

From:

Coulloudon, B. et al. 1999. Sampling Vegetation Attributes, Technical Reference 1734-4, Bureau of Land Management. Denver, Colorado. BLM/RS/ST-96/002+1730

## C. Density

1. *Description* Density has been used to describe characteristics of plant communities. However, comparisons can only be based on similar life-form and size. This is why density is rarely used as a measurement by itself when describing plant communities. For example, the importance of a particular species to a community is very different if there are 1,000 annual plants per acre versus 1,000 shrubs per acre. It should be pointed out that density was synonymous with cover in the earlier literature.

Density is basically the number of individuals per unit area. The term refers to the closeness of individual plants to one another.

### 2. *Advantages and Limitations*

- a Density is useful in monitoring threatened and endangered species or other special status plants because it samples the number of individuals per unit area.
- b Density is useful when comparing similar life-forms (annuals to annuals, shrubs to shrubs) that are approximately the same size. For trend measurements, this parameter is used to determine if the number of individuals of a specific species is increasing or decreasing.
- c The problem with using density is being able to identify individuals and comparing individuals of different sizes. It is often hard to identify individuals of plants that are capable of vegetative reproduction (e.g., rhizomatous plants like western wheatgrass or Gambles oak). Comparisons of bunchgrass plants to rhizomatous plants are often meaningless because of these problems. Similar problems occur when looking at the density of shrubs of different growth forms

or comparing seedlings to mature plants. Density on rhizomatous or stoloniferous plants is determined by counting the number of stems instead of the number of individuals. Seedling density is directly related to environmental conditions and can often be interpreted erroneously as a positive or negative trend measurement. Because of these limitations, density has generally been used with shrubs and not herbaceous vegetation. Seedlings and mature plants should be recorded separately.

If the individuals can be identified, density measurements are repeatable over time because there is small observer error. The type of vegetation and distribution will dictate the technique used to obtain the density measurements. In homogenous plant communities, which are rare, square quadrats have been recommended, while heterogenous communities should be sampled with rectangular or line strip quadrats. Plotless methods have also been developed for widely dispersed plants.