Habitat Monitoring and Habitat Restoration

Chuck Butterfield
Senior Environmental Scientist
Y2 Consultants, Inc. Jackson, WY

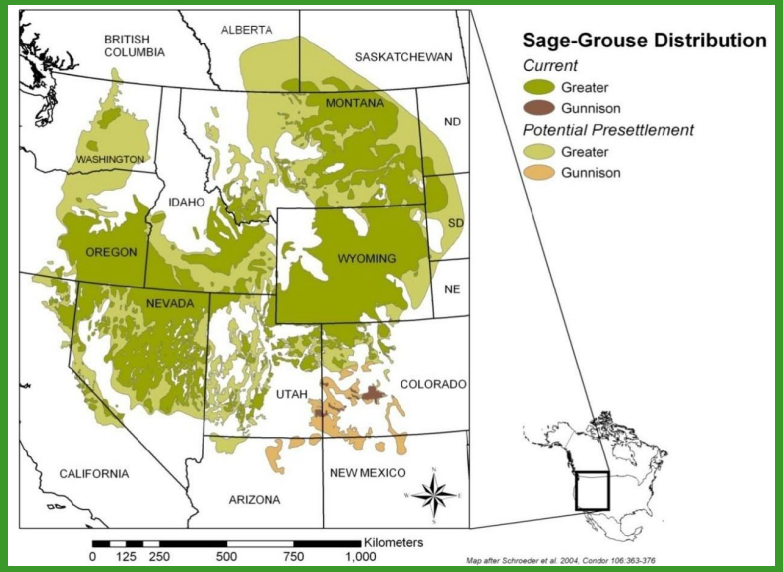
So What is “Good” Habitat?

How Do You Really Know?

Habitat Suitability

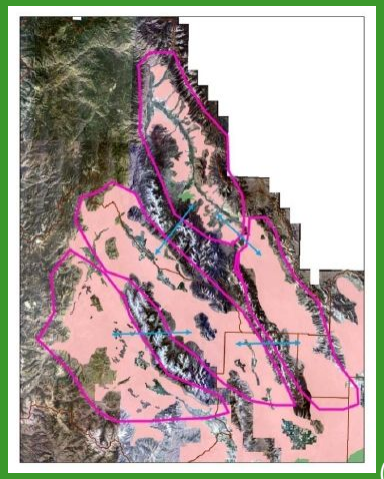
- **Habitat Assessment Framework (Stiver et al. 2010)**
  - **Four Orders of Habitat Suitability**

- **1st Order (Range-Wide) Habitat Suitability & Indicators**
  - **Availability of large expanses of sagebrush or sagebrush/grass habitat**
  - **Presence of migration corridors**
  - **Juxtaposition of other habitats and land uses within**
  - **Climate change**



Habitat Suitability

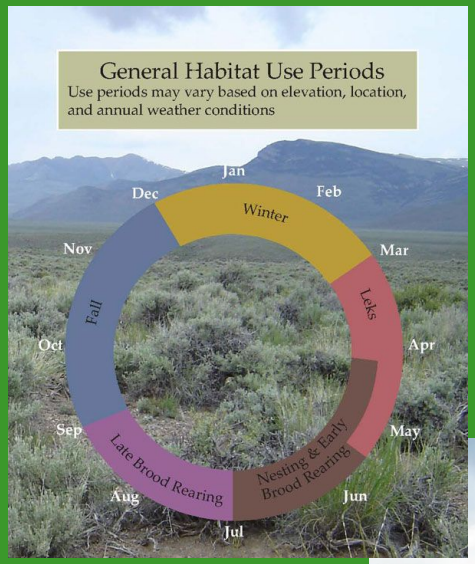
- 2nd Order (Mid-Scale) Habitat Suitability & Indicators
  - Linked to dispersal capabilities (Pop./Sub Pop)
  - Habitats within landscapes
    - Connected mosaics of suitable and varied habitat allowing dispersal (patch size & number)
    - Marginal habitats, poor connectivity, anthropogenic disturbances
    - Habitat fragmentation (too much/little sagebrush, conversion to grassland/forest, change of use)



(Connelly et al. 2004)

Habitat Suitability

- 3rd Order (Fine-Scale) Habitat Suitability & Indicators
  - Seasonal habitats within home ranges and connectivity



Seasonal Food Habits

- Spring
  - Adults 89-100% sagebrush
  - Pre-laying hens 18-50% forbs
  - Juveniles & chicks >80% insects & forbs
- Summer
  - Juveniles 66-77% forbs, remainder insects
  - Adults ≈60% sagebrush, remainder forbs & insects
- Fall & Winter
  - Sagebrush leaves

Habitat Suitability

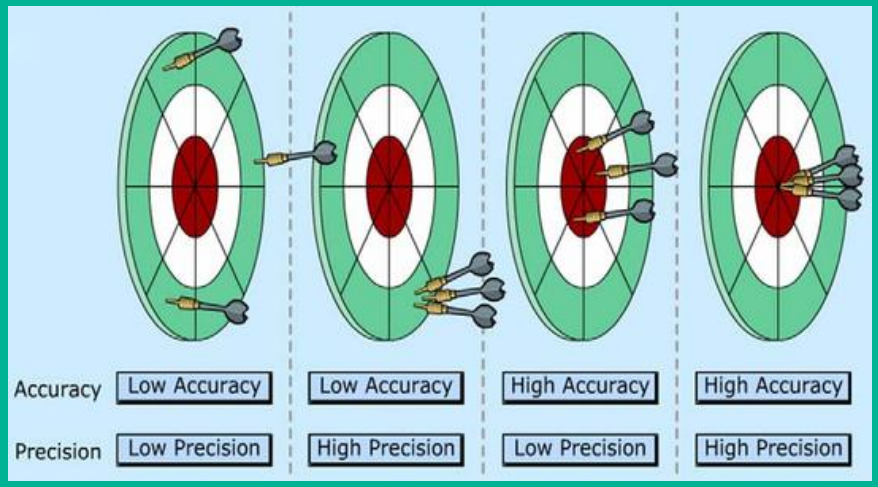
- **4th Order (Fine-Scale) Habitat Suitability & Indicators**
  - **Describes detailed vegetative habitat characteristics of the canopy and associated understory**
  - **May include riparian, wet meadows and more mesic habitats adjacent to sagebrush habitats**

4th Order Indicators

1. Sagebrush canopy cover (all seasons)
2. Sagebrush height (all seasons)
3. Sagebrush shape (breeding season)
4. Perennial grass and forb canopy cover (breeding & summer)
5. Perennial grass and forb heights (breeding & summer)
6. Forb availability (breeding & summer)

Monitoring

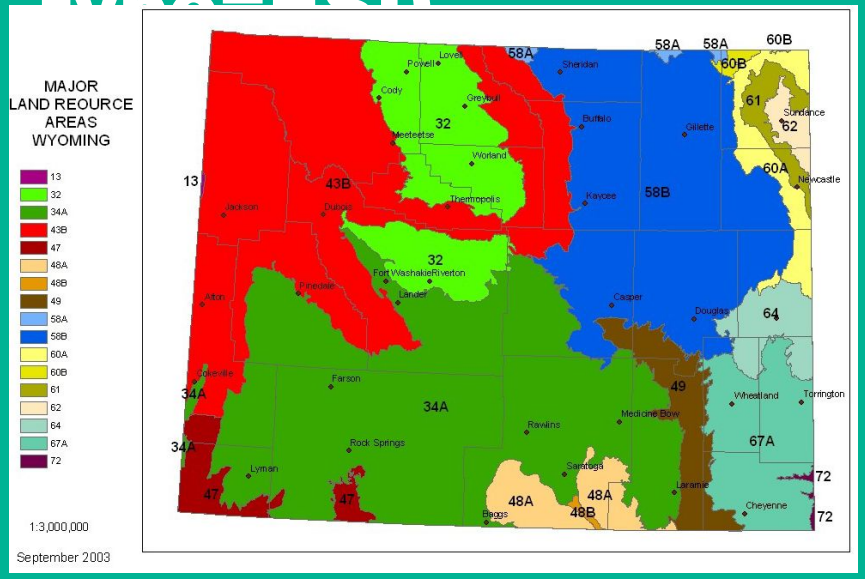
- **Where to begin?**
  - **Inventory vs. Monitoring**
  - **Bias & Error – Precision & Accuracy**
  - **Stratified random sample**
    - **Stratifications: vegetation, topography, ecological site, season of use, etc.**
  - **Document, Document, Document!!!**
    - **Paper and photos**
  - **Know your plants!**

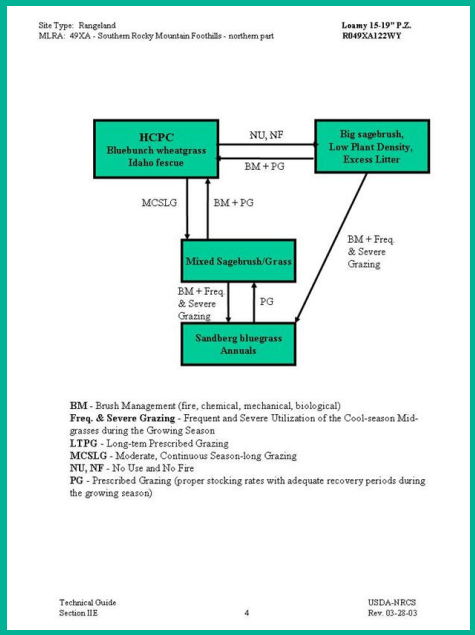


Think!

Monitoring

- **Where to begin?**
  - **Obtain an Ecological Site/Range Site Description**
  - **https://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=ESD**



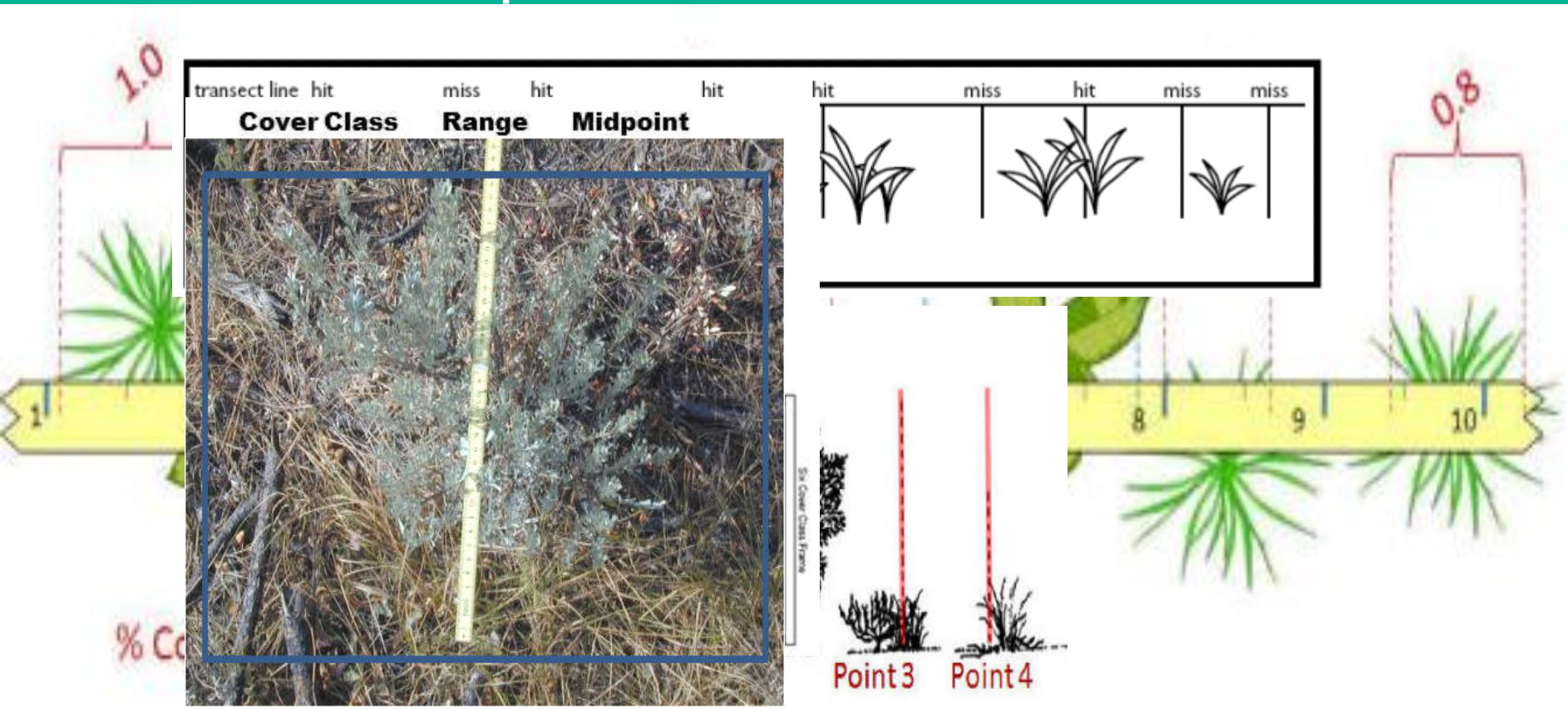


Monitoring

- **Most habitat assessments for sage-grouse include estimates of:** Connelly et al. 2003
  - Cover
  - Visual Obstruction
  - Height
  - Shape
  - Density
  - Frequency
  - Production

Cover

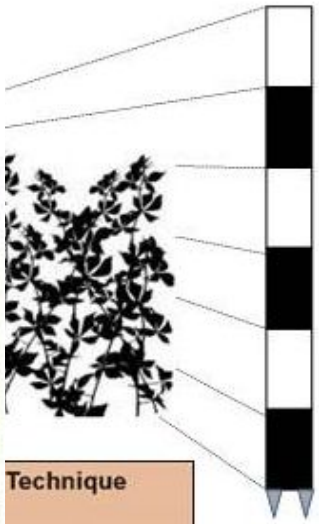
- **The projection of the crown or stems of the plant onto the ground surface (canopy & ground)**
  - **Common methods**
    - **Line Intercept**

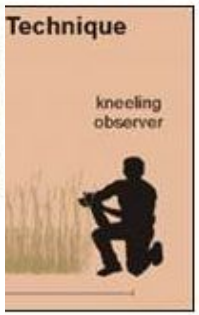


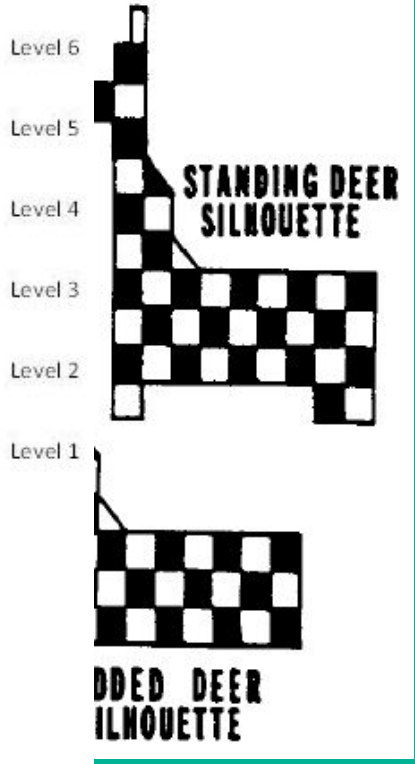
Visual Obstruction

(Plant Structure or Hiding Cover)

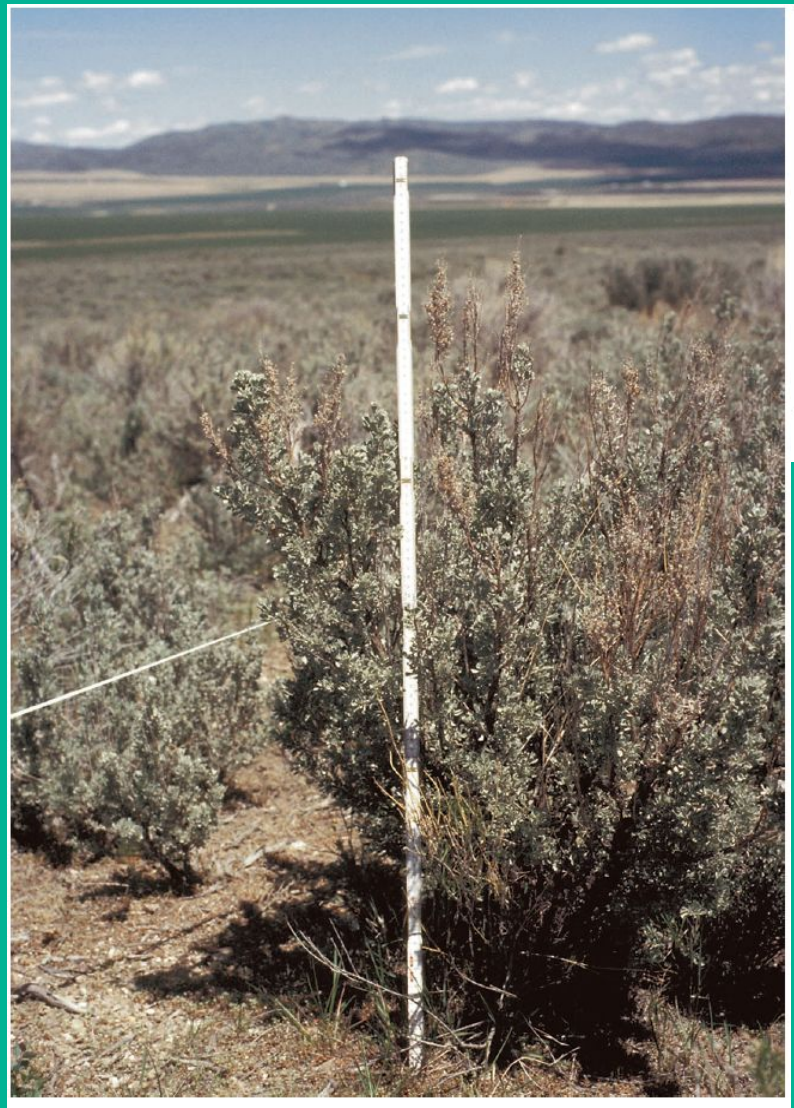
- **The way in which vegetation is arranged in 3-dimensional space**
  - **Robel Pole**

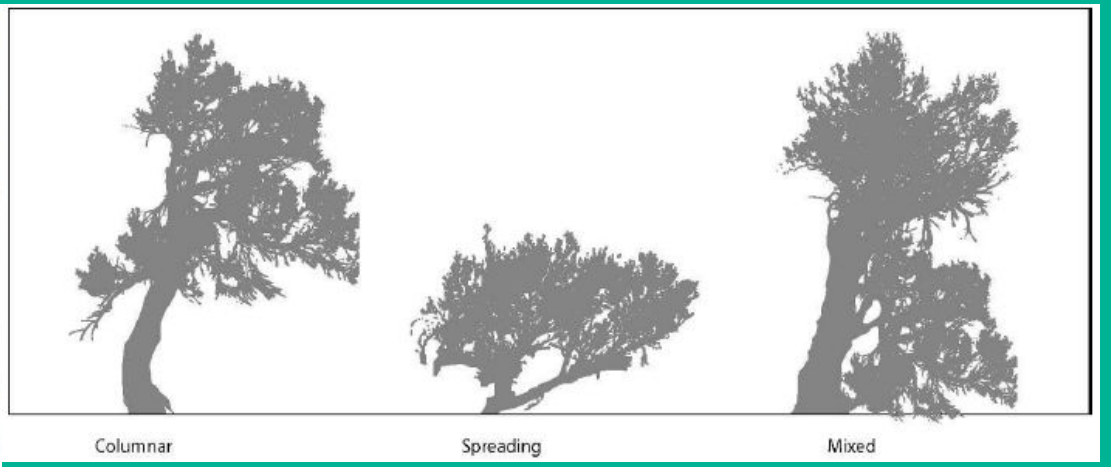






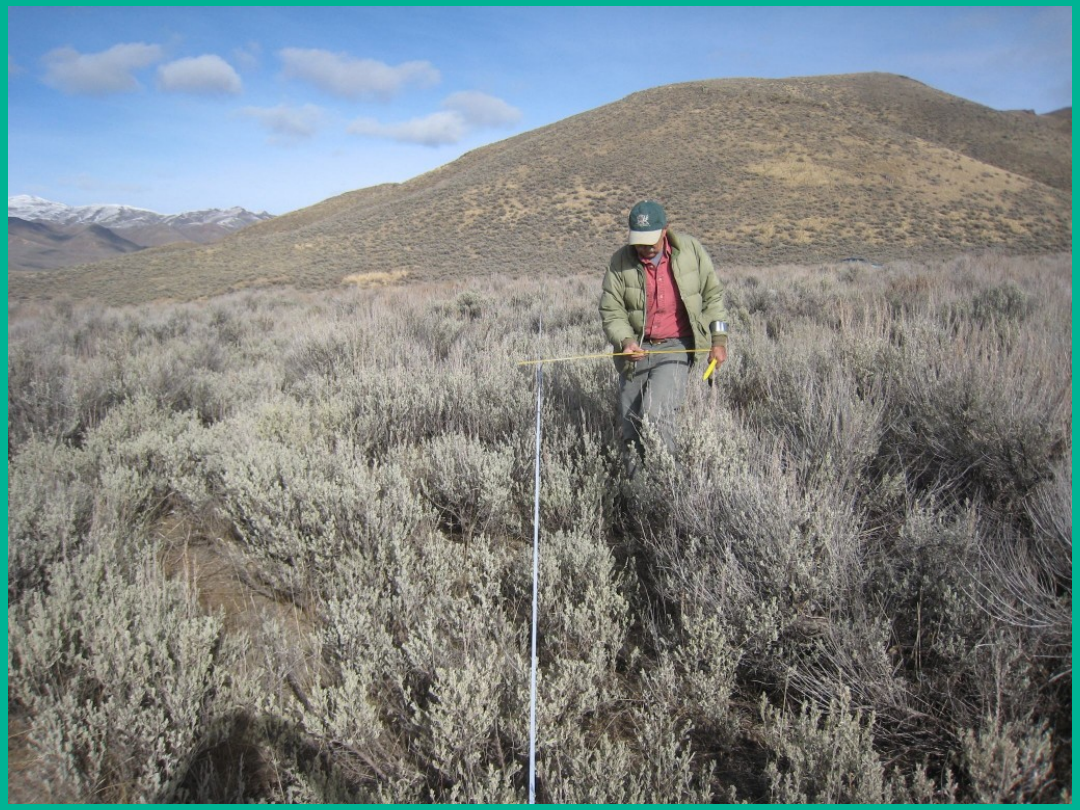
Plant Height
Sagebrush Shape





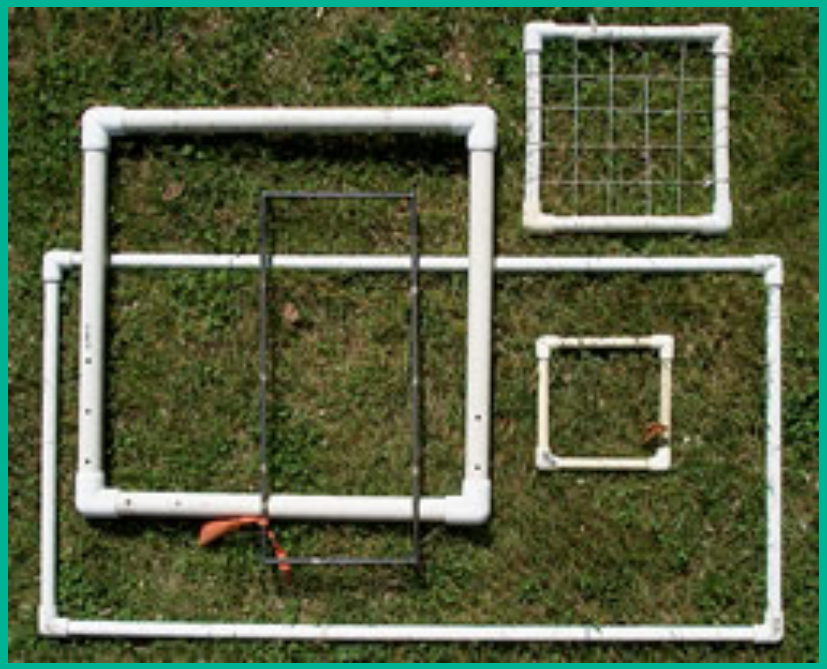
Density

- **Number per unit area**
  - **Can include age class**



Frequency

- How many times a plant occurs
  - Pace frequency
  - Nested frequency



Production

- Weight/unit area (lbs/ac, kg/ha, g/m^2)
- Clipping
- Double sampling

Riparian

- **Riparian Proper Functioning Condition (PFC)**
  - **A consistent approach for considering hydrology, vegetation, and erosion/deposition (soils) attributes and processes to assess the condition of riparian-wetland areas (Prichard et al. 1998, 2003).**
  - **Streams are either PFC, FAR ↑ ↓, or NF**

"We shall never achieve harmony with land, any more than we shall achieve absolute justice or liberty for people. In these higher aspirations the important thing is not to achieve, but to strive.“ Aldo Leopold