Barren, Wild, and Worthless: Evaluating Desert Plant Communities

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OK, but what if we’re interested in the plants for their own sake?

- ecological sites / state and transition models
  - rangeland health assessments
- biodiversity
  - species richness
  - floristic quality index

Ecological sites: edit.jornada.nmsu.edu

Ecosystem Dynamics Interpretive Tool

The Ecosystem Dynamics Interpretive Tool (EDIT) is an information system framework for the development and sharing of ecological site descriptions, ecosystem state and transition models, and land management knowledge.

What is EDIT?

The Ecosystem Dynamics Interpretive Tool was developed to offer natural resource professionals, scientists and others a standard framework for cataloging information about how ecosystems respond to different land uses, management practices, and natural phenomena. EDIT now serves as the primary repository of Ecological Site information produced by the USDA Natural Resources Conservation Service (NRCS). The framework is also being used to support the development of other ecological land classifications in the U.S. and elsewhere.

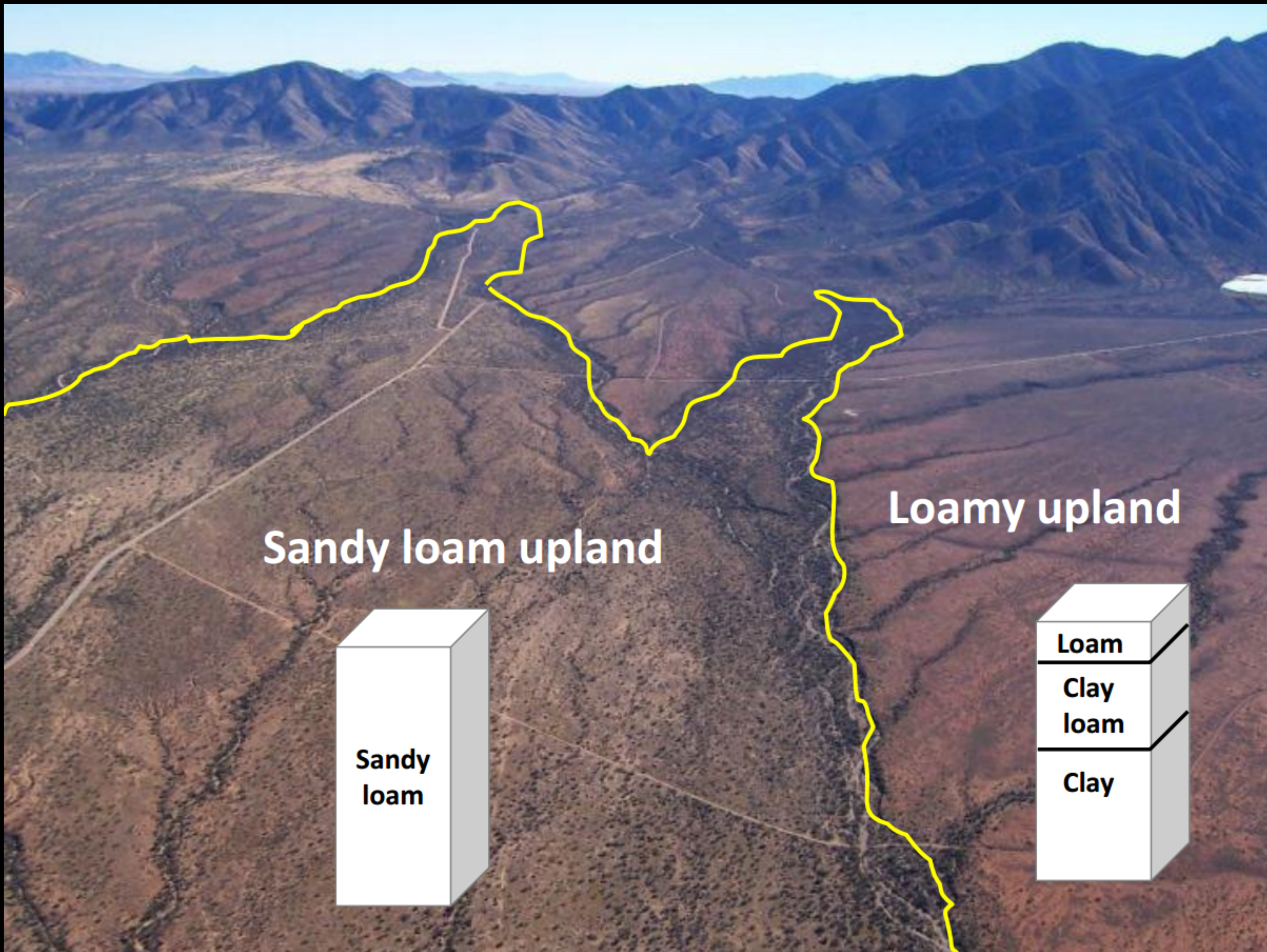
SELECT A DATA CATALOG TO GET STARTED

United States

ECOLOGICAL SITE DESCRIPTIONS

U.S. ECOLOGICAL SITE GROUPS

Ecological sites



Vegetation varies with:

- temperature
- precipitation

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- geomorphology

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- temperature
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- soils

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- temperature
- precipitation
- geomorphology
- soils
- disturbance:
    - grazing
    - fire
    - roads
    - recreation
    - oil / gas
    - wildlife
    - drought

Ecological sites

classify the land to account for variation in:

- temperature
- precipitation
- geomorphology
- soils

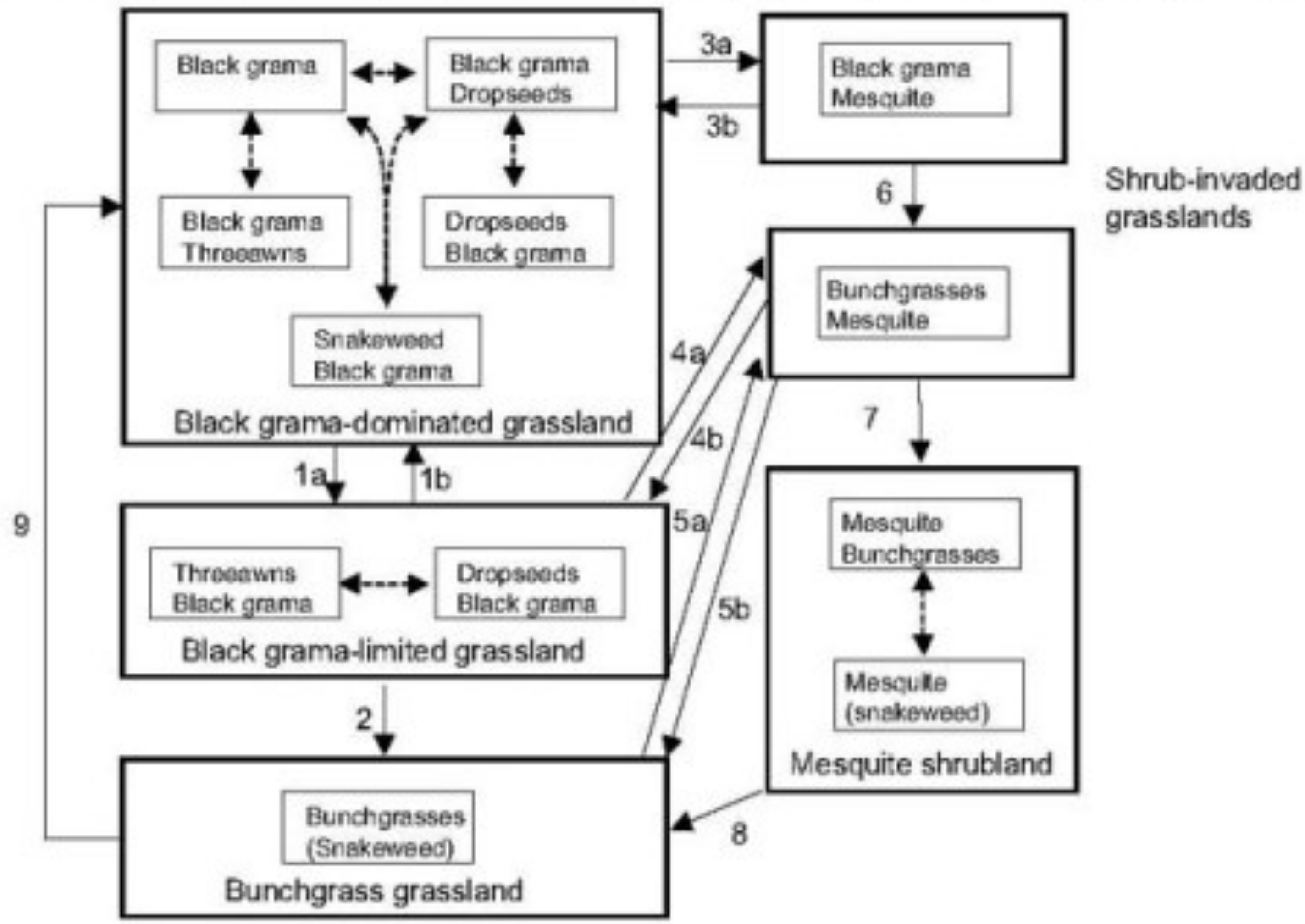
Ecological sites

so that residual variation is due to disturbance:

- grazing
- fire
- roads
- recreation
- oil / gas
- wildlife
- drought

MANAGEMENT

State and transition models!



1a. Climate change and/or overgrazing, moderate soil degradation. **1b.** Restoration of soil fertility (if climate not involved)
2. Extinction of black grama, severe soil degradation.
3a. Introduction of mesquite seeds, reduced grass competition, lack of fire. **3b**.Shrub removal, restoration of fuel loads and fire.
4a, **5a**. Mesquite invasion. **4b**, **5b**. Shrub removal, restoration of fuel loads and fire.
6a. Black grama extinction due to mesquite competition and grazing. **6b.** Shrub control with black grama restoration.
7. Continued grass loss (e.g. overgrazing), inter-shrub erosion, soil fertility loss, high soil temperatures, small mammal herbivory. **8**. Dune destruction, mesquite removal, soil stabilization, nutrient addition, seeding during wet periods.
9. Reseeding, replanting with restoration of soil fertility.

State 1. Black grama (*Bouteloua eriopoda*) grassland.

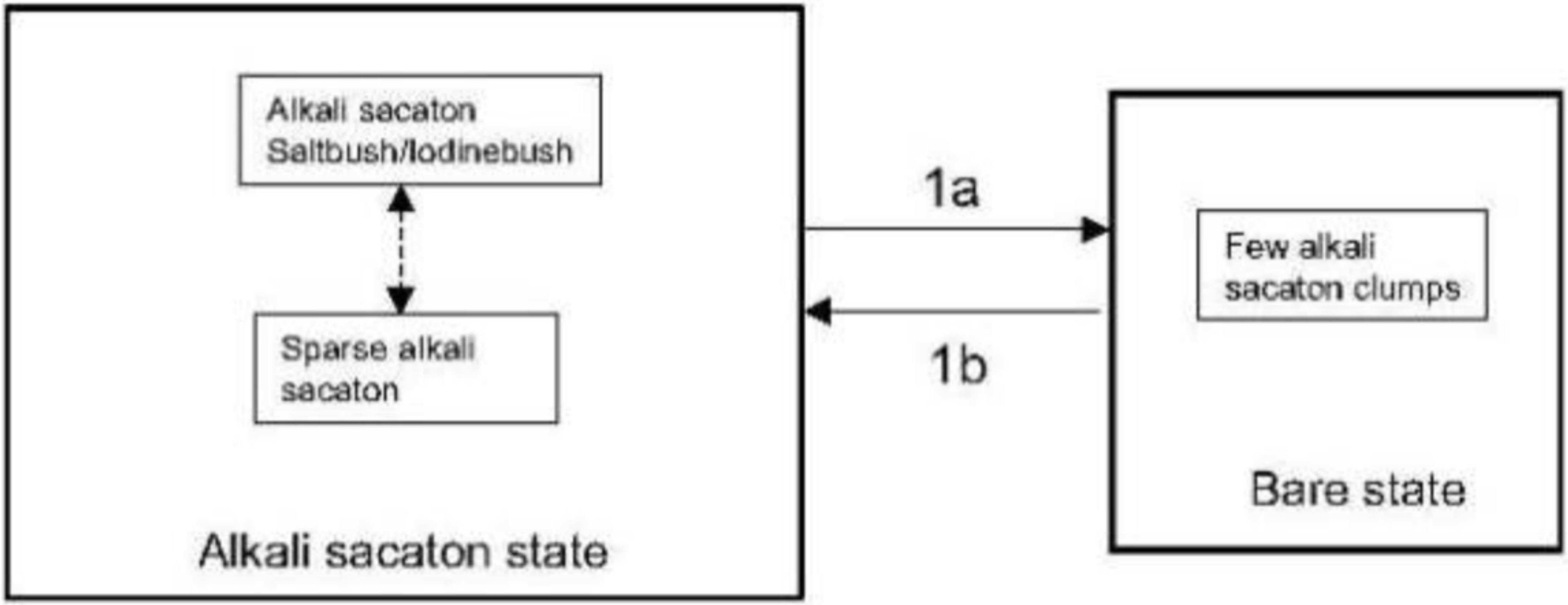
State 3. Bunchgrass grassland (mesa dropseed, *Sporobolus flexuosus*).

State 4. Black grama (*Bouteloua eriopoda*) / mesquite (*Prosopis glandulosa*)

State 6. Mesquite (*Prosopis glandulosa*) shrubland

Another example.

State-Transition model: MLRA 42, SD-2 and 3, Salt flats



1a. Interruption of run-in water, soil sealing
1b. Restore run-in water, increase soil permeability, seeding

State 1. Alkali sacaton (*Sporobolus airoides*) grassland

State 2. Bare (annuals don’t count in this context!)

Is this site in good condition?

Species richness: raw number, may be misleading

Coefficient of conservatism: 0-10 scale

0 = non-native

1 = native, but more abundant in disturbed sites

2 = native, ubiquitous, occurs in highly disturbed sites

5 = mostly in natural lands, but not too picky about quality

9 = very sensitive to disturbance, but not limited to pristine sites

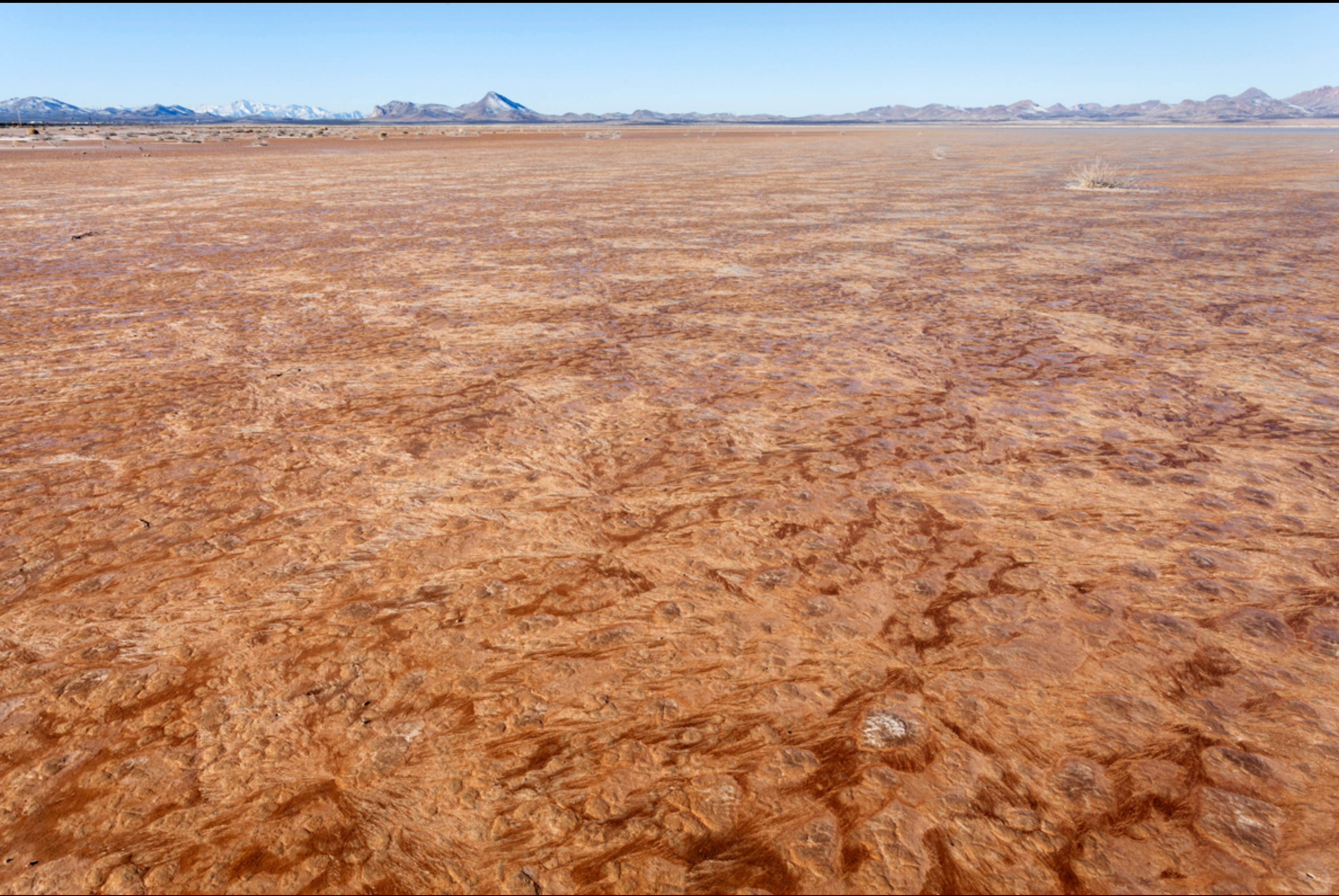
10 = very sensitive to disturbance and not found in disturbed sites

Floristic quality index

$$FQI = average\ C\ of\ C \times \sqrt{number\ of\ species}$$

FQI varies from 0 to 42 for 10 m radius plots in Las Cruces District Office.

FQI = 0 species richness = 0



FQI = 6 species richness = 8

FQI = 9 species richness = 14

FQI = 12 species richness = 22

FQI = 13 species richness = 19

FQI = 8 species richness = 8

FQI = 17 species richness = 17

FQI = 36 species richness = 43

FQI = 35 species richness = 29

FQI = 35 species richness = 31

Noticing a trend?

Ecological sites

classify the land to account for variation in:

- temperature
- precipitation
- geomorphology
- soils

Where do we go from here?

Ideally, we probably want a measure that takes into account:

- historical / reference plant communities
- biodiversity, with an FQI-like approach

and:

- controls for abiotic variation

And, if we have time, a few cute desert plants…

broadfruit combseed (*Pectocarya platycarpa*)

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Bartlett daisy (*Bartlettia scaposa*)

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Bartlett daisy (*Bartlettia scaposa*)

low cryptantha (*Cryptantha pusilla*)

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