

Lets not reinvent the wheel: Using very old school strategies for cheap and easy restoration success

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In arid systems, successful restoration is hard



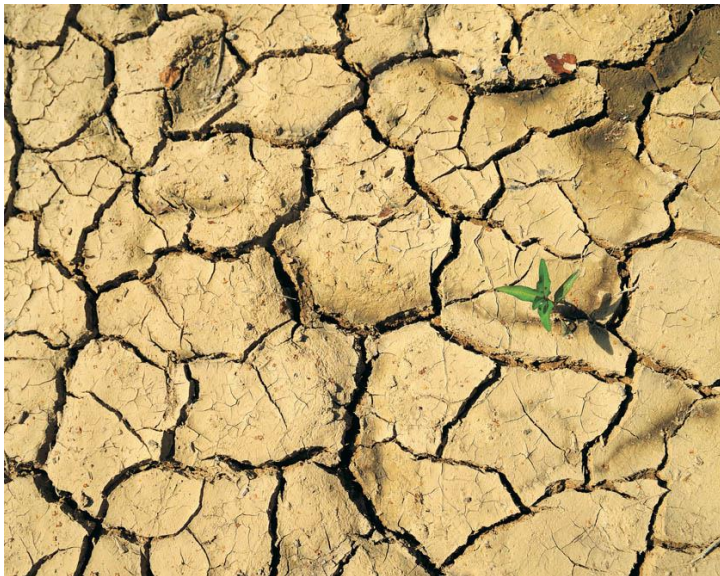
In arid systems, successful restoration is hard

< 5% success in seeding efforts in the arid western US



# In arid systems, successful restoration is hard

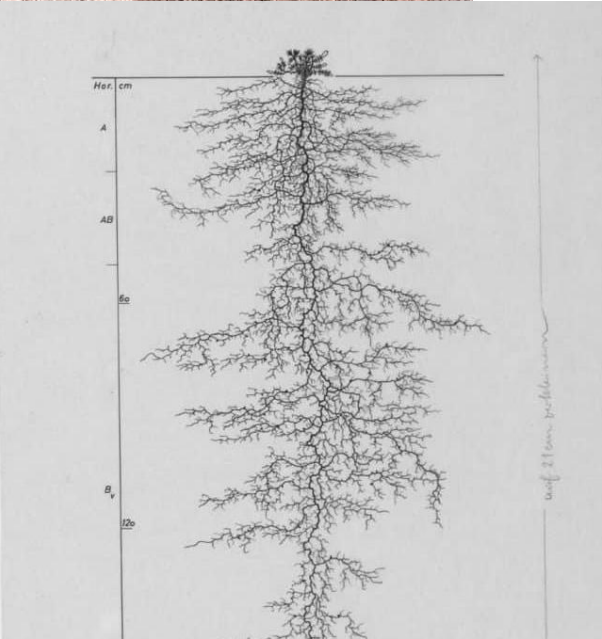
- Low availability of moisture
- Infrequent and, often, unreliable rain events
- Seed loss to desiccation stress, wind, and seed eating animals
- Seedling loss to desiccation stress and animals



Mark Dimmitt 1980

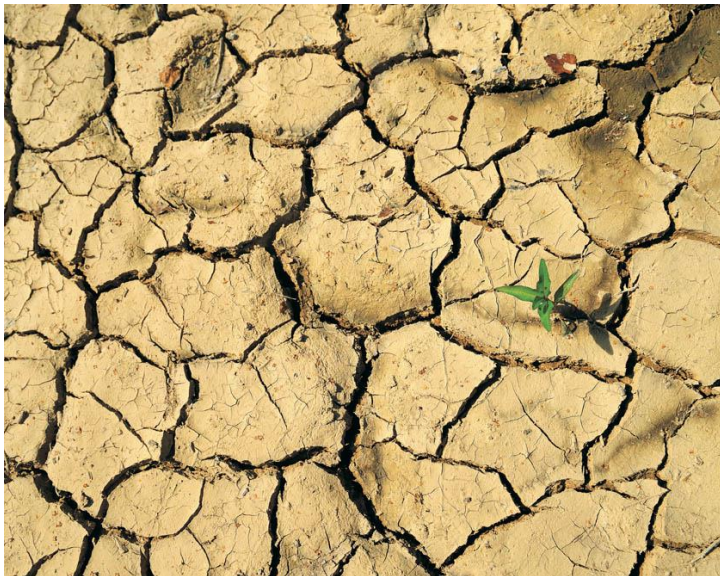
In order for techniques to be widely used, they need to be

- Logistically simple**
- Inexpensive**
- Easy to scale up**



# In arid systems, successful restoration is hard

- Low availability of moisture
- Infrequent and, often, unreliable rain events
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- Seedling loss to desiccation stress and animals



Mark Dimmitt 1980

Rain is scarce and unpredictable



# Rain is scarce and unpredictable

**1. Choose to seed in sites that provide slight, localized protection from drought effects**

**2. Employ structures that provide slight, localized protection from drought effects**



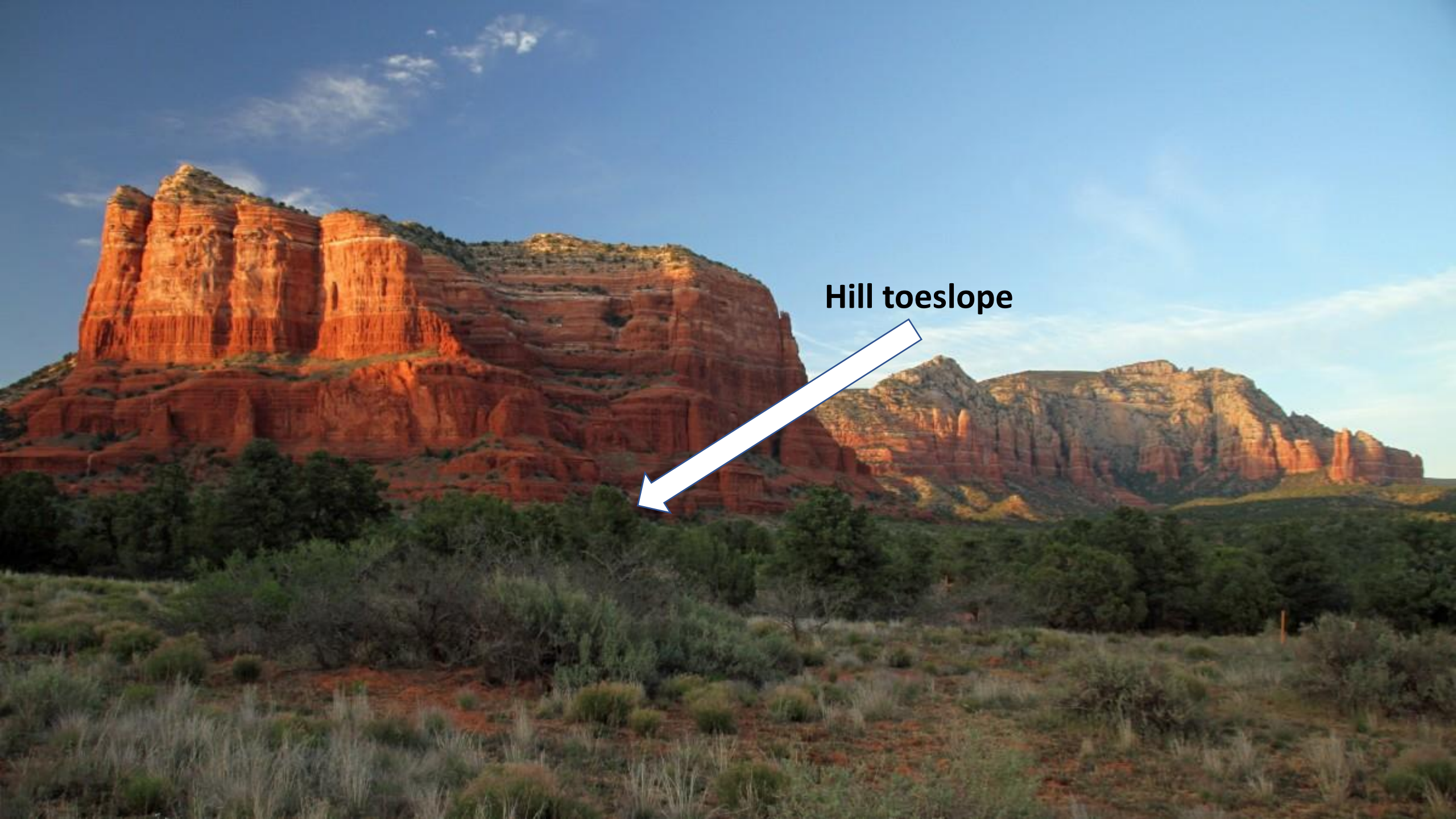
# Rain is scarce and unpredictable

**1. Choose to seed in sites that provide slight, localized protection from drought effects**

**- Fertile islands**

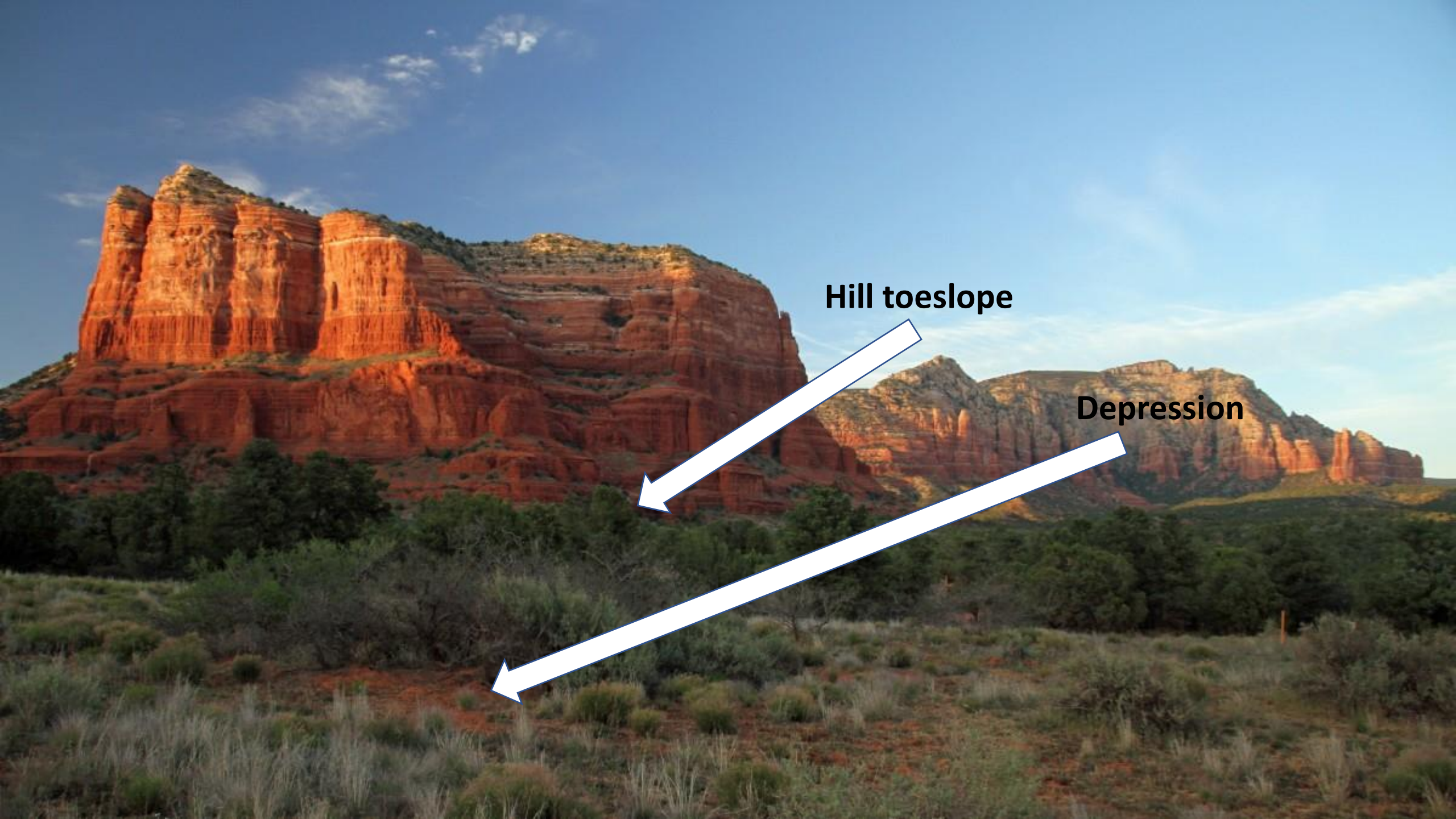
**2. Employ structures that provide slight, localized protection from drought effects**





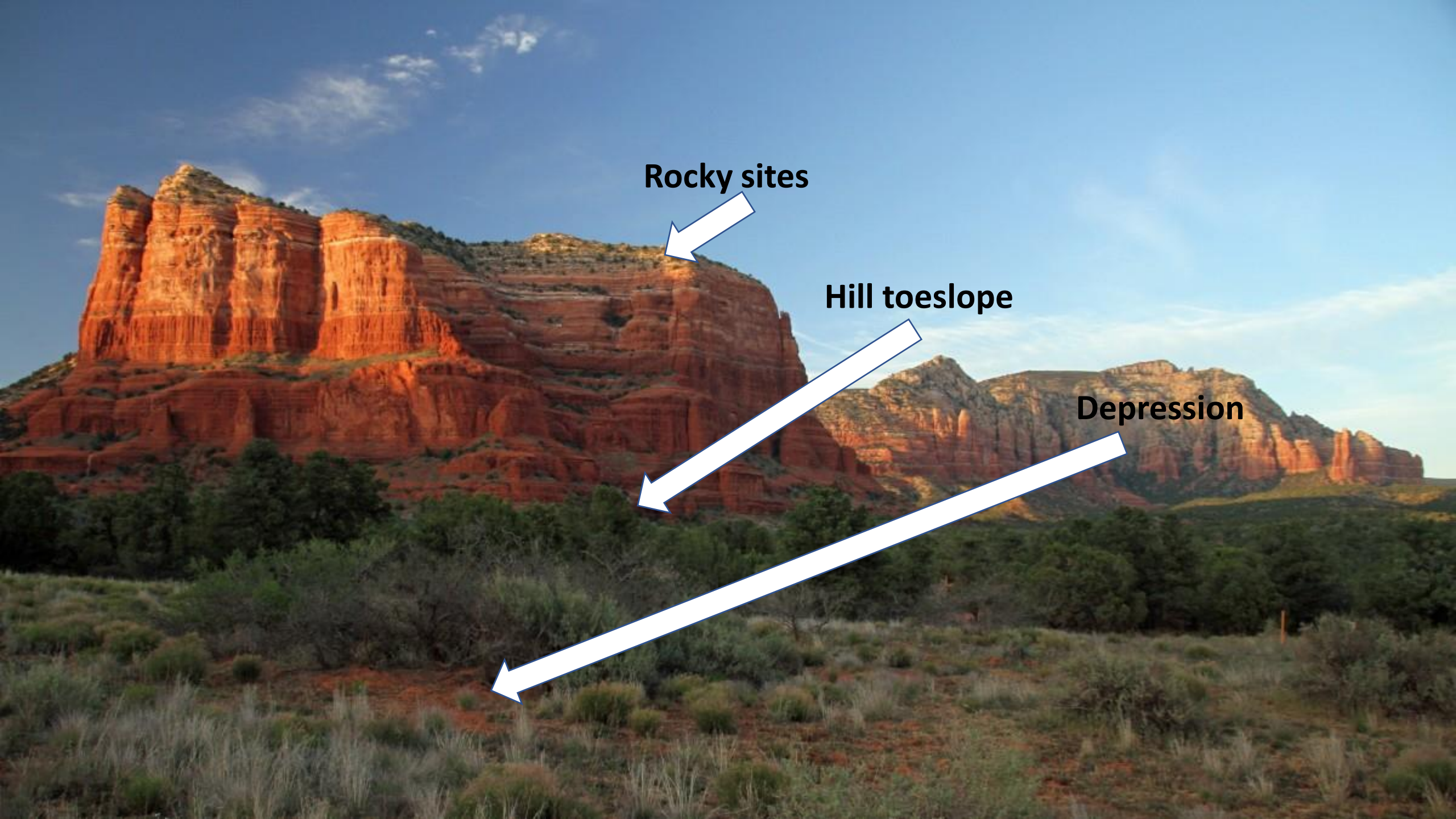
**Hill toeslope**





**Hill toeslope**

**Depression**



**Rocky sites**

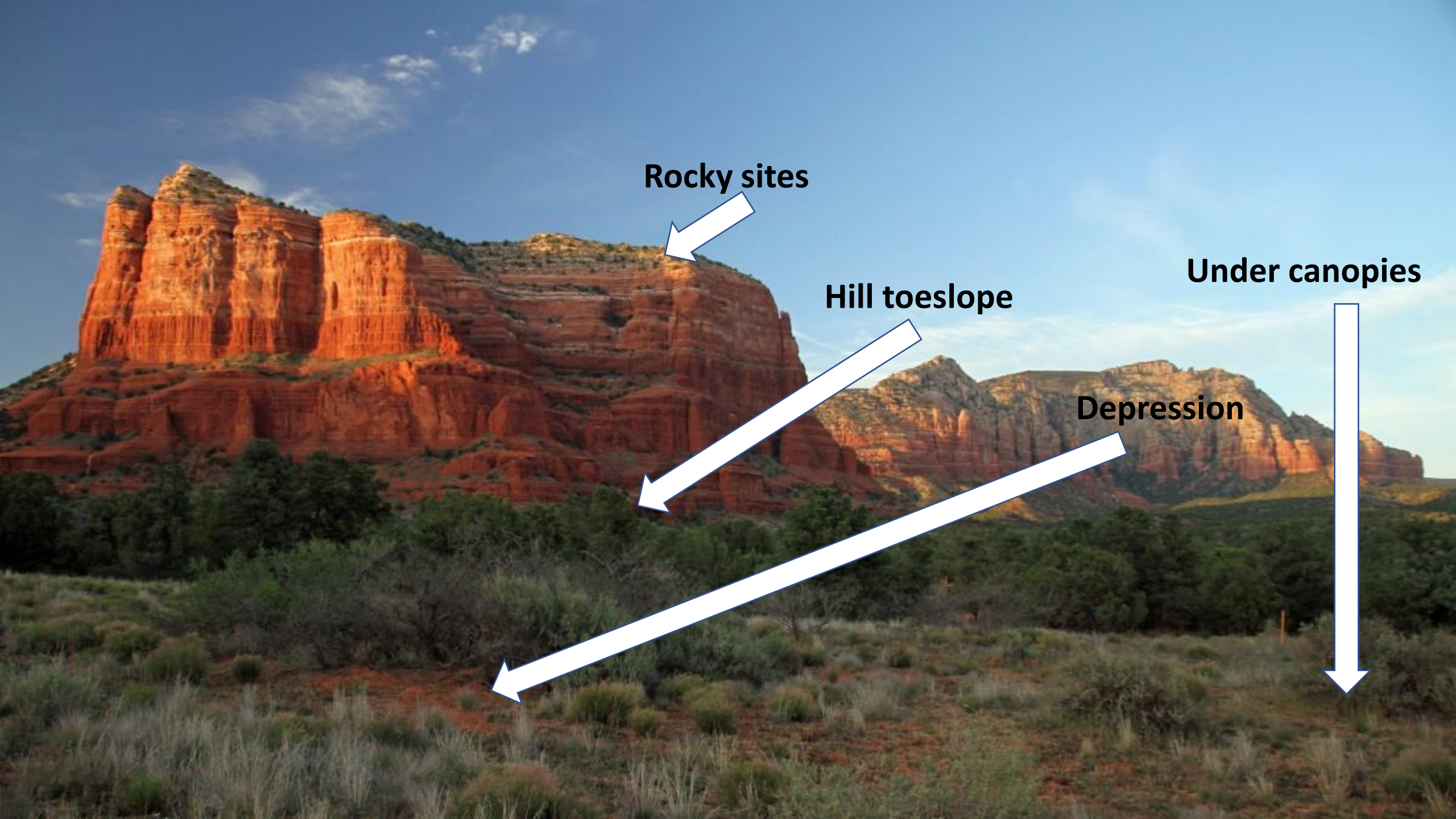


**Hill toeslope**



**Depression**





**Rocky sites**



**Hill toeslope**



**Under canopies**



**Depression**





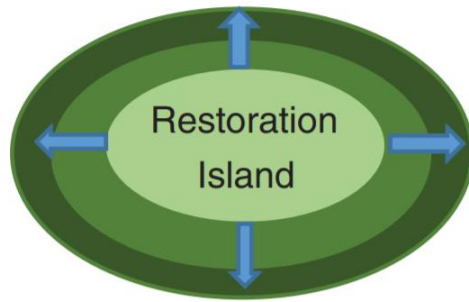
© az plant lady



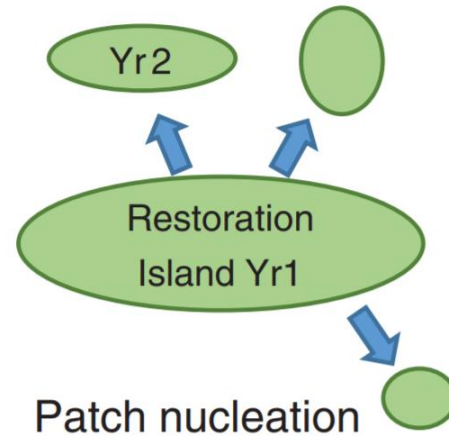
Fertile islands

# Fertile islands

## (C) Spread



Bullseye nucleation



Patch nucleation



# Rain is scarce and unpredictable

**1. Choose to seed in sites that provide slight, localized protection from drought effects**

**- Fertile islands**

**2. Employ structures that provide slight, localized protection from drought effects**

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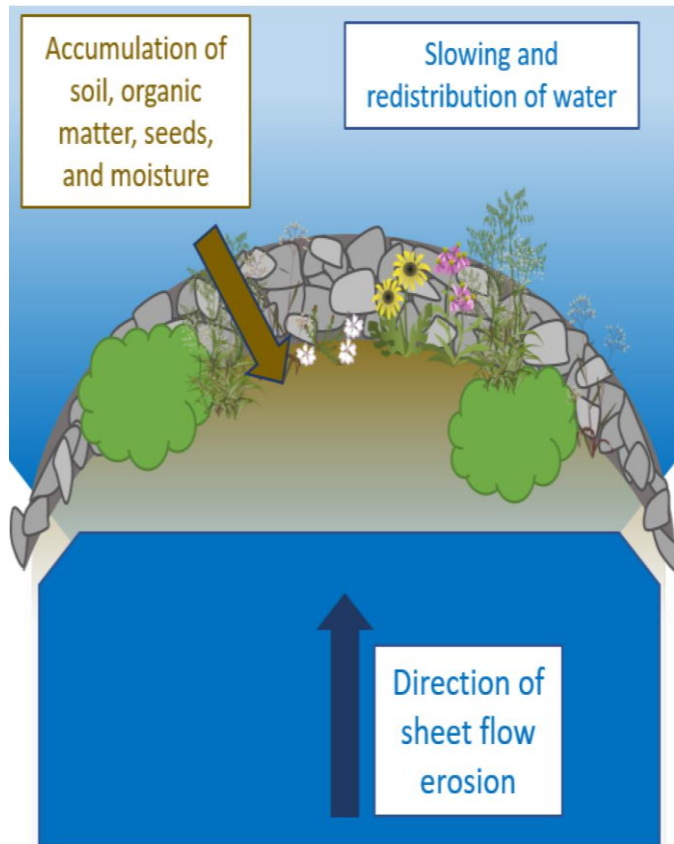
**- Rock lunas**

**- Branch piles**



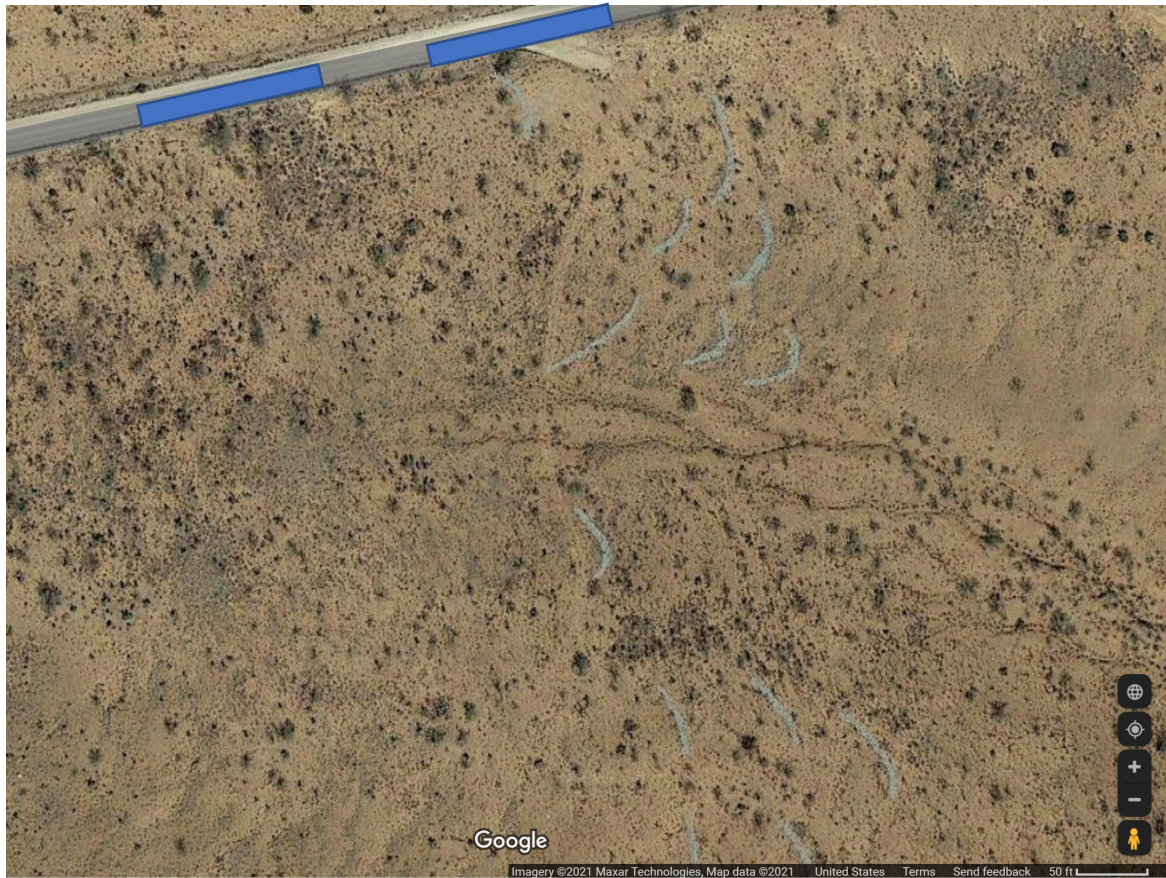
Rock lunas

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# Rock lunas

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# Rock lunas

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# Rock lunas

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South Tank

Google Earth

1985

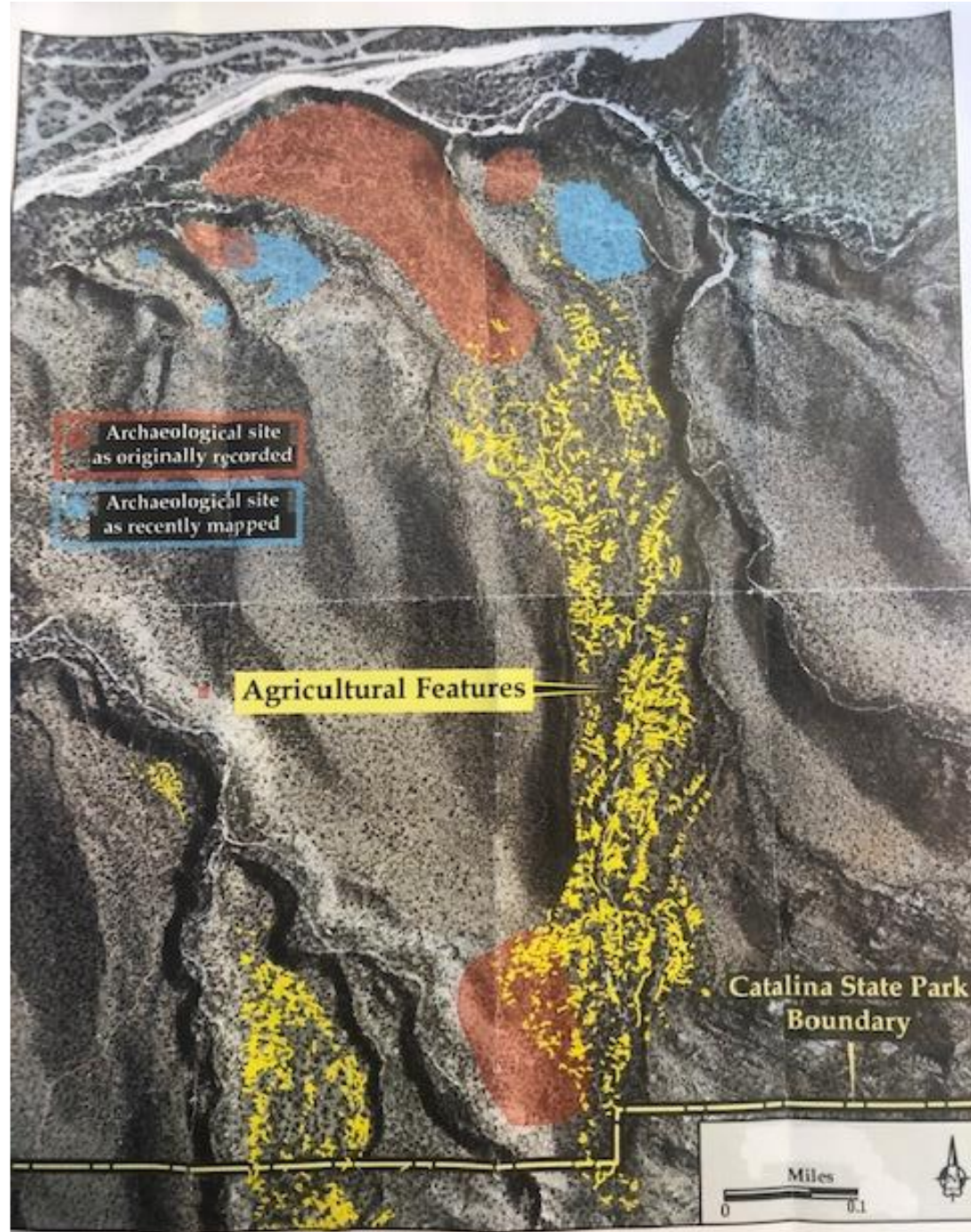
31°46'55.50" N 110°55'03.03" W elev: 3516 ft eye alt: 4938 ft



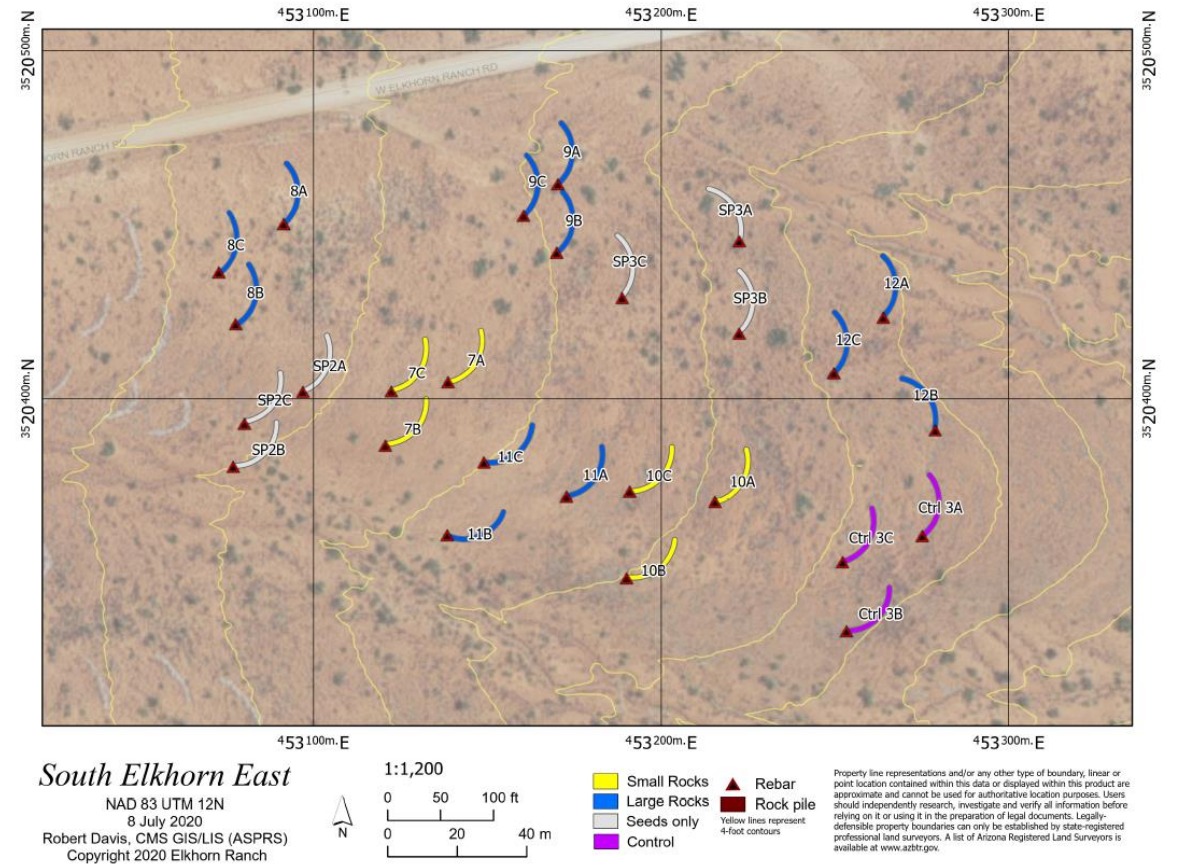


South Tank

Google Earth



Just 7 months after deployment, rock lunas had 2-3x the number of seedlings of control plots.

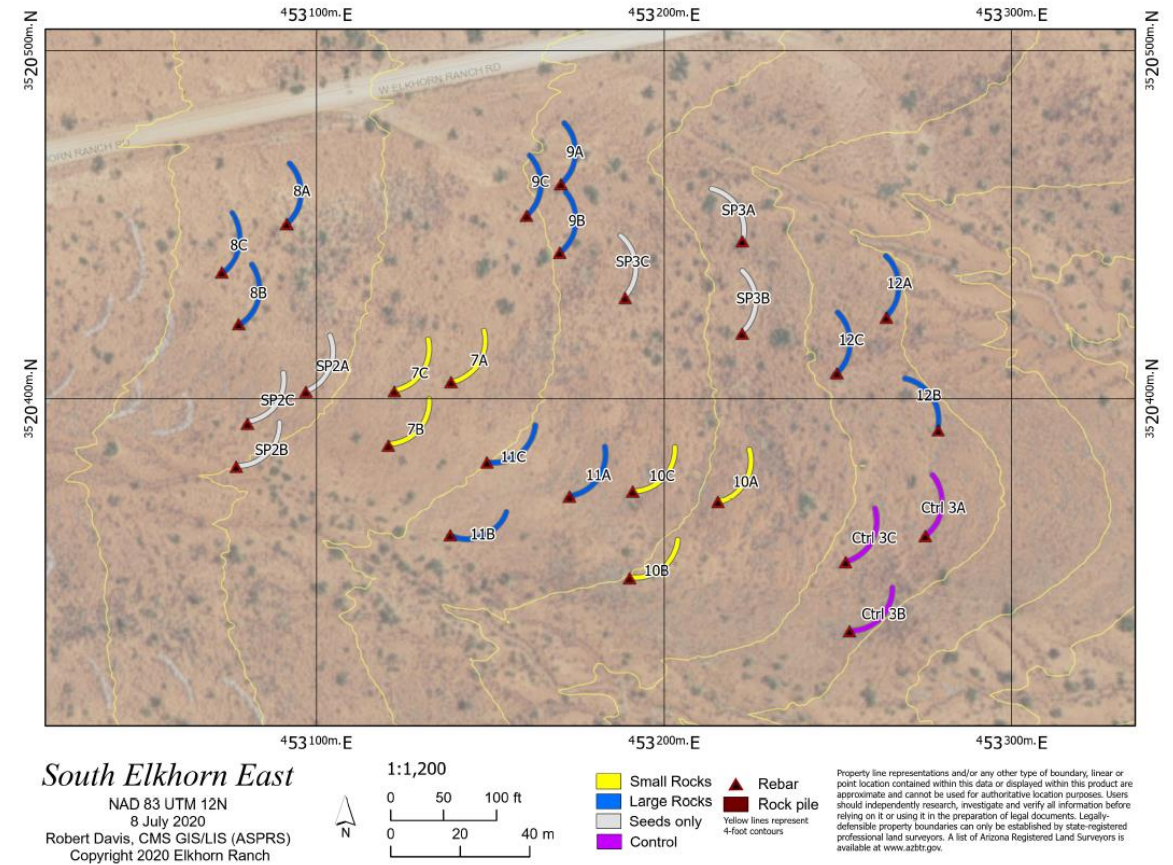


# Rock lunas

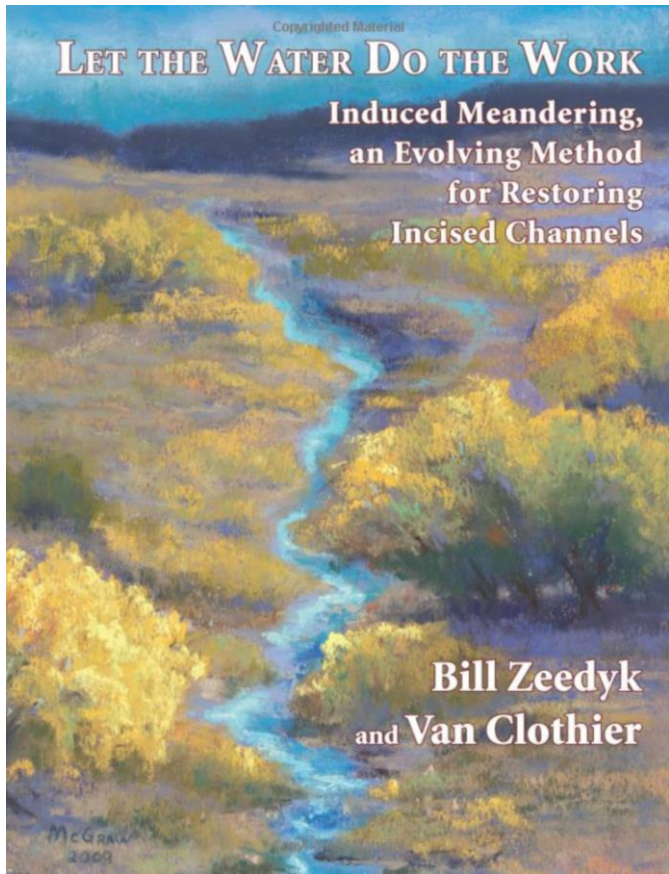
Litter higher in catchment area of big rock lunas

Soil moisture higher in middle of lunas

No effect of lunas on soil C and N



# Rock lunas



Rock lunas

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Branch piles

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# Branch piles

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Rain is scarce and unpredictable







Seed loss to desiccation stress, wind, and seed eating animals



# Seedballs



# Seedballs

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## Making Seed Balls

### 1 Prepare



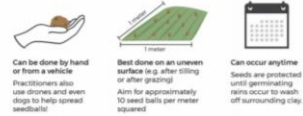
If seed eating animals are a particular problem, add a small amount of cayenne pepper to the mix.

### 2 Create



Seed balls can also be formed by using a pelletizer - see Cooperative Extension publication az1785 online for instructions on its construction: [extension.az.gov/azdocs/default.asp?CID=1785&PID=Public](http://extension.az.gov/azdocs/default.asp?CID=1785&PID=Public)

### 3 Disperse



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This information has been reviewed  
by University faculty.  
[extension.arizona.edu/pubs/az1797-2019.pdf](http://extension.arizona.edu/pubs/az1797-2019.pdf)  
Other titles from Arizona Cooperative Extension  
can be found at:  
[extension.arizona.edu/pubs](http://extension.arizona.edu/pubs)

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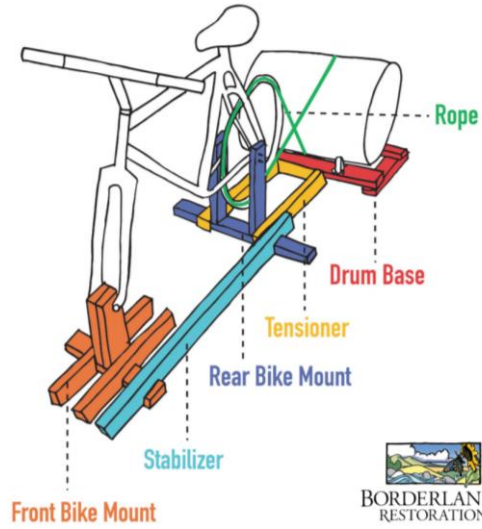
Gornishlab.com



# Seedballs

HOW TO CONSTRUCT  
**A Bicycle-Powered  
Seed Pelletizer for Use in  
Gardening and Restoration**

Elise Gornish  
Ashlee Simpson  
Marci Caballero-Reynolds



Gornishlab.com



# Seedballs

Seedballs prefer to be in  
tilled areas

Seedballs don't care about  
seed density or size

Shape matters for  
disintegration



# Seedballs

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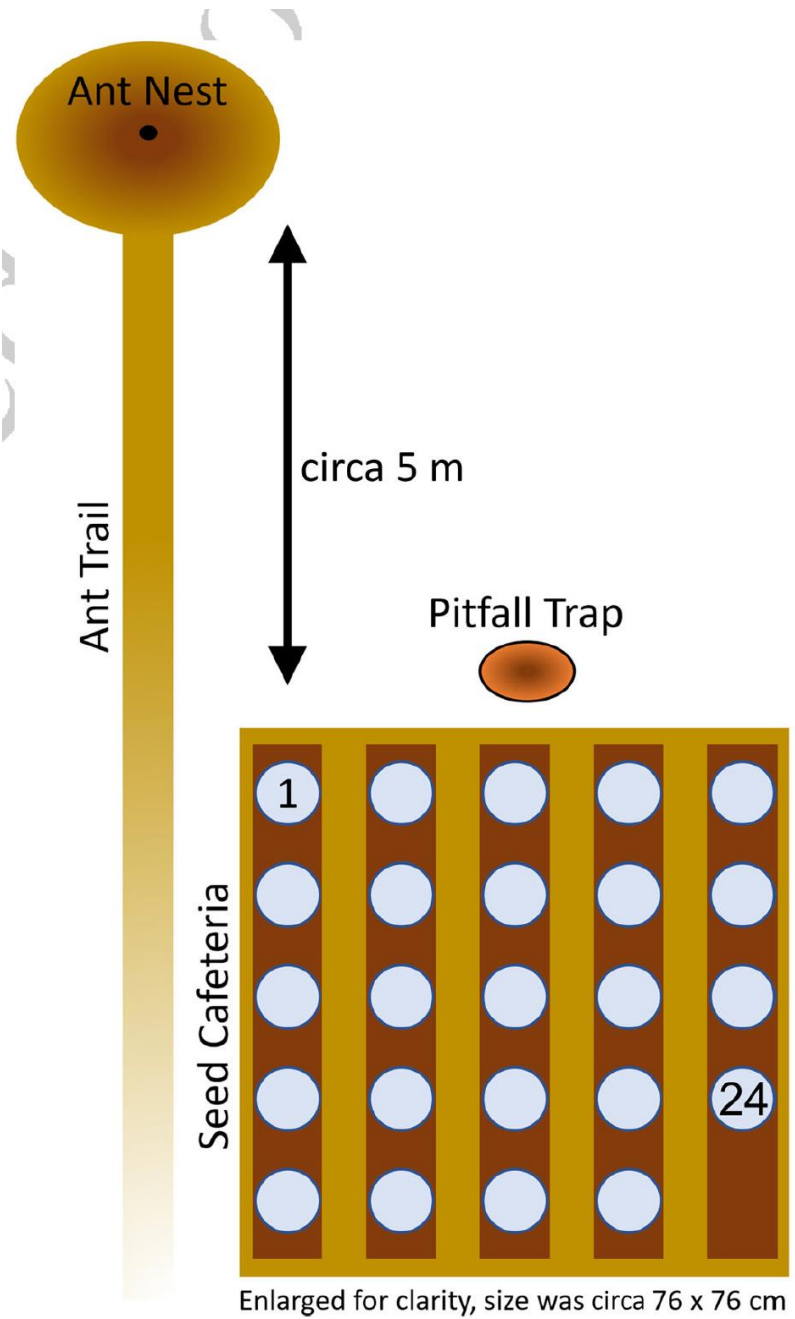
Seedballs

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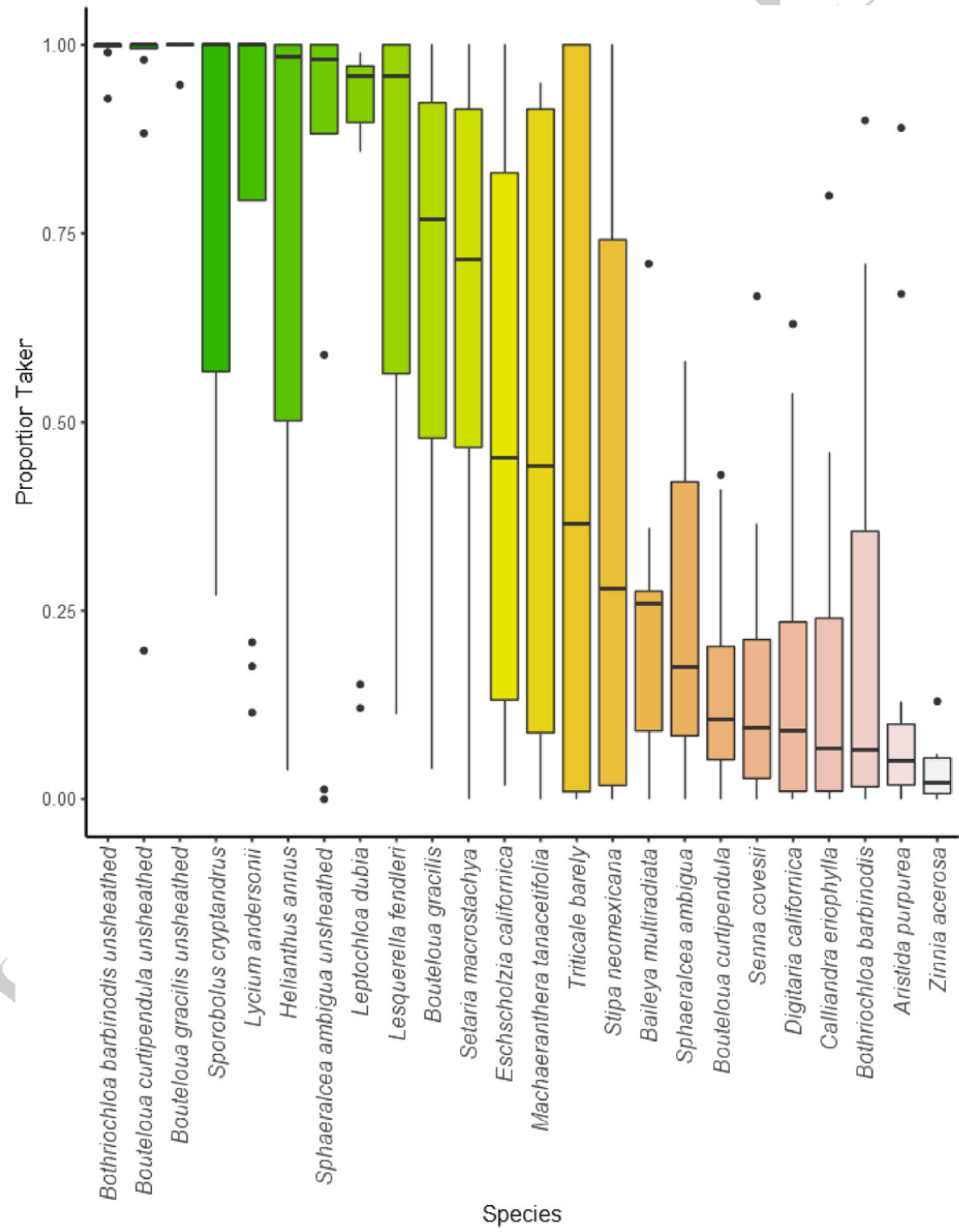


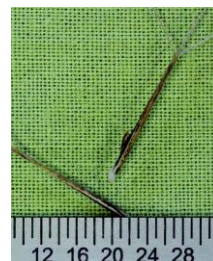
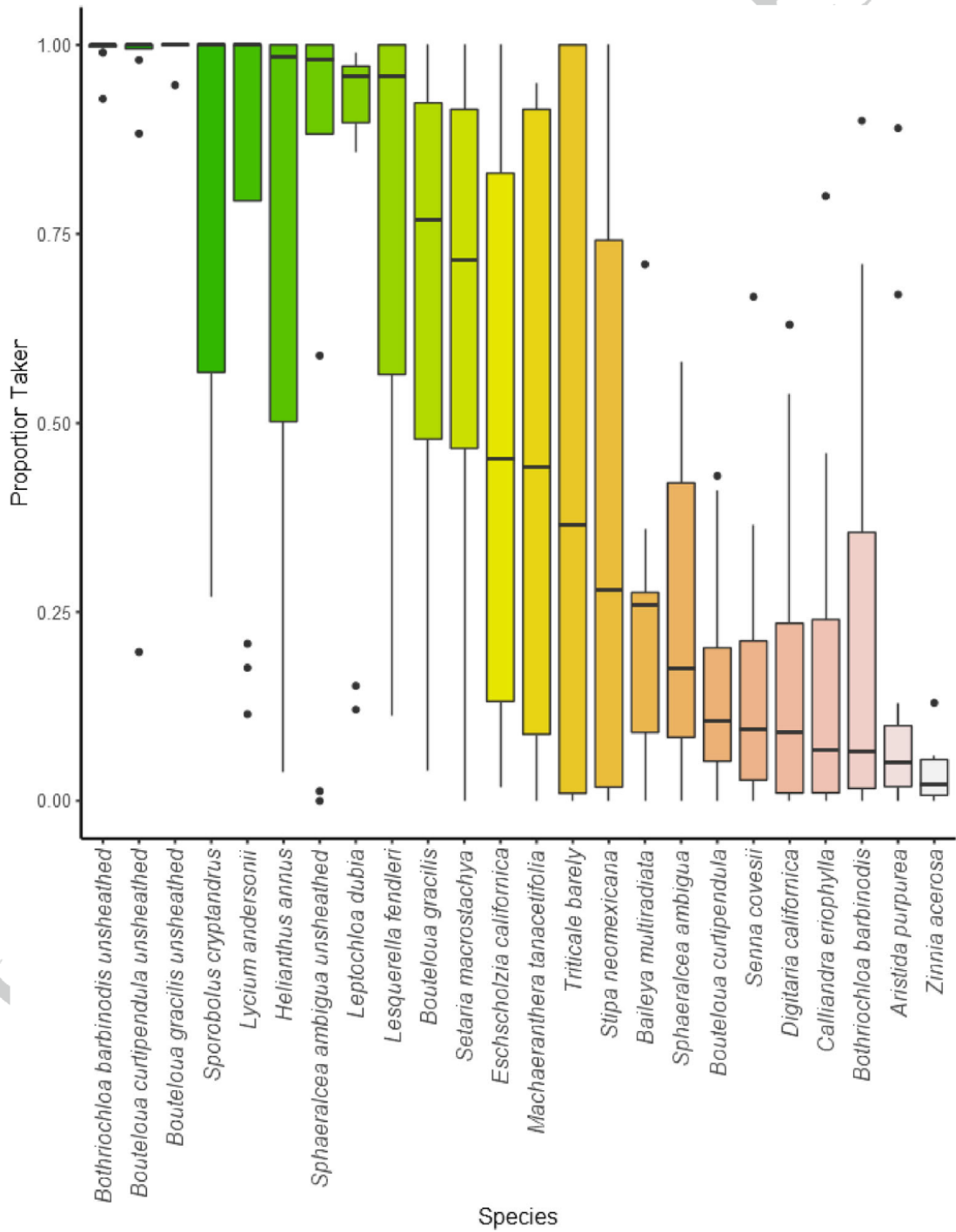
Ants

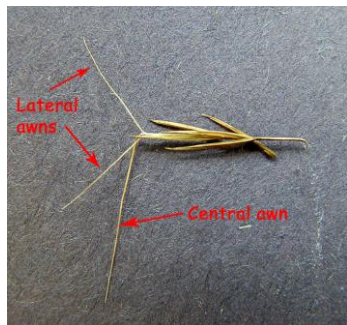
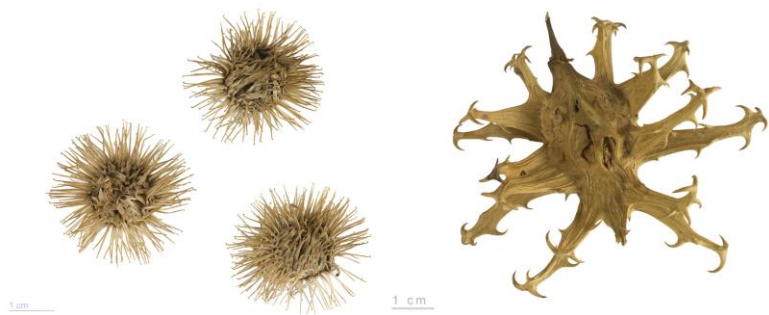




Enlarged for clarity, size was circa 76 x 76 cm







# Seed traits



Seed loss to desiccation stress, wind, and seed eating animals

# In arid systems, restoration can be successful!

- Seeding in the right place, at the right time
- Keeping seed on the ground until it rains
- Protecting seedlings from disturbance



# Seeding is *one* tool in the toolbelt



Livestock management

Range seeding

AMF inoculation

Nutrient application

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ecorestore-kids

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Restore Arizona's Native Plants

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- Ideas for Outreach
- EcoRestore for Kids!

## EcoRestore for Kids!



**Restoration Ecology Activity Book**  
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**A Kids Guide to Ecological Restoration**  
Purchase on Amazon ▾

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