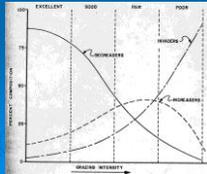


Monitoring Biological Soil Crusts

- 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!

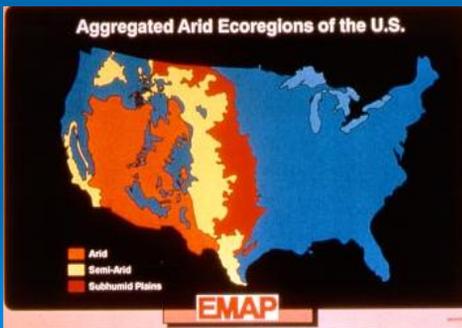
- Incorporate into standard monitoring procedures or it may never happen.
- Biological crusts are being displaced by exotic species.
- Ecologists have only recently recognized the value of these crusts.







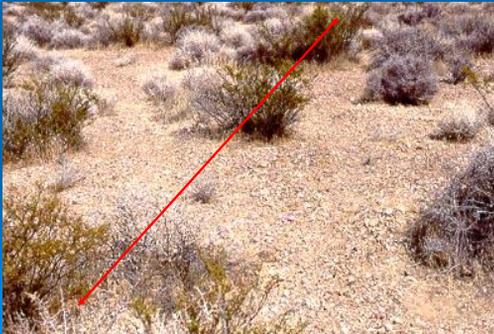
Areas in the USA that this method is suitable



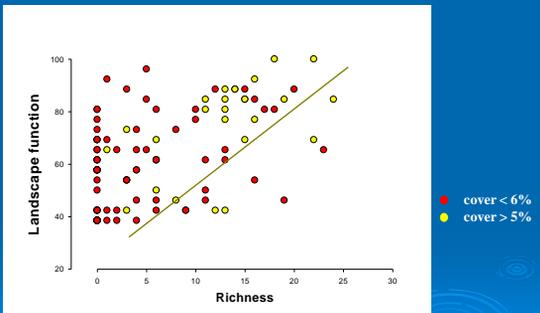
Arid habitat trend monitoring



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) [Schiegg et al. \(2007\)](#)

8/19/2008

Livestock and recreation disturbs the soil surface destroying biological soil crusts



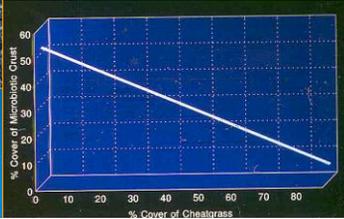
Biological Crusts: inhibits cheatgrass establishment



Biological Crust

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

Lichens, mosses, cyanobacteria, & algae



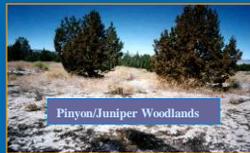
Native Grass Seeding



Suitable monitoring changes in veg structure in:



Yellowstone-7,000 ft.



Pinyon/Juniper Woodlands

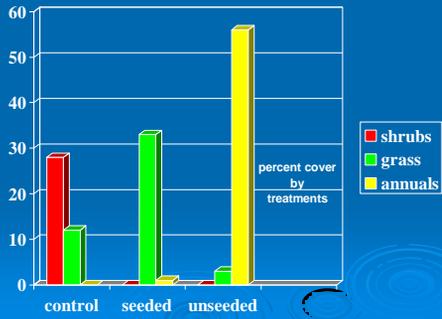


Salt Desert Shrub 1,000 ft.

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



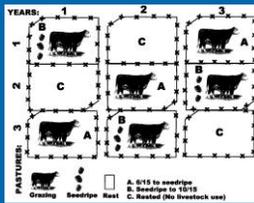
Monitoring crusts

- 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:

- **Soil texture** More Crusts 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

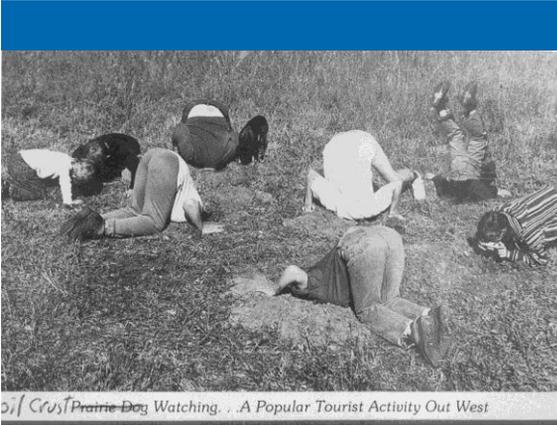
- **Livestock season of use**
 - Summer and spring-
 - Early fall
 - Winter
- **Vegetation utilization level**
 - Severe to high >50%
 - Moderate <50%
 - Light <35%



Trampling is bad not grazing

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





Prarie Dog Watching . . . A Popular Tourist Activity Out West