

## Selecting an Appropriate Sampling Unit

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## Terminology

Quadrat = Plot = Sampling Unit

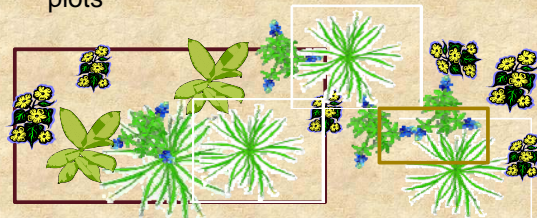


## Quadrat Size?





- **Variability** is the key
- Small plots are quicker to read  
But - -
- Small plots tend to have higher variability  
*(A lot of difference from plot to plot)*
- The greater the variability among plots = The more plots you need to read
- **Trade-off** between number of plots needed, and plot size

## Rules of thumb ....

- Quadrat **too large** if the two most abundant species are **found in every plot**
- Plot **too small** if the most abundant species are **not found** in a majority of the plots



## As variability increases. . .

- Plot size should 
- Number of plots examined should 
- Need for stratification also 
- Effectiveness of double sampling techniques  (to be discussed later)

## Distribution in community. . .

- Large plots have **lower variance**, but may be more difficult to uniformly cover the sampling area
  - *It would be easier to place 100 plots evenly across a landscape study area than if you just placed 20 plots.*
- For rare species, may **need large plots** and stratified sampling

## Plant size. . .

- Larger the average-sized plant the larger the sampling frame needed
- **Rules of Thumb:**
  - Plot should be **larger than average-sized** plant, and **larger than average space** between plants.
  - Plot is **too small** if >10% of plot do not contain the plants of interest

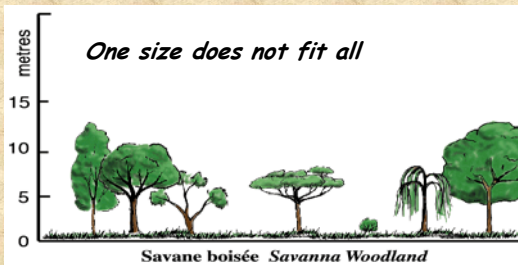


## Bottom line

- **Sparse vegetation** requires **larger** plots or transects than dense vegetation
- **Uniform vegetation** requires **fewer** and **smaller** plots than diverse/variable vegetation

## Sampling different life forms

- Difficult to sample different life forms (moss, grass, forbs, shrubs, trees, etc.)



<http://edcintl.cr.usgs.gov/terrege2/gifs/savanna.gif>

## May require a “stratified” scheme

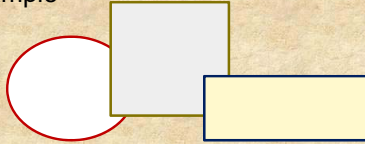


## Perimeter to Area Concerns

- Perimeter to area ratio decreases as plot size increases
- If borderline decisions (*deciding if plant in or out*) are difficult to make, then select a plot size that reduces perimeter:area ratio

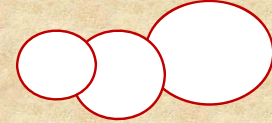
## Shape of Sample Unit

- **Number** and **size** of sample units are the first and most important considerations
- However, **shape** of quadrat or frame is also important and can reduce variation in the sample



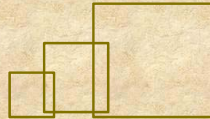
## Circle

- Less perimeter per area than square or rectangle
- Perimeter decisions are difficult to make when clipping vegetation, so circles are often used
- Reduced perimeter: area ratio is also good in communities with large clonal plants



## Square

- Greater perimeter:area ratio than circles, but less than rectangles.
- Most frequently used to estimate frequency because presence/absence is easy to estimate.
- Squares are easier to estimate % cover, than circles but not as easy as rectangles.



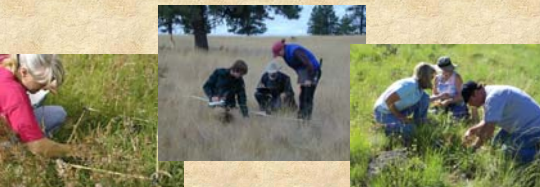
## Rectangles

- More likely to cut across plants rather than be completely occupied by plants
- Rarely completely occupied by bare spaces
- Often has lower variance than square or circles
- Can reduce variability in sparsely vegetated communities
- Easier to estimate % cover than circles or squares



## Take Home Message

- Plot **Size** and **Number** of Plots are **Most Important**
- Plot **Shape** is “fine tuning“



<http://www.habitats.freeserve.co.uk/images/quadrats.jpg>