following definitions, values and actions are thought most appropriate:

Extremely low ecological significance:

Definition: - cover generally absent, no understorey.

Value: - provide limited habitat for fauna.

Action: - liable to insect attack which may require remedial action; require fencing or other protection to enable recruitment and planting required in accordance with the farm plan; stocking unacceptable without protection for new growth; in heavily grazed areas fencing of remnants may allow for recovery by regrowth of the understorey.



Bush remnant of very low ecological significance

Very low ecological significance:

Definition: - moderate cover.

Value: - provide moderate fauna habitat.

Action: - liable to insect attack which may require remedial action; some areas require fencing or other protection to enable recruitment; such fencing should proceed according to the farm plan; periodic stocking unacceptable until new tree growth can withstand this pressure or be protected by sheep/rabbit mesh enclosures; in heavily grazed areas fencing of remnants may allow for recovery by regrowth of the understorey.

Low ecological significance:

Definition: - cover generally present.

Value: - provide more significant fauna habitat.

Action: - liable to insect attack which may require remedial action; some areas require fencing or other protection to enable recruitment; such fencing should proceed according to the farm plan; periodic stocking acceptable but all new growth should ideally be protected by sheep/ rabbit mesh enclosures; in heavily grazed areas fencing of remnants may allow for recovery by regrowth of the understorey.

Mallet areas:

Mallet areas in isolation may fit into one of the above ecological significance categories or may be of a higher level.

Action: - fencing to enable recruitment desirable; mallet areas tend to be relatively steep and of little agricultural value apart from periodic shelter for sheep during cold spells, and should be accommodated in the farm plan accordingly; periodic stocking acceptable but all new tree/ shrub growth should ideally be protected by sheep/ rabbit mesh enclosures until sufficiently mature to withstand periodic grazing; use of mallet areas to provide fence posts/firewood should be prohibited until such time as it is certain the timber removed will be naturally replaced, otherwise the area will not be sustained.

For areas of extremely low ecological significance, very low ecological significance or low ecological significance, disturbance and replacement elsewhere may be acceptable, but is undesirable because of the costs of such replacement relative to the cost of maintenance of the standing vegetation.

Moderate ecological significance, high ecological significance, very high ecological significance and extremely high ecological significance:

Definition: - refer to the key for definitions of each.

Value: - provide significant fauna habitat and make an important contribution to biodiversity; may provide important habitat for gazetted rare flora, priority flora species, geographically restricted plant species and/or communities which are inadequately conserved in W. A.

Action: - fencing, where it is lacking, should be a priority, and such areas should be given precedence over others in the context of the Remnant Vegetation Protection Scheme or via other special funding; areas containing gazetted rare flora, priority flora species, important geographically restricted plant species and/or inadequately conserved communities in W.A., should be given the appropriate response relevant to the perceived importance of such occurrences in the context of the state-wide conservation strategy; currently the presence of such occurrences in on-farm standing vegetation has no affect on the clearance process and this needs a complete review as in at least 1.6% of cases such clearance will result in the illegal destruction of gazetted threatened flora.

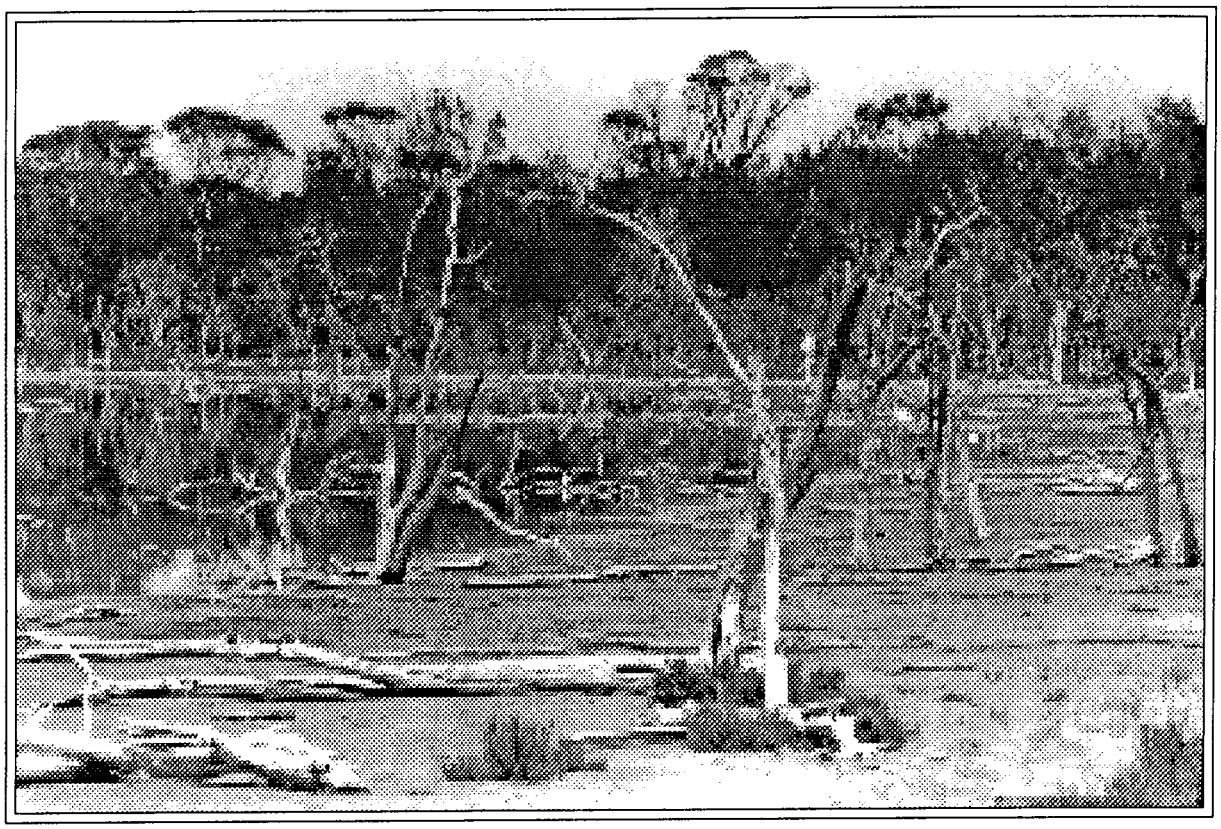
For areas of moderate ecological significance or higher, clearance of land and replacement elsewhere should not be considered, as such replacement is not achievable without the input of impossible amounts of resources and effort. In addition such areas make an important contribution to native plant and animal communities whose conservation is required for the maintenance of biological diversity, conservation of productive land and water resources and landscape amenity.

ACKNOWLEDGEMENTS

The project leading to the development of this key was funded by the Australian National Parks and Wildlife Service 'Save the Bush' program and I would like to acknowledge this assistance.

REFERENCES

Mollemans, F. (1992). Ecological significance of on-farm bush remnants in the southern wheatbelt region of Western Australia. Western Australian Department of Agriculture: unpubl.



Bush remnant of extremely low ecological significance

1459/6-93/250

Print Post Approved PP 665002/00029