

Ecological relationships for Biological Soil crust cover



Why are there crusts on this soil?

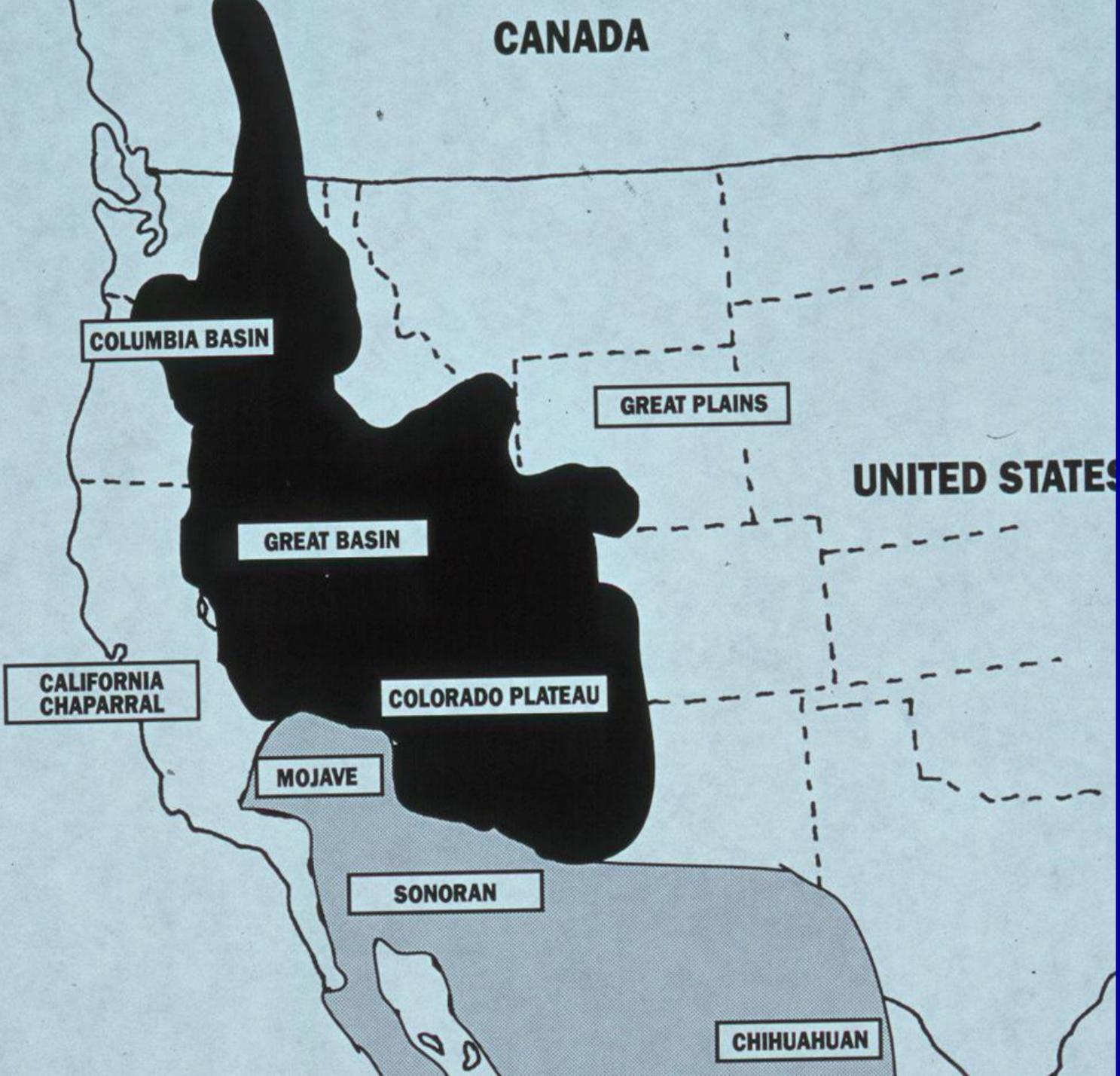


Crusts occur where they are needed

Soil crusts fill the spaces between bunchgrasses like chinking between logs in a cabin



CANADA



COLUMBIA BASIN

GREAT PLAINS

GREAT BASIN

UNITED STATES

**CALIFORNIA
CHAPARRAL**

COLORADO PLATEAU

MOJAVE

SONORAN

CHIHUAHUAN

Summary BSC cover is: Influenced by:

- Soil texture
- Vascular plant cover
- Elevation
- % rock cover
- Stability of the rocks
- Soil depth
- Type of climate cold/ hot deserts

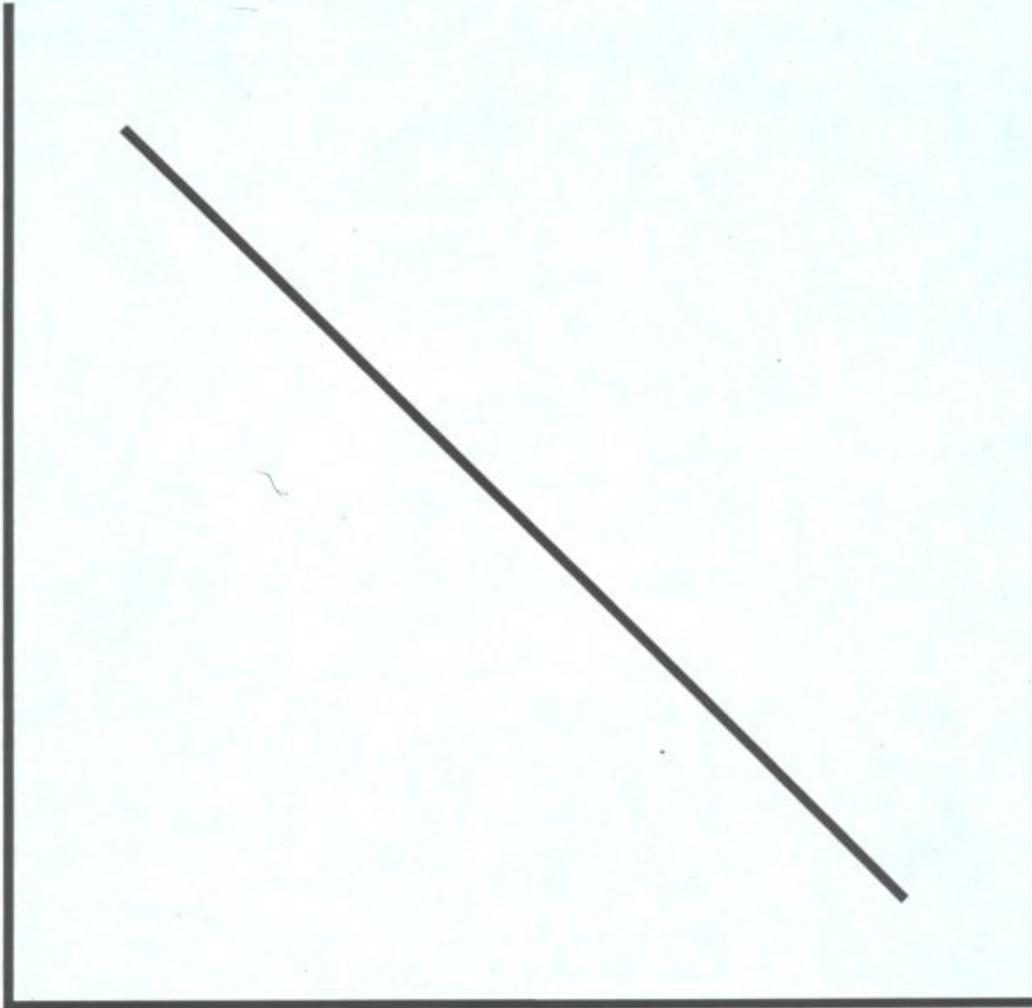
F

TOTAL CRUST COVER

High



Low



Fine



Coarse

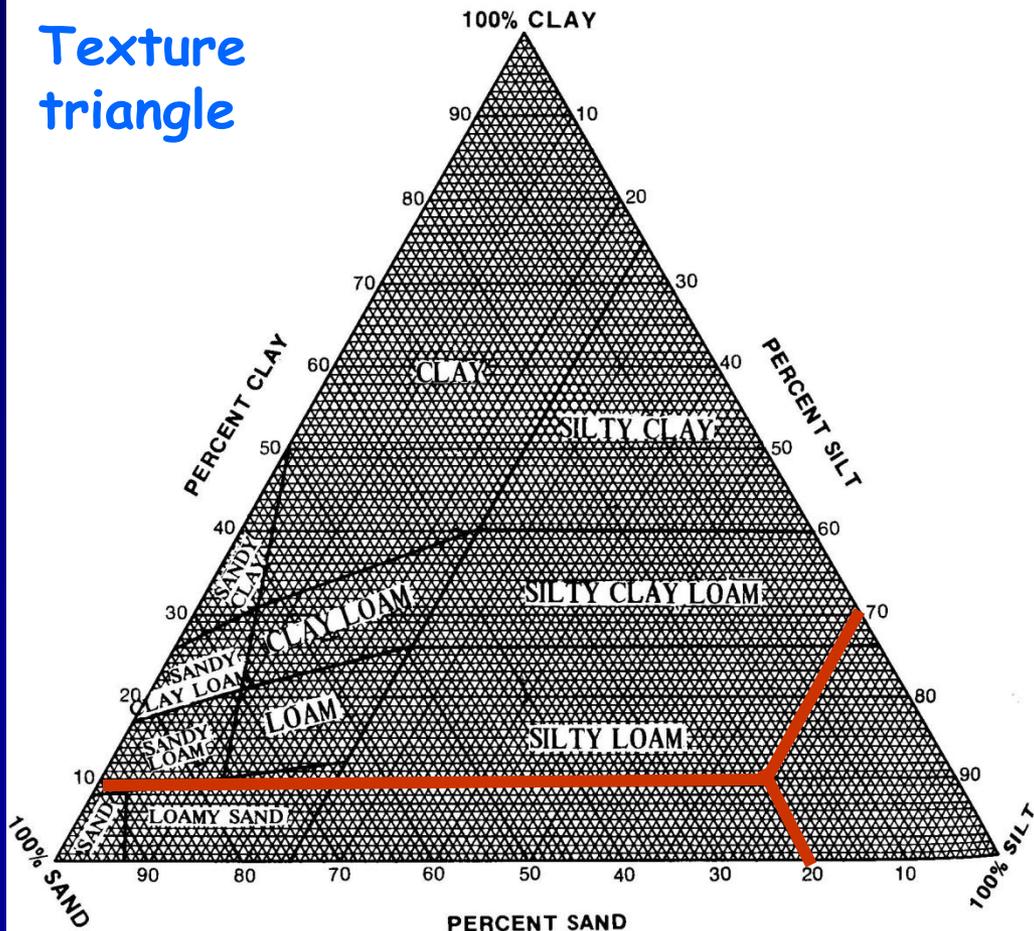
SOIL TEXTURE

Physical properties of soils (cont.)

Soil texture

- the relative proportions of sand, silt and clay in a soil

Texture triangle

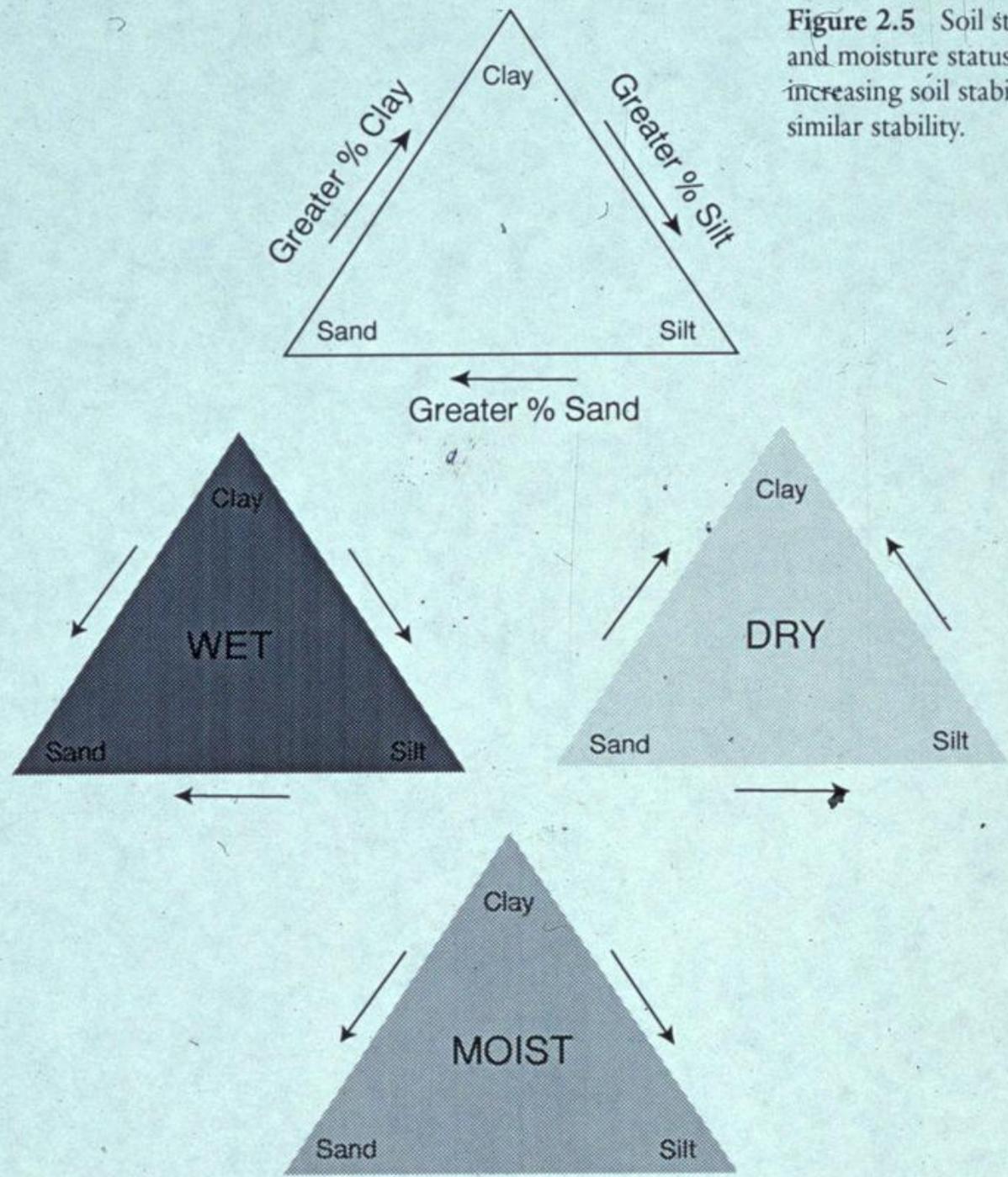


can be used to predict other soil properties e.g. water holding capacity or ability of the soil to adsorb cations from the soil solution

This soil contains 70% silt, 20% sand, 10% clay; therefore it is a

silty loam

Figure 2.5 Soil stability relative to texture and moisture status. Arrows indicate increasing soil stability. No arrow indicates similar stability.



		Soil Texture		
		Sand	Clay	Silt
Soil Moisture Content	Frozen	High	High	High
	Wet	Medium-High	Low	Medium
	Moist	Medium	Low	Medium
	Dry	Low	High	Medium-Low

A

TOTAL CRUST COVER

High



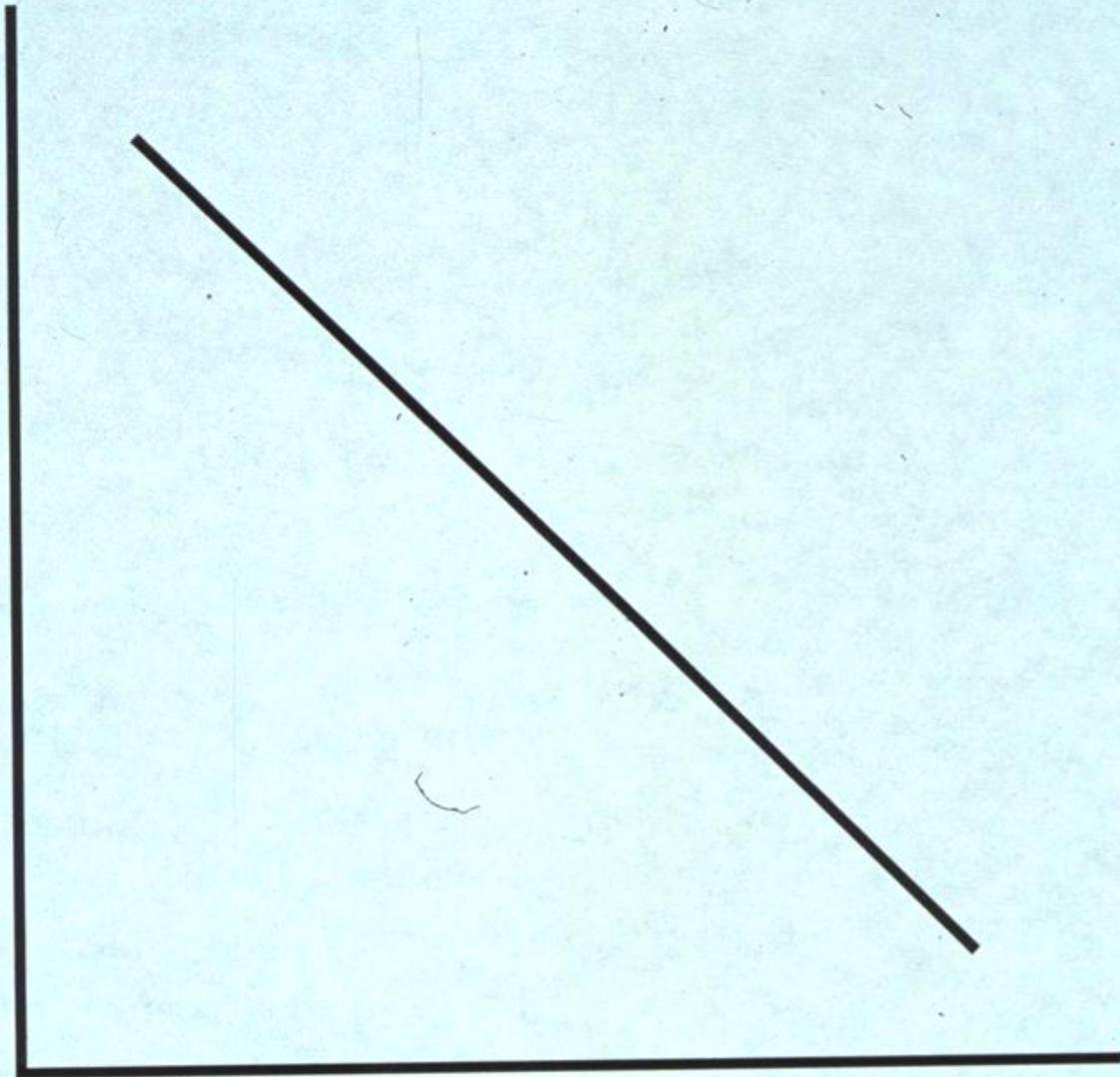
Low

Low



High

VASCULAR PLANT COVER





B

TOTAL CRUST COVER

High

Low

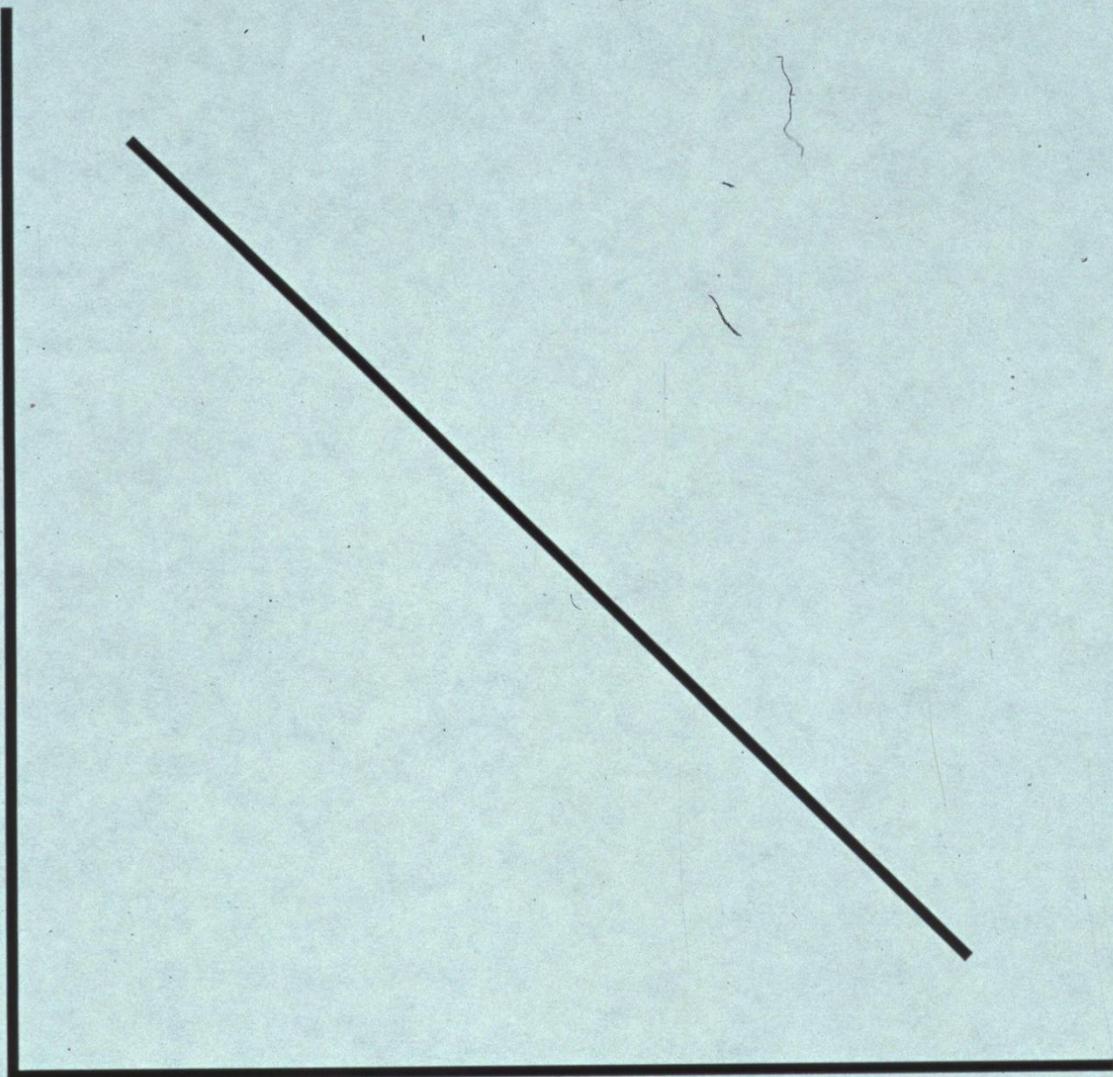


Low



High

ELEVATION



Potential crust cover is high



Potential crust cover moderate



Crust cover is low, too much vegetation



Crust potential?





TOTAL CRUST COVER

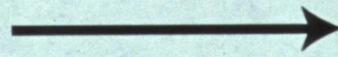
High

Low



Low

High

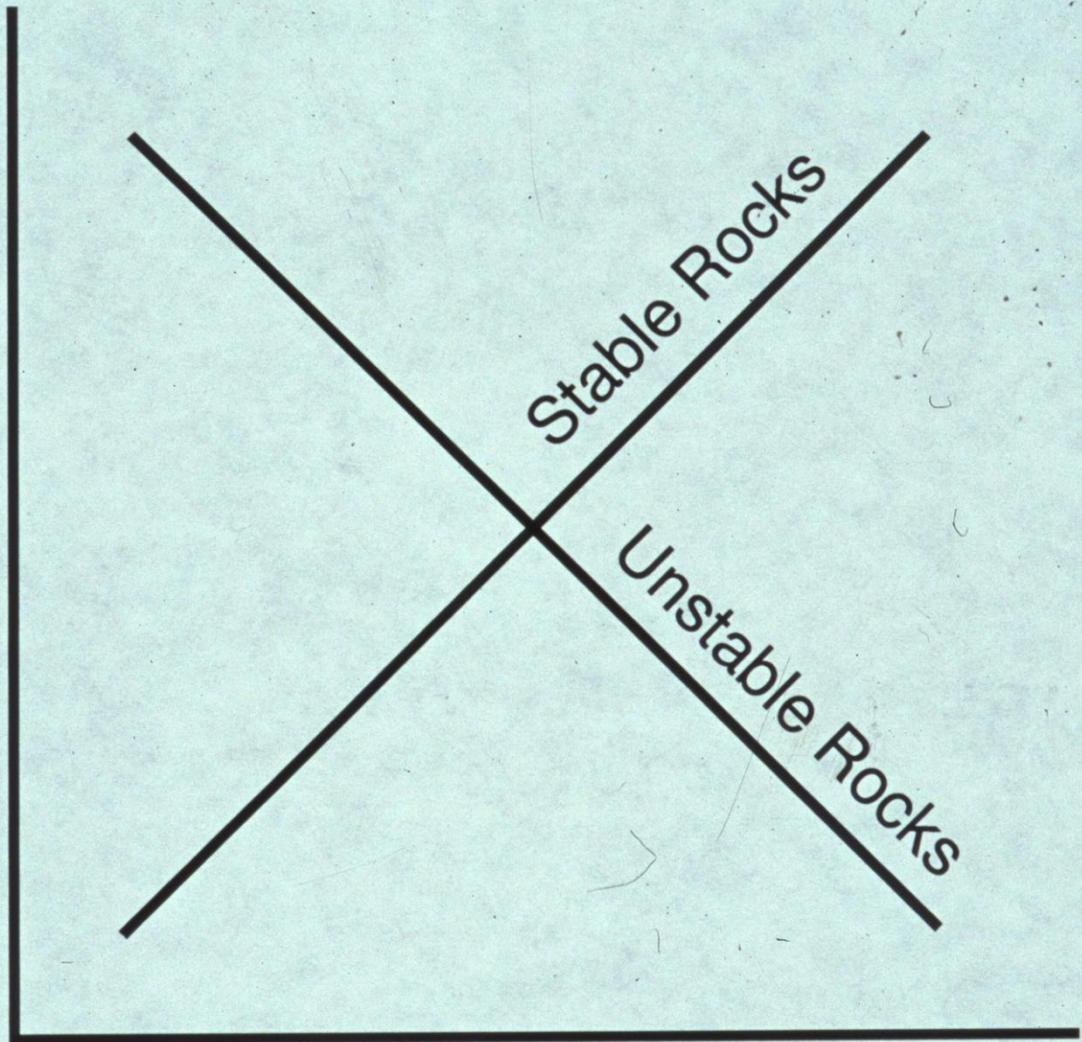


PERCENT ROCK COVER

Stable Rocks

Unstable Rocks

D



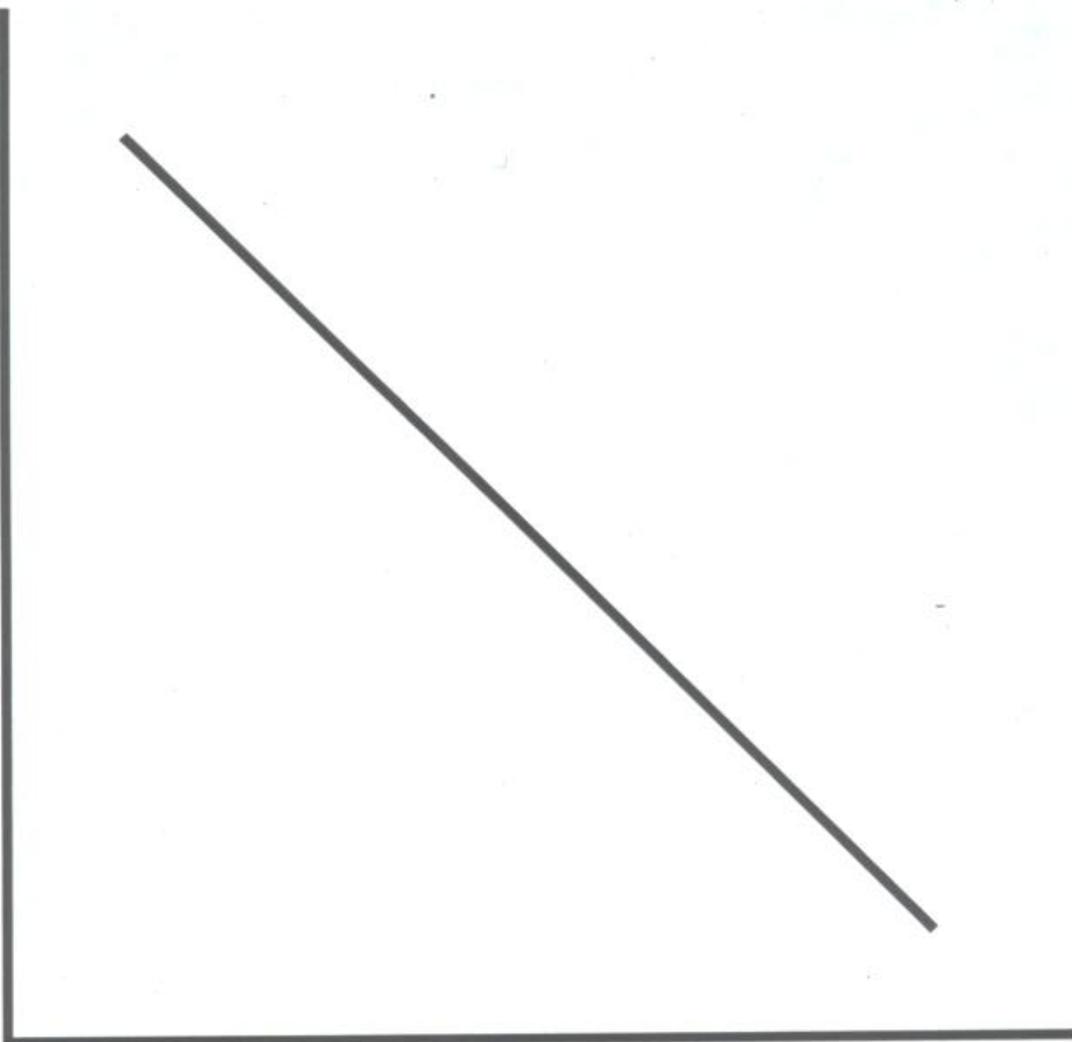
E

TOTAL CRUST COVER

High



Low



Shallow



Deep

SOIL DEPTH

Different soil depths have different amounts of soil crusts



Low to high soil temperature different N₂ fixers



Soil crust lichens that are calcium carbonate indicators

Low
Calcium carbonate

Acarospora schleicheri
Arthonia glebosa
Aspicilia reptans
Cladonia borealis
Diploschistes muscorum
Leptochidium albociliatum
Megaspora verrucosa
Ochrolechia upsaliensis
Placynthiella spp.
Xanthoparmelia wyomingica

High
Calcium carbonate

Aspicilia fruticulosa
Aspicilia hispida
Buellia elegans
Caloplaca tominii
Collema tenax
Fulgensia bracteata
Psora cerebriformis
Psora decipiens
Psora tuckermanii
Toninia sedifolia

The Ecology of Crusts depends on:

- Soil texture
- Climate
- Competing vascular vegetation
- Calcareous soil
- Spatial arrangement of vegetation
- Site disturbance history



W.O. 359306

10/8/37 C.
Boise Nation

The modified
grain drill
steep slopes
The drill is
the contour
steep as 70%

Why are there no crusts in this site?





Where are the biological soil crusts?



Crust are limited by

- OHV's
- Livestock trampling
- Wildfires
- & Other soil disturbances
 - Leads to bare ground
 - Dust
 - Recruitment of cheatgrass and other weeds



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