

Why Measure Biodiversity?

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SUMMARIZING VALUES TO DESCRIBE BIODIVERSITY

What is biodiversity?

Biodiversity is basically the variety within and among life forms on a site, ecosystem, or landscape. Biodiversity is defined and measured as an attribute that has two components — **richness** and **evenness**.

Richness = The number of groups of genetically or functionally related individuals. In most vegetation surveys, richness is expressed as the number of species and is usually called **species richness**.

Evenness = Proportions of species or functional groups present on a site. The more equal species are in proportion to each other the greater the evenness of the site. A site with low evenness indicates that a few species dominate the site.

Diversity can be used to describe variation in several forms:

- Genetic (species, varieties, etc.)
- Life form (grasses, forbs, trees, mosses, etc.)
- Functional group (deep rooted, nitrogen-fixing, soil crust, evergreen, etc.)

Why is biodiversity measured?

Biodiversity is a measure that combines richness and evenness across species. It is often measured because high biodiversity is perceived as synonymous with ecosystem health. In general diverse communities are believed to have increased stability, increased productivity, and resistance to invasion and other disturbances.

Diverse habitats with a variety of plants can have benefits such as:

- Providing forage for a variety of insect and vertebrate species.
- Stability resulting from plants in the community that are able to survive drought, insect plagues, and/or disease outbreaks so that the site will have some soil protection/forage/etc. in those years.
- Plants containing a variety of genetic material that may be useful in long-term survival and stability of the community.
- The community benefits from a mixture of plants:
 - soils improve with nitrogen fixers, deep rooted plants bring nutrients up from soil layers below other plants roots.
 - some species work together so that both can survive (called commensalism) and therefore, diverse communities can be more stable.
- Healthy diverse plant communities generally have all niches filled and are theoretically less likely to be invaded by noxious or opportunistic introduced species.

Though seldom acknowledged, there are also disadvantages to high biodiversity:

- Diverse communities are often a sign of fragmented or somewhat degraded sites where much of species richness is contributed by disturbance species.
- Plant communities with high diversity can be more difficult to manage for grazing because different species of plants have different grazing tolerances and different rates of phenological development.
- Many plant communities are very stable with few species that are well adapted to the environment.

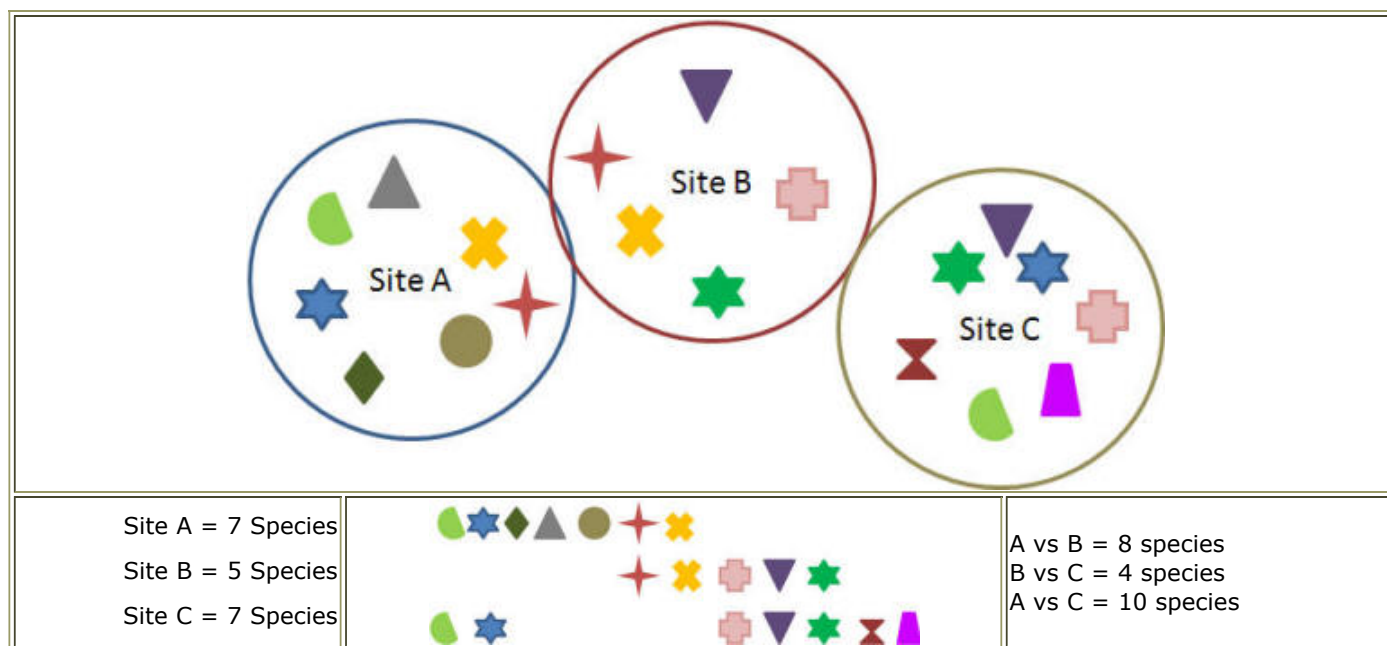
Biodiversity Can be Expressed at Several Scales

Biodiversity can be measured and monitored at several spatial scales.

Alpha Diversity = richness and evenness of individuals within a habitat unit. For example in the figure below, **Alpha Diversity** of Site A = 7 species, Site B = 5 species, Site C = 7 species.

Beta Diversity = expression of diversity between habitats. In the example below, the greatest **Beta Diversity** is observed between Site A and C with 10 species that differ between them and only 2 species in common.

Gamma Diversity = landscape diversity or diversity of habitats within a landscape or region. In this example, the gamma diversity is 3 habitats with 12 species total diversity.



SUMMARY QUESTIONS

1. What is biodiversity?
2. Why is biodiversity measured in plant assessments?
3. What is the difference between alpha, beta, and gamma diversity?

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