FLORA

Assessing Changes in Plant Communities

Bill McArthur

PLANT communities are changing continuously, usually in response to competition between individuals or species, grazing, or the relative longevity of species. There is a need to monitor these changes, and the rates of change, and, whether for commercial, scientific, or aesthetic considerations, the information gained is often applied in management decisions. The method employed is to describe a representative sample of a community on two or more occasions and note the differences over time.

The species present and their abundance, the structure of the community and some measure of size of trees and shrubs, is noted and, on each successive assessment, it is assumed that the same criteria will be applied.

The most rigorous method used is in commercial forestry where an estimate of rate of timber production is required. Individual trees in representative plots are marked and numbered and, at each assessment, the diameters at breast height (DBH) and height are measured and a precise measure of volume of timber is known.

In natural communities, which often consist of many species and several strata from trees to ground cover, the methods used generally involve two stages. Firstly the different communities are identified and possibly mapped at the Association level and then, within each unit, quadrats may be established. The species making up each stratum are identified and the extent of the foliage cover is estimated.

These methods range from relatively simple schemes designed for local community groups with little or no botanical knowledge to those more sophisticated quantitative methods where the data produced are especially designed for computer analysis. In either case trends in growth characteristics can be described. However, there is a degree of subjectivity in most of these methods and so a simple procedure has been devised where direct comparison may be made between sequential measurements regardless of whether the same or different observers are involved.

△ *A quadrat laid out*

◁ *Bill McArthur*

The Scheme

On the basis of plant community mapping, quadrats are established on representative sites. The quadrats are 20 x 20 m, aligned north-south, with corners marked by steel pegs. The north-west corner peg is located by GPS. The quadrat is sub-divided into 5 x 5 m squares, using string or rope, and the squares numbered 1- 16 and shown on a plan at a scale of 1:100 (1cm = 1m).

Within each square each tree (>2m high) is numbered and its position plotted on the plan. The height, DBH, and canopy cover of each tree is recorded. The canopy cover is given as the product of the estimated greatest and least dimension. Standing dead trees are included and any fallen trees or logs are plotted. The shrubs in each square are treated in different strata.

Within each stratum the number of individuals of each species present is recorded and the percentage cover for each species estimated. Groundcover in each square, including leaf litter, is recorded with the main species identified, a total percentage cover for all species including leaf litter is estimated. Bare soil is not recorded but can be determined from the data. Other surface features such as termite mounds, ant colonies and trails may be plotted on the plan.

In heath communities, where plants are of uniform height, individuals are identified and shown on the plan by the extent of foliage cover. When several strata are involved, the system already described for tree communities is used.

These data can be gathered quickly and even in the most dense communities, such as mallet forest with about 7500 stems per hectare, a quadrat can be completed in about three hours.

As an example, this method was applied to a pristine jam woodland on a *Land for Wildlife* property in the Narrogin Shire.

Results showed:

- Jam trees (*Acacia acuminata)* were growing at a density of 1350 stems per hectare. Their canopy covered 38% of the site and 68.5% of them were standing dead.
- Shrubs covered less than 2% of the site.
- The native grass, Foxtail Mulga (*Neurachne alopecuroidea*), covered 45% of the site, Pincushions (*Borya sphaerocephala*) 35% and Orange Immortelle *(Waitzia acuminata)* 5%.

Vouchers of the specimens collected and survey data is being stored at the Narrogin Regional Herbarium.