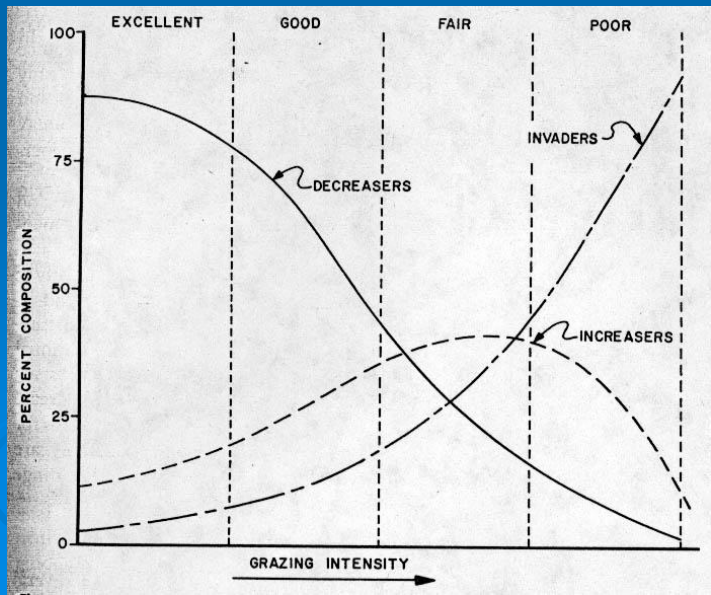
Monitoring Biological Soil Crusts

- Rangeland assessment
- Impacts of OHV
- Recovery post fire
- Indicator for surface disturbance
- Indicator for other plant species
- biodiversity

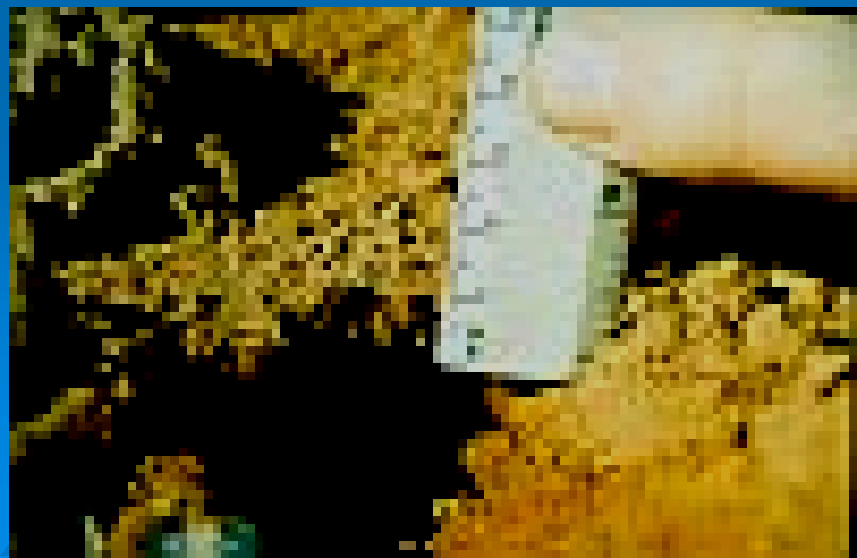


Monitoring

Why not use species level data?

Biological considerations

1. Bryophytes, lichens and Cyanobacteria functionally similar
2. Difficult to identify in the field
3. Is independent of continent, region or area



Why not use species level data?

Efficiency considerations

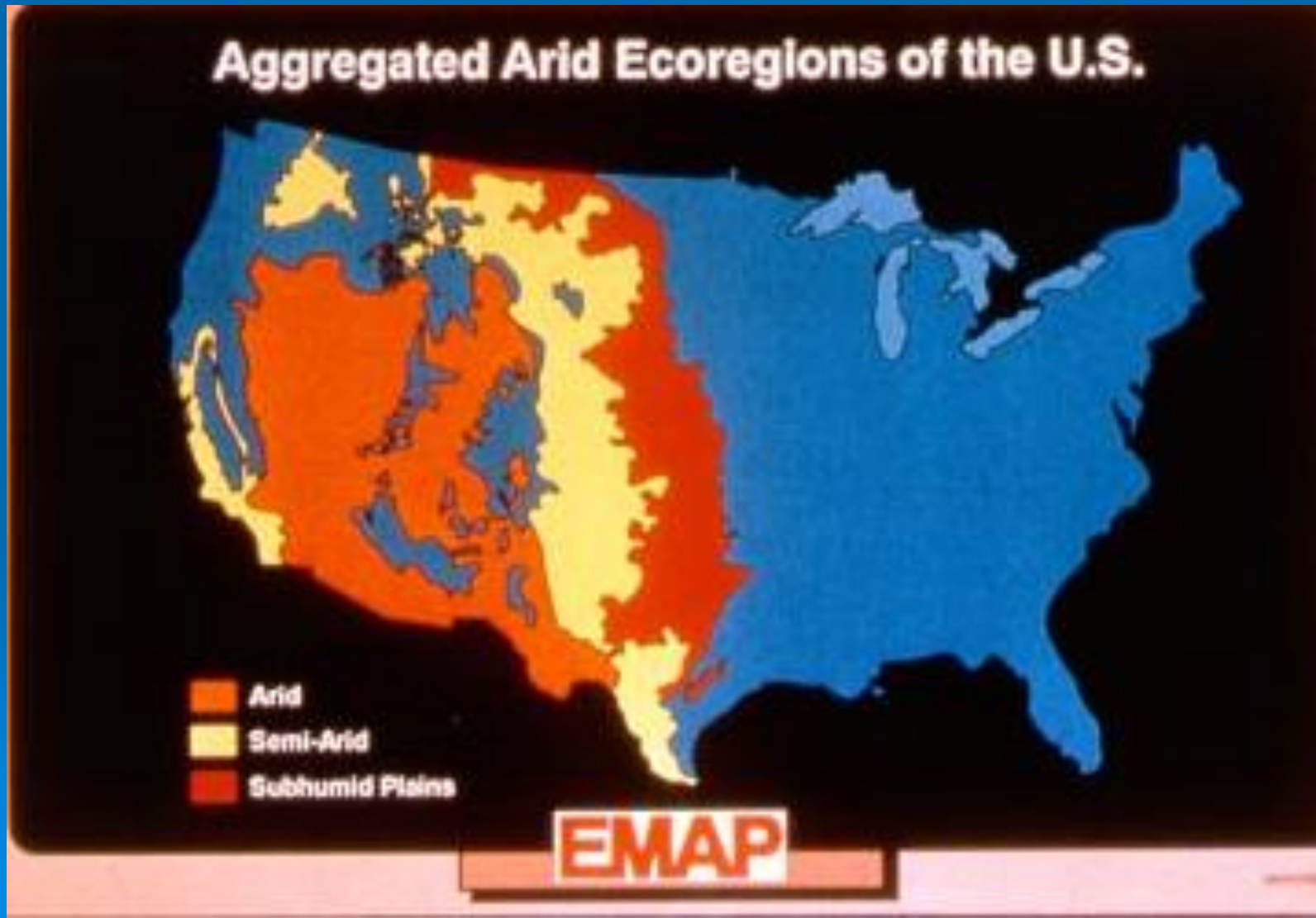
1. Easier to measure with less indecision and > repeatability
2. More rapid and statistically powerful data analysis
3. Rapid field measurements
4. Less costly to monitor

Rangeland Monitoring with crusts!

- Incorporate into standard monitoring procedures or it may never happen.
- Biological crusts are being displaced by exotic species.
- Ecologists have only recently recognized the value of these crusts.

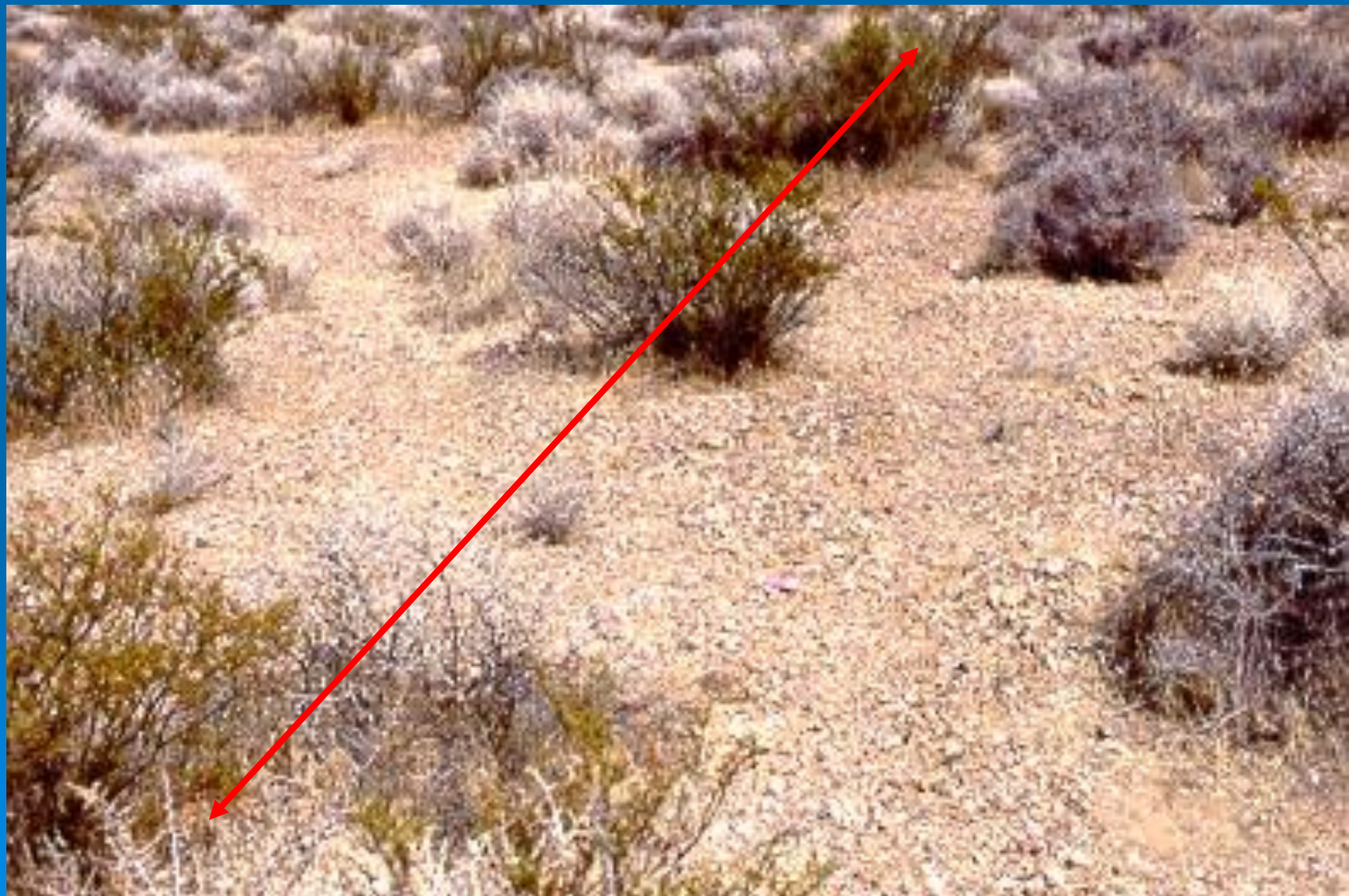

KENAI

Areas in the USA that this method is suitable

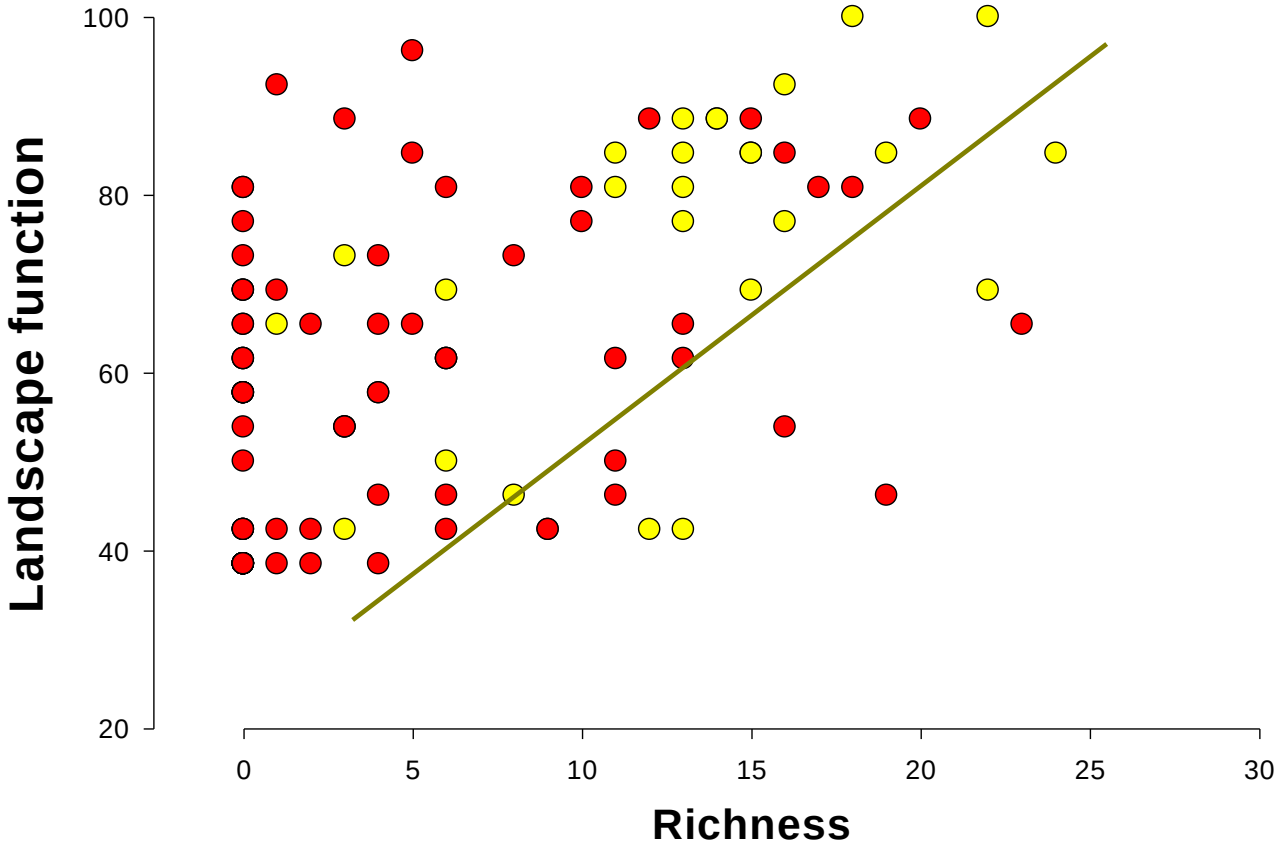


Arid habitat trend monitoring

The hydrologic effects of crusts



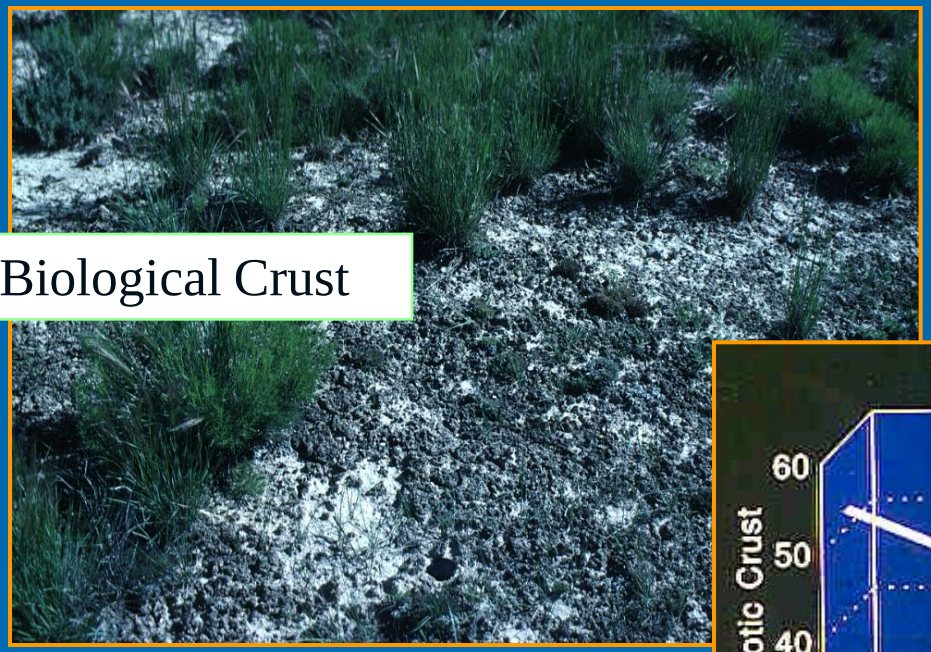
Crusts as useful indicators of site health



richness of the soil crust (# species) strongly correlated with increased index of landscape health (landscape function) Source: Cuddy (2000

Livestock and recreation disturbs the soil surface destroying biological soil crusts

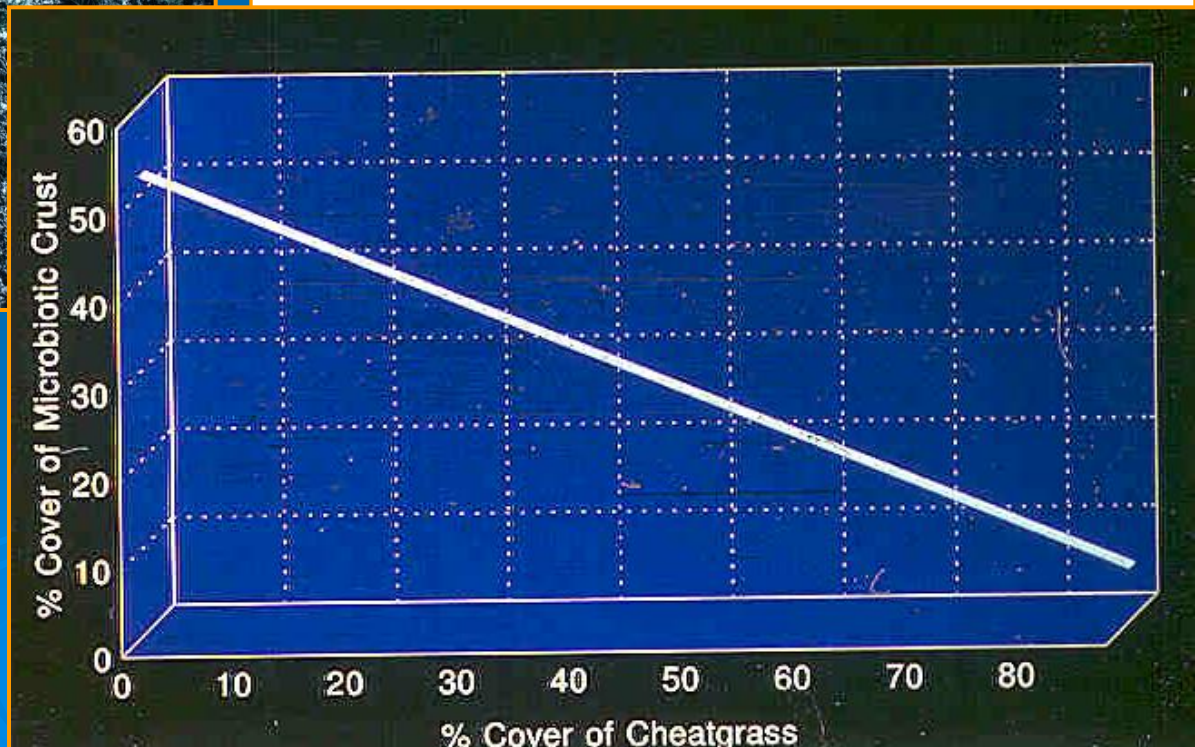
Biological Crusts: inhibits cheatgrass establishment



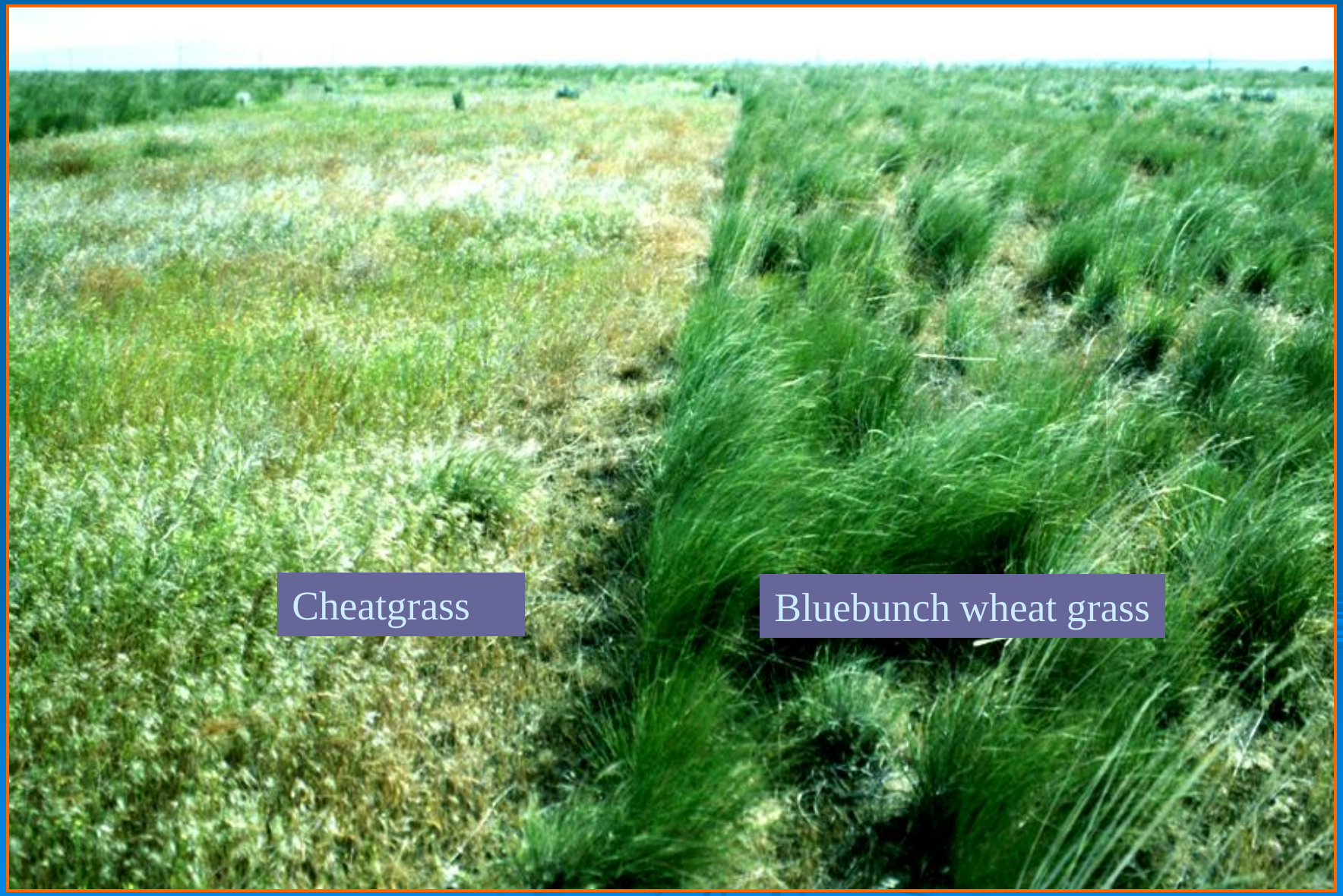
Biological Crust

As biological crust decreases, cheatgrass increases in interspaces in southwestern Idaho

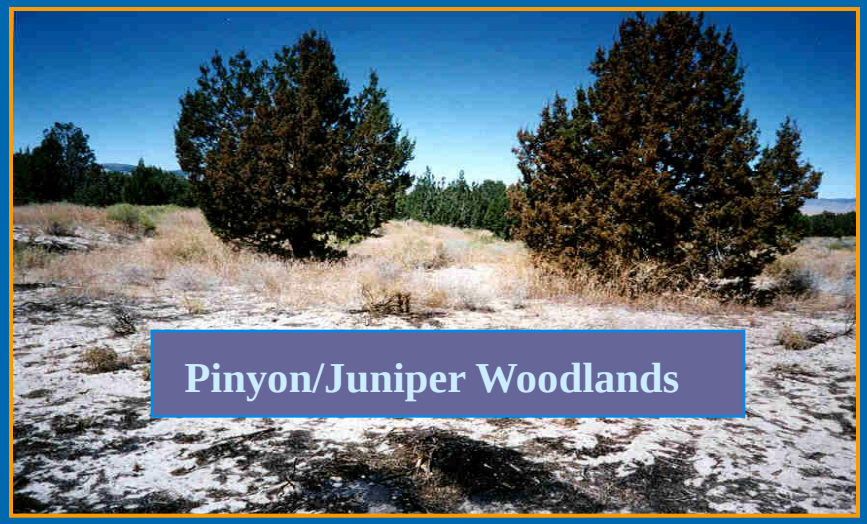
Lichens, mosses, cyanobacteria, & algae

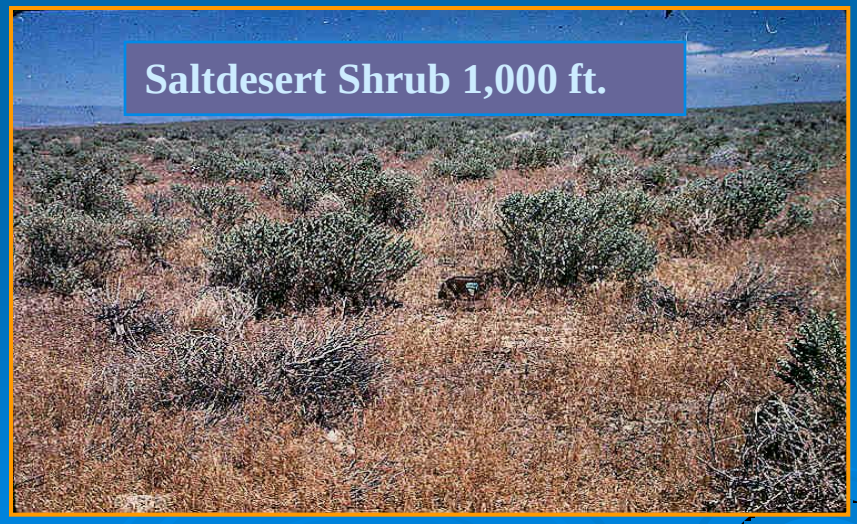


Native Grass Seeding



Suitable monitoring changes in veg structure in:



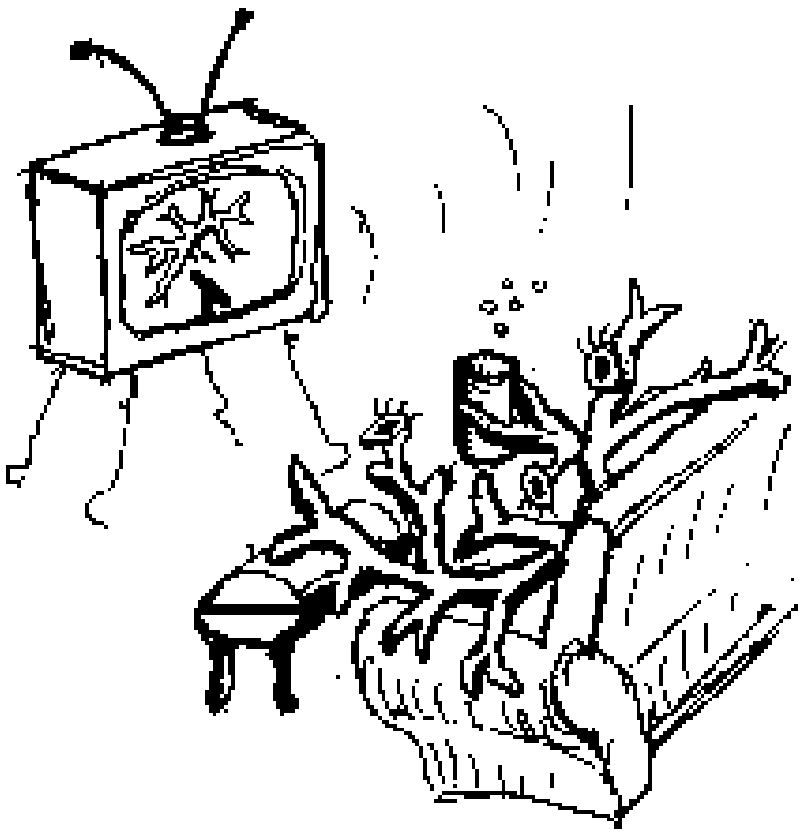


The following is a matrix of monitoring techniques and vegetation attributes that are described in this reference. The X indicates that this is the primary attribute that the technique collects. Some techniques have the capability of collecting other attributes; the • indicates the secondary attribute that can be collected or calculated.

Method	Frequency	Cover	Density	Production	Structure	Composition
Frequency	X	•				
Dry-weight-Rank	•			•		X[3]
Daubenmire	•	X				•
Line Intercept		X				•
Step Point		X				•
Point Intercept		X				•
Density			X			•
Double Weight Sampling				X		•
Harvest				X		•
Comparative Yield				X		•
Cover Board		X			X	
Robel Pole				•	X	

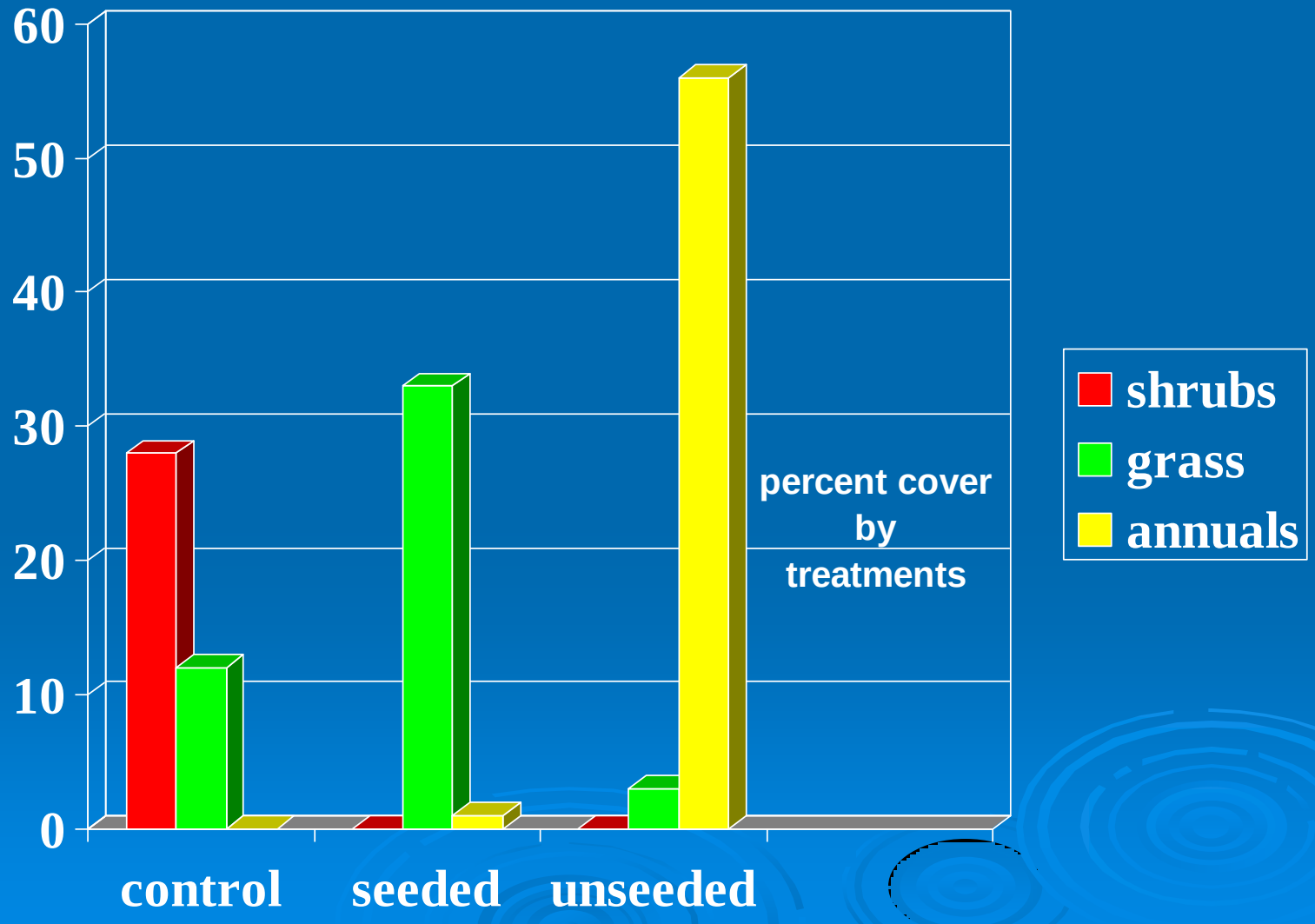
Different species different methods of monitoring

Hypogymnia inactiva



The green native grass is in contrast to the brown cheatgrass

Kuna Butte Rehab



A new view of biological soil crusts

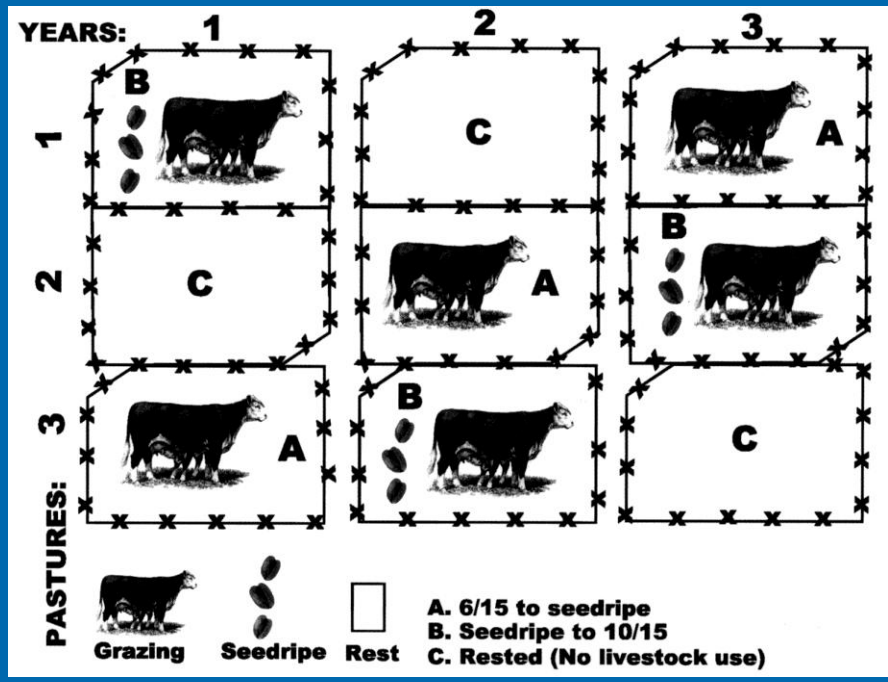
Vascular plant and crust sampling

Monitoring crusts

- Mark the line more exactly and more often each 5-10 m
- Stay on the downhill side of the line
- Moisten the line

Rangeland site potential for BSC influenced by:

- **Soil texture**
- **Veg type**
- **Grass type**
- **Annual precipitation**
- **% surface rocks**
- **Fire interval**
- **Current ecological condition**



Rangeland site potential for BSC influenced by:

	More Crusts
Soil texture	fine
Veg type	wy sage
Grass type	bunch grass
Annual precipitation	<12”
% surface rocks	>1% stable
Fire interval	>50 years
Ecological condition	late-seral

Potential for management actions to impact BSC's

- Livestock season of use
  - Summer and spring-
  - Early fall
  - Winter
- Vegetation utilization level
  - Severe to high >50%
  - Moderate <50%
  - Light <35%

Trampling is bad not grazing

- Soil disturbance creates niches for weeds and erosion
- Soil moisture and soil texture influence the degree of trampling

oil Crust ~~Prairie Dog~~ Watching. . .A Popular Tourist Activity Out West